17TH EUROPEAN BURNS ASSOCIATION CONGRESS

6-9 SEPTEMBER 2017

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Plenary Sessions (PS)

PS1.1

Dr Janžekovic pioneering work in Burn Care (prof. Z. Janžekovic 2018-2015)

A. Stritar, O.G. Grilc
University Medical Center Ljubljana, Slovenia

Aims: Global burns surgery school is based on prof. Zora Janžekovic surgical principles of the treatment of the burn wound. Primary excision in latent infection time is well determined, as well as a secondary burns excision after manifest infection time.
Methods and Results: Primary excision, followed by immediate skin grafting, is a mainstay in treatment of demarcated deep burns. The optimal time for excision is the 3rd – 4th day after injury, when primary changes in the vessels are diminished and infection in the ducts of adnexa is still latent. The skin is oedematous, thus excision is easier to perform. Consequently, we convert a potentially septic wound into an aseptic one and prevent burn disease. Secondary necrectomy is applied when infection drops down, usually on 19th – 20th day after the injury. Thermal destruction of superficial layers of the skin endangers the viability of the remaining deeper layers. Rapid surgical removal of the necrotic layer and immediate covering with autografts prevents the dermis from infection and additional thrombosis; therefore all the biological capacities of the skin are preserved. A kind of complete morphological regeneration can easily be asserted. Late surgery has a higher incidence of infection.
Conclusions: The physiological function and appearance of the skin after spontaneous healing of a thermal injury which has affected the dermal zone of the skin seems to be inferior when compared with results achieved by rapid necrectomy and immediate grafting in thermal burns. Clinical and theoretical reasons for such statement are obvious: necrosis- due to infection and thrombosis- advances into the deep layers of the dermis, severe pains, fever and deterioration of general condition develop. Healing is delayed and even conversion of a dermal into full thickness burn may occur. The scar after the spontaneous healing of a dermal burn is disfiguring due to fibrosis, with possible development of keloids and contractures.

PS1.2

DrJanžekovic's pioneering work in burn care

M. Trop
Medical University of Graz, Graz, Austria

In the 1960s, Zora Janžekovic developed a method to heal many victims of burns who earlier would have died. Her breakthrough new concept in the early burn wound excision and immediate grafting led her to the top of the field. All of this occurred in a small hospital in the Slovenian city of Maribor while working under very disadvantageous material constrains. Her professional achievements are known in the professional world. But who was the woman? Aged ninety she told me: 'My life was worth living'.
Born in 1918 in Slovenska Bistrica, died 2015 in Radenci. She states that the human life is even more multi-layered than the human skin. She encountered and survived the Second World War, four countries. The survivors have to continue living - her last comment on the matter.
She remembers being a lively and happy child, getting on well with her parents and siblings. She came from a then middle class family, and decided at a young age to become a doctor.
Her medical studies were interrupted by the Second World War. She finished them in 1947 and started work in the hospital in Maribor.
After the horrors of the war a modest affluence began to develop. Zora created two symbols for herself, which meant a lot to her emotionally: a small house and a weekend cottage in the mountains.
Her ability to work a lot and to demand the same from her co-workers didn't always make her popular as a boss. In 1984 she was bullied into retirement by her opponents. That hurt her deeply and it took her years to recover. But she lived long enough to see and also enjoy her rediscovery. 'Of course I am delighted' she stated openly with regards her numerous late awards.

PS1.3

Contemporary Pediatric Burn Mortality: Shifting Causes

D.N. Herndon, K.D. Capek, E.E. Blears, G. Foncerrada, J.O. Lee, L.E. Sousse, C. Porter, R.P. Mlcak, O. Suman, C.C. Finnerty, H.K. Hawkins
Shriners Burns Hospital, Galveston, USA

Pediatric burn treatment is one of the greatest success stories in modern medicine. With declining mortality, children are surviving larger burns more frequently today than in the preceding decades. This enhanced survival is due to improvements in resuscitation, early excision and grafting, improved nutritional support, modulation of the hypermetabolic response, and multidisciplinary rehabilitation. With treatment of inhalation injury and management of respiratory failure, advances have led to quantified improvements in patient outcomes. Multi-drug resistant opportunistic infections and the altered immunity that occurs post-burn are intertwined problems facing burn patients that demand increasing attention. We have seen a mortality rate of 3% remain grossly stable for 6000 burn admissions over the last 3 decades. However, when examining the causes of death, the rates of sepsis-related deaths have increased. Sepsis is implicated in over half of deaths in the last 15 years, whereas prior to this time period, sepsis was implicated in only a quarter of pediatric burn deaths. Conversely, mortality related to respiratory failure (inclusive of smoke inhalation injury, respiratory distress syndrome, and pneumonia) has decreased. It used

to be linked to over 70% of deaths in burn patients studied in previous decades; however, in the last 15 years, it is implicated in just over half of mortalities. These trends indicate that treatment of inhalation injury and respiratory management of burned children have improved. Continued efforts to address post-burn infection and altered immunity must be the focus for future improvements in burn survival.

PS1.4

Dermal Regeneration Templates in Acute Burn Surgery

G. Dziewulski
St Andrews Centre for Burns & Plastic Surgery, London, United Kingdom

Advances in burn care have resulted in decreased mortality following major burn injury with a shift in focus toward improving long-term function, appearance and quality of life. The management of the burn patient is a complex, multi- faceted and challenging task. The burn injury and wound cause both local and systemic effects mediated by the host responses of inflammation, regeneration, and repair. Management of the burn wound is key to attenuation of the systemic sequealae and the aim of care is to achieve early durable and sound healing. Following wound excision subsequent wound closure with autograft, allograft and skin substitutes is mandated. A structured and defined plan is required which should include the use of dermal regeneration templates that both physiologically close the wound and minimise donor site morbidity.
Dermal regeneration templates can be used as a one or two staged procedure depending on the site, depth and size of the wound. In massive wounds with few available donor sites the use of a two stage template can effectively close the wound until donor sites become available. In smaller wounds the templates can be used to optimize scarring and outcome in cosmetically and functionally important areas such as the hands and face.
Dermal regeneration templates are an important tool in the armamentarium of the burn surgeon, however, no ideal dermal substitute currently exists that completely mimics the morphology and functions of skin. Evidence of improved cosmetic and functional outcomes using such templates is scarce and further research is warranted.

PS1.5

Enzymatic debridement: A new paradigm in the early excision of burns

Y. Shoham
Soroka University Medical Center, Beer Sheva, Israel

Background: Bromelain based enzymatic debridement of deep thermal burns with NexoBrid® was approved in the EU in 2012. Since then > 2500 patients have been treated, representing the appearance of a new paradigm in burn care.
Methods: Bromelain based enzymatic debridement has been shown to achieve high rates of complete eschar removal within a single 4 hour application, early after injury, with a significant reduction in blood loss and the need for surgical excision and grafting. As the enzymes have a high affinity to denatured collagen they debride the zone of coagulation (eschar), sparing viable tissues, thus also facilitating accurate wound depth diagnosis. However, reduced blood supply or desiccation may still damage the zone of stasis post debridement.
Results: Better understanding of the post enzymatic debridement wound bed leads to increased understanding of its healing potential, allowing for an educated treatment plan. Preserved dermis with the potential for spontaneous healing may be treated by temporary covers in an attempt to provide an optimal environment for epithelialization from skin appendages. Full thickness wounds and those with low healing potential should be autografted. Preliminary reports suggest better graft take when post debridement soaking is prolonged to >24 hours. The wound bed should be refreshed prior to grafting in order to re-open occluded blood vessels and allow
for graft take. When choosing a treatment plan, one should consider that spontaneous epithelialization of a deep dermal wound bed will most probably lead to longer healing times as compared to autografting, in many cases > 21 days. However, a long term follow-up RCT and recent reports demonstrate favorable long term results despite delayed healing times.
Conclusion: Bromelain based enzymatic debridement is a minimally invasive tool facilitating early/immediate eschar removal. Time will tell whether its uptake will lead to the next paradigm shift in burn care.

PS2.2

MBC-WHO collaboration and MBC humanitarian action

M. Masellis
World Health Organization, Geneve, Switzerland

The Euro-Mediterranean Council for Burns and Fire Disasters (MBC), in 1997, was appointed a Collaborating Centre by the World Health Organization (WHO), the supreme intergovernmental authority on all health members. A World Collaborating Centre is part of an international collaborative network carrying out activities in support of the organization's programs at all levels. Only institutions shoving a proven capacity to fulfil functions related to WHO's mission, as an elevated international scientific and technical standing, can qualify for this prestigious designation. The WHO Collaborating Centre is located at headquarters of the MBC, at Department of Plastic Surgery and Burns Centre, Civic Hospital Palermo, Italy – the headquarter of MBC. The Author reports some humanitarian activities developed by the MBC in the humanitarian sector.

PS2.3

Burns in the third world: an unmet need

W. Johnson
World Health Organization, Geneve, Switzerland

Each year, nearly 300,000 individuals die from burn related injuries; globally, there are nearly 11,000 new burns each day. The majority, 70%, occur in low- and middle-income countries (LMIC), nearly half of these in SEARO alone; the burn rate in these countries is 7 times the rate in high-income countries (HIC), where burns are the 11th leading cause of death of children aged 1–9 years and are also the fifth most common cause of non-fatal childhood injuries

All are preventable. There is significant economic impact from burn injury.

Yet treatment options are few in these countries, where prevention strategies, such as smoke detectors and alarms, safety-designed lamps and stoves, fire-retardant clothing and blankets are not available. Furthermore, sophisticated treatment options are generally limited, including emergency and surgical care, optimal pain management and rehabilitation. In HICs, victims survive burns up to 90% of body; in LMICs it is rare to survive a burn over 40%.

Given the current political commitment on surgical care as a component of universal health coverage, the economic gains realized through providing basic essential surgical care and the enormous global burden of surgical disease, particularly in LMICs, it is time for global action to bring safe, timely and affordable surgical care to all people. This is particularly true of prevention and care of burns.

PS2.4

Refugee camps, fire disasters, and burn injuries

B. Atiyeh
American University of Beirut, Medical Center Beirut, Lebanon

In the past five years, no fewer than 15 conflicts – some new, some old – have brought unspeakable tragedy and misery to millions across the world. The number of refugees, asylum-seekers and internally displaced people worldwide has, for the first time in the post-World War II era, exceeded 50 million people. Many displaced persons end up in refugee camps. Women and children comprise 75-80% of refugees worldwide. Although camps are intended to be a temporary solution, some of them exist for decades.

A poorly planned refugee settlement is one of the most pathogenic environments possible. Densely packed settlement of tents or other combustible shelter materials, assembled without fire-breaks provide a potential fuel source for a fire with the potential for uncontrolled fire spread and development over sometimes quite large areas. Reasonable fire protection monitoring is difficult to achieve in these circumstances. There are a number of guidance documents and standards that provide recommendations for the layout of camps. These guidelines are difficult toimplement.

Moreover, providing healthcare to refugees comes with its own unique challenges due to the extreme poverty, limited resources, over crowdedness and remote settings of these camps. Developing various control strategies adaptable to the differing environments are required.

PS3.2

Burn Management in Africa - my journey in Ethiopia

E. Eriksen
Myungsung Christian Medical Center, Addis Ababa, Ethiopia

Introduction: Burn injuries are regarded one of the most common traumas requiring hospital admission throughout the African continent.

WHO has been quoted saying burns is the *"forgotten global public health crisis"* (InterBurns 2013). Most burns are related to ground level cooking where women and children are the main victims.

Basic surgical care for burns is scarce, and in many African countries non existing, whereas throughout the developed world, improved burn care reaches new scientific levels every year.

Burns – Clinical presentations / Surgical Management: Burns are commonly encountered throughout Ethiopia. As facilities and resources, including skilled manpower are very limited, burn survivors frequently appear with severe deformities and disfigurements as the result of longstanding scar development.

The burn surgeon needs to chose surgical solutions that are appropriate to the given settings. The surgeon should carefully design procedures giving predictable good outcome that residents and other colleagues can adopt and perform with confidence.

In the majority of cases, a combination of FTSG and STSG will provide adequate results. Ocasionally, Z-plasty, local and distant flaps are chosen to reconstruct the post burn deformity.

During the presentation, various surgical techniques will be discussed.

Development of Burn Care in Ethiopia: The first Burn Unit in Ethiopia was developed 15 years ago. Simultaneously, a formal training program in Plastic Surgery was launched.

Most burn care is still located within the capital city of Addis Ababa.

There is a tremendous need to bring modern burn care to the various regions in this vast country.

During the presentation, the authour will share experiences how an NGO can provide teaching and training in basic burn care in a rural hospital set up.

PS4.1

A burn survivor perspective

M. Osborne
MOP Holdings Ltd, Ballasalla, United Kingdom

The playing of the film intro time 12 minutes

The Accident

Why, what, how, why me - heard it all before, I bet you have.
I was invincible, raced, rallied, skied, dived, looked charging elephants in the eye. What me, in hospital?
I only survived because I wanted to. My wife and I made it happen. I was insured, we were motivated, we never took 'no' for an answer.
It was not until someone got me to read a passage from an L.R. Hubbard book that I also took responsibility for my own survival. Once I did, Hazel and I searched the world for new technologies, new surgeons, new anything.
We took down the cloak of medical privacy, the need for referrals. We went direct to the consultants, who were happy to communicate directly.
The fear of infection we met head on. We harnessed the body's ability and it's immune system. We were heartened by the use of homeopathy by some consultants. However, we make no bones about being terrified at times!
The lottery of surgeon choice, expertise and bonhomie was very challenging and only by chance and our searching did we get it right.
Your own Juan Barrett is the miracle man. Saving for Prof. Richard Collin of London. Juan Barrett took the hitherto boundaries, threw them in the bin and waved a wand.
Hazel and I have many anecdotal stories to share but political correctness deems that we have to keep them to ourselves!!!
People like us who have survived a 55% full thickness burn waist up are your industry's secret weapon.
So before my talk - Google
'Mike Osborne Burn' and the amazing lives series.
I might ask questions.

PS4.3

Total burn approach: achievements in nursing

A. De Jong
Red Cross Hospital, Beverwijk, the Netherlands

Nurses form the largest group of professionals within the multidisciplinary burn team and are the only professionals providing twenty-four hours care per day. Nurses are therefore in a central position to survey the total care process, to identify change and progress, to solve problems and to coordinate all care activities around the patient. In the near future, the profession will be influenced by the changing patient population, labour market problems, safety management systems and technology. Continued education and clinically related research are prerequisites to cope with these influences.
Since the Seventies, curricula for burn care nurses have been developed gradually, varying from general wound care and plastic surgery courses, to by healthcare authorities recognized studies. We should consider to extend education to an European level and increase the number of nurse scientists and nurse practitioners. This would bridge the gap between science and daily practice and contribute to an increased body of burn nursing knowledge and quality. Burn centres should therefore invest in a learning culture, that also optimizes work satisfaction and decreases staff recruitment and retention problems.
In 1989, incorporation of research findings in daily practice was initiated. Two years later, research priorities were assessed. Since 2001, the focus on measurement instrument development has increased. An international multicentre program would streamline all separate research projects in the burn nursing domain. This program should concentrate on quality indicators, to draw correlations between nursing interventions and the resulting health status of patients. Suggested indicators are self-management, daily functioning, pain, delirium, anxiety, patient and family experience and family centred care, but also nurse competencies and work satisfaction. Once consensus is reached regarding meaningful indicators and how to assess them, they would further improve by connecting them to the most effective nursing interventions.

PS5.3

Patients assessments and reintegration into society: a new paradigm?

S.G. Fidel Kinori
Vall d'Heborn Unversity Hospital, Barcelona, Spain

The evolution towards the physical survival of patients with burns has been in parallel to the evolution of the emotional care of this population. It is a question without absolute answers, but the current developments allow an approximation, under the perspective of evaluating the evolution of the models of evaluation and care, in the last 50 years.
Three periods could be distinguished in the evolution of the models of evaluation and psychosocial reintegration. Interest in individual psychopathology predominated as a model during the decades of the '60s -' 80s of the 20th century. The scientific literature reflects studies on single cases or small samples of patients. The interest in the individual aspects, especially the previous and later psychopathology of this clinical group, as well as the etiological factors and the difficulties, especially in the adaptation to the new post-burn condition prevails in this period.
From the 90's a new paradigm emerges, a period where the interest in the study is extended to new perspectives

and populations, as is the case of studies on the child and youth population and relatives. The interest in the pathophysiology is giving rise to interest in recovery and social integration, based on the identification of risk factors, personal and family environment. The vast majority of studies introduce a cross-sectional evaluation methodology and proposals for the rehabilitation and reintegration of patients with burns arise.
In this period, interest in this clinical population increases significantly, numerically and qualitatively, incorporating issues related to survival, such as quality of life, factors for social and work reintegration, changes in body image, among others.
In the 21st century, scientific production not only maintains the previous themes, but introduces different evaluation models and intervention strategies that are more adjusted and adapted to the needs of this clinical population. From a methodological perspective, it involves moving from a cross-sectional to a longitudinal one, collecting complex statistical models that allow a realistic assessment of this population, over time. It is not a different population from the rest of society, but from the injuries, deep changes in their lives.
And what do these new models contribute to the care of the patients of the Specialized Burn Units ?. Several positive aspects, especially an overall view in coexistence with the personalized vision, models where the patients take a central role, understanding the process of the incident and the evolution, as multicausals and therefore multifactorial also in its evolution.
We have a comprehensive assessment, new models of physical and emotional recovery, but still a sweep to overcome: Full integration, full visibility of this clinical population in all social spheres. This is the pending challenge.

PS5.4

Fluid resuscitation management in patients with burns: Update

P. Guilabert
Hospital Universitari Vall d'Hebron, Barcelona, Spain

Burn patients receive more fluids in their initial resuscitation than any other traumatic patient, so that a replacement with the correct fluids and the adequate amount will be of vital importance[1].
Ineffective resuscitation has been shown to worsen patient prognosis[1], but in spite of advances in this domain, the emergence of new fluids and new techniques of volume monitoring, since Baxter and Shires developed the Parkland formula in 1968[2] the usual clinical practice has not changed much.
The question we would try to solve in this lecture is: Are we really doing the fluid resuscitation as best as we can? The Anaesthesiology group in the Burn Unit of Vall d'Hebron University Hospital carried out a non-systematic review of the fluid therapy in the resuscitation of the burn patients[3] and we reached the following conclusions:
The initial resuscitation should be guided by therapeutic objectives (GGT), although these objectives are still to be defined. Balanced Crystalloids should be the fluid of choice and by the time the Ringer's Acetate seems to be the most suitable for large replacements. There is not enough scientific evidence currently supporting the alert issued by the European Medicines Agency on the use of Hydroxyethyl Starches in burn patients. The gelatins have not shown superiority with respect to the crystalloids.There may be a place for albumin and hypertonic
The scientific evidence is low and more multicenter studies are needed on this subject

Barrow RE, Jeschke MG, Herndon DN: Early fluid resuscitation improves outcomes in severely burned children. Resuscitation 2000; 45:91–6
Baxter CR, Shires T: Physiological response to crystalloid resuscitation of severe burns. Ann. N. Y. Acad. Sci. 1968; 150:874–94
Guilabert P, Usúa G, Martín N, Abarca L, Barret JP, Colomina MJ: Fluid resuscitation management in patients with burns: update. Br. J. Anaesth. 2016; 117:284–96

PS6.1

The molecular basis for the treatment of hypertrophic scarring after burn injury

E. Tredget
University of Alberta, Alberta, Canada

Hypertrophic scarring is a common complication of burn injuries to the deep dermis associated with pain, pruritus, disfiguration, and functional restriction with joint contractures. At the cellular level, unique features of hypertrophic scar fibroblasts as compared to site matched cells from normal skin, include the synthesis of more collagens I and III, high molecular weight proteoglycans including versican and the fibrogenic growth factor TGF-b[155]. However, more importantly, they consistently synthesize less collagenase or MMP1 which facilitates remodelling of the extracellular matrix and less decorin, a small leucine rich proteoglycan important for the fibrillogenesis of small tightly packed collagen fibers and fiber bundles, typical of the morphology of normal skin.
These features of hypertrophic scar fibroblasts are very consistently found in fibroblasts located in the deeper layers of the skin or reticular dermis as compared to superficial papillary fibroblasts. The systemic immunologic response typical of recovering burn patients with severe HTS includes a polarized T-helper cell 2 (Th_2) environment that also promotes the differentiation of blood borne fibrocytes, which secrete extracellular matrix proteins, proteases, and fibrotic cytokines including transforming growth factor-β (TGF-β). *This response to burn injury persists for up to one year post-burn such that reconstruction*

of large burn patients with limited skin donor sites is best delayed where possible, until resolution of the systemic inflammatory response.
Established management strategies for immature hypertrophic burn scars include massage, topical emollients, pressure garments, silicone sheeting, steroid injections, and surgical excision. Experimental treatments for HTS including Interferon (IFN)-α2b, an anti-fibrotic Th1 cytokine that significantly improves scar remodelling and normalizes TGF-β. Other experimental approaches include topical imiquimod, calcium channel blockers, tacrolimus, 5-fluorouracil, and bleomycin, but *newer experimental approaches including interleukin-10, microinhibitory RNA to TGF-β, and peptide inhibitors of CXCR4 offer potential future therapies.* Pulsed-dye laser and fractional CO_2 laser for the treatment of early and later mature scars after burn injury offer *a new potentially transformative approach to difficult scar challenges but more objective controlled trials are required. For both HTS, radiation induced Marjolins' ulcer can occur limiting radiation treatment to severe problems and patients >16 years of age.*
Reconstructive surgery to improve the aesthetic and functional outcomes of burn patients with severe contractures, disfiguring scars, or exposed vital structures is ideally reserved until scar maturation. Prevention of burn scarring involves the understanding that beyond a critical depth, activated deep dermal fibroblasts of specific lineage with fibrogenic potential will lead to HTS. Therefore, accurate determination of burn depth requiring serial physical examination aided by objective instruments to determine burn depth will avoid unnecessary surgery and the resultant scars. Burn reconstruction may be accomplished with contracture release, scar excision and resurfacing, local transposition, rotation, and advancement flaps, tissue expansion, or axial flaps. Microvascular free flaps are utilized in secondary burn reconstruction for joint contractures and hypertrophic scars when injured or deficient regional tissue precludes local flaps, skin grafts, or tissue expansion. Although free flaps can by bulky this is averted by *the use of thinner fasciocutaneous flaps* such as the anterolateral thigh or parascapular flaps in the head and neck, and fascial flaps which offer better colour, thickness, and texture match.

PS6.2

The clinical relevance of the Innate Immune response to burn injury: a Genomic understanding of the Innate Immune Tissue Response in burns

R.G. Tompkins
Massachusetts General Hospital, Massachusetts, USA

By developing the clinical infrastructure to study critically ill trauma populations, as well as the technological and bioinformatics skills to isolate leukocyte populations and probe the transcriptome as it responds to severe injury, the "Inflammation and the Host Response to Injury" Glue Grant Program has made unprecedented advances in the understanding of the human inflammatory response.
The Glue Grant has generated the largest human dataset to date, and likely for the foreseeable future, on the human genomic response to injury in total leukocytes, enriched leukocyte populations (neutrophils, monocytes, and T cells), and from human skeletal muscle, fat, and skin tissue, thereby providing a unique opportunity for data mining towards improved understanding of the mechanism(s) of inflammation and injury as well as better prediction of patient recovery trajectories.
These findings have broad application to virtually all surgical patients as the innate immune system is central to the field of transplantation and for the pathogenesis of post-operative sepsis and infections in all surgical populations.
Based on our 10-year analysis of over 2,000 patients enrolled in our studies, we have demonstrated that mortality (16%) and multiple organ failure (MOF) (35%) remain significant in patients with severe blunt trauma. We have also demonstrated that severe trauma alters the expression of almost 80% of the blood leukocyte, neutrophil, monocyte and lymphocyte genomes during the first 28 days post injury.
These changes occur rapidly, within a few hours, and are long lasting, with changes in expression often lasting greater than four weeks after blunt trauma and more than one year after severe burns. Of particular interest has been the identification of 63 total leukocyte genes whose expression could distinguish those patients who were destined to have a complicated clinical trajectory and organ failure. Preliminary analysis has revealed that approximately 10% of the human genome (~ 3,000 genes) is significantly changed at the 1.5 fold level in the peripheral tissues of the skeletal muscle and peripheral fat of patients after serious burn injury.
Many of these highly regulated genes are involved in metabolic pathways and offer the possibility that altered metabolism postburn can be attributed to or at least supported by genomic changes. In addition, the Program has developed a new human transcriptome array (GG-H) that is not only highly reproducible in estimating gene and exon abundance, but also provides genome-wide identification of alternative splicing, as well as analysis for coding single nucleotide polymorphism detection and non-coding transcripts.
For the first time, the Glue Grant results are yielding an unparalleled view of the human neutrophil, monocyte, T cell, and tissue-specific contributions to the genomic response to injury at levels of granularity and breadth that are unobtainable from any other source.
Such an improved understanding should lead to genomic and proteomic markers that predict ultimate patient outcomes both good and bad, and should suggest new targets for further basic and clinical research, as well as fruitful targets for pharmacological and immuno-modulatory interventions.

PS6.3

Scar free healing: the tissue engineering approach

E. Middelkoop
Depart. Plastic, Reconstructive and Hand Surgery, VU Medical Centre, Amsterdam, the Netherlands

Dermal substitutes have now been used for acute burn treatment since several decades. Although improved scar quality is reached with this treatment, still scar formation is present.
Use of cellular skin constructs could represent a further improvement in quality of wound healing.
We tested the feasibility to use fetal dermal cells in a collagen based dermal substitute in acute wound treatment. Human (hFF), porcine fetal (pFF) or autologous dermal fibroblasts (AF) were seeded in a collagen-elastin substitute (Novomaix, NVM), which was applied in combination with an autologous split thickness skin graft (STSG) to evaluate the effects of these cells on wound healing in a porcine excisional wound model. Autologous fibroblasts were superior in improving scar quality and reducing wound contraction and immunological responses compared to the other treatment modalities.
Application of autologous cells in tissue engineering approaches represents challenges in terms of regulatory demands and logistics of surgical application. Nevertheless, important steps have been taken to overcome these hurdles. Application of autologous epidermal cells in a clinical trial were demonstrated to improve wound healing and scar quality measured after 1 year. Novel developments are applications of a full skin construct by Boyce et al and Reichmann et al. in clinical trials.

PS6.4

Live imaging inflammation and its consequences in wound healing and cancer

P. Martin
University of Bristol, Bristol, United Kingdom

We model various aspects of tissue repair in several genetically tractable model organisms from the fruitfly, *Drosophila*, through to mice. We know that inflammation is both beneficial for healing in that it fights infection and drives wound angiogeneisis, but it has negative consequences also, in that it causes scarring and is aberrant in chronic wounds. We use *Drosophila* and translucent zebrafish, which are both amenable to live imaging and mathematical modelling, to make movies of immune cell migration into the wound and to dissect the genetics of inflammatory cell recruitment towards tissue damage, and its consequences, and, its parallels with cancer inflammation. Most recently we have also begun to investigate how adipocytes and obesity might link into wound repair and cancer.

PS7.2

'stumbling blocks - what went wrong in one particular multicultural case'

V. Cortés[1], C. Schiestl[2], I. Zikos[1]
[1] *University Childrens Hospital, Zürich, Switzerland*
[2] *University Children's Hospital, Zürich, Switzerland*

Objectives: Multicultural patients increased in the last 10 years and require special diversity skills from the whole burn team. Normally it is manageable and often a pleasure to learn from different points of view and cultures. In one particular case the skills of an experienced, well-trained burn team seemed to be extravagated by surrounding conditions and disharmony of the team members.
Methods: Presenting the one particular case that happened in Zürich and almost splitted a burn team.
Results: There were some helpful inputs and interventions to go trough a situation like this. Supervision as well as strict rules for all involved persons were only a few.
Discussion: What are other burn team experiences and could we maybe help each other to handle such situations? What would be possibilities to do so?

PS7.3

Through the eyes of an Occupational Therapist: The pathway to recovery from a burn injury within a diverse South African context

M. Pursad
Red Cross War Memorial children's Hospital, Cape Town, South Africa

Burns injuries in South Africa is a common occurrence especially affecting lower-socioeconomic communities and children.
A large number of South Africans live in shacks (temporary housing) in informal settlements where fires can spread unabated as a result of overcrowding, flammable building materials and unsafe structures.
Treating burn victims is a challenge but a priority at Red Cross War Memorial Children's Hospital , the only dedicated pediatric burns unit in sub-Saharan Africa. We treat approximately 1400 in-patients per year and another 4500 out-patients contact per year. 600 -1000 of these children require surgical intervention.
The burns injuries most commonly seen in the unit are hot water burns (76 %), Flame burns and to lesser electrical burns and chemical burns. Burn cases are often devastating and expanse of burns we treat has significant physical and emotional debilitating consequences on the individual and family.
This presentation strives to position and confirm the role of occupational therapy from the acute onset through the different stages of recovery within this diverse population and context as an essential part of the occupational well-being of the carer and developing child.

PS7.4

Overcoming burn unit nursing challenges in a resource restricted country.

R. Goosen
Red Cross War Memorial Children's Hospital, Cape Town, South Africa

Burns is a disease of poverty- stricken countries. Sadly resources are most limited in these areas where burns are abundant. This talk will show ways of getting back to basics with wound care and the results of early wound washing on infection rates. Practical cost-effective innovations for infection control will also be demonstrated. Survival rates for major burns in our unit are comparable to those in Europe and Australia.

PS7.5

The cultural background and context of patients with a burn injury 'How different worlds meet in a hospital'

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How to work with patients with different cultural backgrounds?
In a busy burn centre it's always a challange to integrate the cultural habits and needs of the patient during his or her treatment. However the number of patients with a different cultural background is growing. Therefore it's very important to make sure that we make an effort to take care of our patients in our burn units including their background and context.
This workshop unnerves a couple of myths about this topic illustrated by some practical examples and cases. Very often we tend to think that background does not matter that much for recovery, or that we should have specific knowledge on this subject which we don't have and that it takes too much of our limited time.
This workshop will show that making an effort to integrate the context of the patient in your treatment will make your work much easierand fun, more efficient and, very important, it will help the recovery of your patient.
We will talk about how an attitude of "watch, wait and wonder" on burn patients with different cultural backgrounds will accelerate the healing proces. The motto: 'Use or loose the patient by seeing or ignoring his/her background' will be explained. Not only the patient with a different background needs to adjust, we have to adjust as well. However; taking the context of a patient into consideration does not automatically imply that the patient should be entitled to special treatment. It's about the ability to make exceptions on a day to day basis in a hospital and to be able to improvise.
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PS8.1

Enzimatic debridement in major burns

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Introduction: Standard of care in burns is defined as tangentially debridement and autografting. During the last years, different authors have published their results using an specific debridement product (Nexobrid). But this product was authorized for burn less than 15% of total burned surface area, with some advantages: reduce the number of surgeries needed, less grafting rate and less blood transfusions. Our objective were evaluate if in major burned patients this results were sustained.
Material: We conduct a retrospective study evaluating 16 patients with more than 15% TBSA treated off-label with Nexobrid between June 2015 and December 2016. This cohort were compared to an historical cohort of 21 patients from 2014, before the marketing of this product in Spain. Both groups were comparable in terms of TBSA, age and burn depth. Patients were treated in consecutive debridements of 15-20% to treat the total surface. Number of escarotomies, blood transfusions, number of surgeries and days from admision to first surgery
were collected. Statistical management were carried out using SPSS 20.0 for Macintosh.
Results: We found lesser number of days from burn to first debridement in the Nexobrid group (4.76 ± 3.96 vs 0.93 ± 1.38 days, $p<0,05$). The number of scarotomies carried out in the Nexobrid® group was significantly lower than in the Control Group (10 vs 0, $p<0,05$) and transfusion requirements were lower in the Nexobrid® Group compared to the Control Group (23.23 ± 26.33 vs 6.50 ± 10.96 blood packages, $p <0.05$). However, we found a less average of surgeries in the Nexobrid group, but the differences were not statistically different (3.40 ± 2.52 vs 2.00 ± 1.79 surgeries, $p>0,05$).
Conclusions: Nexobrid reduce time elapsed to first debridement, need for scarotomies and need for blood transfusion, with a clear trend to reduce the number of surgeries.

PS8.2

Biomarkers and outcomes in acute burns

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The pathophysiology of burn injuries is tremendously complex. A thorough understanding is essential for correct treatment of the burned area and also to limit the appear-

ance of organ dysfunction, which, in fact, is a key determinant of morbidity and mortality. In this context, research into biomarkers may play a major role.
Different definitions of biomarkers have been proposed. They could be defined as characteristics that can be objectively measured and evaluated as an indicator of normal biological processes, pathogenic processes, or pharmacologic responses to a therapeutic intervention. In this regard, the WHO proposed a broad definition of biomarker including ‘‘almost any measurement reflecting an interaction between a biological system and a potential hazard, which may be chemical, physical, or biological. The measured response may be functional and physiological, biochemical at the cellular level, or a molecular interaction’’.
Therefore, a biomarker can be considered as everything from the pulse, blood pressure, or urine output through basic molecules present in blood and tissues. The ideal biomarker should be easily and rapidly obtained and must be sensitive, specific, and reproducible. Its levels should be modified by therapeutic interventions and it should also be useful for prognostic purposes. Ideally, the processes of procurement and measurement must also be cost-effective.
Research into biomarkers has become increasingly important for several reasons. These indicators have helped us to understand the pathophysiology of diseases, allowing early and accurate diagnosis of particular complications and determining the severity of illness. Moreover, they may also be useful for designing new therapeutic targets that can improve outcomes, and for assessing the effectiveness of treatments.
Therefore, investigation into biomarkers in severe burn patients is a key feature of translational medicine in this area of knowledge.
Future research should focus on preventing complications of burn injury, stratifying patients according to their risk and severity, designing new therapeutic targets, and validating clinically new experimental findings.

Oral Presentations (O)

O1.01

Burn and NexoBrid™ - Our Italian experience

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Introduction: For Burn burn/thermal injury the standard treatments include the use of surgery like escharotomy and autograft. The use of proteolytic enzymes enriched in bromelain comparative with SoC is the target of our study. The escharectomy surgery involves removing necrotic tissue until it reaches a viable plan. NexoBrid™ is a product that contains concentrate of proteolytic enzymes enriched in bromelain, corresponding to 0.09 g/g concentrate of proteolytic enzymes enriched in bromelain after mixing (2g/22g gel or 5g/55g gel).
This procedures allows us to obtain the chemical escharectomy and selective reaching a plan safeguarding vital dermal those areas that have been affected by the thermal damage to a lesser extent therefore.
Methods: Methods The study began in May 2015 and was divided into two time phases trial. We included in our studies 73 patient including burn between 5 and 15 % degree treated with NexoBrid™. First phase/pre-treatment phase diagnosis and analysis of burn injuries: after careful vision and documentation with photographic record of the lesion we made medical history and survivior evaluation. After 24 hours we apllied NexoBrid™ on the wound and removed after 4 hours.
We use NexoBrid™ and we approach to early escharotomy reduce the time of hospitalization. We observe that the procedure with this product It allows us to reduce blood loss during procedure.
Results: No adverse reactions to NexoBrid™treatment were found in all treated patients, the injury was treated while a significant improvement from both aesthetic and functional point of view were observed. We reduced the hospitalization of our patients by 10%.
Conclusions: From the resulting data it appears that NexoBrid™ alone allows a significant improvement of burn patient management. It'is certainly a viable alternative in selected patients to traditional surgery and often in combination with this it enhances healing and ensures greater performace.

O1.02

CO2 laser debridement in cases of patients with deep burn injuries

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Objectives: For several years CO2 laser therapy has been available, not only for the treatment of scars and texture improvement of the skin, but also for (micro) ablation. During the past four years our Department has consistently used CO2 laser therapy in cases of deep dermal burn injuries, in particular in aesthetically demanding regions of the body, for the ablation of necrosis and to assist with texture improvement of the skin.
Methods: In the case of 52 patients with deep dermal burn injuries, CO2 laser was used to remove necrosis, followed by fractionated superficial CO2 treatment to improve skin texture.
Conventionally treated patients, as well as those of the patients treated with laser therapy were subsequently dressed using the same type of dressing. Where possible, all patients were treated with a negative pressure wound therapy after the laser therapy.
Wound healing and scarring of the patients treated using laser therapy was documented and results were compared to conservatively treated burns patients.
Results: In all cases, not only highly selective wound debridement was observed, but also a reduction of germ load of the wound surface and scab and gradually a quick and complete closure of the wound was brought about.
Apart from the considerable advantage of the swift and technically simple and practical administration of the CO2 laser ablation, the previously burned skin areas show significantly reduced textural changes of skin and pigmentation.
Conclusion: The use of CO2 laser therapy for patients with deep dermal burn injuries has been proven to be an excellent method for targeted ablation for all patients treated to date.
In addition, the combined use of CO2 laser treatment with negative pressure wound therapy has also shown excellent results. By adaptation of skin texture we have been able to achieve much more aesthetically pleasing results after reepithelisation.

O1.03

Comparison of six outcome prediction models in adult burn population in a developing country

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Background: There are two types of prognostic models to predict mortality risk in burn patients. They are burn-specific models or general models. Almost most of prediction models were innovated in developed countries. The aim of this study was to compare the performance of the six outcome models in a developing country.
Methods: In a retrospective cohort study, data of all adult (Age≥18 years) thermal burned patients admitted to the Burns Intensive Care Unit (BICU) were collected. Six prediction models were assessed for each patient: Acute Physiology and Chronic Health Evaluation (APACHI II), Abbreviated burn severity index (ABSI), Belgian Outcome in Burn Injury (BOBI), Ryan-model, revised Baux and FLAMES model. Discriminative ability and goodness-of-fit

of the prediction models was determined by receiver operating characteristic curve analysis and Hosmer–Lemeshow tests.
Results: 238 patients (mean age 38.3 years, mean TBSA 58.27%) were included. Inhalation injury was diagnosed in 172 patients and 72.4% of cases were intubated. Mortality rate was 69.7%. The deceased patients had significantly higher mean age, %TBSA and number of inhalation injury.
The area under curve of models were between 64.5(APACHI II) and 85.9(ABSI). The best estimation of predicted mortality was showed by ABSI model (%67.2).
Conclusion: Our study on adult burn population in a developing country revealed that the ABSI scoring model has the best predictive performance.
Keywords: outcome prediction models, adult burn population, developing country, ABSI score, APACHI II.

O1.04

Prevention of major joint burn scar contracture in acute full-thickness burns using Integra™. Ten years revision

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Objectives: Avoiding major joint burn scar contracture in acute full-thickness burns has become difficult, in spite of using thick split-thickness grafts, splints and rehabilitation exercises, requiring in most cases reconstructive surgery. Traditional techniques render poor results in many cases with important contractures.
We present our experience using a dermal regenerator (Integra™) for treatment of burns that affect these special areas to avoid scar contracture.
Methods: During a 11 year interval (1999-2009) 90 patients were prospectively treated with, Integra (35 axillas, 45 elbows, 45 wrists, 30 knees) with acute full-thickness burns,, which these joints were affected. We do not include the neck because its specifity.
The patients ages ranged from 13 to 60 years old and the burned body surface area ranged from 10% to 50%.
In the 1º stage, tangential debridement was performed down to viable tissue and Integra™ was applied. After near 4 weeks, in a 2º stage, the silicone layer exchange was performed applying a thin split-thickness graft.
Results: The follow-up of the patients ranges from 8 to 18 years. No significant complications appeared in both stages of surgery neither in the donor sites. No impairment of joint range of motion was observed neither reconstructive surgery needed
Discussion: This serie of 90 patients demonstrates that Integra™ can be of value to this type of surgery. Both, good aesthetic and functional graft site outcomes could be achieved with the use of Integra™ thus preventing scar contracture and further reconstructive surgery.
Conclusion:
- The use of Integra™ produces an elastic and pliable scar
- Further reconstructive surgery, that adds morbidity,is avoided
- The use of Integra™ is highly cost effective
- In general, the use of Integra can be recommended in acute full-thickness burns that involve the major joints, to avoid burn scar contracture

O1.05

Blood conservation strategies in burn surgery: a systematic review

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Introduction: Acute surgery for burn injuries of 10% TBSA or greater is associated with significant blood loss. This occurs by 3 processes: directly from the thermal injury, from surgical management of the wounds, and from systemic factors in critically ill patients.
As estimating blood loss during burns surgery is largely inaccurate (Budny *et al*., 1993) and treating hypovolaemic shock poses risks, optimising blood conservation is critical. This study reviewed studies of methods used to conserve blood.
Methods: A systematic review was conducted in keeping with the PRISMA statement. A bespoke highly-sensitive search strategy was built in conjunction with an information scientist, then applied to MEDLINE, EMBASE and the Cochrane Library (including CENTRAL as a source of grey literature) from inception until January 2017. Abstracts for search results were screened using pre-specified stepwise inclusion criteria. Data were extracted from full texts of included articles and if appropriate, meta-analysis would be performed.
Otherwise, narrative synthesis was performed.
Results: 63 articles were included after screening 107 results. Amongst the 63 were 4 systematic reviews (including one with meta-analysis), 15 randomised control trials comparing therapies (2 of which one were multi-centre), 10 literature reviews, 11 retrospective cohort studies, 16 case series, 6 case reports and a single centre pilot study. Methodological quality varied.
Various techniques to limit intra-operative blood loss were identified. There appears to be considerable variation in what was considered "standard care" based on inferences from studies.
Conclusions: A range of blood conservation strategies have been described, but further comparative research and consensus is needed to determine which of these should be incorporated into standard care.

O1.06

Bromelain and great burns, help or damage?

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Objectives: The use of bromelain like a debridant for a burns is a reality in the majority of our units in Europe. The results in small burns have being spectacular, and in great burns?
Methods: We present our experience of 10 patients with 20%TBSA or more (maximum 80%TBSA, age 24 to 85). The bromelain aplication was in one, two or three times, spacing 24 hours each one, depending of the TBSA (25-30% TBSA maximum for daily aplication)
Results: The burns debridement was complete in all the patients and the SIRS dissapeared almost completely in 8 patients. On the other hand, the need of blood transfusion and the autografts was much smaller than the conventional debridement.
Conclusion: The use of bromelain in great burns is really safety and good for our patients (with 20%TBSA or more) benefiting from a speedy recovery compared to the gold standard of surgical debridement.

O2.01

Conservative versus operative treatment choice of deep dermal partial-thickness burns in childhood

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Objectives*:* Deep dermal partial-thickness burns, also called II/2.degree burns - mainly due to scalding - are one of the most common paediatric burn injuries. The treatment choice of such wounds is very controversial. Some authors advocate conservative treatment relying on the ability of self-re-epithelialization of these wounds, which is possible but may be significantly prolonged. Others postulate operative treatment - tangential excision and autologous skin grafting - which may shorten the time of wound healing. We aimed to evaluate our experiences in the management of II/2.degree burns, comparing it with the international literature data.
Methods: The hospital records of 116 consecutive in-patients who were treated in our tertiary care paediatric burn centre with II/2.degree burn injuries in 2015 were retrospectively examined. Demographic information, %TBSA, data about management and outcome were collected for all patients.
Results: All children with II/2. combined with III.degree (full-thickness) burn injuries (n=29) were treated operatively. Children with only II/2.degree burns (with or without more superficial injuries, n=87) were managed more conservatively (64%) than operatively (36%). II/2.degree burns less than <10%TBSA (n=108) were treated either conservatively (54%) or operatively (46%), while II/2.degree injuries more than >10%TBSA (n=8) were managed all operatively (100%). In the operative group longer hospital stay was observed (17.5 vs. 7.5days) which correlates mostly to the extent of burns. The blood transfusion requirement was significantly higher in the operative group (41% vs. 8%). There was no mortality in either group.
Discussion/Conclusion: Our institute's treatment strategy of II/2.degree burns in childhood seems to correspond with the international literature data. In accordance with some other authors we think that the extent of injury (%TBSA) is one of the most determining factors in the management decision of DDPT burns in the paediatric population.

O2.02

Comparative usefulness of Sepsis-3 and burn sepsis criteria in patients with major burns

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Objective: We aimed to evaluate the ability of the proposed Sepsis-3 (S3) criteria to accurately determine the severity of sepsis in patients with severe burns, relative to that of the previous definition of burn sepsis (BS). We also evaluated whether lactate levels and Sepsis-related Organ Failure Assessment (SOFA) scores are associated with S3 criteria.
Design: This was retrospective cohort study
Setting: The Burn Intensive Care Unit of Burn Center, Hangang Sacred Heart Hospital, Hallym University, Seoul, Korea,
Patients: A total of 1,185 adult patients (mean age: 50.4 years) were admitted between January 2009 and December 2015.
Interventions: Among the 1,185 patients enrolled in the present study, 565 had been diagnosed with sepsis based on burn sepsis criteria. All 1,185 patients were then re-evaluated based on S3 criteria, following which 809 patients were diagnosed with sepsis based on S3 criteria.
Measurements and Main Results: Logistic regression analysis was performed to evaluate the independent association between mortality and each sepsis category. The area under the curve (AUC) of the receiver operating characteristic curve was calculated to determine the accuracy of mortality prediction. TBSA burned was 46.4%. BS criteria identified 565 patients with sepsis at 8.2 days, while S3 criteria identified 809 patients with sepsis at 6.5 days. The most common infection source was pulmonary in origin. Overall mortality was 20.3% (241 patients). Mortality was highest (82.2%) in patients with S3 septic shock and lowest in patients with S3 (26.5%). AUC values for SOFA

scores were higher than those for lactate levels in all sepsis categories.
Conclusions: The S3 criteria may be useful for earlier and more sensitive detection of sepsis, as well as for more precise stratification of sepsis severity in patients with major burns. SOFA score may be a better indicator of mortality than lactate levels.

O2.03

Improving Paediatric Burn Care through In Situ Simulation

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Objective: A majority of adverse events in health care result from problems relating 'non-technical' skills such as communication, teamwork, leadership, and decision making rather than lack of medical knowledge. Non-technical skills can be incorporated into medical education by teaching the principles of Crisis Resource Management (CRM) through a High-Fidelity Simulation (HFS) program. The aim of the study is to describe our experience in running in situ (in the actual hospital working environment with native teams) simulation courses for paediatric burns.
Methods: Scenarios were designed by a panel of simulation/burn experts from 2 Hospitals (Children's Hospitals in England and Italy). Training program objectives were: a)to teach CRM skills, b)to provide clinical and medical management skills in paediatric burns. Each simulation scenario is based on actual patient cases. The courses took place in the shock and operating room within the 2 hospitals. 30-40 minutes is dedicated to debriefing using a 'CRM Principle Approach'. Using a 10-question survey, quantitative and qualitative data are collected from participants on each course. Quantitative data are collected using a 1- to 5-point Likert scale.
Results: 57 participants have attended the courses. The training was well-received and its "Overall Satisfaction" was rated at 4.8/5. Participants felt that the course developed their ability to interact with other team members (4.7/5), further improved their understanding of how to appropriately use resources (4.8/5), emphasized the importance of role clarity (4.5/5), and developed their communication skills (4.9/5). The realistic nature of scenarios was highly appreciated (4.8/5) as well as the non-judgmental nature of the debriefing (5/5).
Discussion: Simulation training program can effectively improve patient safety and further educate our emergency burn care teams. In situ HFS is a powerful method of making emergency and burns housestaff aware of human errors, logistical problems and allows the team to train in low-frequency burns emergency.

O2.04

Detection and control of a multiresistant Pseudomonas Aeruginosa outbreak in a burn unit

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Objectives: The incidence of multi-resistant pathogens outbreaks in Critical Care Units has increased significantly. The procedure followed to limit the multi-resistant *Pseudomonas aeruginosa* (MPA) outbreak occurred in the Burn Unit at Vall d'Hebron Hospital between April and July 2016 is explained in this abstract.
Methods: Given the increasing isolation of MPA, a weekly screening of all admitted patients was performed and samples were taken of taps, tap diffusers and drains of the Burn Unit rooms, Nursing Area, surgical wash hand basin taps and therapeutic bath, looking for environmental reservoirs.
Results: There were 8 patients infected or colonized by MPA only sensible to amikacin and colistin. The index case was a 83 year old female patient without previous diseases with burns of 15% TBSA. An environmental reservoir was detected in the tap diffusers and inside the pipes of 4 of the 6 major burn rooms, in the Nursing Area drain and in the therapeutic bath faucet. MPA from clinical isolates from the eight cases was indistinguishable from water strains by pulsed-field gel electrophoresis. A contact isolation of all cases, cohort of the health personnel and review of the compliance of the measures for prevention of the infection transmission was carried out. A thermal disinfection, daily purging and replacement of all unit taps and the installation of antibacterial filters enabled the outbreak to be controlled in September 2016.
Discussion: The underlying immunosuppression and damaged skin barrier allows entry of microorganisms in burn wounds causing serious infections. *Pseudomonas aeruginosa* is an invasive, gram-negative bacterial pathogen that causes serious infections of the lower respiratory tract, the urinary tract and wounds. Infections caused by antibiotic resistant microorganisms usually result in significantly higher morbidity, longer hospitalization and increased mortality rates. For this reason, a correct detection, investigation and arrest of any MPA outbreak is vital.

O2.05

Tracheostomy techniques minimising damage to neck burns and airway contamination in burn patients.

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Objectives: The aim of this study is to present and

analyse the approach we use in our burn centre when considering tracheostomy in burn patients, by using techniques which minimise damage to neck burns and airway contamination.
Methods: Our tracheostomy protocol depends on the patient and burn characteristics. In case of neck burn we use 2 different approaches depending on the need of of excision and grafting of the neck. We conducted a retrospective chart review of the severe burn patients that received tracheostomy in our burn centre from January 2010 to April 2015.
Results: Between January 2010 and April 2015, of the 530 patients admitted to the Turin Burn Centre, 62 patients (12.2%) required tracheostomy.
They were 40 males and 22 females, with a mean age of 56.93 years and a mean TBSA of 39.87%. We performed a surgical tracheostomy in 4 patients (6.45%) and percutaneous tracheostomy at the bedside in 50 patients (80.64%). In 8 patients (12.90%) we performed a percutaneous tracheostomy in the operating theatre after excision of neck burn tissue and before grafting of the neck region during the same surgical session (combined tracheostomy).
All the 8 patients who underwent combined tracheostomy had a neck full thickness burn, and no complications were observed during the procedure neither the neck wound healing process was affected.
Discussion/Conclusions: Tracheostomy is a relatively common procedure in severe burn patients. Both surgical and percutaneous tracheostomies can be safely performed. Choice of indication, timing and technique should be tailored to the patient. In case of neck full thickness burn, percutaneous tracheostomy combined with surgical treatment of the neck burn is an option.

O2.06

The Breast Burn Index (BBI)
A new classification and treatment algorithm of female post-burn breast asymmetries

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Objective: Burn trauma affecting the breast in prepubescent girls is quite common and can have different effects on breast development, leading to a variety of breast malformations. Although surgical treatment should be individually tailored to the affected breast, singular approaches have been made in the past, to adapt a clinical classification to assist the surgeon in the decision making process for an adequate treatment modality. Upon these few classification systems regarding breast asymmetries, none focuses on the specific problems of post-burn breast deformities and there is no widely accepted clinical nomenclature until now.
Methods: Based on a medical database review of our University hospital from 1997 to 2014, we identified 69 patients (n=69) who were treated for post-burn sequelae of the female breast. Additionally a literature review using the Medline and Cochrane databases was carried out. Six Studies with a total of n=422 patients were involved.
Results: Based on the results of the retrospective analysis of our cases and the cases from the literature review, we established a clinical classification for asymmetries following deep second to third degree burns of the female adolescence breast, ranging from BBI Grade I a up to IV b. Additionally actual treatment concepts according to this gratification are presented.
Conclusion: We herein present a simple and easy to adapt clinical classification of burns to the adolescent female breast, that should help the surgeon in the decision making process, which treatment modality to choose and the optimal timing when to perform surgery.

O3.01

Retrospective review of a 5-years adult burn centre's experience with Meek grafting in the management of extensive burns

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Background: The Meek technique constitutes an efficient surgical approach for the skin coverage of extensive full-thickness burn injuries. The aim of this retrospective study is to present our experience with the Meek technique of grafting, outcomes achieved and recommendations for optimized outcomes.
Methods: We retrospectively reviewed patient records from our burn centre and identified all patients who had Meek grafting between 2012 and 2016. Patient records were reviewed individually and information regarding patient demographics, mechanism of injury and surgical management was recorded. Outcome measures including graft take rate, requirement for further surgery and complications were also recorded.
Results: Twelve patients had Meek grafting procedures. The average age of patients was 38 years old (range 15–66). The average total body surface area (TBSA) burnt was 54.30 % (range 31–77 %). On average, 83 % of the grafted areas healed well and did not require regrafting. In the regrafted areas, infection and hematoma were the leading cause of graft failure.
Conclusions: Meek grafting is a useful method of skin expansion in patients with large burn wounds. Management is simple and more efficient when a scheme comprising topographical division of the body surface and an order in wound care and coverage is incorporated.

O3.02

Epidemiology and outcome of patients with burns treated with Cerium Nitrate Silversulfadiazine

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Objective: In this study the outcome of treatment with Flammacerium in burn patients is studied.
Methods. The retrospective study involved patients with acute burns admitted to the burn centre of Martini Hospital Groningen between 2009 and 2014. The outcome parameters were mortality, complications (non-infectious and infectious), need of surgery and length of stay. The results were compared with the data of the National Burn Repository of the American Burns Association (NBR-ABA) published by Bessey et al (2014).
Results: The group of patients consisted of 853 patients, of which 554 were male (64.9%). There were 23 patients with a total burn size of 40% TBSA burned or more (2.7%). In total 13 of the 853 patients (1.5%) died, none of them children <16 years . The overall mortality in the group of patient with burns > 40% TBSA burned in the data of the NBR-ABA was 49.9% and in our population 30.4%. In the elderly group (>70 years old) the mortality rate of our population was 6.3% compared to 18.4% of the NBR-ABA.
Conclusions: Treatment with Flammacerium is applicable in all thermal burn patients. Especially children, elderly patients and patients with severe burns can benefit from a more conservative treatment with Flammacerium whereby the first operation can be postponed until the patient is stabilized (damage control) and in which the wounds can be covered directly with skin transplants.
Key Words: Cerium, Silver sulfadiazine, damage control, mortality, burns.

O3.03

Effectiveness and costs of enzymatic debridement in burn wounds

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Objectives: Enzymatic debridement of burn wounds is an alternative to surgery and allows for the minimally invasive removal of necrotic tissue. The aim of the study was to compare the effectiveness and costs of enzymatic treatment of burn wounds between surgically-treated and conservatively-treated patients after debridement. Methods: A group of 10 patients (4 women and 6 men, aged 12-47) with mixed deep dermal and full-thickness burns underwent enzymatic debridement of burn wounds using Nexobrid (eschar-specific removal agent). After enzymatic treatment, 5 patients underwent non-surgical procedures and the other 5 patients received skin grafts. Would healing times were evaluated and treatment costs were calculated and compared with respect to the method of post-debridement wound care.
Results: The complete removal of necrosis was achieved after a single application of Nexobrid in all patients. The average time of wound healing was 17 days, but this was shorter in the group of operated patients (from 7 to 14 days; mean: 10 days) compared to conservatively-treated patients after enzymatic debridement (from 14 to 37 days; mean: 23 days). The average cost of hospitalization for the non-operated patients was much higher (PLN 20,850 per patient) compared to the group of patients subject to grafting after the initial treatment with Nexobrid (PLN 14,600 per patient).
Conclusion: Enzymatic debridement of wounds is an effective method for removing necrotic tissue in deep dermal and full-thickness burns. Early coverage of an enzyme-treated wound with a split-thickness skin graft decreases the hospitalization time and costs of burn patient treatment.

O3.04

Does the Abbreviated Burn Severity Index need revision?

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Objectives: The Abbreviated Burn Severity Index (ABSI) was first introduced in 1982 by Tobiasen et al. Ever since the score was used to estimate the probability of death in severely burned patients. In the year 2011 Forster and colleagues conducted a retrospective study to reevaluate the score. However, they came to the conclusion that despite the bettered possibilities in intensive care the ABSI score is still an accurate and valuable tool in the prediction of burn patient mortality. The objective of the current study was to retrospectively evaluate the practical implementation of the ABSI and the predicative value of the score.
Methods: A retrospective single-center cohort study was performed on 706 patients admitted to the Burn Intensive Care Unit of the General Hospital of Vienna between 2003 and 2016. Burn patients that meet the following criteria were include in the present study: Total Burn Surface Area (TBSA)≥10%, time (ICU)≥24 hours, age≥12 years. Burn

patients that received primarily palliative treatment were excluded from the study population (22/728,3%).
Results: 706 burn patients meet the inclusion criteria (443/706,63% male and 263/706,37% female). The median age was 48 years (range,16-95). A total of 119/706(17%) died after median 10 days (range,2-156). In the current patients collective 250/250(100%) patients with ABSI 2-5 survived, 172/185(93%) with ABSI 6-7, 120/155(77%) with ABSI 8-9, 32/72(44%) with ABSI 10-11, 12/36(33%) with ABSI 12-13 and 1/8(13%) patient with an ABSI>13 survived the burn injury.
Discussion/Conclusion: Especially burn patients with an ABSI greater 8 showed a notable better survival rate as predicted by the score. In conclusion, it might be interesting to reevaluate the prognostic score.

O3.05

Are we tied to our prognostic scores? A 74-year-old patient with an ABSI of 14

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Objective/Method: We aim to demonstrate by means of an exceptional case report that aged
patients with severe burn injury and high ABSI score can be treated successfully.
Case report: A 74 years old female patient, was involved in a tragic car accident and suffered from deep dermal and full thickness burns (TBSA 70%) affecting the face, both upper and lower limbs, the back, the neck and the buttock. She was immediately transferred via helicopter to our Burn Intensive Care Unit of the General Hospital of Vienna. In addition to the burn injury a spinal fracture (C4) without dislocation was diagnosed. Moreover the patient suffered form an inhalation injury and an Abbreviated Burn Severity Index of 14 was calculated.
After an interdisciplinary discussion, a curative management was initiated. Except for arterial hypertonia, no other previous conditions were known. The patient showed sufficient cardiorespiratory
stability and adequate renal function. Because of circumferential burns, escharotomies of all four limbs and both hands was performed on the day of admission.
Two days later, an epifascial necrosectomy of all four limbs and wound coverage was performed using MEEK Technique (1:9). Despite her advanced age, the patient showed successful wound healing. The wounds of the back could be dried and in large parts healed conservatively by bedding in an air-fluidized bed.
Twenty-three days after admission, the remaining wounds were covered in a third operation. During her stay, Stenotrophomonas maltophilia was detected in wound swab, bronchial secretion and blood culture, and treated successfully with Gentamicin over 12 days.
The patient could be mobilized; small defects on the calf on both sides, back and upper extremities healed conservatively using granulation method.
Discussion: This patient is an outstanding example that burns patients despite advanced age and a high ABSI can survive an extreme burn injury and be treated successfully.

O3.06

Predictive validity of short term scar quality on final burn scar outcome using the Patient and Observer Scar Assessment Scale

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Objectives: Early recognition of burn patients who are prone to develop scar morbidity is important. The aim of this study was to assess the predictive validity of the Patient and Observer Assessment Scale (POSAS), in order to determine whether it can be used to predict final scar quality.
Methods: Patients with a maximum TBSA burned of 20% who were treated in a Dutch burn center and participated in two scar assessments at 3 months and >18 months post-burn were included. Scar quality assessment consisted of the POSAS, Dermaspectrometer (color) and Cutometer (elasticity). Predictive validity was determined in three ways: (1) the discriminative ability to distinguish good from reduced long term scar quality, (2) correlations between POSAS items score at the two subsequent assessments and (3) linear regression was conducted to identify POSAS items as independent predictors. Additionally, reliability, construct validity and interpretability were assessed.
Results: A total of 141 patients were included with a mean TBSA burned of 5.2% (SD 4.5). The ability of the Patient scale to discriminate between good and reduced long term scar quality was adequate with an area under the curve (AUC) of 0.728 (95% CI 0.640–0.804), the ability of the Observer scale was good with an AUC of 0.854 (95% CI 0.781–0.911).
Correlations between items scored at 3 months and over 18 months were at least adequate. On item level, pain and stiffness (Patient) and pliability and relief (Observer) were identified as significant predictors for reduced long term scar quality. The POSAS was reliable, construct validity was adequate at three months but declined at >18 months.
Conclusion: Long term scar quality after burns can be

predicted by an early POSAS assessment at three months. These results might be helpful in the decision-making of selecting patients for outpatient follow-up in specialized burn care.

O4.01

The impact of an eye-controlled communication device on the communication ability between the burn intensive care patient and the care staff

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Introduction: Almost 40% of burn patients treated at burn centers need intensive care (IC) for longer or shorter periods. Several patients need help with breathing, and are placed on a ventilator. Patient in weaning from mechanical ventilation is often frightened, having pain and / or are confused (due to strong drugs and long IC stay). As long as the patient is on the ventilator verbal communication can be difficult. This is complicated because it is important for the patient to be able to communicate their own needs and for the care staff to understand without words. Communication is something central to mankind.
Aim: The purpose of this study is to examine how an eye controlled communication devise may affect the ability to communicate between the burn intensive care patient and care staff.
Methods: This is a prospective survey study with pre- and post-test. Adult patients who are admitted for treatment of burns to the Burn Center, Uppsala University Hospital, with Richmond Agitation - Sedation Scale (RASS) score more or equal to 1 and is intubated / tracheostomized is asked consecutively for participation. Patients and staff answer questions of current emotions before and after the use of the communication aid as well as perception of usefulness. The data collection is to be carried out when 10 patients and 10-20 staff member are included.
The project's importance: The project can contribute to deeper understanding of, if and how the use of an eye controlled communication device can enhance the possibilities for patients that are intubated / tracheostomized, and care staff to communicate.

O4.02

Emotions in the environment and critical burn patient care

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Objectives: During the atention of critical burn patient, emerge a large number of emotions and feelings of high intensity . The pacient and theirs relatives will face an extremely dramatic situation with a overwhelming emotinal charge. Nurses during the atention not only must manage all these emotions but also must manage theirs own feelings, taking in consideration the complex situation that requieres efficient care because of involving great vital risk.
Methods: Through qualitative research and based on grounded theory, we can set and define the main emotions and feelings involved in the care of critical burn patient in the triad patient-environment-nurses.
Results: The most prevalent emotions and feelings during the care of critical burn patient are: fear, impotence, anxiety, sadness and anger.
These feelings are being modifying in intensity and appearence in the long proces and are conditioning it in an important way.
Discussion/conclusion: People with better management of emotions , feelings and great behaviorall skills, are facing this complex situation effectively and also they have a significant influence on the good evolution of the patient.
Nurses are not only health care agent, in the physical approach during the atention of critical burn patient, but also they offer emotional care of great relevance.
This care endowed with an optimum level of emotional intelligence, allows the interaction in a receptive and proper way with the patient and relatives promoting holistic atention. At the same time that it protects the emotional integrity of professionals.

O4.03

Care of patient with Epidermolysis bullosa by Burn Unit nurse staff

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Epidermolysis bullosa is a group of inherited connective tissuediseases that affect the skin and mucosal membranes, causing blisters from minor friction or trauma as a result of failure in the collagen genes. There is no specific treatment or cure, it is a chronic evolution.
Epidermolysis bullosa's patients treated in Vall d'Hebron Burn Unit benefit by comprehensive care due to our multidisciplinary staff made up by plastic surgeons, pediatrician, anesthetist, dermatologist, psychiatrist, physiotherapist, nursing assistants and nursing staff, among others.
Object: Make public the coordinator role and emphasize the holistic care that the Burn Unit nursing staff provides to the treatment of Epidermolysis bullosa patients.
Methodology: Qualitative-descriptive and observational techniques have been used to stress the importance of the nurse's job in the treatment of Epidermolysis bullosa's patients.
Results: Currently, Burn Unit staffs are working on developing an action protocol for these patients care and dress-

ings, including the surgical process and therapeutic bath treatments.
Conclusion: Based on the routines observed we underline that the Burn Unit nursing staff are essential in the following of holistic care that these patients need during their hospitalization process.

O4.04

Case-Study: Height Burn Victims Flown in from Romania

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Objectives: Explain the organization required to transport the seven victims from the military airport to the hospital.
Methods: With hind-sight, retrace the difficulties encountered during the transportation with highly unstable victims, including a scarcity with ambulances and personnel.
Results: Every victims survived
In the end, the " action plan " succeeded
Discussion/conclusion
The plan required a good management of resources and a proper coordination with those concerned

O4.05

Nursing problems in patients with Toxic Epidermal Necrolysis and Stevens-Johnson syndrome in a Dutch burn centre: a 30-year retrospective study

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Objective: Multiple studies have been published on Toxic Epidermal Necrolysis (TEN) and Stevens-Johnsen syndrome (SJS). Most of these are, due to the low incidence, based on only small numbers of patients. Nursing care is an important part of the treatment of TEN patients. Unfortunately, hardly any knowledge is available in the current literature on nursing in TEN/SJS patients. Burn Centre Rotterdam is an expertise centre for TEN patients in the Netherlands and nursing research is needed to improve the complex nursing care in these rare patients. Therefore, the objective was to assess nursing problems in TEN patients in burn centre Rotterdam over a 30 year period.
Methods: Data for this study was gathered retrospectively from nursing records in all patients with TEN/SJS admitted to the burn centre Rotterdam between January 1987 and December 2016. Nursing problems were classified using the classification of nursing problems of the Dutch Nursing Society.
Results: Analysis of the 70 records showed that the most frequently reported nursing problems (in >70% of the patients) were threatened or disrupted vital functions, dehydration or fluid imbalance, pain, secretion problems and fever. Furthermore, TEN specific nursing problems were documented and often related to mucosal lesions. The highest number of concomitant nursing problems occurred in the period between day five to ten after onset of the disease.
Conclusions: Most often reported nursing problems were in the physical functions, especially in day five to ten after onset of the disease. With this knowledge we can start nursing interventions early in the treatment, tackle the problems at the first signs and inform patients and their family or representatives early. A next step to improve nursing care in TEN patients is to gain knowledge on the optimal interventions in nursing problems.

O4.06

How to improve the quality of interprofessional teamwork focused on nurses treating patients with enzymatic débridement on the burns intensive care unit Zurich

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Objectives: Wound management is a multiprofessional task and there is clarification needed about who is dealing with which part of the treatment. When we started with the enzymatic débridement as a new intervention we were focused on a treatment protocol for the several involved health professions. The aim was to implement the new treatment with best possible coordination of the activities and competences of the involved professions.
Methods: Nurses and plastic surgeons visited the further trainings together. Before implementing the method, surgeons wrote a standard operating procedure to regulate when and how to treat patients with Nexobrid®. Nurses wrote a checklist to regulate the intervention step by step and to specify the task sharing.
Results: Since 2016 the enzymatic débridement is implemented in the burns ICU Zurich, 23 patients have been treated with Nexobrid® so far. If the treatment takes place at admission or during an operation, the surgeons are responsible for the application. Most of the treatments happen bedside in the ICU and the task sharing between surgeons and nurses is communicated. The surgeons identify the area to be treated. Analgosedation and airway
management of the patients is done by nurses, in awake patients by intensive medicine. The nurses do the pre-

soaking, skin protection and application of Nexobrid® like defined. Plastic surgeons take responsability for removement of Nexobrid® and final wound assessment.
Discussion/ Conclusion: Both the nursing team and plastic surgeons are very interested in learning how to deal succesfully with Nexobrid®. Enzymatic débridement bedside consumes a lot of nursing ressources and clear arrangements are needed to coordinate the task of both professions satisfactory. There is potential to optimize the collaboration and the checklist is being adapted continuously with increasing experience. The evaluation of the process takes place in different meetings and has to be updated continuously.

O5.01

Supporting the introduction of treatment innovation using cost analysis

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Objectives: In times of financial constraint, concern that a new treatment will prove to be cost inefficient can hamper its application but this is often based on weak evidence and simplistic financial analysis. In an effort to bring an evidence-based understanding of the financial consequences of introducing innovation, a model was developed using nationally available anonymised data. This was then applied to the introduction of a recent innovation (Nexobrid).
Methods: Anonymised data was requested from the international Burn Injury Database (iBID) which included the subset of (12,000) patients suitable for the new treatment. Each patient pathway in the subset was then costed using a previously reported Patient Level Costing (PLC) methodology. Modifications were then made to important cost driver items (length of stay, operations) in the data of each case. Each case was then re-costed to include the cost of the new treatment. The income implications of these 2 pathways were also analysed and compared against health care tariff information so that effect could be appreciated.
Results: The model allowed a clinically realistic alternative pathway to be assessed financially and the income and cost implications for burn services as a whole to be estimated. This suggested that for smaller TBSA treatment groups the financial implications were cost neutral and provided useful objective evidence to support the treatment.
Discussion/ Conclusions: The use of national data in this way allows estimates of the cost implication to be better understood. The model has the potential to be applied to specific local data from each burn service. It is hoped that the use of this model and costing methodology will bring about a more accurate understanding of burn care costs and the potential value of the introduction of innovation.

O5.02

Evidence-based injury prediction data for severe spill/splash and immersion scalds

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Objectives: Understanding the relationship between water temperatures, duration of contact and tissue injury severity is essential to reduce the risk of scald injuries. For both spill/splash and immersion scalds, evidence-based injury prediction data is lacking for the conditions likely to result in deep rather than superficial partial thickness dermal injuries.
Methods*:* A porcine scald model was developed to examine a range of burn conditions. For *Study 1*, 16 pigs, tissue injury in the acute post-burn period was investigated. In total, 20 burn combinations were tested including 50 to 60â °C water for 1 to 10 minutes (immersion) and 60 to 100â °C water for 5 seconds (spill/splash). Wound examination, biopsies and Laser Doppler Imaging were performed at 1 hour and days 1, 3 and 7 post-burn. In *Study 2*, 8 pigs, a subset of 10 burn combinations were followed for 21 days to assess time to re-epithelialise.
Results: Histologically, depth of damage increased until day 3. At day 3 post-burn for immersion scalds of equivalent duration, water at 55°C caused significantly deeper dermal damage than 50°C ($p<0.05$). For spill/splash burns (5sec duration) at day 7, water at 90°C caused significantly ($p<0.05$) greater dermal damage than water 60-85°C. Damage to ≥ 75% of the depth of dermis was associated with burns taking longer than 3 weeks to re-epithelialise. Burns which were not re-epithelialised by day 21 included: 50°C for > 10minutes; 55°C for 5minutes, 60°C for 60sec; 70°C for > 15sec; and 85°C and 90°C for 5 seconds.
Discussion/ Conclusions: Novel scientific evidence regarding the heat dose required to sustain deep dermal partial thickness scalds is presented. Importantly, quantitative histological data is related to the clinically relevant outcome of time to healing. This injury prediction data is crucial for guiding scald burn prevention strategies and legislation and also to inform medicolegal judgements.

O5.03

The Effect of Adipose Derived Stromal Vascular Fraction on Stasis Zone in an Experimental Burn Model

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Background: Stasis zone is the encircling area of the coagulation zone which is a critical area determining the depth and width of the necrosis in burn patients. In our study we aim to salvage the stasis zone by transplantation of adipose derived stromal vascular fraction (ADSVF).
Methods: Thermal injury was applied on dorsum of Sprague -Dawley rats (n=20) according to the previously described ''comb burn'' model. After the burn injury (30 minutes) on Sprague - Dawley rats; rat dorsum was separated into 2 equal parts consisting of 4 burn zones (3 stasis zone) on each pair. ADSVF cells harvested from inguinal fat pads of Sprague - Dawley rats (n=5) were injected on the right side while same amount of phosphate buffered saline (PBS) injected on the left side of the same animal. One week later, average vital tissue on the statis zone was determined by macroscopy, angiography and microscopy.
Vascular density, inflammatory cell density and gradient of fibrosis were determined via immunohistochemical assay.
Results: Macroscopic stasis zone tissue survivability percentage (32 ± 3.28 %, 57 ± 4.28 %), average number of vessels (10.28 ± 1.28, 19.43 ± 1.72), capillary count (15.67 ± 1.97, 25.35 ± 2.15) and vascular density (1.55 ± 0.38, 2.14 ± 0.45) were higher on ADSVF side.($p<0.01$) Fibrosis gradient (1.87 ± 0.51, 1.50 ± 0.43) and inflammatory cell density (1.33 ± 0.40, 1.20 ± 0.32) were higher on the PBS side.($p<0.05$)
Conclusion: Macroscopic and microscopic findings indicated that ADSVF has a statistically significant benefit for salvaging stasis zone on acute burn injuries.

O5.04

Skipping to improve scar management: modulation of TGF-β signalling in hypertrophic scars via exon skipping

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Background: In burn patients wound healing is often accompanied by hypertrophic scar (HTS) development, resulting in both functional and aesthetic problems. HTS's are characterized by
abundant presence of myofibroblasts, which contribute to excessive production of extracellular matrix (ECM). The TGF-β signalling pathway plays a key role in the differentiation and activity of the myofibroblasts. Previous studies have shown that inhibition of TGF-β receptors in fibrotic diseases, such as Dupuytren's disease, results in a significant reduction of the fibrotic load.
Objective: The aim of this study is to investigate the effects of exon skipping (ES) using antisense oligonucleotides (AON's) to inactivate Alk5 (TGF-β receptor I) in HTS-derived fibroblasts and tissue.
Methods: HTS biopsies were used to set up fibroblast monocultures, Fibroblast-derived matrix (FDM) and *ex vivo* models. In order to induce ES, AON's targeting ALK5 were supplemented to fibroblast monocultures and HTS *ex vivo* tissue was injected. Chemical inhibition was performed with the ALK5 inhibitor SB431542. Validation of AON delivery in our models was performed using immunofluorescence. Analysis of TGF-β signalling downstream targets, collagens and migration was performed by qPCR, western blot and immunohistochemistry.
Results: Our data demonstrate that 1) AON's are delivered in HTS fibroblasts and tissue, 2) ES of ALK5 was successful, 3) ES affects the expression of ECM-related genes in fibroblast monolayers and *ex vivo* tissue, 4) AON treatment does not affect migration of fibroblasts during wound healing, and 5) AON's are viable after prolonged culturing.
Conclusion: In conclusion, ES is a promising tool in order to modulate the TGF-β signalling pathway and the expression of ECM components in HTS. This would open a therapeutic window for the treatment of HTS patients.

O5.05

Extracorporeal shock waves therapy in Pathological Post-Burn scars. Results of a randomized prospective study.

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Objectives: Despite the new tools in the management of burn wounds, the physiological healing process can lead to the formation of pathological scars like hypertrophic, retractile or keloids. The current conservative treatment for all of them is limited to physical therapy, silicon films or gels and presotherapy. However, when these options are not enough, the surgery is the only option. Identifying another useful tool could facilitate conservative treatment and decrease the surgical needs.
Methods: A prospective randomized trial to compare the efficacy of extracorporeal shock waves was designed in 40 consecutive patients. All pathologic active scars in inpatienets and outpatients are considered candidates for inclusion in the study provided informed consent is obtained. Formal exclusion criteria are contraindications for ESWT, pediatric age and active infection. Patients were divided in two groups: Group A, which received the usual treatment, and group B, which received the usual treatment and extracorporeal shock waves, twice a week during for 4 weeks.
Results: Although the results are still provisional, shock

waves may play a role in the treatment of pathologic burn scars. Initial pilot studies showed an improvement in quality and texture of scars in the ESWT group. ESWT was well tolerated in all patients, with no adverse events.
Discussion / Conclusion: The importance and magnitude of pathological scars in burned patients are subject of enormous debate. In order to provide new tools to improve the quality of life of these patients, this study has been performed. Currently, the results are provisional and lack of evidence, but in spite of this extracorporeal show waves may play their role. More high-evidence studies are needed.

O5.06

Tadalafil Reduces Burn Injury Progression in a Rat Model

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Objectives: Burns are characterized by a central zone of necrosis surrounded by a zone of potentially reversible ischemia. The rat comb model is often used to study the progression of injury in the zone of ischemia. Tadalafil is a phosphodiesterase-6 inhibitor that potentiates nitrous oxide resulting in vasodilation, which is used to treat erectile dysfunction. We compared burn injury progression in rats with comb burns treated with tadalafil, a nonsteroidal anti-inflammatory agent (naproxen) and an antioxidant (N-acetylcysteine [NAC]).
Methods: Two standardized comb burns were created on the dorsum of 20 Sprague-Dawley rats
(300 g) using a brass comb with four rectangular prongs preheated in boiling water and applied for 30 seconds, resulting in four rectangular 10×20mm full-thickness burns separated by three 5×20mm unburned interspaces, representing the zone of ischemia. Four animals each were randomized to receive an oral dose of 1 mg/kg tadalafil, 10 mg/kg naproxen, 500 mg/kg NAC, or normal saline by gavage 30-60 minutes after injury and then once daily for 7 days. Wounds were observed daily for visual evidence of necrosis in the unburned interspaces and full-thickness biopsies from the interspaces were evaluated with Hematoxylin & Eosin staining 7 days after injury for evidence of necrosis. The primary outcome was the percentage of the total area of the unburned interspaces that underwent necrosis at day 7.
Results: The total percentages of gross necrosis of the interspaces at day 7 by treatment were tadalafil, 45+/-40%; naproxen, 78+/-22%; NAC, 91+/-16%, and NS, 89+/-20% respectively (P<0.001). The percentages of interspaces undergoing full-thickness histological necrosis at day 7 were tadalafil, 40%, naproxen; 93.3%; NAC, 96.7%; and NS 86.7%, respectively (P<0.001). There were no systemic adverse events noted in any of the treatment groups.
Conclusions: Daily oral therapy with tadalafil reduces burn injury progression by approximately half in a rat comb burn model.

O6.02

Nanofibrillar cellulose wound dressing in skin graft donor site treatment

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Objectives: Despite recent advancements in wound treatment, there is still need for better methods to improve wound healing. Nanofibrillar cellulose (NFC) has been found as a promising material for biomedical and pharmaceutical applications. The objective of this study was to investigate the potential of wood based NFC wound dressing as a skin graft donor site treatment of patients needing skin grafting. Previously, NFC has been used as a topical functionalized wound dressing in mice where it improved wound healing.
Methods: Wood derived NFC wound dressing was tested in a clinical trial in split-thickness skin graft donor site treatment of 15 patients at Helsinki Burn Centre. NFC dressing was applied to skin graft donor sites, where it dehydrated and attached to the wound bed during the first days. During the trial, the physical properties of the material were optimized by altering the composition of dressing. Among patients 5-10 and 12-15, a commercial lactocapromer dressing, Suprathel® was compared to NFC dressing.
Results: NFC dressing self-detached after 11-22 days. After the detachment of the NFC dressing from the donor site epithelialized skin was observed. Epithelialization on the NFC dressing-covered donor site was faster than with Suprathel®: among patients 5-10 and 12-15, NFC dressing self-detached on average 3 days earlier compared to Suprathel®. An optimized NFC amount in the material was found to result in the improved dressing pliability and adherence to the wound bed. NFC dressing was not observed to cause any allergic reaction and it didn't induce more pain compared to Suprathel®.
Conclusion: Based on clinical results, NFC dressing is a promising material for skin graft donor site treatment due to biocompatibility and tendency to attach to the wound bed, remain in place until the donor site has epithelialized and self-detach after epithelialization.

O6.03

Burn in neonates and prematures - treatment strategy

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Burns represent a very severe condition per se. Among the factors that significantly increase burns severity, age is an important one.
Objectives: are identifying risk factors and develop adequate strategies to effectively prevent and efficiently treat these severe burns.
Methods: Over the last 10 years, we encountered a series of burns in neonates and prematures.
8 victims of a fire from a neonate department, infants with burns between 40% and 80% TBSA, were admitted in our burn center.
Another accident involved a premature child who suffered contact burns involving the head and upper extremity.
Proper fluid resuscitation and meticulous local care were applied as standard protocol.
Burn wound examination was done on a daily basis.
Results: Response to a neonatal pediatric disaster was good. The collective accident baby victims reached our clinic in a short time and everybody mobilized to cope with the situation. Five of the eight victims survived, returned to their families and had normal subsequent growth. There was no need for surgery even for deep burns as their evolution was rapidly shifting favorably. The healing pattern was unique, resembling fetal wound healing. The premature child with contact burns required surgical removal of large deep burns and skin grafting.
Conclusions: Collective accidents are overwhelming tragedies.
Neonatal burns pose various extreme risks but ultimately good results are to be obtained even in serious cases. Serious burns in this age group are extremely rare and this case series shows up a unique experience.
Particular aspects of collective accidents were the large number, higher surfaces affected and good results after adequate treatment.
Certain patterns arise regarding preventing, treatment planning including long term evaluation of these extremely severe burns.

O6.04

Toxic epidermal necrolysis; long-term sequelae in a multidisciplinary check-up

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Objectives: Long-term sequelae of toxic epidermal necrolysis (TEN) are very common and can sometimes cause important disability in daily life. Our aim with this study is to highlight long-term cutaneous, ocular, otolaryngological, urological, gynecological and psychological sequelae of TEN and to propose a multidisciplinary follow up.
Methods: 19-years (1998-2016) retrospective study was made including all patients diagnosed of TEN and admitted to Cruces University Hospital´s Burn Unit. A total of 23 patients diagnosed with TEN were admitted. At present, 6 of the 7 survivors were available for a multidisciplinary examination involving a dermatological, ocular, otolaryngological, urological and gynecological check-up. Furthermore, four validated psychological questionnaires were answered to evidence anxiety, depression, psychological distress, post-traumatic stress disorder (PTSD) and the effect of their skin sequelae on daily life.
Results: The mean age of the patients examined was 37.33 years and 83.33% were women. Cutaneous and ocular complications were the most common. We observed dermatological sequelae in all the patients (scars, nail deformities, pigmentation abnormalities, etc.) and ophthalmologic complications in 50% of the patients being extensive corneal damage with opacification and severe dry eye the most frequent and disabling sequelae. 50% of the patients complained of xerostomia and 16.67% of dysphagia. No gynecological complications were seen but the only man had to be operated on phimosis due to acquired genital mucosa adhesions. Psychometric scales captured symptoms of depression (16.67%), anxiety (50%), PTSD (33.33%) and psychological distress (33.33%). Furthermore, quality of life was affected in 66.67% of the patients by skin complications.
Discussion/Conclusion:
TEN is a multi-organ disease that requires care from a variety of specialists. Quality of life can be severely impacted by multiple long-term complications. We believe that multidisciplinary examination and prophylactic care during their acute stay at Burn Unit might prevent or limit the progression of many of the chronic sequelae.

O6.05

The benefit of microskin in combination with autologous keratinocyte suspension to treat full skin loss in vivo

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Objective: Patients with extensive deep burns often lack enough autologous skin to cover the wounds. This study explores a new method using microskin in combination with autologous keratinocytes in the treatment of extensive deep burn.

Methods: Wounds in the combination group were treated with automicroskin at an area expansion ratio of 20:1 (wound area to automicroskin area) and autologous keratinocyte suspension. Which were compared to the following treatments: no autotransplant only allografts (control group); autologous keratinocyte suspension only (keratinocyte only group); automicroskin at an area expansion ratio of 20:1 (20:1 group); automicroskin at an area expansion ratio of 10:1 (10:1 group, positive control). We used epithelialized rate (epithelialized area on the day 21 divided by original wound area), HE staining, laminin and type IV collagen immunohistochemistry to assess the wound healing.
Results: The epithelialization rate of combination group was similar to 10: 1 group and significantly higher than 20:1 group , keratinocyte only group and control group . The HE staining and immunohistochemistry showed the epithelialization in combination group was better than keratinocyte only group and control group.
Conclusions: Microskin in combination with autologous keratinocyte suspension can promote the re-epithelialization of the full-thickness wounds and reduce the requirements for automircoskin and it is a useful option in the treatment of extensive deep burns.

O6.06

A systematic review of pre-clinical compromised wound healing models

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Introduction: *In vivo* animal studies are central to burn healing research. Currently, a common approach is to use porcine full thickness excision wounds (Middelkoop *et al.,* 2004). However, this model only reflects acute uncomplicated wound healing. Understanding and being able to treat delayed wound healing is a greater challenge. This study reviewed studies of describing pre-clinical models of attenuated wound healing.
Methods: A systematic review was conducted in keeping with PRISMA principles. A sensitive search strategy was built (with an information scientist), then applied to AMED, MEDLINE, EMBASE and the Cochrane Library (including CENTRAL - grey literature source) from inception until December 2016. Abstracts for search results were screened using pre-specified stepwise criteria. Data were extracted and if appropriate, meta-analysis would be performed. Otherwise, narrative synthesis was performed. The search strategy included: animals, disease models, attenuated, chronic, ischaemic, delayed (in conjunction with wounds and animals), skin dermis, epidermis, cutaneous, cicatrix and biofilms (duplicates were removed).
Results: 425 articles were included after screening 1751 results. No randomised control or multi-centre trials comparing attenuated wound models were found. 11 articles reviewed the literature. Studies included either described or validated models, or described models used to evaluate drugs or medical devices. 312 articles used rat / mouse models, 8 articles used guinea pigs, 42 articles used rabbits, 3 articles used dogs, 1 article used sheep and 36 articles used pigs. Methodological quality varied. Various techniques to simulate or imitate complex wound healing were identified. There appeared to be considerable variation in what was considered "a compromised wound" based on inferences from studies.
Conclusions: There is a paucity of animal wound models that reliably represent the human chronic and complex wound. The ideal attenuated wound healing model would be cost-effective, reliable, safe and reproducible.

O7.01

Health related quality of life after burn injuries: a systematic review

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Objectives: Health-related quality of life (HRQL) measurement is often used to assess the consequences of burn injuries. More insight into HRQL measurement and outcomes is important in order to quantify the burden of burn injuries and to assess recovery pathways. The objectives of this study were therefore to assess which HRQL instruments are used and to examine recovery patterns of HRQL after burn injuries.
Methods A systematic review on HRQL after burn injuries was performed. Relevant databases were searched from the earliest record until October 2016. Original research studies that examined HRQL in children and/or adults after burn injuries were included. Risk of bias of included studies was scored using the QUIPS tool.
Results Thirty-one different HRQL instruments were used among the 125 included studies. The Burn Specific Health Scale – Brief (BSHS-B) (35%) and the Short Form – 36 (SF-36) (32%) were most often applied. Considerable variation was seen in recovery patterns at the short and long-term of both BSHS-B and SF-36 domains. Based on the SF-36 domains, most patients recovered towards the norm score in the long term, with the exception of the domains 'emotional role limitations' and 'physical role limitations'. Six BSHS-B domain outcomes showed improvement, whereas two others remained stable. The domain 'work' varied widely among studies in both the short- and long-term. Risk of bias in outcome measure-

ment was generally low, whereas high risk of bias in study attrition was seen in many studies (67%).
Conclusion This review demonstrates large variation in HRQL instruments used in burn research. Most of the domain outcomes from both the SF-36 and the BSHS-B showed improvement over time, excluding work, and emotional and physical functioning. These domains require more attention in the aftermath of burns in order to further improve HRQL after burns.

O7.02

TEN treatment without immunosuppressive therapy in a Burn Centre

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Introduction: Toxic epidermal necrolysis (TEN) is a serious and infrequent skin disease, usually secondary to drugs. Since the disease includes severe exfoliative disease it has been treated in Burn Centers due to large skin losses. Its high morbidity and mortality highlights the importance of early detection and appropriate treatment, although the most effective treatment remains currently controversial.
Objectives: The aim of our study was to evaluate the efficacy of *therapeutic abstention in* adult patients presenting TEN admitted during 2016 in a Burn Centre.
Methods: Ten patients with TEN were treated during year 2016 only with supportive care and without specific or immunosuppressive therapy. They were all admitted to Sevilla Burn Centre where a multidisciplinar approach and supportive care was established with conservative measures.
Results: Mortality rates were significantly reduced when compared to previous series in the same Burn Centre (38% versus 0%). Also, discharge times and hospital stay were also decreased.
Discussion/Conclusion: The many aspects of supportive care are well detailed in the guidelines, whilst with regard to specific treatments, the authors noted the lack of evidence-based medicine available. The scarcity of large randomised-controlled trials comparing treatment strategies reflects the rarity of the disease.
Immunosuppressive therapy has not emerged as optimal for TEN compared to supportive care. We present a series of ten patients treated only with supportive care and no specific drugs. In our experience and, given the lack of alternative evidence, conservative measurements alone worked very well with TEN patients while the disease natural history was taking place.
Nevertheless, in this potentially devastating condition only international co-operation and multicentre trials could give sufficient significant power to such studies.

O7.03

Cost effectiveness of Silver Delivery Approaches in the management of patients with superficial and deep-partial thickness burns

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Aim: To estimate the cost-effectiveness of silver delivery approaches in patients with superficial and deep-partial thickness burns using silver sulfadiazine (SSD) as the baseline i.e. Silver Barrier dressing (SBD)[a], Silver Hydrofiber Dressing (SHD)[b] and Silver Foam Dressing (SFD)[c].
Method: A decision analytic model was developed from a UK payer's perspective for adults with 20% mean TBSA. Outcomes were length of stay (LOS), infections and incidence of surgical procedures, Quality adjusted life years (QALYs) and costs.
Clinical data was obtained from a comprehensive meta-analysis of both randomised controlled trials (RCT) and observational studies[1]. Diagnostic related group cost and dressing costs were obtained from the NHS reference costs and drug tariff.
Results: The meta-analysis results showed statistically significant difference for all outcomes ($p<0.0001$) for SBD, while for SHD no difference in infections and significant differences in surgical procedures and LOS compared to SSD respectively. For SFD only LOS was significant compared to SSD.
The estimated QALYs were 0.98 vs 0.94 vs 0.95 vs 0.93 and mean cost per patient was £5,738, £8,794, £9,884 and £10,385 for SBD, SHD, SFD and SSD respectively. The analysis showed SBD to be less costly with better clinical outcomes compared to SHD, SFD and SSD saving **£3,057, £4,147** and **£4,647** per patient compared to SHD, SFD and SSD respectively. SHD was the second most cost-effective and SSD was dominated by all other silver dressings. The findings were robust in sensitivity analyses.
Conclusion: This analysis suggests that SBD is the most cost-effective silver delivery system followed by SHD and SFD then SSD in this patient population.
References: Nherera L, Indirect treatment comparison of antimicrobials in deep partial thickness burns, WUWHS, Florence, Sept 2016
[a] ACTICOAT◊ Smith & Nephew Hull, [b] Aquacel™Ag ConvaTec, Princeton, NJ, [c] Mepilex™Ag Molnlycke Health Care, Gothenburg.
◊Trademark of Smith and Nephew, ™All Trademarks acknowledged

O7.04

Functional restoration in burn injured patients after enzymatic eschar-lysis. Preliminary comparative study with surgical treatment.

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Objectives: The aim of the study is to compare the impact of enzymatic eschar-lysis (EE) with surgical treatment (ST) on functional recovery and quality of life (QoL), observing the characteristics of scar.
Methods: 40 burn patients, admitted to the Burn Centre of Niguarda Hospital in Milan since December 2015, were enrolled into this retrospective study in two arms (EE & ST) and matched according to depth of burn, TBSA, anatomical regions (hands, upper and lower limb, neck). Burn Specific Health Scale-Brief version (BSHS-B) and Barthel Index Modified (BIM) were applied to determine QoL and functional recovery. Vancouver Scale and The Patient and Observer Scar Assessment Scale (POSAS) judged the scars. The same rehabilitation program was adopted for all patients. Measurements were recorded before treatments, at discharge and follow-up.
Results: EE reduces time of hospitalization (by 23% for upper limb to 50% for hands). At discharge EE improves functional recovery: BIM, for lower limb, had similar results for both treatments, but with difference of 2 months of hospitalization; the greater difference was 33 points for hands. The consequences are decreased functional disabilities and improved QoL (up to 19 points BSHS-B for hands) . At follow up similar scores for BIM (93-100/100), BSHS-B (32-36/36) and Vancouver Scale (M1,V1,P1,H0) were noticed at 5 months for each area treated with surgery, whereas for EE were at 1,5 month (neck, upper limb), 3 (lower limb), 4 months (hands). At discharge and follow up POSAS gave better results for EE, with a difference of 2 points/10, with a substantial agreement between observer and patient.
Conclusion: EE patients healed faster so that the rehabilitation procedures could be initiated earlier. A larger cohort study should be done in order to corroborate these findings.

O7.05

The development and implementation of routine outcome measurement in burns care

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Objectives: Randomized controlled trials (RCTs) have been proclaimed as the holy grail for clinical research. Nevertheless substantial issues have been encountered with RCTs also in burn care. Datasets with routinely measured outcomes of care may serve as an alternative for RCTs. Furthermore, in healthcare there is an increasing demand to continuously evaluate and improve daily practice and to increase patient involvement in recovery and rehabilitation processes. Routine measurement of outcomes that are important from the patients' perspective can facilitate in all of the above. Therefore the Dutch burns centers in collaboration with the Dutch Burns Foundation have initiated an ambitious project to develop and implement routine outcome measurement in daily practice of burn care. The outcome registry serves three purposes: 1) real time data feedback for the patient and practitioner 2) continuous quality improvement and comparisons of outcomes in and between the Dutch burns centers 3) use of the data for comparative effectiveness research.
Methods: This project consists of multiple phases. In phase 1 a core outcome set with accompanying measurement instruments and measurement trajectories (who will complete which measurement when) will be defined with the input of professionals and patients. In phase 2 a state-of-the-art electronic measurement system including real-time feedback for patient and practitioner will be developed and piloted. In phase 3 the measurement system will be adapted and implemented in the Dutch burns centers.
Results: We aim to have completed phase 1 in August 2017 and will be able to present these results at the EBA congress.
Discussion / Conclusion: This project is one of the largest data projects in the burns area. As routine outcome measurement is on the agenda of many national and international burns societies we would like to share and discuss the pearls and pitfalls experienced so far with the international burns community.

O7.06

The toxic shock syndrome in paediatric burns registry – first results

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Objective: Toxic shock syndrome (TSS) is a rare, but potentially life-threatening complication of thermal injuries in children. To address the lack of high-quality evidence to guide clinical decision-making, an electronic disease registry was created. The study objective was to review the first cases entered into the Toxic Shock Syndrome in Paediatric Burns
Registry.
Methods: In 2012 the Toxic Shock Syndrome in Paediatric Burns Registry was established in a collaborative effort between two tertiary paediatric burns centres in Zurich and Toronto. After obtaining Research Ethics Board approval, patients aged 0 to 16 years who were treated for TSS after a thermal injury at the two institutions were entered into the registry. Data on patient characteristics, symptoms, laboratory parameters, management and outcome were extracted from paper and electronic patient charts. Descriptive statistics were performed.
Results: Fourteen anonymized TSS-cases from Zurich (n = 11) and Toronto (n = 3) were identified. The median age was 17 months (range 9 months - 14 years), 12 (86%) were male and 2 (14%) were female, 3 (21%) suffered burns and 11 (79%) sustained scalds with a median of 8% affected total body surface area (range 2%-30%). Diagnosis of TSS was made on post-trauma day 4 in median (range 3-34). Eleven out of 14 patients received intensive care with a median of 2 days (range 1-14). The total length of stay was 14 days in median (range 4-176). Survivors (13/14) had no long-term sequelae besides scars. One 13-month old boy died 3 days after a 7%-BSA scald.
Discussion/Conclusion: Diagnosis and management of TSS in paediatric burns remain challenging and awareness among treating clinicians is crucial for favourable outcomes. International contributions to the disease registry are required to allow for stronger conclusions and an increase in higher quality evidence in this field.

O8.01

Post Burn Ectropion Correction Of Upper Eyelid With Full Thickness Skin Graft and 40% overcorrection - A Prospective Study

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Objective: This study describes the procedure of 40% over correction needed in case of upper eyelid post burn cicatricial ectropion release and coverage with FTSG as FTSG have more primary contraction potential.
Methods: This was a prospective observational study done in the Department of Plastic Surgery, Dhaka Medical College Hospital, Dhaka, from January 2015 to December 2015. 40% over correction with FTSG was used in the treatment of 21 upper eyelid ectropion of 20 patient. Vertical distance between lower eyelid margin to malar fold was divided into 3 equal portions with 2 imaginary line when 1 portion equals to 33% (approx.). Release of ectropion was such extent that upper lid margin should touch the mid point of middle portion of the defined area or goes beyond the mid point. Then it assumed that adequate 40% over correction is achieved. Post-operative complete eyelid closure and graft take were used as outcome measures.
Result: A total of 14 eyelids of male and 7 eyelids of female made up the study groups. After release and overcorrection wound dimension was mean horizontal length 40.86 ± 5.50 mm. Minimum HL is 30 mm and maximum is 60 mm. Mean vertical length is 29.86 ± 4.28 mm. Minimum VL is 21 mm and maximum is 36 mm. In 19 (90.48%) cases complete
graft was obtained, 10% graft loss in 1(4.76%) case and 20% graft loss in 1 (4.76%) case survival. Palpebral fissure measurements were compared preoperative and post-operatively and p value was <0.001 in closed state, which was highly significant. Outcome were excellent in 12 (57.1%), satisfactory 7 (33.3%) and poor outcome in 2 (9.52%) cases.
Conclusion: 40% over correction with full thickness skin graft may be used as a reasonable reconstructive option for post burn cicatricial upper eyelid ectropion.

O8.02

The dorsal ulnar artery flap use in the treatment of burn injuries of the hand

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Soft tissue defects of the hand as a consequence of a burn injury require early coverage to preserve hand function and enable rehabilitation. An adequate amount of healthy tissue must be placed into the site of the lesion to prevent and treat contractures, hypertrophic scarring, and syndactylias.
We have evaluated the use of dorsal ulnar artery flap in five patients with soft tissue defect of the hand following burn injury and in the treatment of postburn palmar contractures.
The dorsal ulnar artery flap is a pedicle flap based on dorsal ulnar artery. A large flap up to 20 cm long and 9 cm wide of vascularised tissue can be used to cover defects of the wrist, the palmar and dorsal surfaces of the hand and wrist and the thenar and hypothenar eminences and offers a number of advantages. The flap is centered along the mid axis of the ulna, between the tendon of the palmaris longus and the level of the extensor digitorum communis tendon of the fourth finger. Length is calculated according to the size of the defect, axis of rotation occurs 2 – 4 cm from the pisiform.

We have treated five patients using dorsal ulnar artery flap with good results. In four patients we used this flap forthe coverage of palmar defects resulting from radical release of postburn contractures.
In one case this flap was used in acute setting for the cover of the thumb and thenar area. Before surgery an angiographic examination and Allen test must be preformed to confirm adequate blood supply in the hand and palm area.
The dorsal ulnar artery flap is therefore considered to be a good option for covering soft tissue post-excisional defects of the hand in selected patients, without sacrificing any major vascular axis of the hand.

O8.03

The Effect of Autograft Adipose-Derived Stem Cells on Angiogenesis of Random Skin Flap in Rats

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Background: Flap necrosis caused by inadequate blood flow is a common complication of reconstructive surgeries. Since the angiogenic potential of stem cells has been proved, the purpose of this study was to evaluate the effect of autograft adipose-derived stem cells on angiogenesis of random skin flap in rat.
Materials and Methods: This experimental study was conducted in 2015 in laboratory animals of Hazrat Fatima Hospital. In this study 24 male Sprague-Dawley rats weighing approximately 300-350 g were divided into two groups after anesthesia. In the study group, autograft stem cells were prepared and cultured from fat tissue of inguinal area and then injected subcutaneously into the base of random flap. Normal saline was injected in the control group.
Photographs on days 7 and 14 were taken to determine the extent of flap necrosis and then the flap base was sampled on day 14 for histopathologic examination and counting the number of capillaries.
Results: The comparison between the two groups at days 7 and 14 of viable surface area of flap and angiogenesis results showed a statistically significant difference ($P<0.000$), so that the average of them was more than stem cells group.
Conclusion: These findings suggest that adipose-derived stem cells have the potential to improve the random flap viability.
This mechanism can happen either through differentiation of these cells into endothelial or indirectly by increasing angiogenesis.

O8.04

Acellular allodermis grafts prepared by a novel method for use in burns and reconstructive surgery

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Objectives: The acellular allogenic dermis (AAD) plays an important role in burn medicine, plastic and reconstructive surgery. Currently used skin decellularization methods include a combination of enzymatic, chemical and physical procedures increasing the price of the final product. We developed a novel decellularization method including minimum steps with only a few chemicals.
Methods: Skin grafts for AAD preparation were supplied by the Bratislava Central Tissue Bank.
The new decellularization protocol involves the following steps: proteolytic enzyme (trypsin) used for epidermis detachement, scraping of the epidermis from dermis, dermal cells lysis by repeated hypotonic sterile water bath, decontamination by a mix of antibiotics, cryopreservation, packing and storage of AAD in deep freezer. Product samples from each step were taken and fixed by buffered formalin for histology.
Results: Successful process of decellularization was confirmed with both histology and DNA analyses. No remaining cells in the final AAD product have been detected. Cytotoxic testing confirmed nontoxicity of the final AAD.
Discussion/conclusion: The new decellularization method allows to prepare AAD from both freshly procured and cryopreserved skin allografts. Another advantage is its simplicity and cost-effectiveness which could increase its accessibility in routine clinical use. The nontoxicity is a crucial factor for AAD use as a scaffold for cultivation of different cell types.

O8.05

Vascularised Composite Allotransplantation for Burns Reconstruction - Review of Worldwide Experience and Special Considerations

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Objectives: Conventional reconstructive options are limited in extensive facial burns. Transplantation of vascularised composite allografts (VCAs) allows for reconstruction with functional tissue units that enable like-for-like restoration.
As worldwide experience in VCA transplantation increases, reports of reconstructive transplantation in the setting of extensive burns has emerged.
The acute management of extensive burns can lead to the development of anti-HLA antibodies, however the role of antibody-mediated rejection (AMR), donor-specific antibody (DSA) formation and the immunological sequalae in the context of VCA remains unclear.
We reviewed the reported immunological outcomes of facial transplant recipients following extensive craniofacial burn injuries.
Methods: A PubMed search for clinical case reports of facial allotransplantation following burn injury was performed (to December 2016). Data abstraction included HLA matching, pre-transplant panel reactive antibody (PRA) status, acute management strategies and post-operative immunological outcomes.
Results: 10 full or partial facial transplants have been performed for the reconstruction of extensive burn injuries. 7 are published cases with 6 patients maintaining graft integrity at follow up (mean 7 months). The degree of HLA mismatching varied from 0/6 to full 6/6 mismatch, with concurrent variation reported in the presence of PRA prior to transplantation (0-98%).
Notably, one patient demonstrated 98% PRA positivity, four AR episodes and concurrent C4d vascular deposition. Such vascular lesions were not noted in other cases where anti-HLA antibodies were not reported prior to transplantation.
Pre-transplant surgery including serial debridement, autologous grafting and free flap reconstruction were reported for all patients.
Discussion/ Conclusion:
Currently employed acute management strategies predispose to the development of anti-HLA antibodies, adding to the already complex immunological challenge of VCA. Early appropriate care is warranted in patients with extensive burn injuries where the resuscitative needs should be balanced against strategies to mitigate the immunological burden, particularly as VCA transplantation becomes a feasible option for future reconstruction.

O8.06

Intralesional Cryosurgery for Keloid Scars: Outcomes from a UK Plastic Surgery Unit

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Objectives: Keloid scars have proven difficult in which to achieve consistently favourable outcomes. Research has tended to focus upon manipulation of the physiologic basis of wound healing. Intralesional cryosurgery has been described as a method of achieving control of keloid scars, using rapid freezing to induce a local "frostbite" injury. The study aim was to evaluate outcomes from this newly-introduced technique in a UK burns and plastic surgery unit and to consider its utility and place within available scar treatment guidelines.
Methods: Intralesional cryotherapy (CryoShape, Etgar Group, Israel) was used to treat keloid scars in 25 patients, with 30 scars, over a 16 year period. Follow up time was 6-24 months. In each case, the treatment was used as a second- or third-line line therapy. Pre-operatively, scars were evaluated by measurement and by associated symptoms. Additionally, quantitative POSAS scar scores were obtained pre-operatively and post-operatively. Outcomes included: response to treatment; effect on scar volume; change in symptoms; recurrence; post-procedure pain; post-procedure bleeding and loss of pigmentation.
Results: Most treatments were carried out under local anaesthetic (88%, *n*=22/25). All scars responded to treatment. Scar volume reductions varied from 25% to 100% with a single treatment. Recurrence was noted in one patient, with a history of recurrence of keloid after radiotherapy. Associated symptoms reduced dramatically after treatment, with sustained improvements observed over 6-19 months. Hypopigmentation occurred in every patient with pigmented skin. However this resolved in most cases, within 12 months.
Discussion: Intralesional cryosurgery is a safe and effective technique in the treatment of keloid scars, delivering good scar volume reductions and improvements in associated symptoms. These are maintained in the medium-term. In most cases it is suitable for use as a local anaesthetic day case treatment. This treatment warrants further investigation with randomised trials.

O9.01

Evidence based guidelines in Dutch burn care

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Objectives: Guideline development is an important method to assist conversion of scientific evidence into practice. Guidelines are especially useful for diseases/ trauma that do not occur frequently enough to develop na-

tionwide medical routine, such as burns. Although most burns are treated in primary and secondary care, the medical professionals in those settings have far less individual exposure to burn patients compared to professionals in tertiary care. Guidelines can support decision-making by medical professionals not familiar with burns and help to standardise and improve medical care for burn patients. The objective of Dutch burn professionals was to improve burn care delivered in primary and secondary care by developing guidelines.
Methods: Representatives of medical disciplines involved in burn care in primary, secondary and tertiary care reviewed and summarised the literature on the most urgent topics in burn care. The evidence was combined with expert opinion, applicability in Dutch healthcare and patient preferences. Group discussions led to the formulation of recommendations.
Results: Two guidelines were developed. The first describes the care delivered in the first 24 hours, including first aid, cooling, primary/secondary survey, intubation, burn size estimation, fluid resuscitation, referral criteria and possible transfer to a burn centre. The second guideline describes the care for burn
patients in primary and secondary care. The following topics were included: burn depth estimation, treatment setting (primary/secondary/tertiary care), wound treatment, pain management, consultation options, psychological/psychosocial (after)care, and rehabilitation. Recommendations were summarised in flow charts in order to facilitate implementation.
Discussion: Burn specialists possess the knowledge necessary for state-of-the-art burn care delivered to severely burned patients treated in burn centres. They also have the obligation to share their knowledge in order to improve burn care delivered to patients with smaller burns treated in primary and secondary care. Guidelines can help disseminating knowledge and improve burn care for all patients.

O9.02

Night club fire disaster in Bucharest: the experience of the Brussels military burn center, the tale of a successful European collaboration.

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In the aftermath of the "Club Colectiv" tragedy on the 30th of October 2015, the Brussels military burn center received the mission to fly a burn team (B-team) to Bucharest to evaluate and accept eight severe burn victims. We would like to share the lessons learned from this calamity, as a burn team and burn center and as part of a EU collaborative effort.
We conducted a retrospective study based on patient data analysis and literature review.
The B-team sent to Bucharest on November the 5th, 2015, performed the secondary triage of 120 casualties in 11 hospitals over 10 hours. The criteria they used for triage and eligibility and prioritization for air evacuation (AE) consisted of TBSA burned, localization and depth of the burn wounds, ventilation and hemodynamic parameters compatible with AE, tolerance to intrahospital transportation, bedside Glasgow Coma Scale (GCS) and social and cultural backgrounds. In Brussels, on postburn day #9, we admitted eight severely burnt patients aged 15-42 years (mean 28 years) with TBSAb 15-54% (mean 34%) and including 3 with smoke inhalation injuries. We activated our mass casualty disaster plan and the Belgian Association for Burn Injuries (BABI) disaster plan to prepare for the simultaneous admission of 8 severe burn casualties. None of the patients died. Despite victim's colonization and infection with multidrug resistant germs, there was no outbreak in our burn center. A European plan similar to the BABI plan could be set up to deal with mass burn casualty disasters in Europe. The EBA was mandated by the European Commission to design a European Response Plan for Mass Burns Casualty Disasters (MBCD).
This is the story of a successful collaboration between Romania and Belgium. The call for a European Response Plan for MBCD has emerged as a consequence of this tragedy.

O9.03

Developing a European Response Mechanism for Mass Burn Casualty Disasters - Suggestions from the EBA MBCD working group

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Background: Disaster planning is one of the core interests of the EBA. However, it has proven difficult for a single organisation, such as the EBA, to implement a coordinated European plan. Lately an initiative by the EU might revive the possibilities for a collective European response mechanism. In response to the events after the Romanian "Colectiv" fire disaster in 2015, the EU invited member states partake in developing an European Mass Burn Casualty Disaster (MBCD) response mechanism. The EBA was asked for guidance in the development of medical care guidelines.

Methods: The EBA executive board appointed a MBCD working group in September 2016, which consisted of three anaesthesiologists/intensivists and three surgeons. Several online meetings were conducted in addition to one physical meeting in Oslo, Norway. Available literature on disaster planning and experiences were reviewed and group consensus was developed.
Results: Recent and past experiences show the need for a well planned and coordinated response mechanism in Europe. Efficiency and timely intervention seems essential. Alleviating the burden of care in the affected country might best be done by focusing on secondary assessment, and on secondary dispatching of patients to treatment facilities in helping countries. Practical implementation involves quick deployment of specialized Burn teams.
Conclusion: The EBA MBCD working group suggests standards for the medical part of a European MBCD response mechanism that includes Burn teams, burn casualty assessment template, triage guidelines, templates for requesting and offering assistance, suggested standards for long distance in-flight care, and conduction of burn team exercises.

O9.04

Teleburn- An Evolution from Novelty to Necessity
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Objective: Assessing burn injuries straight forward. Appropriate triage of burn injuries is difficult for providers who don't often treat burns. Using the telephone to provide a verbal description of injuries often leads to under/over triage. Over and under triage is a waste of resources, contributes to treatment delay in, leading to potential complications.
Since 2008, our burn center has utilized a Teleburn program to augment the verbal description of burn injures by using digital pictures sent by the referring physician to our burn surgeons. This software has
enhanced the triage process and has become indespencible. It is now installed in over 125 referal centers within our burn center's coverage area.
Methods: Teleburn[sm] is a store and forward system that allows preburn providers to upload 1-4 photographs to a HIPAA compliant, web-based interface and transmit them to our burn providers, 24 hours a day, 7 days a week. Our providers are able to view the photographs of the injury and have a discussion with the referring physician, in real-time. An accurate assessment of the burn injury leads to the patient being admitted emergently at our burn center, told to follow up at our clinic, or follow up at a local facility.
Results: Teleburn[sm] has evolved much in last 7 years, going from a computer based program to a mobile application. We have utilized the process to assist in the triage of nearly 5000 patients. A retrospective analysis of Teleburn[sm] metrics reveals that in addition to decreasing over and under triage, Teleburn[sm] usage has increased the size of our burn centers coverage area, increased collaborative performance improvement between our burn center and our referring facilities and has directly impacted volume growth within both our inpatient and outpatient centers.
Conclusion: Teleburn capability is a necessity in every burn center to facilitate efficient triage.

O9.05

March 22nd 2016: The day at the Burn Unit Queen Astrid Military Hospital
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Objectives: Describe the routine functional adaptation of the Burn Unit during a massive influx of victims during the period after the attacks on the International Airport Brussels and the Subway Station Maelbeek, Brussels European center.
Methods: Description of the functional adaptations made this day in daily work and infrastructure in the Burn Unit
Results: The adaptations indicate that the use of a military infrastructure and hospital in an unconventional context decreases the otherwise considerable pressure on medical infrastructure and workload in specific hospital sectors.
Discussion/conclusion: The close collaboration and trust between military facilities as here, the military hospital, (due to their experience and knowledge with burn-victims and injuries commonly associated with combat) allowed for a rapid and effective response as resources began to dwindle.

O9.06

Lessons identified from the terrorist attacks on March 22, 2016: the experiences of the Brussels military burn center.
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Objectives: On the 22[nd] of March 2016, our burn center was faced with a large influx of victims of the terrorist attacks in the National Airport and a metro station in Brussels. Twenty-three victims with severe blast- and fragmentation injuries, as well as burns, were assessed and triaged. The purpose of this study was to analyze pa-

tient data and personnel responses in order to identify lessons to help refine and strengthen planning and training for future mass casualty incidents (MCIs).
Methods: We conducted a retrospective study based on patient data and literature review.
Results: Eighteen of the 23 assessed casualties were brought directly from the explosion site; 5 were referred from other hospitals. The burn-specific mortality prediction models predicted a low risk of mortality in our burn patients (1.1 ± 2.5%). However, the injury severity score (ISS) indicated a significantly higher mortality risk of 10% (average ISS of 16.7 ± 17%), due of the multiple blast- and fragmentation injuries. This aside, none of the patients died during hospitalization or during follow up. Eardrum perforation and eye injuries were frequent (respectively 80% & 60%). Acute distal arterial occlusion of foot needed venous graft bypass in 2 patients. Intra abdominal bleeding and severe spinal injury was encountered in one patient with an ISS of 66.
Discussion and conclusion: The staff of the burn unit had been primed through practice during previous MCIs involving burn patients, such as the gas pipeline explosion in Ghislenghien (2004) and more recently the admission of eight severely burned patients from a nightclub fire in Bucharest (2015). With this paper we would like to emphasize the importance of staff, supplies and infrastructure for triage and treatment; damage control resuscitation and surgery; facilities and staff for debridement and wound care; as well as the importance of drills and training.

O10.01

NexoBrid potential in early debridement of Sulfur Mustard contaminated skin: A concept validation porcine study

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Objectives: Sulfur Mustard (SM) is a potent vesicating agent causing long lasting injuries to the skin, eyes and respiratory system. Invented more than 100 years ago, it is still used as a chemical warfare and terrorism agent, leading to mass casualties. The aim of this study was to test the efficacy of enzymatic debridement with NexoBrid® (NXB) as a possible solution for SM burns.
Methods: A porcine pilot study was conducted, including 4 pigs. All procedures involving animals were in accordance with the Guide for the Care and Use of Laboratory Animals, National Academy Press, Washington, DC, 1996, and were approved by the IIBR Institutional Animal Care and Use Committee. The same SM dose was applied on six areas on each side of the spine inflicting 12 equal typical superficial SM burns on each animal. At times 0, 24 hours, 48 hours and 6 days - 6 burns were treated with NXB, 3 were mechanically dermabraded (sham) and 3 were not debrided (control). Biopsies were taken from all sites.
Results: In NXB treated wounds at times 0, 24 and 48 hours only damaged tissue was removed as observed in the histological sections of biopsies taken immediately following the 4 hour debridement. Necrotic tissue (epidermis and upper dermis) was seen mostly in the sham & control biopsies, while absent following NXB. NXB effect was not seen on day 6 where all burns were seen covered with a necrotic layer.
Conclusions: This concept validation study indicates NXB may be effective in dissolving SM contaminated skin at least as well as mechanical dermabrasion. Based on this study, larger statistically powered studies should assess NXB efficacy in deeper wounds, the effect on wound healing and potential benefits that may originate from the unique characteristics of medical grade Bromelain.
Funding: by MediWound LTD.

O10.02

The review of tissue decellurization methods in a treatment of burns

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Objectives: A large number of effective procedures for regenerative medicine (burn treatment) can be based on cell-free materials consisting of the extracellular matrix ECM or single, individual components of the ECM. The process of decellurization consists of
chemical, physical and enzymatic techniques of elimination of cellular components. It must be stressed that the preserving the natural nanostructure
and composition properties of decellurized ECM is highly desirable. Today, a further development of such methods is currently observed moreover and existing knowledge about the processes occurring in the body of the recipient after transplantation of decellurized tissue or whole organ has widen.
Materials and methods: Key words related to tissue decellularization and ECM were used to search relevant databases (NCBI MedLine, Clinical Key, Clinicaltrials.gov, and MedlinePlus). This presentation was based on 177 literature sources of which 129 (72.9 %) had been released after 2011.
Results: All proposed physical, chemical and biologic methods (used separately or in combination) to extract cells from tissues (e.g. skin) often cause a disruption of

the ECM texture and probable loss of important structure components.
Discussion: Although cell-free ECM scaffolds (e.g. acellular dermal matrix) are generally classified as medical devices, there are no widely accepted or legally defined criteria for quality control / evaluation methods of obtained matrices. Such criteria must be provided. Some of them have been proposed in this presentation.

O10.03

Effectiveness of automated UVC-light for decontamination of textiles inoculated with enterococcus faecium

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Introduction: Healthcare textiles are increasingly recognized as potential vehicles for inter-patient transmission of hospital pathogens. Especially in burn patients hospital acquired infections may have deleterious consequences. UVC-light has proven effective for the eradication of pathogens residing on hard surfaces, with $\log_{10}$ reductions by more than 4.0.
The aim of this study was to evaluate the efficacy of automated UVC-light for decontamination of healthcare textiles in a clinical setting.
Materials and Methods: Sterile polycotton (50% cotton, 50% polyester) swatches were contaminated with 1ml of Enterococcus faecium broth containing approximately 10^8 CFU/ml. Five contaminated swatches were distributed to defined spots across an unoccupied burn ward room.
The Tru-D® automated room decontamination unit was centred in the room and decontamination was carried out until a reflective UVC-light dose of 22 000 µWs/cm² had been registered by the device. Two swatches served as control and did not receive any treatment. After decontamination, viable counts were done to determine the degree of decontamination. The experiment was carried out 10 times. Statistical analysis was done with Wilcoxon's signed rank test.
Results: The mean time required for decontamination was 111 minutes. UVC decontamination resulted in an average reduction of viable bacteria by 1.37$\log_{10}$ units compared to controls (p=0.005).
Discussion: A consistent reduction of bacteria residing in textiles could be achieved. Previous studies reported a greater reduction of bacteria inoculated onto hard surfaces though. However, automated UVC-decontamination may be a feasible method to preserve the cleanliness of healthcare textiles in place.

O10.04

Do Serum Calcium Levels Play a Role in Burn Prognostication? A Study of Bone Profile Trends.

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Introduction: Severe burn injuries have been known to result in hyper metabolic state even beyond the acute phase of injury. The systemic inflammatory and stress response following burn injuries, coupled with prolonged immobilization in large burns triggers bone resorption and apoptosis of osteoblasts. The role of haematological indices such as bone profile (adjusted calcium, alkaline phosphatase, phosphate) and the changes in their trends have not yet been fully understood. This study aims to review trends of adjusted calcium, alkaline phosphatase and phosphate in burn patients as well as statistically analyse the impact of changes of these indices on mortality stratified according to burn size.
Methodology: A 5-year retrospective review of all adult burn patients admitted to a regional burn centre was conducted. Patients not admitted were excluded, as they would not have routine blood tests taken. Data was collected from case notes and laboratory reports. Microsoft Excel (version 2011) was used to analyse data. Fisher's exact test was used for discreet data whilst univariate logistic regression was used to analyse any relationship between these bone profile results and mortality.
Results: 247 adults with ages 50.2 +/- 20.35 (SD) years, who were admitted consecutively during a 5-year period, were divided into 2 subgroups, 154 with burns covering more than 15% TBSA and 93 with burns less than 15% TBSA. Blood specimens were obtained daily for bone profile tests. The difference in changes of adjusted Ca between the two subgroups during their inpatient stay were found to be statistically significant (p-value 0.01).
Conclusion: The effects of burn injury on mineral ions are yet to be fully understood. Monitoring adjusted Ca levels as an index of severity of the systemic inflammatory and stress response to burn injuries is recommended, as they may have an impact on mortality according to burn size.

O10.05

Agreement of burn size estimations: result of five data sets

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Objectives: The determination of the burned TBSA is done by different methods. Regardless the used method there are 2 key factors for quality: (1) the average error of estimation of real wound sizes, as well as (2) the agreement of estimation of different raters (Inter-Rater-Reliability, IRR). Especially for comparisons and for aggregations of size assessments the IRR has an important role.
The IRR for five datasets will be investigated with regards to method, experience of raters and education of raters. As measure of the IRR the Intra-Class-Correlation will be used.
Methods: For assessment of the TBSA-B mannequins with artificial wounds have been prepared. By use of 2D and 3D Scans the TBSA of the mannequin and the TBSA-B of each wound was measured as a gold standard. In one data set the TBSA-B was marked on photos with highlights borders only.
The IRR of the individual TBSA-B estimations were determined by Intra-Class-Correlation, variant ICC(2,1). In contrast to the classic Pearson-Correlation the ICC(2,1) has the advantage, to handle offset errors as well as multiplicative errors. An ICC of 1,0 can only be reached by exact agreement, an over-estimation of 100% would mean an ICC of 0,49.
Results: In the years from 2010 to 2016 multiple data-sets of TBSA-B assessments investigations have been created within the scope of scientific conferences (German Speaking Burns Meeting, European Burns Association) as well as in a separate study with paramedics. The raters have been asked to use different Methods (Hand-Rule, Rule-of-Nines, Lund-Browder Chart, 2D/3D computer aided methods).
In relation to the gold-standard the resulting average ICC(2,1) ranges from 0,25 to 0.97.
Discussion / Conclusion: Even unexperienced raters (e.g. paramedics, SAN 2015) can reach good agreement with the gold standard. By high qualified burn experts, the usage of computer-aided methods showed a significant improvement of the Inter-Rater-Reliability.

O10.06

Perfusion Evaluation by Laser Speckle Contrast Analysis (LASCA) imaging in burned patients, finger replantations and scars

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Background: Successful of tissue transplantation and long-term tissue stability after wound healing depends on sufficient tissue perfusion. Laser Doppler-supported procedures provide relative perfusion values to support clinical judgement. The development of Speckle-based Laser Doppler (LASCA) imaging allows real-time representation of tissue perfusion. Perfusion of scars, phalangeal replantations and burn wounds were systematically analysed by (LASCA) imaging.
Method: Perfusion of skin, scars, replanted fingers and different burn wounds (IIa, IIb and III) were systematically examined by LASCA imaging. Baseline perfusion of control tissue and perfusion values of compromised tissues were quantified and compared.
Results: LASCA imaging shows significant differences in baseline perfusion of skin compared to atrophic scars, hypertrophic scars and keloids. Finger replantations with subsequent replantation failure show a characteristic and significant hypoperfusion in line with clinical appearance. A significant difference in tissue perfusion is seen in superficial (IIa) and superficial deep (IIb) burns, which are clinicallly difficult to judge. Hypoperfusion hallmarks and significantly distinguishes deep burns (III) from grade IIa and IIb burn wounds with increased perfusion patterns. In addition, characteristic perfusion values of different burn degrees are in line with the chosen treatment strategies, retrospectively.
Conclusion: LASCA imaging is a reliable method of perfusion imaging, which combines high resolution and speed. Hypoperfusion of tissues scars, finger replantations and the different burn degrees can be quantified by LASCA imaging with high precision. Easy use and immediate real-time imaging make LASCA imaging a tool for standard evaluation of tissue perfusion following surgical procedures and burn depth evaluation.

O11.01

Changes in patterns of treatment of burned children at the Linkoping Burn Centre, Sweden, 2009-2014

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Objectives: Children are a relatively large group among patients with burns in Sweden. We changed the management of children's burns to a flexible, outpatient-based plan. The aim was to follow up the outpatient management for children's burns during the period 2009– 2014, and track it, to find out to what extent the patients had been treated flexibly as outpatients, and to clarify the reasons behind those who did not fit in the plan. Methods: Descriptive retrospective analysis dividing the patients into three groups: inpatients only, flexible management, and outpatients. Other variables recorded included: age, sex, percentage total body surface area burned (TBSA%), percentage full thickness burn (FTB%), cause of burn, county of residence, operations required, number of visits to the outpatient department, costs, and duration of overnight stay in the hospital.
Results: The study group included 620 children: nine

were managed strictly as inpatients, 204 as flexible outpatients, and 407 strictly as outpatients. Among the total there were 269 children who came from remote areas (43%), and of these 260 were treated as outpatients and flexible outpatients. Median TBSA% in the whole group was 1 (10th–90th centile 0–9) with the biggest median TBSA% 12 (5–38) in the inpatient group. The most common cause of injury was scalds (332/620, 54%). Costs/patient(US$) was lower in the flexible outpatient group than in the inpatient group (median 10 557 (3213–35802) and 35343 (7344–66554), respectively). Discussion & **Conclusion:** Based on the results, we expect that the flexible outpatient treatment plan for children with minor to moderate burns can be expanded in the future. The results encourage us to continue the service and to further reduce duration of stay in hospital below the level already achieved (25% of the whole period of care).

O11.02

The inflammatory response pattern among children with scalds

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Objectives: Scalds are the most common type of burn injury in the pediatric population and burn wound infections in this population are common and poses a clinical problem. we aimed in this study to describe the inflammatory response in the first two weeks after injury among scalded children .
Methods: Retrospective pediatric scalds cohort study analyzing all admissions to a Swedish national burn centre during 2010-2016. Patients, The following variables were registered: Age, sex, TBSA%, burn depth, clinical signs of infection, C-reactive protein (CRP), Pro-calcitonin (PCT), White Blood Cell count (WCC).
Results: We studied 216 children, of whom 127 were boys (59%), mean age was 2.2 years (SD 1.5), and mean wound healing time was 19.4 days (SD 12.1). CRP concentration was initially raised in the study group. The CRP levels had an initial rise in the first week followed by depression in the second week, which was noted in the case of Procalcitonin while the white blood cells showing a rising pattern in the seond week compared to the first week after injury.
Discussion& Conclusion: The inflammatory response pattern among children with trivial scalds is showing an appreciable rise in the first week of injury and subsides in the 2nd week except for the increase in WCC which can last longer. Correlation was found between the maximum values of CRP and WCC and TBSA% and hospital stay and wound healing time (CRP).

O11.03

Late enzymatic debridement of severe burns - a monocentric study

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Objectives: The standard of care (SOC) for severe burns is surgical debridement followed by transplantation of skin grafts. Due to SOC's limitations in functional and aesthetic outcome, enzymatic debridement evolved as alternative treatment over the last few years. Enzymatic debridement is commonly used 0-48 hours after burn injury. The current literature dose not report delayed enzymatic debridement beyond 72 hours after trauma.. The aim of this study was to investigate complications, limitations and outcome of late enzymatic debridement.
Patients and methods: From 01/2016 – 01/2017 late enzymatic debridement was used in 9 patients that suffered deep partial- or full-thickness burns. Computerized medical records were retrospectively analysed. The following parameters were evaluated: medical state at admission, total number of further surgical interventions, wound infections, wound healing time, duration of hospitalization and rehabilitation and functional or rather aesthetic outcome.
Results: Nexobrid was used 10.1 (3-16) days after burn-injury in 10.1 (0.5-18)% burned body surface amongst 1 female and 8 male patients. At admission patients had a burned total body surface area of 25.9 (0.5-67)% and an ABSI of 8.4 (5-12). Secondary surgical treatment was performed in 44.4% of all patients with 1.1 (0-4) interventions. No wound infection was recorded while 33.3% had prolonged wound healing. Hospitalization time was 33.3 (1-90) days with 20.6 (0-68) days in the intensive care unit. After burn center treatment 2 patients underwent rehabilitation for 69 (59-79) days.
Discussion/Conclusion: Late enzymatic debridement can be an effective therapy in severe burn patients. In our setting it was frequently used rather as an adjunct therapy to surgical therapy in adequate localizations than as sole treatment.

O11.04

The Frailty Scale-Modified Baux Score: the new benchmark?

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Objectives: It is generally accepted that burns in the elderly have a higher mortality. We previously reported frailty as an adjunct for predicting outcome in burns >10%TBSA admitted to a burns HDU/ICU, however, the full impact of frailty in elderly patients with burns of any size has not been comprehensively examined. We investigated our

outcomes for all burn-injured patients >65 years.
Methods: A retrospective analysis of medical notes for patients >65 years admitted between January 2008-December 2015 was performed. The data set included standard demographics, burn parameters, surgical management, length of stay, medical history and survival. Frailty measures included clinical frailty scale, presence of polypharmacy and dementia. The data was analysed to evaluate the impact of frailty on outcome and assess how Baux Score may be further modified to improve prediction.
Results: 373 patients met the inclusion criteria. 125 short-stay patients (33.5%) were excluded. Mean age was 73.4 years (range 65-98 years) and burn size was 10%TBSA (range 0.5%-98%TBSA). Increased premorbid frailty was clearly linked to poor outcome and increased mortality. The most significant finding was the previously unrecognised link between frailty and poor outcome for small burns, sometimes only 0.5%TBSA in size. Based on the demographics collated and correcting for frailty, there was no significant difference between those who survived and those who died.
Discussion and Conclusions
The modified Baux Score remains a commonly used predictor of outcome in burns for all ages, however, in the elderly population, its efficacy is compromised by biological rather than chronological age. The Clinical Frailty Scale (and polypharmacy on admission) can be used to modify the Baux Score and improve outcome prediction. Our most important finding was how a relatively minor burn can akin to a fractured neck of femur herald a patient's inability to cope. These patients need to be targeted appropriately.

O11.05

The use of epifast® (live cultured human keratinocytes) in paediatric burn scald: long term benefits

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Introduction: Scald burn in the pediatric patient represents one of the most frequent causes of emergency care in our country and is the number one cause of all causes of burns in children ≤5 years (80%). The use of epifast® as a biological dressing in the treatment of mixed second-degree burns has shown short-term benefits, being a good form of treatment for this type of patients.
Objectives: To demonstrate the long-term benefits in the pediatric patient with mixed second-degree burns scald treated whit epifast®
Material and methods: records of patients ≤5 years old were included 1 year prior to the present study, analyzing sex, cause, depth, percentage affected, treated with epifast®. The Vancouver Scale was applied, recording data.
Results: from April 2014 to April 2016, the 71 files of patients ≤5 years with scalding burn and mixed second-degree affection treated with epifast® were collected. 69% male (49), 31% female (22), mean age 1.9 years (range 8 months to 5 years), mean percentage 15% (range 5 to 25%), all had mixed 2nd degree burn by scald and treated with epifast®. The results were evaluated in 55 patients (12 cases lacked follow-up and 4 cases presented deepening), recording the results in a format that included the Vancouver scale application averaging 2.9.
Conclusions: 71% of the cases were evaluated, showing that patients under 5 years of age with scald burn and 2nd degree mixed condition can be managed with live keratinocytes cultured in vitro (epifast®) obtaining favorable results to long-term scarring, as a good alternative to avoid keloid scarring.

O11.06

In Hot Soup - An Asian perspective of paediatric burn epidemiology presenting in Singapore

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Objectives: KK Women's and Children's Hospital is the national referral centre for burnt children and has managed 1785 paediatric burn patients from 2009-2013. The objective of this study is to evaluate our
improvement in paediatric burn care and assess deficiencies in burn care and prevention.
Methods:A retrospective chart review of all burn patients presenting to our Children's Emergency from 2009-2013 was performed. Patients who were less than 18 years old with first presentation of an acute burn were included. Patient demographics, circumstances of burn injury and first aid management was collected.
Results:Majority of burn patients (47.5%) was under 2 years of age. Annual paediatric burn incidence increased by 3.5% year on year. 77.4% of patients had a total body surface area burn of <5%. The commonest mechanism of burn was scald (79.4%), followed by hot contact (11.5%) and flame (3.7%). Burn most commonly occurred at home, especially in the kitchen. It was most often reported that the child was pulling on an adult, resulting in spillage of hot liquid. 98% of all children received inappropriate first aid. 77% of patients received no first aid, and 7% of patients had traditional remedies such as soy sauce applied to their wounds. 75% of patients presented to hospital within 2 hours of injury. The burn admission rate was 9.8%. The average length of stay was 2.67 days. The mortality rate was 0.06%. <3% of patients underwent surgery.
Discussion/Conclusion: Scald burn was commonest between 0-2 years old and is likely attributed to natural curiosity. In addition, Asian food preparations are predominantly soup based, resulting in higher risk of scald burn. The lack of appropriate first aid knowledge, coupled with a rising yearly incidence, is startling. A national education campaign will be most effective in reducing risk and providing first aid knowledge for burn injuries.

O12.01

Wound bed assessment after enzymatic debridement: to operate or not to operate?

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Introduction: With the growing use of enzymatic debridement of deep burns, the subsequent treatment of the wound bed after non-surgical eschar removal has become a major challenge. In this study we report our combined clinical and Laser Doppler Imaging (LDI) experience gathered on pre- and post-enzymatic debridement wound bed diagnosis and treatment.
Methods: 23 patients with a total of 76 deep dermal and/or full-thickness burns on clinical assessment underwent selective enzymatic debridement followed by immediate coverage with allografts. Subsequent therapy consisted of: early surgical coverage for evidently full-thickness wounds (n=5) and conservative therapy in burns with varying degrees of intact dermal tissue (n=71 of which 24 were eventually operated). In order to refine the indications and the timing for surgery, we studied the LDI flux values, the detailed visual aspect of the debrided wound bed and we evaluated acute wound healing and long-term outcomes.
Results: The LDI flux values strongly confirmed (>95%) the post-enzymatic debridement wound bed
depth diagnosis in accordance with the vascular structures of the skin: 1. uniform red color for the papillary dermis depth with LDI flux-values >550 (healing time <2w), 2. more white wound bed color for reticular dermis depth with LDI flux-values <250 (healing time 3-4 weeks), and 3. circular red patterns for the deepest dermal layer with flux values <150 and still longer healing times. The incidence of long-term hypertrophic scar formation was extremely low. Earlier surgical intervention is indicated for: 1. LDI flux values <125, 2. a step-off in the debrided wound bed, 3. exposed fat or translucent fat lobules and, 4. coagulated dermal blood vessels.
Conclusions: Detailed visual diagnosis of the wound bed after enzymatic debridement combined with the LDI flux values allows for an optimal treatment plan with successful spontaneous healing combined with timely surgical closure of the deeper burn wounds.

O12.02

Bromelain based enzymatic debridement versus traditional surgical debridement in the treatment of deep dermal facial burn injury

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Introduction: Tissue preserving debridement is essential for an optimal long term aesthetic outcome in deep dermal facial burns. Tangential burn eschar excision is still the gold standard. In the recent past promising results were reported for selective and precise eschar removal by NexoBrid, a Bromelain based enzymatic debridement agent.
Methods: In a single-centre clinical trial we compared 13 versus 13 patients which received enzymatic and surgical debridement in deep dermal facial burn injury. We assessed time to complete healing, complications in healing process and scar quality after more than 12 months for both groups.
Results: 77% of the facial burns that had been debrided enzymatically were found more superficial burned than initially assessed. Enzymatic debridement significantly reduced time to complete wound closure after admission (19.85 days versus 42.23 days, p=0.002), and after enzymatic eschar removal (18.92 days versus 35.62 days, p=0.042). The number of procedures to complete debridement (1.00 versus 1.77, p=0.003) and the need of autografting (15% versus 77%, p=0.002) were significantly reduced in the enzymatic debridement group. Scar quality was superior compared to surgical debridement after 12 months regarding pigmentation (p=0.016), thickness (p=0.16), relief (p=0.10), pliability (p=0.01), surface area (p=0.004), stiffness (p=0.023), thickness (0.011) and scar irregularity (p=0.011). Regarding erythema and melanin, viscoelasticity and pliability, trans - epidermal water loss or laser tissue oxygen saturation, haemoglobin level and microcirculation we found no significant differences for treated and untreated skin in the enzymatic debridement group.
Conclusion: Compared to our current SOC we found promising results for enzymatic debridement of deep dermal facial burns with NexoBrid® regarding healing potential, time-efficient treatment and long term caring.

O12.03

The experience of 98 enzymatic debridement in burn patients

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Objective: Early debridement of burn eschar is gold standard for the treatment of the patients. Burns can be critical patients. Sometimes the degree of burns are not so clear and escharectomy is delayed. The aim of this study is to consider the using of the enzymatic debridement as first stage of early escharotomy.
Material and methods: We have treated patients ,early (76h)after department admission with enzymatic debridement. We consider the percentage of burn. the percentage of next autograft , the need for blood transfusion. Another aspect is infection and the clinical impact of treatment on critically ill.

Results: we consider 98 enzymatic treatment with no complication after the product application . The patients were fron 18 to 96 years old with a burn <50 %TBSA. At the beginning, the problem associated with treatment was pain management: the patient were treated with local, regional anesthesia or with deep sedation. There were no treatment-related infections. Autograft was been used in lower rate than the initial estimate.The debridement has been really effective. When the enzymatic debridement was done after some day from the trauma, we must treat the wound before the application.
Discussion: enzymatic debridement can be used as an alternative to traditional escharectomy in critically ill. In many cases reduces the area of auto graft because is able to able to save the Dermis not affected by burn.
The time of escharectomy has been reduced and therefore also the discharge was premature. In some cases, where the treatment was performed on the day of admission , it was carried out at discharge with outpatient path within 48 hours of admission. Another result is the early riabilitation especially for hands and large joints with early mobilization and resumption of autonomy compared with the standard treatment.

O12.04

Pediatric burn injuries of the foot

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Burn injury in children continues to be a major epidemiologic problem around the globe. Nearly a fourth of all burn injuries occur in children under the age of 16, of whom the majority are under the age of five.
This is a retrospective study of the epidemiology and management of isolated foot burns presenting to the Burn department of RSCUMA and Samarkand Inter-Regional Burn Center, Samarkand, Uzbekistan. In Central Asia foot burns are widespread, because many people, especially children, walk barefoot in summer, and because the heated sandal is still used for keeping warm in winter.
A total of 161 were treated of which 119 were included in this study. Approximately 65% were in the pediatric age group and the gender distribution varied
dramatically for adults and children. Most patients had deep foot burns caused by sandal heaters. Characteristics of sandal burns include not only skin injuries are of various depth but also injuries to underlying tissues: subcutaneous fat, fasciae, muscles, and even bones.
This study suggests a protocol for the initial acute management of foot burns. This protocol states immediate referral of all foot burns to a burn centre, admission of these burns for 24–48h for elevation, regular wound cleansing with change of dressings and prophylactic antibiotics. The following methods of treatment were developed: initial surgical debridement of the wound, necrtomy with application of chemotherapeutic medications and early necrectomy, the removal of necrotic tissues and preparation the wound for early autodermoplasty.
Result off all patients, 83,5% were heated after the first autodermoplastic surgery. The secondary autodermoplastic surgery was performed on 16,5 % of the patients.
Through the use of multidisciplinary teams, burn centers, and advancement of knowledge through sustained research efforts, we can continue to offer these patients an excellent chance for recovery with burn injury of the foot.

O12.05

A systematic review of surgical and non-surgical debridement techniques of burn wounds

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Objective: The aim of this review is to provide an overview of all burn wound excision methods and to find the best evidence for (non-)surgical debridement techniques with regard to efficiency and safety outcomes in burn patients.
Method: Electronic databases searches included: Pubmed, Embase, Cochrane, CINAHL, Web of Science and Academic Search Premier. We included all studies on the efficiency and/or safety of (non-)surgical debridement techniques in patients with thermal injuries of any age, published in the period 1990-2016. Case-reports were excluded. Primary outcomes were time to complete wound healing and time to complete debridement. Two researchers independently assessed eligibility and extracted data. Relevant papers were selected by screening titles (first step), abstracts (second) and full articles (third) using covidence.org. The methodology of the included articles was critically appraised.
Results: The data search yielded 2254 articles. After screening, 33 full texts remained of which 20 were eligible for data-extraction. The design of the studies consisted of four randomized trials, fifteen cohort studies and one case-series. The debridement techniques were categorized into four categories: conventional tangential excision (CTE, four studies), hydrosurgery (HS, eight studies), enzymatic debridement (ED, seven studies) and shock waves (SW, one study). Time to wound healing in the groups CTE, HS, ED and SW were respectively 24-44 (one study), 11-13, 19-33 and 16 days. Time to complete debridement in the

groups CTE, HS and ED were respectively 5, 4-23 and 2-9 days.
Discussion/conclusion: Time to wound healing was shortest in the HS group. Time to complete debridement was shortest in the ED group. Although conventional tangential excision is considered standard of care, studies evaluating hydrosurgery and enzymatic debridement have the most available evidence based on our outcomes. The evidence regarding the efficiency and safety of debridement techniques is limited, partly due to lack of controls and comparative studies.

O12.06

Dermal Regeneration Template use in a UK Regional Burns Centre

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Introduction: Artificial skin substitutes having a dermal substitute component have an important role in management of acute burns.
They can be life-saving when used to cover large burn wounds with limited skin donor site. When used over critical areas in small burns they provide better functional and aesthetic outcomes. We review the use of dermal substitutes specifically Integra, Matriderm and Pelnac in a single burn unit over a period of 13 years.
Methods: We reviewed the acute burn patients operated in the unit from January 2003 to December 2016. Patients who underwent burn reconstruction with artificial dermal substitutes viz. Integra, Matriderm and Pelnac were included. Operating room records, patient medical records and IBID database were used to collect the data. We looked at patient demographics, type and extent of burns, indications for use of the dermal substitute, length of stay, complications and outcomes of use of the dermal substitute.
Results: A total of 139 patients over a period of 13 years underwent acute burn reconstruction with dermal substitutes. The age ranged from 4 months to 75 years of age. The burn percentage ranged from 0.5 percent to 90 percent total body surface area. Integra was used in 68 patients while, 68 underwent use of Matriderm and 3 underwent use of Pelnac. Indications included large surface area burns with limited donor sites, full thickness burns exposing vital structures and burns over areas of aesthetic and functional importance. We discuss the outcomes of use of dermal substitutes.
Conclusion: Dermal substitutes are being increasingly used in burn care especially in acute management of large burns. Our experience with dermal substitutes shows that they can be used safely and effectively to improve the mortality and morbidity associated with burns.

O13.01

Parents' perspectives on parental presence or absence during wound care procedures

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Objectives: Wound care procedures can cause severe pain and stress in children, and presence during these procedures may be stressful for parents. To determine to what extent parents are able to cope with these procedures, parents' experiences concerning their presence in child wound care were investigated.
Methods: A qualitative approach was used to explore parental experiences. During hospitalization, 24 semi-structured interviews with purposively sampled parents were conducted at three Dutch burn centres. Two burn centres allowed parents to be present and one centre did not allow parental presence. Interviews were recorded, transcribed, coded, and analyzed thematically.
Results: Parents described their view on parental presence or absence in terms of what was in their child's best interest. Whether parents chose to be present was dependent on their emotional availability, i.e. their ability to set aside their own emotions in order to be there for their child. Whether parents regarded their presence as valuable was dependent on their ability to find a meaningful role for themselves. Parents that were able to find this role described increased feelings of control over time. Parents not presented with the opportunity to be present generally complied with the hospital's policy, mainly driven by a strong trust in health care providers.
Discussion/Conclusion: Results of this study unequivocally indicated that being present during wound care procedures was distressing for parents. However, findings suggest that parents should be offered a choice to be present during child wound care. Parents less able to cope with their presence may be offered support in finding a meaningful role during wound care and gaining a sense of control.

O13.02

Help the parent, help the child: How to support parents during young paediatric dressing changes

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Objectives: Paediatric burn dressing changes are distressing to the child and the parents. Young children par-

ticularly need support during dressing changes, as their coping skills are under-developed. Some parents' own distress may impact their ability to assist their child. We wanted to investigate the impact of parent mental health on the parent's ability to deliver supportive behaviour, and therefore on the child's coping, distress, pain and anxiety during the dressing change.
Methods: Ninety-two families of children aged 1-6 years old were recruited at the first dressing change appointment at the Pegg Leditschke Children's Burns Centre, Lady Cilento Children's Hospital, Brisbane, Australia. All adults and child behaviour were observed during the dressing change using a burns-modified Child-Adult Medical Procedure Interaction Scale. The child's highest pain, anxiety, coping, and distress scores were recorded by parents, nurses and researchers. Parents were also screened for mental health symptomology. Linear regression analyses were employed.
Results: Parents with more mental health symptomology showed reduced coping-promoting behaviours (β=-.24, p<.05) and increased distress-promoting behaviours (β=.52, p<.05). Additionally, children of parents who demonstrated distress-promoting behaviours were more likely to experience higher pain (β=.32, p<.05), anxiety (β=.46, p<.01), and distress (β=.66, p<.001). Conversely, children of parents who demonstrated coping-promoting behaviours were more likely to experience higher coping (β=.38, p<.01), and lower distress (β=.44, p<.001).
Discussion: Parent mental health affects their ability to support a child during a dressing change, and leads to a poorer experience. This research shows children may benefit from their parents receiving guidance regarding the best ways to support their child during dressing changes, and the parent's mental health must also be addressed for the behavioural modification to be effective. This presentation will make specific recommendations regarding the content of parental coaching before and during a young child's dressing change.

O13.03

Developing support services for parents of burn-injured children: novel ideas based on parents experiences and opinions about peer support

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Objectives: UK burns care standards state: "a support group should be available whereby patients, their families and/or carers have access to peer support (PS) from others who have experienced burn-injuries". Is this what parents of burn-injured children want to access? What are parents' experiences of support and their opinions regarding PS?
Methods: Twelve parents and one grandparent from across the UK, who had a child suffer a burn-injury participated in semi-structured interviews via telephone, Skype, email or face-to-face. Interviews were transcribed verbatim and thematic analysis was used to create an overall narrative using key themes.
Results: Interviews were conducted a mean of 3 years after injury and mean TBSA was 22% in children aged under 13 years. Parents discussed: barriers to accessing support and how, if accessed, it can be valuable; factors important for staff-parent collaboration within the hospital and post-discharge; and the value of PS. Possible novel channels of PS delivery and barriers to peer engagement were also discussed.
Discussion/Conclusion: The magnitude of the impact of a burn is hard to anticipate for parents of
newly injured children. Although many parents were offered and accepted professionally-led psychological support for themselves, there was a theme of this being self-indulgent when the child was suffering and needed them. Supportive staff-parent relationships are enhanced by mutual information-sharing and the involvement of parents in decision-making. PS is recognised as having value; parents would value the opportunity to access insights from other parents with similar experiences to help them prepare for the future, access practical advice and information, normalise their experience and decrease the sense of isolation, but it is often felt that demands on time are too great, services are often far away and concerns about the opinions of others prevail. Novel methods of support delivery should be considered in collaboration with parents.

O13.05

Stress disorders in burned infants: a pilot study

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If acute stress disorders (ASD) are well-documented in burned adults, they are much more difficult to evaluate and very often ignored in young children, while this population is considerably more at risk for burn trauma.
This prospective, non randomized pilot study concerns 9 children, 6 boys and 3 girls, aged 13 to 22 months, with a mean burned surface of 14,55 +/-5,73%; all had daily dressings before being excised and grafted at day 10 post-burn; mean hospitalization time was 20 +/- 2,6 days.
Symptoms of ASD were appreciated using M.S. Scheeringa's alternative criteria to DSM-IV for infancy and early childhood.
Post-traumatic stress disorders (PTSD) were deducted from the QUALIN questionnaire of A.Dazord and S. Manificat to the mother at admission and 3 months later. At the same intervals the mother's mental status was studied using the GHQ 28.
Symptoms of ASD were observed in all patients, including

"post-traumatic games" in five. Three of them presented 3 months later obvious signs of chronic PTSD. The influence of the parent's presence during hospitalization and the impact of the child's trauma on the mother's general condition will be disc

O13.06

Rites of passage in burn patients

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Introduction: Once the patient is discharged from our pediatric burn unit, because the architectonic characteristics, they must walk on through a door house framing with a surgical barrier (stepper kind of). Before she or he does the walk through, the family set up this event wearing on the patient, one of three kinds of clothes: complete brand new, secondhand gifts, and occasionally, devotional or religious.
Objectives: The aim of this work is to demonstrate that this behavior is indeed a ritual, a truly Rite of Passage.
Methods: We designed an ethnographic, hermeneutic, prospective, non-randomized, qualitative study to identify the three phases defined in Van Gennep's work: separation, liminality and incorporation.
Results: There were included all the 369 children discharged from the Centro Estatal de Cuidados Críticos (CECC) Burn Unit, in Salamanca, Guanajuato, México, from January 2012 to December 2016. 256 (70%) they were wearing secondhand clothes gifts; 65 (17%), brand-new clothes; 48 (13%), devotional o religious clothes. We identified, with no exceptions, the Van Gennep's three phases of the Rites of Passage: the admission moment corresponds to separation, inpatient is the liminality, and discharged is the incorporation.
Conclusions: The burn wound is a complex event that involves not only the patient and family, but the community. We identify the Van Gennep's three phases of the Rites of Passage. It is very important to incorporate this concept in the interdisciplinary team dedicated to attend the burn patient, because doing this, we will be able to follow them, respectfully, carefully, lovely, and it will be transcendental, as the ritual is, for the improvement of patient life's quality.

O14.01

Extracorporale Membranoxigenation Therapy (ECMO) in severe burns, inhalation trauma (IHT) and extensive wounds - A 7-year experience

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Background: In severe burns, extensive wounds and IHT with consecutive respiratory failure, therapeutic options are frequently limited. ECMO therapy represent the last resort of the medical treatment cascade offered by burn care centers of maximum capacity clinics. In frequently occurring ARDS of intensive care patients, limited survival of ECMO patients, restricts consensus based recommendations in randomized studies (www.elso.org). Currently no guidelines for ECMO therapy in severely burned patients exist and recommendations are based on case reports of a scarcely evaluated patient group. Here we report on our 7- year experience in treating severely burned patients and extensive wound patients with or w/o IHT admitted to our burn center.
Methods: From 2010 to 2017, 8 patients with severe burns, extensive wound areas with and w/o IHT and fatal respiratory failure aged 16-71 were treated with ECMO-therapy. Disaese course, inflammation, onset of organ failure and septicemia was analyzed and ECMO associated comorbidities recorded.
Results: 7 patients suffered from inhalation trauma and superficial deep to full thickness burns (TBSA 32-80%) with accompanying IHT. All patients with severe burns and ECMO therapy deceased within 1-12 days following the initiation of ECMO therapy. One male 56-year old patient with isolated severe IHT (COHb of 36%) survived 21 days of ECMO therapy and was successfully rehabilitated. One female patient with pyoderma gangrenosum and extensive leg and thigh wound areas (30%) suffered from fatal cerebral hypoxemia after sustained resuscitation and
ECMO therapy was terminated on day 4.
Conclusion: The prognosis of severly burned patients or extensive wound areas in the event of respiratory failure is poor. In our patient group the combination of burn injuries or extensive wound areas with consecutive respiratory failure was fatal in all cases treated with ECMO therapy. Isolated IHT might be a condition with lower mortality and morbidity following ECMO therapy.

O14.02

Predicting mortality on burn patients: the influence of comorbidities in outcome

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Objectives: Burn injuries are a major cause of mortality and morbidity. The most widely used formulas for mortality prediction in burn patients are based on a small set of easily obtained variables. However, none of the currently available formulas consider the impact of comorbidities on burn trauma mortality. In this retrospective study, our purpose was to determine the factors influencing burn mortality and to examine the impact of pre-existing comorbidities, using the Charlson Comorbidity Index (CCI).
Methods: A retrospective analysis of medical records of

burn patients admitted to our Unit during a 3-year period (from 2014 to 2016) was undertaken. Variables analyzed included demographic data, burn mechanism, presence of inhalation injury, total burn surface area (TBSA), length of hospital stay (LOS) and pre-existing comorbidities, classified according CCI. Statistical analysis was performed to estimate odds of death.
Results: 401 patients were included in this study. Overall mortality rate was 6%. 55.6% of our study population had at least one comorbidity. Bivariate analysis model for mortality outcomes identified five statistically significant variables: age (p=0.001), TBSA (p<0.001), inhalation injury (p<0.001), presence of at least one comorbidity (p=0.001) and CCI (p<0.001). On multivariate analysis, higher mortality rate was independently associated with age (OR=1.058; p=0.006), inhalation injury (OR=5.008; p=0.009), TBSA (OR=1.091; p<0.001) and CCI (OR=1.935; p<0.001).
Discussion/ Conclusion: Age, TBSA and inhalation injury remain the mainstays of burn prognostic formulas, however we should consider the inclusion of CCI on burn admission scores in an attempt to better prognosticate burn outcome.

O14.03

BURNHES: Retrospective study about mortality associed to HES administration in major burns

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Background: Major burns require a huge resuscitation with more fluids tan any other traumatic patient. The use of Hydroxyethyl Starches (HES) in
these patients was a normal clinical practise until 2013,when the PRAC issued an alert about the use of HES in septic, critical care patients and burns[1], but the studies in which the recommendations were based did not include major burn patients[2]. After reviewing the evidence in burns there were no studies showing bad outcomes whit the use of HES in burns[2,3]. We carried on a retrospective study in our burn unit to determinate if the use of HES 130/0.4 in Burns is related to an increased mortality.
Material and Methods: A retrospective cohort study on mortality associated to volume replacement with HEA 130/0.4 during the period 2012-2015 in patients older than 18 years with burns in more than 20% of the Body Surface Area. The objectives are to determine whether the use of HEA 130 / 0.4 is associated with increased mortality in the large burned patient at 28 and 90 days.
Results: Of the 113 patients initially selected through coding in the database, 57 where finally included. 30 received HEA and 27 did not receive it. There were no significative differences in the mean score of the ABSI between the groups. Mortality at 28 days was 10% in the HEA group and 29.6% in the No HEA and at 90 days 32.1% in the HEA and 32.0% in the HEA, in neither case the results were statistically significant.
Conclusions: There were no significant differences in mortality at day 28 and 90 with the use of HES 130/0.4 in major burns.
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O14.04

Management of wound dressing changes in burn patients by ambulatory procedure under sedo-analgesia technique.

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Objective: Burn injuries cause intense and prolonged pain, made worse by the need to change dressings frequently to aid healing. Actually, early excision and skin replacement therapy have reduced the number of dressing changes necessary to treat a burn injury. Nevertheless, daily cleansing of the wound, and occlusive dressings are necessary, especially for injuries where sufficient epidermal living cells remain to ensure a degree of satisfactory spontaneous healing. About 95% of burn patients are treated on an outpatient basis, but only 75% of these patients receive medication at dressing changes according to same authors.
Method: We are concerned about this issue and treat all patients using the outpatient surgery circuit for these procedures , ensuring adequate intraprocedural analgesia and sedation and post-
procedural analgesia at home after discharge by means of a safe and effective sedo-analgesic protocol .
Results: This treatment works satisfactorily for burn patients, reducing pain and risk of post-traumatic stress disorder.
Conclusion: Ensuring pain control over wound dressing changes allows for a less traumtatic experience for burn patients. Patients who do not require hospitalization may also benefit from dressing changes performed under sedation by using an outpatient circuit.

O14.05

Early intubation - Friend or enemy?

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Objectives: Standpoints on ventilatory support for the burn patient are evolving. They indicate that mechanical ventilation improves the quality of care provided and patient survival; nonetheless, it must be performed in selected cases to avoid or minimize unnecessary procedures.
The purpose of this study was to identify variables related to the need of early intubation in burn patients and determine the incidence of early extubation, based on the experience of Portuguese Burn Units.
Methods: This is a retrospective study of burn patients who underwent early extubation (before 48 hours) in two Burn Centers, between January 2011 and December 2015, in order to define the number of redundant procedures and characterize the aspects related to morbidity and mortality of these patients. Data collected was duration of mechanical ventilation, total burn surface area (TBSA %), Clark factors, length of stay in the Burn Center and in-hospital mortality.
Logistic regression was used to identify variables predictive of early intubation.
Results: The study population had 254 subjects with a median age of 57 (19 - 97), with the majority being male. The TBSA was 18%. A significant extent of the patients met the criteria for early extubation. In patients with definitive inhalational injury,fire was the most frequent etiology, more Clark factors were found, dispnea and face burn being the most predictive.
The overall mortality was 28% and superior in the patients with airway burn.
Conclusion: The pre Burn center provider is often in a dilemma: Even though protection of the airway in burn patients can be vital, the decision to implement MV doesn't come without risks. The acceptable % of unnecessary intubations isn't known, however, looks too high in our population.
Therefore, revision of these criteria and education of the first aid providers is warranted.

O14.06

Continuous Hemodiafiltration with a Cytokine-Adsorber During Sepsis - a Review of the Literature on its Potential

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Sepsis is the primary cause of death from infection. It is common in the aging population, and it mainly affects patients with cancer and underlying immunosuppression as well as trauma, bacterial and fungal toxins. In its most severe form, sepsis causes multiple organ dysfunctions that can produce a state of chronic critical illness characterized by severe immune dysfunction and catabolism. Sepsis induces the activation of complement factor via three pathways and the release of inflammatory cytokines such as tumor necrosis factor alpha (TNF-α) and interleukin-1ßeta (IL-1β) resulting in the so-called systemic inflammatory response syndrome. The inflammatory cytokines and nitric oxide induced by sepsis can decrease systemic vascular resistance, resulting in profound hypotension. The combination of hypotension and microvascular occlusion results in tissue ischemia and ultimately leads to multiple organ failure.
Several clinical and experimental studies have reported that treatment for adsorption of cytokines is beneficial during endotoxemia and sepsis. This review article will analyze the efficacy of CytoSorb adsorber in reducing the inflammatory response during sepsis. The CytoSorb adsorber is known to have excellent adsorption rates for inflammatory cytokines such as IL-1β, IL-6, IL-8, IL-10, and TNF-α. Studies have demonstrated that treatment with cytokine adsorbing columns has beneficial effects on the survival rate and inflammatory responses in animal septic models. Several cases have been reported in which treatment with cytokine adsorbing columns is very effective in the stabilization of organ failure and hemodynamics in critically ill patients. Although further investigations and clinical trials are needed, treatment with cytokine adsorbing columns may play an important role in the treatment of septic events in the near future.

O15.01

The evaluation of Smart MatrixTM and split thickness skin graft as a single stage procedure in the attenuated wound healing model.

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Introduction: Smart Matrix™ (SM) is a novel fibrin-alginate synthetic dermal scaffold. In previous studies, using an acute full thickness excision wound model, SM has demonstrated good graft take with early vascularization and cellular ingress and diminished wound contraction, when used as a single step procedure. However, the greatest value of wound healing adjuncts would lie in the ability to heal a refractory wound. An attenuated wound healing porcine model was used to examine the healing trajectory of SM and overlying split thickness skin graft (STSG).
Aims: To evaluate and compare the wound healing tra-

jectory of single stage reconstructive procedures using STSG alone, Matriderm™ (MD)+STSG and SM+STSG in an attenuated wound healing model in a 42-day study.
Methods: 6 wounds with attenuated healing (partial excision of a full thickness burn) wounds were created on the flanks of each of 4 Large White pigs (n=24). The wounds were treated (in a randomised and in equal distribution) either with STSG alone, MD+STSG or SM+STSG. Wound healing parameters were observed at 7 day intervals until day 42.
Results: Wounds treated with SM+STSG and MD+STSG showed similar wound healing trajectories in the porcine wounds with compromised healing properties. Wounds treated with SM+STSG and those treated with MD+STSG improved the rate of epithelialization, vascular ingress and graft take success, while decreasing wound contraction when compared to wounds treated with STSG alone.
Conclusions: Used as a single step reconstructive procedure in compromised cutaneous porcine wounds, SM+STSG improve the wound healing trajectory compared to STSG. Dermal scaffolds may be useful in the treatment of chronic and complex wounds. Further comparison of SM to existing products is indicated.

O15.02

Enzymatic escharolysis with NexoBrid® on partial thickness burn wounds: pre- and post-debridement histological assessment

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Enzymatic escharolysis is an innovative, non-surgical treatment method applicable to severe burn patients as it allows performing very early, nontraumatic removal of necrotic tissue even on patients whose overall clinical conditions would mandate delaying traditional surgical escharectomy. This work was aimed at examining some aspects related to the “quality” of enzymatic debridement, which is inherently different from surgical debridement. To this aim, some biopsies harvested from partial thickness burn wounds before and after enzymatic treatment were histologically assessed. METHODS We performed 16 biopsies with Biopsy Punch 4 mm, 8 pre-treatment with NexoBrid® and 8 post-treatment, and in one case two full thickness lozenges including normal tissue adjacent to injured tissue were harvested. All samples were immediately fixed in 10% formalin and sent to the II Pathological Anatomy Unit of the University Hospital of Pisa. Histology slides were prepared using hematoxylin and eosin staining, then they were photographed under different magnification. RESULTS The histology reports provided very similar information in all cases under examination. Residual dermis, in its most superficial portion, looked as “homogenized” with few and poorly vital annexes. In some areas we observed significant vascular congestion with frequent blood extravasation due to capillary disruption. On the other hand, deep dermis looked normal. DISCUSSION AND CONCLUSIONS Enzymatic escharolysis, unlike the surgical one, seems to act with great selectivity: it completely removes necrosis but saves normal tissue and the structures partially damaged by heat. In our study, conducted only on mid-deep and deep wounds, we observed that partially damaged dermis was always saved by lytic action. However this dermis takes on characteristics of “homogenization”, with poor vital annexes: it becomes similar to the scaffold of dermal matrices actually available. This scaffold would be saved for a possible subsequent spontaneous regeneration more complete and functional.

O15.03

Silk for the treatment of superficial burns in comparison to Biobrane- an intra-individual study

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Aim: Superficial burn injuries of the hand and face are often treated with wound dressings that propose fast healing and satisfying cosmetic outcome and allow a fast mobilization. Biobrane is often used for the treatment of those burns. Nevertheless deliver problems urged us to search for a financially attractive alternative. Silkworm silk had shown good results in wound healing regarding biocompatibility, inflammation and pain. Therefore it seemes to be an interesting product for the treatment of superficial burns.
Methods: In a prospective intra-individual design we compared the wound healing of superficial burns of the hand and face after treatment with silk and nylon mesh in 30 burn patients. Following a standardized case report form, we monitored pain, bleeding, exudation and inflammation. Furthermore scar quality we evaluated objectively with the Cutometer, Mexameter and Tewameter and subjectively with the patient and observer scar scale and vancouver scar scale.
Results: During wound healing no significant differences could be found. High subjective satisfaction was reported for both dressings applied on the face. Biobrane applied as a glove was subjectively preferred for burn of the hand. Regarding cost efficiency silk was clearly superior. Long-term results in functional and aesthetic outcome were similar.
Conclusion: Silk and Biobrane both provided an effective and safe healing environment. Additionally no significant differences regarding scarring could be found. Therefor silk, being clearly superior to nylon mesh in cost efficiency is an interesting alternative for the treatment of superficial burns of hands and faces.

O15.04

Recovery of skin sensitivity in burned patients

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Introduction: Skin is a complex sensory organ with different organelles and nerve fiber endings involved in pain, heat, cold and touch. Organelles and nerve fiber are located in different skin depth. Burn injury, depending on burn depth, may alter sensitivity recovery.
Objectives: To investigate the different patterns of sensory and sudomotor function alterations in burn patients and to correlate patterns with burn degree.
Methods: We present a Cross-sectional observational study. Criteria of inclusion: Patients of both genders with ≥18 years old; Body surface burned in upper limb and/or lower limb; both spontaneous wound healed or skin autografting were investigated.
A functional and quantitative exploration of touch, touch-pain, heat, cold, heat-pain and sudomotor skin response in burned skin areas was performed with neurophysiological explorations. Burn skin is compared with the healthy homologous contralateral area to know the variability.
Results: Significant alteration in sensitivity recovery was observed: heat sensitivity affects 8/10 patients. Cold sensitivity affects 5/10 patients. Touch sensitivity affect 6/10 patients; pressure pain sensitivity affects 6/10 patients.
Conclusions: Patients, after suffering the accident, regenerate the sensory skin system with different range of sensitivity compared to healthy contralateral skin area, causing during their long recovery, an intense and often chronic discomfort. Burns alter heterogeneously the skin sensory functions. Heat sensory function seems to be the more affected and cold sensory function the least affected. To evaluate the neurologic severity of burns and to quantify the improvement could be the first step to evaluate possible treatments to improve the neurologic function of the skin.

O15.05

Heterologous Keratinocyte cultures: uses and advantages in burns

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Introduction: The heterologous keratinocyte cultures (HKC) is a tool used since early 1990s for treatment of burns of 2nd grade superficial and deep as well as in donor sites of dermal grafts. The immediate availability and safety of use are perhaps the most important advantages in the management of wounds and burns
epifast® is an epidermal allogeneic cryopreserved keratinocytes culture consisting of three or four layers of living human epidermis, which comes from the cultivation of cells obtained from the foreskin of newborn infants. Its function is to produce growth factors that promote the proliferation of new cells in the affected area.
Objective: To evaluate the **beneffits** of the use of Heterologous Keratinocyte Cultures (HKC) *epifast* ® in burns and wounds
Methods: Wounds were analyzed in pediatric patients with burns treated with HKC *epifast*®. HKC *epifast*® *was* applied after adequate resuscitation of the patient as well as debridement of the affected area.
Also analyze the use of HKC *epifast*® in 25 donor sites of dermal.
Results: We observed a significant reduction in the time of epithelization in some cases up to 56%, in the case of donor areas will **speed up the time to make these areas available for new takes**. Hospital stays were shortened in the same way the number of interventions required for their resurfacing
Epithelialization of donor sites treated with *epifast*® takes around 6 to 8 days after surgery and they can be used again as donor sites while with conventional therapy recover in 12 to 14 days and **moreover reduces pain and prevents infections**. In patients with partial-thickness burns, wounds treated with *epifast*®recover in 7 to 8 days and with traditional therapy require 14 to 21 days .

O15.06

Effects of Suprathel, AquacelAg or auto-grafting on human telomesase reverse transcriptase expression in the healing skin in children with partial thickness burn.

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Objectives: Skin aging is continuous process that affects the function and appearance of the skin. Burn and burn dressing types may affect telomere length and telomerase activity; however, the effect of burn dressing types on telomerase activity in the healing skin has not been studied
This study investigated the effect of Suprathel and AquacelAg on human telomesase reverse transcriptase expression (hTERT) in the healing skin in children with partial thickness burn.
Methods: On postburn 21th day, Three-mm punch skin biopsies obtained from children with partial thickness burn, who treated by using Suprathel, or AquacelAg, or autografting. Each treatment groups consisted of 15 patients. Biopsies were examined in routine hematoxylin and eosin staining and immunohistochemistry to investigate expression of hTERT.
Results: All studied skin biopsies from patients of each groups showed cytoplasmic staining in epidermal cells. In the dermis hTERT expression was present in some sweat

glands, hair follicles, and occasionally fibroblasts.
The epidermis of Suprathel group showed less positive hTERT than of AquacelAg and auto-grafting groups ($p<.05$).
Discussion / Conclusion: The present study showed a higher percentage of negative hTERT in the epidermis and dermiÅŸ among Suprathel group compared with AquacelAg and auto-grafting groups and a higher percentage of positive hTERT expression among AquacelAg and auto-grafting groups. These may mean that the quality of healing skin may be higher in patients with using suprathel than with using AquacelAg and autografts.

O16.01

N-terminal-brain natriuretic peptide one week after severe burn injury

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Objectives: Appropriate fluid resuscitation after severe burn trauma is challenging. NT-proBNP is a neuroendocrine agent released from cardiac
myocytes after ventricular stretching thus expressing indirectly circulating volume and fluid balance. Among burn patients it has been previously observed to reflect excessive fluid resuscitation and high SOFA scores during the hospital stay, though its clinical use has not been validated to guide fluid resuscitation.
Methods: Nineteen consecutive burn patients (>20% TBSA) were enrolled in Helsinki Burn Centre between 2013-2014 to a prospective study. Plasma NT-proBNP values were measured during one week from admission. Other clinical parameters such as infusions, urine output, plasma CRP, arterial base deficit and pH, BMI and SOFA score were also recorded.
Results: NT-proBNP values varied among single patients, even more in patients with acute kidney injury although acute kidney injury itself had no correlation to NT-proBNP values. Multivariable regression analysis showed that cumulative infusions, older age, and lower body mass index were associated with higher NT-proBNP values.
Conclusion: This study demonstrates that NT-proBNP correlates with cumulative fluid infusions and older age and lower body mass index are associated with higher NT-proBNP values one week after burn injury.

O16.02

PCT: a good biomarker for sepsis in burn patients?

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Background: The diagnosis of sepsis in burn patients is difficult due to the magnitude of the systemic inflammatory process unleashed by large burns. Both sepsis and burns inflammatory response without associated infection may present the same unspecific symptoms and such as hyperthermia, tachycardia, leukocytosis, and tachypnea) and differential diagnosis is not easy. The gold standard for sepsis identification still relies on microbiological cultures, which may take 48-72 hours to provide results, delaying the start of antimicrobial therapy and increasing the risk of failure and mortality. Biomarkers allowing an earlier diagnosis of sepsis in burns patients are required. Procalcitonin (PCT) has emerged as one of the most useful and reliable ones.
Methods: Retrospective observational study including burn patients with TBSA ≥15% and sepsis (according to ABA criteria) admitted at the Coimbra Burns Unit, Portugal, during a 36-month period. Biomarker results from150 burn patients were available: 2,767 timepoints without sepsis and 652 with sepsis. The ability of PCT to diagnose sepsis was analyzed against other biomarkers. Quantitative variables were compared with the Mann-Whitney tests and qualitative variables were compared with the Pearson chi-square test. Receiver operating characteristic (ROC) curves, in particular the area under the curve (AUC), were performed to evaluate biomarkers capacity for sepsis diagnosis.
Results: Statistically significant differences, with medium to large effect size, between the groups of septic and non-septic patients, with medium to large size effects, were detected for all the biomarkers considered except for temperature. PCT was the biomarker with the greatest AUC and demonstrated a large effect size with AUC > 0.71.
Conclusion: In this large sample, procalcitonin proved to be the best biomarker for early diagnosis of sepsis. In conjunction with a sound clinical examination, it should be considered in antimicrobial stewardship programs in order to reduce mortality, toxicity, antimicrobial resistance arousal and financial burden.

O16.04

Infraclavicular plexus block for upper extremity burn debridement using a bromelain-based debriding enzyme (Nexobrid®).

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Introduction: Due to the anatomy of the hand surgical burn debridement is technically difficult and may lead to

considerable complications. Therefore, these problems have driven motivated clinicians and researchers for half a century to investigate the potential of various enzymatic debridement means for hand burns.
Selective enzymatic debridement of the burn wound can preserve the spontaneous epithelialisation potential and reduce the added injury to the traumatised tissue added by a surgical debridement. Other than pain, no enzyme-related adverse events or complications have been reported.
Regarding pain, upper extremity plexus blocks have an obvious place as a sole anaesthetic technique providing effective early postoperative pain relief. There is one recent meta-analysis assessing the available evidence on the infraclavicular block technique for perioperative use.
Objectives: To demonstrate that infraclavicular plexus block is an effective alternative to supraclavicular and axillary block, providing good pain control when performing lower arm enzymatic debridement outside the operating room (OR).
Methods: Nine patients underwent lower arm enzymatic debridement with Nexobrid® using ultrasound-guided infraclavicular block techniques with continuous perineural infusion. Pain control was provided for five days in all cases. Patient data regarding pain were recorded using visual analogue scales. Photographic documentation was performed
Discussion/Conclusion: All hand-burn wounds treated in this study would have undergone tangential excision and grafting, if treated according to current state-of-the-art clinical practice. Enzymatic debridement decreased both the number of patients with burns undergoing surgical procedures and the wound area grafted in those undergoing skin grafting.
The continuous perineural infusion in the infraclavicular plexus is a feasible alternative, providing effective analgesia and improving patient satisfaction in upper extremity enzymatic debridement. Moreover, it allows burns enzymatic
debridement to take place outside the OR, therefore allowing other patients to be treated.

O16.05

Is General Anesthesia Neccesary for Nexobrid Application? Our Experience

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Objectives: Enzymatic debridement with Nexobrid for treatment of deep burns is increasing nowadays in burn care centers. During the 4-hour debridement period, general anesthesia is usually considered due to pain management, limiting the early use of the product which may later compromise the final outcome.
We present our experience in sedation using intravenous midazolam and ketamine combination in our burn care unit during Nexobrid application.
Methods: A total of 16 patients have been treated with Nexobrid under sedation protocol with a combination of ketamine (1mg/kg) and midazolam (0.1 mg/kg). Once recovered from the procedure, patients responded to an anonymous questionnaire about subjective pain scale, with 0 being not having pain at all and 10 being maximum pain. Patients with ASA PS (American Society of Anaethesiologists physical status classification) score III or more, having neurological or respiratory impairment were excluded.
Results: Average pain before the procedure was 6.25 out of 10. During sedation pain tended to decrease even with the application of Nexobrid to an average of 1.75/10, which then increased to a value of 2.375 when the product was washed out 4 hours later. No major adverse effects were registered. Minor effects included nightmares in 2 patients (12.5%) and agitation (12.5%), whereas 14 patients referred to have pleasant memories or unconsciousness of the procedure (87.5%).
Conclusions: Ketamine and midazolam combination during Nexobrid application procedure is a safe and feasible alternative to general anesthesia in patients with low risk ASA PS (score 2 or less) and without neurological or respiratory diseases. In our experience, pain has been well tolerated, without any major adverse effects registered. Neither an operation theatre nor anesthesiologists were needed.

O17.01

Profile, scenario and circumstances of burn trauma of patients in the reference hospital in Brasília capital of Brazil

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Objective: To describe the epidemiological profile, scenario and circumstances of burn trauma of patients admitted to a reference hospital in Brasília.
Method: Cross-sectional research based on data collection of patient health record. We included all hospitalized patients from January 2010 to December 2012.
Results: We investigated 721 patients, of whom 29.5% were children; 5.8% were adolescents; 59.2% were adults and 5.4% were elderly. This is a reality present in the capital of Brazil and in these surroundings, the places of origin of most patients admitted to the hospital of Brasilia. Males accounted for 61.6%. The frequency of deaths was 6.0%, the highest absolute number in adults (n=29; 6.8%) and proportional in the elderly (n=8; 20.5%). The most prevalent burns were thermal and exposure to fire. The main circumstances of accidents are the scald in children in the kitchen; physical aggression in adolescents; attempts at self-extermination and work-related accidents in adults. The main scenario of burn injuries in the elderly is the

kitchen, the children is in the domicile or near the house.
Discussion/Conclusion: The accelerated urbanization by which Brazil passed in the last decades was not accompanied by the supply of infrastructure and urban services. Lack of infrastructure and services can be considered as the basis for numerous preventable burns, such as accidents involving the burning of domestic waste, firing of domiciliary areas to eliminate vegetation and animals, and the use of lamps in the home lighting. Our results indicate the prevalence of victims in children and adults, greater male victimization and higher death rate in the elderly. The circumstances indicate prevalence of scalds in children, situations of violence in adolescents, self-extermination and work accidents in adults and the kitchen as the main scenario involving the elderly.

O17.02

A comparative study of Self-inflicted burns

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Introduction: The scientific literature on the socio-demographic and clinical characteristics of patients committing self-inflicted burns is very scarce and this data could be of interest to design tailored preventive and rehabilitative interventions.
In 1994, a retrospective study was published describing main characteristics of patients who performed self-inflicted burns and who were admitted at the specialized burn units (SBU) from the University Hospital Vall d'Hebron (Barcelona) between 1983-1991. This study revealed that 1,98% of this sample were autolytic attempts, predominantly males, unmarried, and 75% had previous psychiatric history.
Objectives: To compare data from the previous study comprising 1983-1991 period, with data from a sample of patients admitted for the same causes in the same SBU during the period 2010-2015.
Methods: A cross-sectional study was designed to collect main demographics and clinical characteristics of patients attended at the SBU in the University Hospital Vall d'Hebron (period 2010-2015).
Results: 36 patients admitted during 2010-2015 were compared with 67 patients from the 1983-1991 study. Individuals with self-inflicted burns between the years 2010-2015 accounted for 1.45% of total burned unit income versus 1.98% of the previous study. Significant differences were identified in terms of age, psychiatric history, number of previous autolytic attempts, site of the incident and precipitating causes.
Conclusions: The obtained results show a difference between both periods with respect to the profiles of patients with self-inflicted burns. The low prevalence has been increased and changes in the profile of the patients are possibly attributable to the social changes over the last 20 years. These new aspects should be considered to design psychosocial interventions.

O17.03

The social impact of burn injury: Associations between fear of negative evaluation, perceived stigmatization and self-esteem

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Objectives: In the aftermath of a burn accident, burn survivors may be confronted with stigmatizing social behavior. However, which people are most vulnerable to experience feelings of stigmatization is not sufficiently understood. The severity of the injury, as well as a fear of negative evaluation may impact perceived stigmatization. In turn, among other factors, stigmatization may impair a patient's self-esteem. The current study examined relationships between burn severity, fear of negative evaluation, perceived stigmatization and the burn patient's self-esteem.
Methods: A prospective, multi-center study was conducted. The sample consisted of 205 patients (73% male). Mean age of the patients was 45.0 years old (*SD* = 15.3, range 18-82) and mean percentage TBSA burned was 10.4 (*SD* = 11.1, range 1-75 %). Patients filled out the Perceived Stigmatization Questionnaire and the Brief Fear of Negative Evaluation scale 3 months postburn, and the Rosenberg Self-esteem Scale 6 months postburn. Hierarchical regression analyses were used to examine associations between burn severity, fear of negative evaluation, stigmatization and self-esteem.
Results: Perceived stigmatization was found associated with higher TBSA burned and more fear of negative evaluation. Moreover, the effect of burn severity was particularly found in people with a higher fear of negative evaluation. In turn, perceived stigmatization and fear of negative evaluation predicted lower self-esteem. Other predictive factors for lower self-esteem included higher burn severity and female gender.
Discussion/Conclusion: A higher fear of negative evaluation may increase a burn patient's vulnerability for more

feelings of stigmatization and a lower self-esteem after burn injury. Therefore, fear of negative evaluation might be a potential target for screening during hospitalization.

O17.04

The 'unseen scar' - A cross-sectional study of post major burn psychological impact and quality of life.

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Objectives: The objectives of this study is determine the effect of total body surface area (TBSA) of burns towards Posttraumatic stress disorders (PTSD), depression and quality of life (QOL) in major burn cases.
Methods: Majors burn patients that was treated in Hospital Universiti Sains Malaysia was carefully selected. A total number of 55 patients with 2 years post burn was invited voluntarily to participate in answering the psychometric battery which are the Malay Translated PTSD Checklist for civilians (MPCL-C), the Malay translated Beck depression inventory (Malay-BDI) and the Malay translated Burn Specific Health Scale (Malay BSHS-B).
Results: There is a significant relationship between TBSA and PTSD (DF 2,52=6.81, $p<0.05$), also between TBSA and depression (DF 2,52=19.88, $p<0.05$). There is a significant effect of TBSA towards quality of life (DF1,53=15.70, $p<0.05$). It reflects the higher level of TBSA leads to poor quality of life, with 1% increase in TBSA we expect the changes of QOL was -16.5 . Overall, the model explained 22.80% variance changes in quality of life.
Conclusion: Major burn patients ideally should be screened for PTSD and depression in view of the vulnerability of their psychological state. Post burn QOL assessment is the next tool to be instilled in burn management as it reflects patients current well-being.
Keywords: Burns, posttraumatic stress disorder, depression , quality of life

O17.05

Alcohol use and smoking in burn patients at the Helsinki Burn Center

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Objectives: We investigated alcohol use and smoking at time of burn and their relationships with severity of burn injury and presence of mental disorders.
Methods: Consecutive acute burn patients (N=107) admitted to the Helsinki Burn Center were assessed with the structured clinical interview for mental disorders (SCID) at baseline and after 6 months. Information on alcohol influence and smoking-related activity at burn and on pre-burn risk drinking (Alcohol Use Disorders Identification Test=AUDIT) and heavy smoking was recorded.
Results: Half (52%) of the acute burn patients were under the influence of alcohol, and 19% had been both drinking and smoking at the moment of the burn. Compared with patients not under the influence of
alcohol, those under the influence at burn had significantly more often lifetime psychiatric disorders (73.2% vs. 45.1%, $p=0.003$), especially alcohol dependence (55.4% vs. 13.7%, $p<0.001$) and anxiety disorders (28.6% vs. 9.8%, $p=0.015$). Patients with both alcohol use and smoking at burn differed even more from those without, having more often at least one psychiatric disorder (95.0% vs. 51.7%, $p<0.001$), in specific alcohol dependence (90.0% vs. 23.0%, $p<0.001$), or psychotic disorder (25.0% vs. 6.9%, $p=0.016$). Characteristics related to the burn injuries themselves and their treatment did not significantly differ between these subgroups.
Conclusion: Half of the burn patients were under the influence of alcohol at the time of the burn. Almost all patients with alcohol use and smoking at burn had a diagnosable alcohol use disorder. Prevention of alcohol use disorders or the risk behaviors related to them is important for prevention of burns.

O17.06

Preventing Burns in children in Israel

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I believe that old habits can be changed and we can lead a better, safer life.
In my daily work as a nurse in the plastic surgery clinic at Tel Hashomer Hospital, I encounter countless children with completely preventable burns. These burns stem from coffee, tea, kettles and faucets.
Each day I encounter parents who are astonished that hot water caused so much harm to their young children. Hot water literally can burn a child like fire. The hospital stays, skin grafts, bandaging, operations and lifelong scars are equally surprising to parents.
I concluded that prevention is the number one course of action. We need to increase awareness among parents
While the hospital I work for aligned squarely behind my quest to prevent burns, and the head of the Burn Unit in Tel Hashomer, Professor Haik supported my effort, I still lacked financial support.
Itried to use the tools available without incurring expenses. I open a Facebook page on burn prevention. I produce

clips to raise awareness. I spoke about the project at forums for medical professionals in Israel. I received financial support from mediwound Israel for producing a clip
I distributed the clips on Facebook, and had a chain of coffee shops run it on their in-house screens. I managed to reach one of Israel's HMOs to put it on the internal screens of their hundreds of clinics.
I reached out to friends and acquaintances in the on-line and print media and had articles
I created a team together with representatives from my hospital, the ministry of education, and ministry of Health, and other health organizations to declare and promote a "burn prevention week".
It is my belief, that with proper education, tips, and reinforcement on burn prevention we will drastically reduce the dangers and reuce burns.

O18.01

An early experience of burn treatment with the NexoBrid.

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Objectives: The local treatment of the II b and III degree burns is still a great challenge. The possibility for limitation of aggressive surgical excision is a great benefit for patient and surgeon. Flame burns usually lead to deep full thickness skin damage. Scalds usually have a better prognosis, especially in adults. However not only the depth, but also mainly the location of the burns determines the severity and physical and psychological consequences. After the face the most important body region from a physiological and esthetical point of view seems to be the hand and forearm. This is the area we chose to study with the newly introduced method of Nexobrid for necrosis debridement.
Methods: We evaluated the results of treatment of upper extremity II b/III degree burns in 18 adult patients admitted to the Malopolska Burn and Plastic Surgery Center in Krakow, between the first and third day after deep scald or flame burns of the hand and forearm. All patients were treated according to the same protocol. The first stage was performed in the operative room under regional anesthesia with additional sedoanalgesia. Next stages were painless thanks to the duration of the regional anesthesia. We assessed the efficacy of eschar removal, the need for early escharotomy and skin grafting, the time of treatment and wound closure.
Results: All patients avoided the escharotomy. Wound closure was achieved by spontaneous epithelialization or by skin grafting. We used honey ointment or Aquacel Ag for conservative treatment. Less than 25 % of patients were skin grafted. The hospitalization time was almost 40% shorter than in classical treatment. The average hospitalization time was 15 days.
Conclusions: The application of Nexobrid seems to be the treatment of choice in hand and forearm burns.

O18.02

Cost analysis of enzymatic debridement of Burns in Spain.

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Objectives: Nexobrid® (NXB) is a novel enzymatic (bromelain) debriding agent that has shown efficacy in eschar removal, reducing the need for escharectomy and autografting. The aim of this study is to assess the total direct cost of treatment with NXB in patients with thermal burns in a Spanish reference hospital.
Methods: 75 consecutive patients, between December 2014 and December 2016, with deep/superficial partial and full-thickness thermal burn, and treated with NXB, were included in this retrospective study. The hospital perspective was adopted; so, only direct health care costs (€, 2017) were included (NXB, escharectomy, autograft, blood transfusion, reinterventions, and hospital and ICU stay). A multiple regression model was designed to estimate cost from hospital admission until discharge by age, type of burn and range of total body surface area (TBSA).
Results: The cost distribution was skewed to the right, with an average cost of € 25,697 (range: 1,797-180,348). Regarding the type of burn, estimated costs were: superficial partial (n: 5): €11,592 (SD: 18,659), deep partial (n: 57): €18,457 (SD: 20,059), and full-thickness (n: 13): €62,865; SD: € 54,271). The cost determinants were ICU and hospital stay (41.3% and 31.5%), NXB merely represents 10.7%. Total cost was lower than mean value for patients aged < 30 (n: 22): €16,890, from age 30 to 60 (n: 37): €22,499 and age >60 (n: 16): €45,202. Likewise, the smaller the TBSA, the lower the cost: 1%-≤5% (n: 30): € 6,978; from 6% to ≤10% (n: 13): € 18,303; from 11% to ≤15% (n: 10): € 35,148; and >15% (n: 15): €71.797.
Discussion/Conclusions: Clinical trials with NXB have demonstrated an improvement in the treatment of burns. The results of this economic study show that NXB represents a minor proportion (10%) of the total cost, with ICU and hospital stay being the determinants of cost.

O18.03

Early experience in the use of NexoBrid™ in two Nordic Burn Centers

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Background: Successful implementation of NexoBrid treatment protocols in different burn centers in Europe is increasingly being reported. Nexobrid purportedly facilitates precise and delicate debridement of dermal burns with an increased conservative healing potential of the remaining wound bed. Proponents of the product therefore advocate for a shift in burn treatment protocols. Nevertheless, certain unanswered questions still need to be addressed. We report the early experience of two Nordic burn centers in implementing NexoBrid in daily Burn Center routine. The aims were to assess the effects of Nexobrid on time to healing, and need for surgery. Staff acceptability was also assessed.
Methods: A consecutive series of patients with various clinical depths of dermal burns were debrided with NexoBrid. All patients were treated within 72 hours from injury. Clinical data was collected on burn aetiology and characteristics, results of NexoBrid treatment, the need for post treatment surgery, and the time to final healing. A questionnaire on personnel early experiences on the implementation was circulated to ward staff.
Results: Nine patients were treated between 2016-2017. Burn TBSA ranged from 4-30%. Nexobrid treatment area ranged from 2-15%. Successful debridement was assessed to be between 50-100%. Burn depth varied from superficial dermal to full thickness. Post treatment protocols varied greatly. All patients needed later surgery, and most patients needed autografting of at least some areas. Staff reported the treatment protocol as challenging to adhere to.
Conclusion: Implementation of the NexoBrid at our two burn centers proved time-consuming and challenging. The immediate effect of debridement was acceptable in all cases. Contrary to most reports from the product's proponents, all our patients ultimately at some point needed surgery. We did not observe an increased conservative healing potential in comparison to our standard of care. However, the effective debridement is beneficial in obviating the need for theatre resources.

O18.04

5 Year Single Centre Review: The Management of Chemical Burns

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Objectives: To review all patients with chemical burns at the regional burns unit over a 5year period. To determine the epidemiology, aetiology and management of chemical burns. Including first aid in the community, emergency department (ED) management and definitive management on arrival to the burns unit.
Methods: Clinical coding was used to capture all patients with a diagnosis of a chemical burn over a 5 year period. The notes for each patient were reviewed and a pre-designed pro-forma was completed. This included ED management, referral times and definitive burn management.
Results: Total of 30 patients; 79% alkali, 17% acid and 3% unknown chemical burn. 52% occurred at work, 45% at home and 3% at school. 86% accidental, 14% self-inflicted. Average 1.6%TBSA (0.25%-13.5%). 79% full thickness burns. No first aid administered in 24% of patients. 32% presented to ED within 6 hours, 46% over 24hrs post burn. Average pH of alkali burns in ED:8.1 (pH7-12) and pH7.7 on admission to burns unit. 72% were seen by a burns specialist within 24hours of referral. No patients were treated with a neutralising agent. 100% were managed at ward level. 52% required burn excision and grafting; average time from burn to excision was 9 days (1-25 days).
Discussion: The management of chemical burns remains variable in both the community and ED. There appears to be a lack of knowledge regarding first aid and initial management of chemical burns, leading to ongoing chemical burn injury. Targeted education to ED staff and the community is needed. Delays in first aid and presentation with chemical burns results in deeper and more extensive burn injuries. Regional guidelines need to be introduced to reinforce appropriate first aid, irrigation and the potential use of a neutralising agent to reduce the extent of the burn injury and need for burn excision.

O18.05

The use of NexoBrid in larger burns (over 15%) within or outside the label

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Objectives: Our clinic has started using NexoBrid as standard of care for eschar removal of deep partial thickness and full thickness burns since 2015. We have mainly used it within the label until now and just 2 times outside the label (on the face and on the ears).
Methods: Since NexoBrid became standard of care in our clinic, in the last 2 years, we have treated 30 patients by enzymatic debridement, on surfaces between 1% and 30% TBSA. We applied NexoBrid on deep partial and full thickness burns affecting the upper limbs and dorsal torso of the patients, with the same technique as recommended by the label. We treated less than 15% TBSA in one application.
Larger burns required multiple applications of NexoBrid, 1 or 2 days apart. 70% of the wounds were grafted 2 or 3 days after the NexoBrid application, the rest were conducted for spontaneous epithelisation.
Results: Enzymatic debridement removed 98-100% of the

burn eschar in fresh burns and decreased compartment pressure in circumferential burns, allowing us to better evaluate the actual depth of the burn and start the local treatment faster. It decreased blood loss, man power and time compared to classical surgical excision. The post-application soaking is of utmost importance and must be done very well, because in some cases the burns dried and deepened, requiring surgical excision and grafting. The eschar removal was lower (80-90%) in burns older than 84 hours. Conclusions: NexoBrid is very useful in small burns, but even more so in larger burns, where the operating time and effort is reduced by 50%. This allows us to evaluate the burns faster and make the decision for treatment accordingly. We introduced it in our standard of care for fresh, DPT, FT or mixed burns, regardless of age and burned TBSA.

O18.06

Paediatric Friction Burns: 5-Year Experience from a UK Burns Unit

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Introduction: Friction injuries are relatively common among children. The aim of this study was to quantify and classify paediatric friction injuries presenting to a large regional UK burns and trauma centre over a 5-year period, in order to assist prognostics and advice on risk reduction.
Methods: All patients from 2011 to 2016 presenting to the Paediatric Burns Unit with friction burns were included. Data were collated from paper and digital medical case notes.
Results: 56 patients presented with friction injuries between 2011 and 2016. Patients' ages ranged from 11 months to 16 years 7 months. There were 31 males and 25 females. Causes of injury included: rope burns (1.8%, *n*=1); lawn mower burns (3.6%, *n*=2), carpet burns (3.7%, *n*=2), bike injuries (7.1%, *n*=4), road traffic injuries (23.2%, *n*=13), vacuum cleaner injuries (25%, *n*=14) and treadmill injuries (35.7%, *n*=20).
41 cases (73.2%) were managed conservatively. 15 cases required operative intervention (26.8%). Time to surgery ranged from Day 0 to 6 months post-injury. Time to healing ranged from 7 days to 53 days. 22 cases developed complications including wound infection, delayed healing, graft failure and scar contractures.
Discussion: The authors believe this study to be the largest published paediatric friction injury series. The youngest patient in this series was 11 months old, reflecting the age when toddlers become more mobile, putting them at risk of injuries. Exercise treadmills and vacuum cleaners are prominent sources of these injuries, suggesting risk reduction measures could be directed at these ubiquitous household items.

O19.01

Rating scales for scar contracture: call for a functional approach

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Objectives: Scar contracture is a well-known complication after burns. To evaluate the effect of (new) treatments or analyse prevalence and risk factors of scar contractures, rating scales are used, based on joint range of motion (ROM). However, this is not without problems; cut-off points for levels of severity vary between scales hampering comparison, and how cut-off points relate to function is unclear. Different rating scales for shoulder and elbow therefore were compared, and their severity ratings contrasted with functional ROM. Actual patient data were used to clarify issues.
Method: Contracture severity rating scales used in burns were included as well as most often used scales in orthopedics and physiotherapy. Functional ROM angles for shoulder and elbow were derived from a recent synthesis published by our group. Using a convenience sample of passive ROM data of patients 3 months after burn injury, severity of shoulder flexion and elbow flexion impairment was determined for each of the rating scales. Secondly, the shoulder and elbow flexion ROM angles were related to the required angles to perform over 50 different ADL tasks.
Results: Included were 16 rating scales (shoulder: 5, elbow: 11). Large differences in number of severity levels and the cut-off points between scales were found. Rating the measured ROMs with the different scales showed large inconsistency in how many joints had no impairment (shoulder: 14 – 36%, elbow: 26 -100%) and, at the other end of the spectrum, severe impairment (shoulder: 4 - 29%, elbow 0 - 17%). Functionally, the elbow was most impaired. Cut-off points of most scales were not related to function.
Discussion, conclusion: There is an urgent need for rating scales expressing the severity of
contractures in terms of loss of functionality. This study provides some solution indications, but much work is still to be done.

O19.02

Responsiveness of the POSAS for patients with burn scars following a physical therapy rehabilitation program

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Objectives: Despite frequent use of scar rating scales the psychometric properties are not fully documented. Responsiveness or the ability to measure differences over time is important for longitudinal study designs and to establish the clinical meaningfulness of the measure. For the Patient and Observer Scar Assessment Scale (POSAS), a commonly used subjective scar rating scale which includes patient's opinion, no studies have examined the responsiveness. The aim of this research was to investigate the internal responsiveness of the POSAS.
Methods: Sixty patients were assessed before starting a physical therapy rehabilitation program at baseline and at 1 year follow-up using the POSAS. Responsiveness was determined using effect size (ES). The ES is a standardized measure of change over time that is calculated by dividing the difference between the pre- and post-test scores by the pre-test standard deviation (SD).
Results: In the Patient scale the ES was small for the items pain (0.43) and itch (0.49). For the items thickness (0.77) and irregularity (0.58) ES was moderate. In the items color (1.13), stiffness (1.30), global score (1.14), and total score (1.33) ES was large.
In the Observer scale for the items vascularity (1.25), thickness (0.91), pliability (1.43), overall score (1.30) and total score (1.33) ES was large. For surface roughness (0.55) ES was moderate and for pigmentation (0.30) and surface area (0.33) ES was small.
Discussion/conclusion: Responsiveness was assessed by means of distribution method and only ES size was calculated. No external responsiveness was investigated. Several items of the Patient scale and the Observer scale together with the overall scores and global scores showed large sensitivity to change between baseline and 1 year follow-up measurements.

O19.03

Effects of home exercise program on depression and quality of life in burn patients: pilot study

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Objectives: Burn injuries are vital and very serious injuries and can cause considerable disability. The term burn rehabilitation is in a physical, social and psychological integrity. Aims in burn rehabilitation; reduce complications arising from joint contracture and other deformities, increase functional capacity, control scar tissue formation, improve mobility, reduce the loss of professional ability and improve quality of life. Exercises are one of the most important elements of rehabilitation. Studies show that the psychosocial burden continues after the burn injury. Depression in burn patients is a complication that can persist for years. Ambulance and mobility are important factors that will make the patient feel better. The purpose of this study is to examine the effect of home exercise program on quality of life and depression in burn patients.
Methods: 11 voluntary burn patients were included in the study. Demographic information, burn area, grade, percentage and type, number of operations performed, number of grafts applied, duration of hospitalization were recorded. The quality of life was assessed by Short Form-36 (SF-36) and depression by the Beck Depression Scale. Home exercise program provided by the physiotherapist at discharged. Evaluations were repeated after 3 weeks.
Results: There was a statistically significant difference in Beck Depression Scale (BDS) evaluations and SF-36 physical functioning, pain and mental health sections before and after home exercise program ($p < 0.005$). BDS scores decreased after home exercise program when SF-36 scores increased.
Conclusion: According to our results, the quality of life of the patients increased when they showed improvement in depression after home exercise program. Home exercise programs in burn patients can help prevent complications, increase the quality of life and improve their depression levels. Our study continues with increasing number of participants.

O19.04

The cultural adaptation and validation of patient and observer scar assessment scale into Turkisch

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Objectives: The scales used in the scar evaluation give information to the clinician about the effectiveness of the treatment applied, as well as providing benefits to the clinician in terms of planning and based on the inadequacy of the treated person. The Patient and Observer Scar Assessment Scale (POSAS) is a reliable and feasible scale to subjectively assess scar formation. POSAS emphasizes the opinions of the patients as opposed to other evaluation scales. There are no scales evaluating burn scar in Turkey. The study was planned to evaluate cross-cultural adaptation, validation and reliability of POSAS into Turkish.
Methods: In our study, 50 burn patients with hypertrophic scar, aged 18-65 years (mean age 37,5 ±1,4 years), who

were admitted Kartal Lütfi KÄ±rdar
Training and Research Hospital-Wound and Burn Treatment Center from February 2014 to April 2014 were included. For cultural adaptation of POSAS from English to Turkish, the scale was translated by two people working in different health fields. POSAS was administered to 50 patients with a 1-week interval to evaluate the validity and reliability. The internal consistency of the scale was tested using the Cronbach alpha method. **Results:** As a result of the analysis, the Cronbach alpha value for observer measurements was found to be 0.93 (excellent), while for patient measurements was found to be 0.77 (good). It was determined that the internal consistency of scale accordingly.
Conclusion: The Turkish version of POSAS is valid, reliable, a culturally appropriate and available survey for evaluating hypertrophic scars. We believe that the Turkish form of POSAS will be an important clinical/scientific tool in the field of burn physiotherapy in our country and lead to new researches on this field.

O19.05

The Intrarater and Interrater reliability of an automated hand measuring system vs manual measurements of the hand

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Aims: Pressure therapy gloves are engineered to apply adequate pressure to hand and fingers with the aims to increase the rate of scar maturation, prevent contracture formation, and enhance cosmetic appearance without impairing circulation. To optimise the effectiveness of the gloves, an accurate measurement of hand dimensions is crucial. In making custom-made gloves, direct measurement tools such as flexible measuring tape are used. The tension of a measuring tape and the curvatures of corresponding landmarks can influence the results, which lead to poor repeatability and large variances. The Manu3 Hand Measuring System is a touchless, portable, desktop optical laboratory scanner, based on the measuring principle of stereo-photogrammetry. The software analyses the photos and calculates the lengths and circumferences required to fabricate compression gloves. The aim of this study is to investigate the reliability of the automated hand measuring system and compare this to the reliability of manual measurements of the hand.
Method: Two measurers will perform the measurements. The first measurer will perform two consecutive measurements with the Manu3 system for intrarater reliability, after which the second measurer will also perform a measurement with the Manu3 system for interrater reliability. This protocol is repeated for the manual measurements. Intra Class Correlation Coefficients, Standard Error of Measurement and Bland-Altman Plots are calculated for statistical analysis.
Results: Data collection will be completed by 31 May 2017. The results of 30 subjects with normal hands and 15 hands with scars from at least 8 subjects will be presented at the EBA Congress in September.
Discussion and conclusion: If the results of this study indicate that the reliability of the automated hand measuring system is higher than the reliability of the manual measurements; we can conclude that the Manu3 system could give added value to the optimisation of the effectiveness of pressure therapy gloves.

O19.06

The effects of shockwave-therapy on burn scars, a randomised comparative trial

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Objectives: Extracorporeal shockwave-therapy (ESWT) is emerging as a new non-invasive type of mechanotherapy to treat both wounds and scars. This study aims to investigate the added value of ESWT in the treatment of hypertrophic burn scars after delayed wound healing.
Methods: Evaluations included the Patient and Observer Scar Assessment Scale (POSAS) for clinical assessment, tristimulus colorimetry for redness and cutometry for elasticity. Patients were randomly assigned to a group and treated with pressure garments, silicone and moisturisers. The intervention group was additionally treated with ESWT once a week during 10 weeks. Patients were tested at baseline, after one, three and six months. An intention to treat analysis with the last observation carried forward was applied. Sensitivity analyses were carried out to detect significant differences between the analysis with or without the missing data. To detect significant differences between the groups a repeated measures ANOVA was used with the intervention being the between-subjects factor and time + scar outcome parameter (e.g. elasticity) being the within-subjects factor.
Results: Final results for 20 patients in each group after six months are presented. Average age was 44,4 years (±18,2) in the intervention group and 39,1 years (±14,89) in the control group. Scars were on average 2,4 months (±1,42) and 2,7 months (±1,81) old. Results of the clinical assessments showed a trend towards a better performance for the intervention group with statistically significant

improvement for elasticity, global opinion and total sum of POSAS scores assessed by the patient and observer. Results of the objective assessments showed a statistically significant better performance of the intervention group for elasticity assessed with cutometry (p=.011, η2p=0,107, d=-1,23) and revealed no statistically significant differences between the groups for redness assessed with tristimulus colorimetry.
Conclusions: ESWT could give added value to the non-invasive treatment of hypertrophic scars especially to improve elasticity.

O20.01

Three donor site dressings in paediatric split-thickness skin grafting: a prospective randomised controlled trial

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Aim: to prospectively compare three donor site dressings in paediatric split-thickness skin grafting: Algisite M, Cuticerin, and Sorbact. All three dressings were in use within the Pegg Leditschke Children's Burns Centre in Brisbane Australia.
Methods: Prospective parallel 3-arm randomised controlled trial, powered to show a minimum clinically important difference of 3 days in time to healing as primary outcome. Recruited through a single children's burns unit. Secondary outcomes pain and itch. Trial registered with ANZCTR. Trial protocol pre-published.
Results: 101 patients recruited from 106 consecutive eligible children. No statistically significant difference in time to healing between the three dressings. No significant differences in donor site pain or itch during and after healing.
Conclusion: There were no clinically or statistically significant differences in outcomes when comparing three donor site dressings currently in use within our department, justifying the continuing policy of surgeon preference for each of these three dressings.

O20.02

Our experience in the treatment of chronic wounds of lower limbs

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Objectives: To improve the results of treatment of patients with chronic wounds of the lower extremities.
Methods: Treated 15 women aged from 35 to 83 years with chronic wounds of the lower extremity in the period from 2014 to 2016. Etiology: 9 mechanical injury, 2 - animal bites; 1 - abscess; 1- chronic venous insufficiency; 1 - bedsore; 1- skin cancer. Duration of wound existind from 1 month to 10 years. Wound area from "‹"‹3 to 20 cm in diameter. Combined treatment included antibacterial therapy, NPWT, gialuronic acid injection and application, skin grafting. We studied: clinical indicators of skin grafts healing and wound healing time, bacteriological examination of the wounds and the perfusion control with laser Doppler flowmetry.
Results: In 11 patients there was 100% healing of skin grafts, in 2 - 75% engraftment, these patients after 10-12 days after the operation applied dressings with Ialuset - cream for 2-3 weeks, in 1 patient wound healed within 14 days after the course of VAC therapy without surgery, and 1 experienced severe pain during the negative pressure action that led to abandon the VAC therapy. Prior NPWT in most cases in wounds were found: Staphylococcus aureus (45%); Klebsiella (27%); Pseudomonas aeruginosa (18%); Proteus mirabilis (10%). During monitoring of tissue perfusion in 10 (66%) patients were increase of perfusion rate from 2 to 6 hours after vacuum therapy, in 5 (34%) - rates unchanged and even had a tendency to decrease. Chronic wounds healed completely in 11 patients within 2 weeks, in 1 case - within 5 weeks and 3 - for 6 weeks. Observation for 12 months after discharge showed no recurrence.
Conclusion: By using the combined method of treatment of chronic wounds achieved complete healing of the wound defect in all patients during the period from 2 to 6 weeks.

O20.03

Skin graft healing after autodermoplastic surgery for thermal burns

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Objectives: To determine the length of time it takes to achieve complete wound healing in split-thickness skin-grafted burn wounds and to identify factors that affect time to complete wound healing.
Methods: Prospective study of 20 thermic burn trauma IIB, III grade pacients, who underwent autodermoplastic surgery. After transplantation patients were observed during 1st, 2nd, 4th wound dressings and on discharge. Percentage of wound surface epithelialization, presence of exudate, graft color and any possible complication were assessed. Time to complete wound healing was defined as the number of days from skin grafting until the wound was 100 percent epithelialized.
Results: Median patients age was 54 years *IQR* [38 – 67.25]. 80% had IIAB grade burns, 1 patient III grade burn, 3 patients had both IIAB and III grade burns. All patients were transplanted 0.3 mm thick skin autograft. 65% of skin grafts were meshed. Median time to complete wound healing is 5 weeks, minimal 3 weeks (n=3) and maximum 12 weeks (n=1). 50% of skin grafts had 90% wound closure at postoperative day 12. No grafts were lost to infection. Factors that significantly affected time to complete wound healing were age (r=0.46; p= 0.05), wound epithelialization percent observed during dressings (r=0.53; p=0.02) (Spear-

man rank test). Wound epithelialization percent statistically significantly differs in patient groups with pale or rose skin grafts, with or without exudation in wound, with or without diabetes ($p<0.05$) (Mann-Whitney rank-sum test).
Conclusion: Evaluation of wound epithelialization gives information about skin graft healing already on the 3rd post-operative day (1st dressing). Results demonstrate that all patients will have 100 percent wound closure at discharge. Factors thought to influence time to complete wound healing, such as total body surface area burned, burn grade, sex, graft type, donor site, smoking and infection, did not significantly affect the authors' patient group.

O20.04

Surface skin management in complex burn: an experience with Polihexanide-Bataine and Silver dressing in paste for wound bed preparation
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Objective: The aim of this case study is to demonstrate the benefits of a combined therapy for wound bed preparation: hydrotherapy, polihexanide –betaine and silver alginate in paste in the prevention of sepsis skin focus, in severely burns patients.
Methods: Descriptive and prospective case study. Male patient (40), suffer workplace accident. Inflammation of paint fumes caused severe burns by fire. 40%TBSA .Facial, thoracic and abdominal burns were superficial partial thickness. Deep partial thickness burns affected upper and lower limbs. ICU admission. Surgical cleaning was needed to remove blisters and sticked paint. Skin grafts were performed in upper limbs.
A skin surface management protocol was initiated after first surgical cleaning. The protocol include: a daily basis hydrotherapy and advanced wound care on bed side. Soft shower for mechanical debridement. Afterwards, steril gauze soaked in polihexanide-betaine were left for 15 minutes over burns, donor and grafted areas. Silver dressing in paste was applied covering all areas, grafts included. In order to maintain moisture and avoid desiccation, the paste were covered with a steril petrolatum dressing. Hyperoxygenated fatty acids was applied over epithelized zones.
Results: After seven days, evident signs of epithelization were observed. Diminished systemic and local inflammatory signs due to a low bacterial bioburden and biofilm formation prevention. Reduction of wound size and exudate amount. Excellent functional and aesthetic patient outcomes. Weaning and early mechanical ventilation withdrawal.
Conclusion: Despite of the critical condition of this patient due to a large burned body surface area, this skin surface protocol achieved the prevention of sepsis skin focus. The synergic and powerful effect of hydrotherapy, polihexanide and silver dressings in paste have allowed excellent patient outcomes. This case can lay the groundwork to update the current burn management protocol. A cost-effectivity study is suggested to measure the impact of these results.

O20.05

Platelets Rich Plasma (PRP) gel post Fractional carbon dioxide LASER resurfacing for atrophic scars
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Introduction: Atrophic scars are known for being difficult to treat especially areas with poor blood supply e.g. tip of nose. Fractional carbon dioxide laser resurfacing (FxCR) has a remarkable effect on scar remodeling, and autologous platelet rich plasma (PRP) is known to enhance wound healing. We hypothesized that combined treatments by FxCR and PRP gel would manage atrophic scars more effectively.
Aim of the work: Determine the value of adding PRP gel in healing after FxCR as regards down time for healing and final outcome.
Materials & Methods: Nineteen patients with atrophic scars were treated by FxCR with variable settings for 5 sessions at 6- weeks interval. PRP was prepared from 9 ml blood collected in a tube prefilled with 1 ml anticoagulant solution followed by centrifugation 500 x g for 10 minutes, where PPP was separated, then 1000 x g for 7 minutes to separate PRP. PRP gel is allowed to form as platelet rich fibrin matrix membrane (PRFMM) by adding platelet poor plasma (PPP) to calcium gluconate 10% for induction of fibrin mesh network polymerization a sterilized dish and leaving it for 20 minutes in fridge at 40 C. PRP gel membrane (PRFMM) was applied immediately after each session for treated areas and kept for 5 days.
Discussion & Conclusion: Significant improvement for all cases with signs of revitalization (e.g. Elasticity, Colour, Texture).
Conclusion: PRP gel prepared in the form of PRFM provides a good scaffold for scar remodeling after FxCR. It acts as a reservoir for delivering growth factors (which have short half-life) from platelets and maintaining platelets concentration for enhancement of post FxCR ablative wound care.

O20.06

Challenging the 21 day golden rule for wound closure: lessons learned from rapid enzymatic eschar removal in deep burns assessed by LDI
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Introduction: Laser Doppler imaging (LDI) has been shown to assess the healing potential of burn wounds with

>96% accuracy. Low flux values of <230 (blue color on LDI) always indicate deep burns requiring surgery to avoid prolonged healing times of >21 days and subsequent hypertrophic scars. Recently, proteolytic enzymes enriched in bromelain have been reported to provide selective eschar removal with better preservation of viable dermis and skin appendages. We herein present our experience with conservative treatment after rapid selective enzymatic debridement with regards to LDI flux values, local therapy, wound healing and long-term follow up results.
Methods: Deep burns on clinical assessment were scanned. Regions of interest (ROI) with low flux values of <230 underwent enzymatic eschar removal. If viable dermis was visible after debridement, conservative treatment with allografts, hydrocolloid gels and hydrocortisone cream was applied till wound healing followed by the full range of aftercare for at least one year.
Results: Ten patients [age 7–80] with a mean TBSA of 12.6% [range 1.5–30.5] showing 37 separate ROI with a mean size of 43 cm² [range 5–190] were included. Thirteen ROI with a mean low flux value of 171.8 [range 88–230] healed within 21 days [range16–21] and 24 ROI with an even lower mean flux value of 134 [range 46–202] required a longer mean healing time of 32.7 days [range 22–57]. Surprisingly, hypertrophic scarring was observed in only 4 of the 37 ROI's.
Conclusions: Without enzymatic eschar removal all included ROI would have been surgically debrided and grafted. Rapid selective enzymatic debridement resulted in an increased preservation of viable dermis and skin appendages. Our results clearly demonstrate that conservative treatment in deep burns doesn't increase hypertrophic scar formation despite longer healing times of >21 days. These findings challenge the universally accepted 21 day golden rule for wound closure.

O21.01

Magisterial Therapeutic Bacteriophage Preparations - Bacteriophages vs Superbugs

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For hundreds of millions of years, bacteriophages – the viral parasites of bacteria – protect Earth's biosphere against bacterial overgrowth. Today, bacteriophages could help address the antibiotic resistance crisis that affects all of society. The greatest hurdle to the introduction of bacteriophage therapy in Western medicine is the lack of an appropriate regulatory framework. Belgium is now implementing a pragmatic bacteriophage therapy framework that centers on magisterial bacteriophage preparations.

O21.04

The Revised Baux Score Is Alive And Well

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Objective: To evaluate the discriminative power and calibration of seven burn specific mortality prediction models in adult burn patients.
Methods: Retrospective data were collected of all adult burn patients (>16 years) admitted to a tertiary burn referral centre with an acute burn injury between January 2004 and December 2015. Recorded variables included: age, gender, burn size, depth of burn, inhalation injury, (early) mechanical ventilation and in-hospital mortality. Seven mortality prediction scores were analysed: Modified Baux score, Abbreviated Burn Severity Index (ABSI), scores developed by Coste, Ryan, Galeiras and the Belgian Outcome of Burn Injury (BOBI) study group. The discriminative value of all scores was compared utilizing Area-Under-Receiver-Operating-Curve (AUROC) analyses. Evaluation of the calibration of each individual score was performed by plotting the predicted against the observed mortality.
Results: 3114 patients were included of which 166 patients died (5.3%). Mortality differed among subgroups with 3.5% in patients aged 16 to 65 years and 15% in elderly (>65 years) respectively (P<0.001). AUROC analysis for all burn-specific mortality models showed highest affiliation with the Galeiras score (area under the curve (AUC) of 0,938) for the overall population. Subgroup analysis of elderly patients (>65 years) showed significantly lower AUC for all prediction scores with the Revised Baux Score demonstrating the highest affiliation (AUC 0.897). Of all scores, Revised Baux score demonstrated best calibration with 1% overestimation in adults and 7% in elderly when comparing predicted and observed mortality. In contrast, the Galeiras score underestimated mortality in both adult (20%) and elderly (22%) patients.
Conclusion: Although all scores are less predictive of elderly mortality, the Revised Baux score predicted mortality most accurately compared to other scores in both the adult and elderly of our cohort.

O21.05

Patterns and predictors of change in POSAS patient scale scores for burn scars in the first 12 months post-burn

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Purpose: The study aims to provide insight in changes and predictors of burn scar formation at 3, 6 and 12 months post-burn.
Methods: The Patient and Observer Scar Assessment Scale (POSAS) was used to assess scar formation. Patterns and predictors of the POSAS score were analysed with latent growth curve modelling by using structural equation modelling with AMOS^{TL}. Predictor variables used were patient sex, three age categories, percentage of total body surface area (TBSA), depth and cause of burn.
Results: Our prediction model had a good fit. Sex was a predictor of the total score and the pain, pruritus, pliability and relief scores. Male patients had a lower total POSAS score (better scar quality) at 3, 6 and 12 months post-burn and a lower pain and pruritus scores at 3 and 6 months post-burn compared to female patients. Full thickness burns tended to have higher POSAS patient scores at 3 months post-burn compared to partial-thickness burns. Age younger than 5 years was a predictor of worse scar quality at 3 months post-burn, likely due to higher pruritus, color, pliability and thickness. Higher percentage of TBSA values predicted higher scores of pruritus, thickness and relief at 3 and 6 months post-burn, but not for the total POSAS scores. Patients with flame burns had a higher POSAS score for color at 3 and 6 months post-burn.
Conclusion: Sex, age, depth of the wound, percentage of TBSA and flame burns were predictor of various POSAS items at 3, 6 and 12 months post-burn.

O21.06

The use of NexoBrid rapid enzymatic debridement in the 2015 Romanian burn mass casualty incident: Ground breaking experience

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Objectives: Burn Mass Casualty Incidents (BMCI) represent a huge challenge, and unfortunately are not uncommon in a worldwide perspective. NexoBrid® (NXB), a Bromelain based enzymatic debridement agent, has been previously described as a possible solution for BMCI, as it can non-surgically release burn induced compartment syndrome without need for escharotomy and remove eschar without dependency on surgical facilities. We present the ground breaking experience of the first BMCI where NXB was used to treat dozens of burn patients.
Methods: On October 30th 2015 a fire blazed through a Bucharest nightclub. The initial victim count was 27 dead and >150 injured. Following contacts with government officials and local hospitals, a large quantity of NXB and a medical team were sent to Bucharest, all arriving within 24-36 hours after the disaster.
Results: Thirty-nine patients were treated with NXB by 3 Bucharest hospital teams in the first days after the disaster. Patients were 69% male, 31% female, aged 28.9±8.4 years, suffering from 29.7±18.1 %TBSA, all suffering from various degrees of smoke inhalation. NXB was applied in an average of 1.2±0.4 applications per patient. Treating physicians reported efficient debridements and shorter time to achieving complete debridement in the majority of cases, and that NXB greatly assisted in dealing with the magnitude of victims, especially during the first days.
Conclusions: NXB is a simple procedure that can be performed after a short training period even by non-surgical personnel. This ground breaking experience is a proof of the concept that NXB can help in solving bottlenecks in a burn mass casualty incident.
Funding: This project has been funded in whole or in part with Federal funds from the Office of the Assistant Secretary for Preparedness and Response, Biomedical Advanced Research and Development Authority, USA, under Contract No. HHSO100201500035C

O22.01

Burn epidemiology: feasability of a national data collection system for 100% patients needing hospitalization

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The French P.M.S.I (Programme de Medicalisation des Systemes d'Information) allows an exhaustive collection of data for 100% of the patients hospitalized for burns (public,private,specialized or non-specialized facilities) taken from Hospital Discharge Registries (HDR); but gave no information about the causes and circumstances of injury. Thus in 2011, we knew that among 8670 cases, 27% were children aged 0 -4. And that the raw incidence rate of hospitalisation was 61/100 000 for this age group (vs. 10 to 14/100 000 for the rest of the population). But learned nothing about how the injury happened.
In 2007, a decree made the description of the causes of burns mandatory for burn centres. The French Burn Society (S.F.E.T.B.), the Agence Technique de l'Information sur l'Hospitalisation (A.T.I.H.) and the Institut de Veille Sanitaire (InVS) designed a minimum data set based on the codes V01 to Y98 of the chapter XX of the ICD-10. (International Classification of Disease).These codes have been made available up to the 5th character to describe the mechanisms, the place, the activity, and the intentionality. The data set was fixed up so as to be quickly and easily accessed by collectors.
In 2013, 45,2%of the HDR in all the facilities which admitted burned patients (including non-specialized units) were doc-

umented showing important differences between age groups. Most severe burns (lethal or needing hospitalisation) must be a priority target for Safety Promotion. The continuous surveillance of their causes and circumstances will be an essential tool for their prevention.

O22.02

Non accidental burns - accidentally different?

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Background: Burn injury, as a form of hetero or auto-aggression, is a very serious way of trauma and accounts for a significant amount of admissions to a Burn Care Unit, with epidemiologic and clinical specificities. A complete study of this phenomena may contribute to its prevention.
Methods: We reviewed all the patients admitted between 1 January 2010 and 31 December 2015 to the Burn Unit of Hospital de São José (n = 475), divided in two groups: 1) Patient victims of non accidental (n = 40) and 2) control group of patients victims of accidental burns (n = 435). Using SPSS, we performed bivariate and multivariate analyzes in order to distinguish epidemiological and clinical aspects separating these two groups.
Results: We identified 40 non accidental burn patients (8,5%) between all admissions to our Burn Unit during the 6 year period analyzed.
When compared to the control population, the non accidental burn victims are on average younger, have a higher body surface area burned, have a higher incidence of inhalatory burn and higher mortality. In most cases of aggression, fire was the etiologic agent.
Discussion and conclusion: Compared to patients with accidental burns, those victims of aggression or self-harm have worse clinical condition and prognosis. A multidisciplinary preventive approach, looking at the specificities of the violent nature of the lesions and identifying risk groups may reduce the incidence and severity of this type of burns.

O22.03

The state of the residential fire fatality problem in Sweden: epidemiology, risk factors, and event typologies

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Objectives: Residential fires represent the largest category of fatal fires in Sweden. The purpose of this study was to describe the epidemiology of fatal residential fires in Sweden and to identify clusters of events.
Methods: Data was collected from a database that combines information on fatal fires with data from forensic examinations and the Swedish Cause of Death-register. Mortality rates were calculated for different strata using population statistics and rescue service turnout reports. Cluster analysis was performed using multiple correspondence analysis with agglomerative hierarchical clustering.
Results: Male sex, old age, smoking, and alcohol were identified as risk factors, and the most common primary injury diagnosis was exposure to toxic gases. Compared to non-fatal fires, fatal residential fires more often originated in the bedroom, were more often caused by smoking, and were more likely to occur at night. Six clusters were identified. The first two clusters were both smoking-related, but were separated into (1) fatalities that often involved elderly people, usually females, whose clothes were ignited (17% of the sample), (2) elderly, (often) intoxicated men, where the fire usually originated in furniture (31%). Other clusters that were identified in the analysis were related to (3) fires caused by technical fault, started in electrical installations in single houses (14%), (4) cooking appliances left on (7%), (5) deliberately set fires (8%), and (6) events with unknown cause, room, and object of origin (23%).
Discussion / Conclusion: Fatal residential fires are unevenly distributed in the Swedish population. To further reduce the incidence of fire mortality, specialized prevention efforts that focus on the different needs of each cluster are required. Practical applications: Cooperation between various societal functions, e.g. rescue services, elderly care, psychiatric clinics, and other social services, with an application of both human and technological interventions, should reduce residential fire mortality in Sweden.

O22.04

A review of risk factors that are of influence on increased mortality in elderly burn patients after a house fire

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Objectives: Elderly are at a higher risk for sustaining fatal burn injury as a result of a fire accident compared to other age groups. Just like other European neighbouring country 's, the Dutch population is ageing. To prevent a substantial rise in elderly related fire fatalities, burn injury prevention must focus on this population. To develop effective prevention interventions, insight into risk factors that are of influence of the increased vulnerability for the elderly to sustain fatal burn injury is needed. A review of the literature was performed to search for these factors.
Methods: A literature search was conducted for described risk factors for mortality in elderly burn patients after a house fire. All risk factors where collected and divided into three groups; pre-disposing factors, fire causing factors and escape factors. The fire causing factors and the es-

cape factors where subdivided into factors that can be influenced, including behaviour, and factors that cannot be influenced. These factors can be further subdivided into social, physical and mental factors.
Results: Factors that are of influence on the pre-disposing chance of mortality are physiological deterioration and having a thin skin. Important physical risk factors that cannot be influenced are deterioration of the senses and a decreased mobility. Another important mental risk factor that cannot be influenced is mental decline, such as Alzheimer's disease. Important social risk factors that can be influenced are wearing loose clothing while cooking and not having a smoke alarm.
Discussion: Having identified risk factors which increase mortality for elderly burn patients, it is now possible to develop prevention programs that can specifically target these risk factors. When prevention addresses the described risk factors the programme will be more efficient and thus more effective.

O22.05

Burn injury during long-term oxygen therapy in Denmark and Sweden: the potential role of smoking

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Objectives: Long-term oxygen therapy (LTOT) increases life expectancy in patients with COPD and severe hypoxemia. Smoking is the main cause of burn injury during LTOT. Policy regarding smoking while on LTOT varies between countries. In this study, we compared the incidence of burn injury requiring contact with health care, between Sweden (a country with a strict policy regarding smoking while on LTOT) and Denmark (a country with less strict smoking policy).
Methods: This was a population-based, cohort study of patients initiating LTOT due to any cause in Sweden and Denmark. Data on diagnoses, external causes, and procedures were obtained from the Swedish and Danish National Patient Registers for inpatient and outpatient care. Patients were followed from January 1, 2000, until the first of the following: LTOT withdrawal, death, or study end (December 31, 2009). The primary end point was burn injury during LTOT.
Results: A total of 23,741 patients received LTOT in Denmark and 7,754 patients in Sweden. Most
patients started LTOT due to COPD, both in Sweden (74%) and in Denmark (62%). The rate of burn injury while on LTOT was higher in Denmark than in Sweden; 170 (95% confidence interval [CI], 126–225) vs 85 (95% CI, 44–148) per 100,000 person-years; rate ratio 2.0 (95% CI, 1.0–4.1). The risk remained higher after adjustments for gender, age, and diagnosis in multivariate Cox regression, hazard ratio 1.8 (95% CI, 1.0−3.5). Thirty-day mortality after burn injury was 8% in both countries.
Discussion / Conclusion: Compared to Sweden, the rate of burn injury was twice as high in Denmark where smoking is not a contraindication for prescribing LTOT.
This study was previously published in International Journal of COPD 2017:12 193–197.

O22.06

Impulsiveness and acute burn patients

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Objectives: Impulsiveness is a tendency to act quickly based on an impulse without reflecting or paying attention to consequences. The aims of this study were to investigate how impulsive burn patients are and whether high impulsivity predicts burn-related factors or post-burn mental disorders.
Methods: Consecutive acute adult burn patients (n=107) admitted to Helsinki Burn Centre were examined with structured diagnostic interview (SCID) at baseline, and 92 patients (86%) at six months after injury. During follow-up, 55% (51/92) of them suffered from at least one mental disorder. The mean TBSA was 9%. The Barratt Impulsiveness Scale (BIS-11), the most commonly administered self-reported measure specifically designed to assess impulsiveness with a 30-item self-report questionnaire assessing the personality/behavior construct of impulsiveness was filled by all consecutive patients. It is sub-factored into e.g. motor, attention and non-planning impulsiveness.
Results: The mean BIS-11 sum score was 64.5. Men did not differ from women. BIS-11 self-control subscale correlated with many characteristics, especially in prevalence of mental disorders. High impulsivity correlated especially with prevalence of personality disorders (attention scale, p=0.014 and, self-control scale p=0.027), especially with borderline personality. In binary logistic regression self-control impulsiveness subscale predicted severe burns (%TBSA>20) (p=0.039).
Conclusion: In the present study self-reported impulsiveness among acute burn patients seemed somewhat higher than in previously reported findings among university students but lower than among psychiatric inpatients with substance abuse. High impulsivity predicted strongly mental disorders but not most of the burn-related variables. However, the relationship between high impulsivity and accident proneness needs further research.

O23.01

Keratinocyte spray and fibrin - sequential or combined application?

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Objectives: Keratinocytes can be isolated from a split thickness skin graft (STSG) and applied immediately as spray-on therapy in clinical setting. Fibrin sealant (Artiss®) has been used to improve cell attachment and to avoid run-off from the treatment area.This study aimed to assess the in vitro adherence and long-term viability of keratinocytes sprayed sequentially on or combined with fibrin.
Methods: Keratinocytes isolated from a (6/1000 inch) STSG were either combined with the thrombin component of Artiss® or suspended in vehicle. They were sprayed either after application of thin layer of fibrin glue or mixed with it onto collagen-coated cell culture dishes at a fixed distance using 1 bar pressure. The surface was either planar or in 25o angle to evaluate immediate adherence. Thereafter medium was added and cell viability was followed for three weeks. Medium was changed every other day. Cell viability was assessed by migration from scratch-wounds at one week after spraying.
Results: When applied sequentially or without fibrin glue, only few cells adhered to the surface using a 25o angle. Also the initial adherence to planar surface was poor. When applied mixed with thrombin of the fibrin glue, cells were trapped within the fibrin gel mesh. After one week of application scratch wound were performed to assess the re-epithelialization. Cells migrated from the edges of the scratch and biopsy wounds within one week and stayed viable in fibrin mesh throughout the study period.
Conclusion: Combined, but not sequential application, of spray-on keratinocytes mixed with fibrin glue markedly enhances keratinocyte attachment. The cells stay viable and retain their ability for migration for at least three weeks. The success of application depends also on surface angle. These results give important data for clinical application of keratinocytes.

O23.02

Accuracy of Laser Speckle Contrast Imaging in the assessment of pediatric scald wounds

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Objectives: Changes in microvascular perfusion in scalds in children during the first four days, measured with laser speckle contrast imaging (LSCI), are related to the time to healing and need for surgical intervention. The aim of this study was to determine the accuracy (sensitivity and specificity) of LSCI on different days after injury in the prediction of healing outcome and if the accuracy can be improved by combining an early and a late measurement. Also, the accuracy of LSCI was compared with that of clinical assessment.
Methods: Perfusion was measured between 0–24 hours and between 72–96 hours using LSCI in 45 children with scalds. On the same occasions, burn surgeons assessed the burns as healing <14 days or healing >14 days/surgery. Receiver operating characteristic (ROC) curves were constructed for the early and late measurement and for the double measurement (DM) using two different methods.
Results: Sensitivity and specificity were 92.3% (95% CI: 64.0-99.8%) and 78.3% (95% CI: 69.9-85.3%) between 0–24 h, 100% (95% CI: 84.6-100%) and 90.4% (95% CI: 83.8-94.9%) between 72–96 h, and was 100% (95% CI: 59.0-100%) and 100% (95% CI: 95.1-100%) when combining the two measurements into a modified perfusion trend. Clinical assessment had an accuracy of 67%, κ = 0.23.
Conclusion: The perfusion in scalds between 72–96 hours after injury, as measured using LSCI, is highly predictive of healing outcome in scalds when measured. The predictive value can be further improved by incorporating an early perfusion measurement within 24 hours after injury.

O23.03

Inter-observer reliability of laser speckle contrast imaging for burn assessment

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Objectives: Laser speckle contrast imaging (LSCI) is an emerging technique for burn assessment and the degree of inter-observer differences has yet to be studied. The aim of this study was to compare assessment of LSCI images by two observers regarding (i) burn perfusion and (ii) burn severity.
Methods: A written instruction was given to two observers without medical training regarding the assessment of burns using LSCI images. The task consisted of creating regions of interest (ROI) in 22 burn perfusion images and using the calculated mean perfusion value to assess the burn severity. This was done using a conversion table into different categories of second degree burns. For each case, the observers were given a digital photo of the burn with a ROI and an unmarked LSCI-image of the same area.
Results: Perfusion values between the two observers had

a high correlation with a Pearson's r of 0.982 (95% CI: 0.970-0.998), suggesting high reproducibility of ROI-perfusion values.
Qualitative assessment in form of image interpretation and deductions from observed values yielded a weighted kappa value of 0.55 which corresponds to a weak agreement.
Conclusion: Untrained observers can reliably identify the same ROI, resulting in observer-independent perfusion measurements. Making the correct assessment of the burn depth was more difficult however, which is affected by both the perfusion value of the ROI, its variation over time and that of bordering areas. The assessment capability is expected to improve for observers trained in burn assessment using LSCI.

O23.04

The Use of Concentrated Surfactant Technology (CST) Based Wound Dressings In Biofilm Control and Prevention

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Objectives: The presence of microbial biofilms in wounds has been strongly associated with delayed wound healing. Therefore wound management calls for products or techniques that can help prevent biofilms or control established biofilms within the wound environment. This study was used to test the ability of a Concentrated Surfactant Technology (CST) - based wound dressing* in the prevention and control of *Staphylococcus aureus* ATCC 29213, MRSA ATCC BAA-43, *S. epidermidis* ATCC 35984, *Enterococcus faecalis* ATCC 29212 and *Pseudomonas aeruginosa* NCTC 10662 biofilms.
Methods: To test biofilm prevention and control, several models were employed including ASTM standard models (MBEC, CDC biofilm bioreactor and Dripslide) and bespoke models (biofilm filter model, coverslip model and the chamberslide model). To assess the anti-biofilm capability of the wound dressings, pre-formed 48-hour biofilms were treated with both dressings for 24 hours. To assess biofilm prevention, surfaces were pre-coated with either the non-antimicrobial or antimicrobial-based wound dressing before attempting biofilm growth for 24 hours. All biofilms were washed in 0.85% saline before performing total viable counts.
Results: The treatment of all biofilms with the antimicrobial-containing wound dressing resulted in a 100% kill, respectively, in almost all biofilms. Results showing the treatment of biofilms with the non-antimicrobial dressing varied between biofilm models, with complete biofilm removal in some models and no significant change in microbial numbers in others. The pre-treatment of surfaces using the non-antimicrobial wound dressing resulted in no significant change in microbial numbers. The pre-treatment of surfaces with the antimicrobial wound dressing resulted in reductions in microbial numbers which varied between models.
Conclusion: The use of multiple biofilm models highlighted the efficacy of the concentrated surfactant-based wound dressing* on Gram-negative and Gram-positive microorganisms within biofilms.
*PLUROGEL and PLUROGEL SSD

O23.05

Biological activity and composition of burn wound exudate changes over time during the first week post burn

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Introduction: There is no general accepted idea on the beneficial effect of burn wound exudate on wound healing in burn patients. While high content of inflammatory cytokines in burn exudate is considered by some research groups to impair healing, growth factor content of this fluid might have a beneficial effect. We had observed a strong toxicity of late exudate samples on the viability of skin fibroblasts while exudates samples collected at early time points after burn injury did not have same effect. Therefore we analyzed the biomolecule content of burn wound exudate in order to explain this differential effect.
We also assessed the effect of wound exudate collected at different time points on wound healing in an *in vitro* model.
Methods: We collected the burn exudate from second-degree burns (TBSA>10%) under negative pressure and analyzed the cytokine, chemokine and growth factor content by ELISA. Further, these samples were added to cultures of adult keratinocytes at a dilution of 50% and their effect on the migration of these cells were assayed in an *in vitro* scratch assay.
Results: We observed a general increase in the inflammatory cytokine and growth factor content of exudate samples over the first week post-burn. Interestingly, samples collected from patients with smaller burns had higher content of inflammatory cytokines than larger burns. Similar for proangiogenic growth factor (VEGF), which was significantly higher in small burn patients. Burn exudate promoted the migration of adult keratinocytes into the wound *in vitro* however, late samples showed less migration stimulating effect.
Conclusions: We show that burn wound exudate might be beneficial for wound healing early after burn especially in smaller burns by promoting angiogenesis and increasing the migration of keratinocytes. Also, the mechanisms of wound healing with regards to wound microenvironment might be different in smaller and bigger burns.

O23.06

Long-lasting Glucagon-like Peptide 1 Analogue Exendin-4 Ameliorate the Secretion and Synthesis Function of Islets Isolated from Severely Scald Rats

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Objective: Observe the intra-cellular insulin content of islets isolated from severely scald and Exendin-4 treated rats. Evaluate the stimulation of the β cell insulin and insulin mRNAs synthesis and secreted insulin at different glucose concentrations and during different periods of time.
Methods: 50% TBSA full-thickness scald rat model was made, intervention of the animal model with Exendin-4 was performed and followed by the isolation and functional measurements of rat islets.Intra-cellular insulin content parameters were observed by scanning electron microscope. Scald and scald with Exendin-4 treatment induced parameter changes were measured in rat islets which had been incubated for 1 or 24 h over different glucose concentrations (2.8 or 16.7 mmol/l). Islet insulin secretion function was analyzed by enzyme-linked immuno sorbent assay. Intra-cellular insulin and proinsulin content were analyzed by immuneprecipitation and PAGE. Islet preproinsulin mRNA expression was examined by RT-PCR assays.
Results: SEM analyses showed that severe thermal injury significantly reduced the number of insulin granules per μm2. The insulin secretion function, the intra-cellular insulin and proinsulin reserve were markedly damaged after the islets been stimulated at different glucose concentrations, chronic high concentration glucose stimulated islet preproinsulin mRNA expression was also impaired. Exendin-4 treatment after thermal trauma induced the improvement of intra-cellular insulin granule amount. Under different glucose stimulation conditions, Exendin-4 improved the insulin secretion function, as well as the intracellular insulin reserve after glucose stimulation. The severely injured islet insulin mRNA expression was restored with the Exendin-4 treatment.
Conclusions: Exendin-4 can reverse the islet β cell insulin reserve post severe scald injury, and may also benefit the improvement of the insulin secretion function, insulin reserve, and mRNA expression of islet β cells.

O24.01

Treatment of the burned child

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Objectives: The purpose of this oral comunication is expose the rehabilitation treatment we do in the hospital with burned child, beginning in acute phase until the chronic or stabilization phase, made by a multidisciplinary team composed by physical medicine and rehabilitation doctor, physiotherapist and occupational therapist.
Methods: It's very important to begin the treatment in an acute phase in order to prevent deformities, when these child stay on the intensive care unit, with postural control (cushion, splinting), preventing aedema, skin and joint retraction, and respiratory complications. Before surgery and after of the resting post-quirurgical time passive and active mobilizations are indicated.
When they are awake, and specially in a subacute phase, it's very usefull playing games as a way to rehabilitation, trying to establish a terapeutical relationship so the child are less scared and feel less pain. While playing we can moisturise and stretch skin, teaching the child to restart his daily living activities or his psychomotor development in babies. Progressive splinting in order to correct deformities are indicated, preferentially nocturnal so they can play and move during the day.
To prevent hypertrophycal scars, the child might wear pressure garment clothes, and we must teach the parents and the child how to put it on, plus if they're also wearing gel or sheet silicones.
Results: Our clinical experience at the hospital and the exhaustive review of existing literature allow us the development and execution of this action protocol in burned child.
Conclusion: As a conclusion, these child need a rehabilitation treatment during all process postburn in order to prevent sequelae and achieve their best personal autonomy. This process covers the child's growth, where more surgeries may be necessary, with his specifical rehabilitation treatment.

O24.02

Evolution of Muscular Strength and Aerobic Capacity after Acute Pediatric Burns

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Objectives: Cross-sectional research has shown that children and adolescents after moderate to severe burns run

the risk of diminished muscular strength and/or aerobic capacity 1-5 years post burn. Early identification of those 'at risk' patients enables early intervention and prevention of secondary conditions. However, knowledge on the evolution of muscular strength and aerobic capacity after pediatric burns is lacking thus far. This prospective longitudinal observation study therefore aimed to investigate how muscular strength and aerobic capacity evolve in pediatric patients with mild to severe burns after discharge.
Methods: Eligible were pediatric burn patients with burns covering ≥5% TBSA and/or a length of stay of ≥2 weeks. Muscular strength (hand-held dynamometry) and aerobic capacity (Steep Ramp Test) were measured at discharge, and 1½, 3, and 6 months post-discharge. Outcomes were compared to Dutch age- and sex-matched non-burned reference values.
Results: Twenty-four pediatric burn patients (15 boys and 9 girls, aged 6-18 years, with burns covering 0.1-34% of total body surface area, and 12-66 days of hospital stay) were included, of which so far 14 patients have completed the study. Muscular strength and aerobic capacity improved significantly within six months ($p<.05$). The biggest improvements occurred during the first six weeks post-discharge. Comparison with non-burned peers revealed however that after six months, ten children scored > 1SD below the non-burned reference mean on at least two muscular strength measures, and five out of 12 tested participants on aerobic capacity.
Conclusion: Six months post-discharge, muscular strength was lower than expected based on age and sex in 71% of the pediatric burn patients and aerobic capacity was lower in 42%. Completion of the follow-up measurements and additional analyses have to verify whether this is true for the entire study population and which personal and/or injury-related factors might predict recovery of muscular strength and aerobic capacity.

O24.03

Quality of life and burn severity: a prospective study
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Objectives: Studies showed that a burn injury can have a profound influence on health related quality of life (HRQOL) and that HRQOL is lower compared to norm population data. However, the best starting point would be to compare the individual's health state with the pre-burn health state. This study aimed to investigate the course of HRQOL starting with a baseline pre-burn assessment in three burn severity groups to test if the groups achieve their original health state.
Methods: A prospective study with a follow-up of 18 months investigated HRQOL. The EQ-6D was used to measure HRQOL starting with a retrospective pre-burn health assessment, followed by an in-hospital, 3, 6, 12 and 18 months measurement. Three burn severity groups were formed based on number of surgeries (no surgeries needed, 1 surgery and ≥ 2 surgeries needed).
Results: 215 patients were enrolled in the study, 65% was male, the mean age was 41 years (SD=15) and mean TBSA burned was 9% (SD=9). Compared to their baseline level of functioning, the three groups reached comparable levels in the domains mobility, self-care and usual activities. In contrast, in the domains pain/distress, anxiety/depression and cognition not all groups reached their baseline level. Particularly the most severely burned group maintained more pain and cognitive problems.
Conclusion: The EQ-6D showed to produce meaningful outcomes when used retrospectively in-hospital to measure pre-burn functioning as a baseline measurement. Furthermore, cognitive problems need more attention in a subgroup of patients.

O24.04

Physical activity and participation: What is its significance in paediatric burns rehabilitation?
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Aim: To determine the physical activity levels of children and adolescents 3-6 months post burn injury. The study also aims to identify the barriers to physical activity as perceived by the children and their caregivers and determine if physical activity levels are associated with self efficacy and/or self concept, joint mobility, muscle strength, physical fitness, balance and/or location or extent of the burn.
Methods: This current study includes children and adolescents (aged 5-18 years) who have presented for treatment at a statewide referral centre for paediatric burns in the 6 month period - July 2016-January 2017- having sustained a burn >10% TBSA or any size burn to the lower limb, which required long term follow up. Enrolled subjects are assessed by final year Physiotherapy students under the supervision of a Senior Burns Physiotherapist in a single visit 3-6 months post injury. Assessment consists of self-reported questionnaires completed by both caregivers and participants and a physical assessment. The physical assessment includes measures of; joint range of motion using standard goniometry, strength using the 30 second chair rise test, balance using the Bruininks-Oserestry Test of Motor Proficiency 2nd edition (BOT-2) and the Star Excursion Balance Test and physical fitness using the 6 Minute Walk Test.
Results: Data collection for this study is still currently being undertaken and will be completed in May 2017.

Quantitative and qualitative analysis will be conducted by an independent researcher on completion of data collection and will be ready for presentation.
Discussion: Few studies focus on activity levels and perceived barriers to these in children with burn injuries. Given the known benefits of physical activity in burn recovery and the importance of facilitating its return, it is essential to investigate this aspect of rehabilitation to optimise outcomes of paediatric patients and disseminate learnings to other burns clinicians.

O24.05

Virtual Reality (VR) - a chance for the rehabilitation of burned children

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Objectives: Many children suffer from heavy burn injuries each year, so that it is necessary to treat them in hospital. The burn wounds are painful during surgical intervention and physical therapy afterwards. Especially stretching of scars is very painful, often leads to implementation of pain memory. All in all, pain, anxiety and discomfort for the children are very high. Today common alleviation is through heavy doses of analgesics taking into account well-known side effects. We propose to use modern of-the-shelf Virtual Reality (VR) systems to reduce doses of analgesics and as a drug-free, less pain and anxiety inducing physical therapy approach for children.
Methods: VR has been studied for more than 15 years to improve therapy for different patient groups. Pain alleviation during wound care is one of the first and most successful areas of application. Through the technological advance and especially with the market-success of gaming consoles, today we find VR-systems on the market, which are ready-to-use in clinical settings. Together with these systems comes a variety of movement-based games that are appropriate for main points of treating burned children. Different games can be used before/ during dressing and physical therapy.
Result: The use of VR systems during wound care demonstrated that children with severe burn injuries have about 35-40 percent less pain without high doses of analgesics. There is also a reduction of discomfort during wound dressing and reduction of anxiety levels. The cooperation of the patient may be enhanced.
Discussion/Conclusion: Modern VR systems have a high technical standard and are easy to use, which makes them available to everyday clinical practice. Furthermore, patients can be equipped with the systems to use them at home for on-going rehabilitation. By means of achievements or high-scores it is even possible to monitor the progress at home making telemedicine possible.

O24.06

Acceptability and feasibility of exercise therapy in an aquatic environment for patients after burn injury.

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Objectives: A substantial number of burn survivors will need to regain their former fitness and activity levels after hospitalisation. As an aquatic environment makes moving easier and is safe, it may be specifically relevant to help reactivate patients, but can also in itself be a barrier. We investigated the acceptability and feasibility of aquatic exercise therapy for patients after burns.
Methods: Eligible were all adult patients with (almost) healed burns with an indication for exercise therapy who had been admitted to the burn centre. Patients were asked to participate in an aquatic exercise program for a minimum of 2 weeks, 2 times per week, in combination with their standard follow-up appointments. Patients who were unable, unwilling to participate were asked to serve as control. To assess acceptability and feasibility, a questionnaire was used, based on the Water Exercise Acceptability Questionnaire for COPD patients, enjoyment was assessed and complications monitored. To get insight in the profile of (non)participants, data were collected concerning satisfaction with appearance, previous activity habits and self-efficacy.
Results: From June 2016 onwards 11 patients were eligible, 10 patients gave informed consent and participated. One patient refused because of concomitant disease. Participants were dominantly male (8/10), had suffered mostly extensive burns (median TBSA burned 30%, median LOS 51 days).
All included patients chose to participate in the aquatic exercise program. Patients and professionals were positive. Solutions were found for some practical problems, for instance the use of swim covers to protect bandages on extremities. Some encountered issues were location specific (conflicting treatment schedules professionals) others generic (health insurance). An unexpected effect was peer-support. Data analyses are underway.

Conclusions: Acceptability and feasibility of aquatic exercise therapy after burns is good. These results will be used to further develop exercise therapy for burn survivors in an aquatic environment in the Netherlands.

O25.01

Treatment option of partial thickness burn injuries in children

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Introduction: There are several wound dressings available for the conservative treatment of second-degree burn injuries.
Aims: To determine the effectiveness of silver-laden foam and Zn-hyaluronan gel for the treatment of partial thickness burns was carried out.
Patients, methods: Prospective study has been carried out between January 1, 2013 and December 1, 2015. A total of 73 children were treated with silver-laden foam and Zn-hyaluronan gel. For the first 24 hours, in order to assess the exact depth of the burn, 0.5% silver nitrate solution dressing was applied in 25% of the cases. In the rest of the children silver-laden foam with Zn-hyaluronan gel already as the first intervention was used. The dressing was removed on the seventh day.
Results: In the study population hot water scalds were the main cause of burn injury. Other causes included hot oil, flame, contact, and other types of burns. Wound size was 5% of the total body surface area on average. Burns were seen on all body parts; in 38 cases burns were noted in more than one area. Out of the 73 children were treated with this dressing. Wound infection was not noted. Epithelialization of the burned areas was observed on the 7 days after primary treatment.
Conclusions: The investigated dressing efficiently promotes epithelialization the burned areas. Further advantage of the Zn-hyaluronan gel is to enhance the regeneration of the dermal cells and inhibits the fixation of the dressing into the wound. Based on our experiences, we could achieve gentle, child-friendly, and cost-effective treatment, excellent wound healing and favorable cosmetic results in children.

O25.02

Physical Activity and Sedentary Behavior after Pediatric Burns

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Objectives: Adequate levels of regular physical activity (PA) are crucial for health and well-being. Pediatric burn injuries can have major physiological consequences in both the short and long term. The question is whether these consequences affect post burn PA levels. This study therefore aimed to describe PA and sedentary behavior (SB) in children and adolescents, 1-5 years after burn injury.
Methods: Daily PA and SB were monitored in 20 subjects (12 boys and 8 girls, aged 6-17 years, with burns covering 10-37% of total body surface area, 1-5 years post burn) for one week using the ActiGraph GTX3+ accelerometer. Activity counts were categorized into SB, light PA, moderate PA, vigorous PA, moderate-to-vigorous PA (MVPA), and total PA. Outcomes were compared with non-burned reference values and PA levels recommended by the World Health Organization (WHO).
Results: Subjects spent about 5.1 hours per day on total PA and 7.4 hours on SB. Most of the active time (>80%) was categorized as light PA. Thirty-five percent of the group, especially the young boys, spent on average ≥60 minutes on MVPA per day. Boys, although with large interindividual differences, spent more time on MVPA than girls (p<.005). Older age was associated with less PA, while more time was spent sedentary. No trends were found indicating an effect of burn characteristics, time post burn, or length of hospital stay, and no differences were found with non-burned references.
Conclusion: Duration and intensity of PA and SB in children and adolescents 1-5 years after burn injury were similar to non-burned peers. Only 35% of the group however, met the WHO physical activity recommendation. Although the latter indicates that the long-term health and well-being of pediatric burn patients might be at risk, it is comparable with findings in non-burned peers.

O25.03

The need for agreement on what to measure in randomised controlled trials in burn care: the Core Outcomes in Burn Care Research (COSB) study.

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Objectives: Burns cause morbidity, prolonged hospitalisation and long-term disability. Decision-making in burn care is challenging due to lack of evidence. A range of sur-

gical procedures are performed, new technology is emerging and alternate care pathways are being introduced. Difficulties with producing an evidence base include establishing which outcomes should be used to assess recovery. In burn care, this is hampered by the multiplicity of outcomes and time points, lack of professional agreement and limited patient involvement. Most studies evaluating burn care focus on short-term outcomes, not recognising the importance of longer-term endpoints.
The lack of outcome reporting consensus and consistency makes comparing and combining study results impossible. Reporting an agreed minimum set of the most important outcomes (Core Outcome Set
(COS)) will allow effective evidence synthesis. Patient and stakeholder input is required to ensure the relevance of outcomes chosen.
Methods: A long-list of clinical and patient-reported outcomes will be identified through systematic reviews of burn care RCTs and interviews with patients and multi-disciplinary professionals. A two-stage modified Delphi exercise will be undertaken to prioritise and condense the list. A reduced list will be taken to consensus meetings to achieve a final COS. Project stakeholders will include journal editors, health commissioners, researchers, as well as patients and clinical staff.
Results: Initial scoping results using Ovid Medline and Embase showed 295 and 537 hits respectively for burn care RCTs between 2012 and 2016. Over the same time period there have been nine Cochrane reviews on burn care. Five reviews analysed ≤ 5 RCTs. None could draw firm conclusions on the overall topic due to poor reporting and risk of bias.
Discussion / Conclusion: This study aims to develop a COS to reduce outcome reporting heterogeneity in burn care trials, improve evidence synthesis and ensure effective use of research funding to benefit patients.

O25.04

Ultrapulsed fractional CO2 laser treatment of hypertrophic burn scars: evaluation of an in-patient controlled, standardized treatment approach

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Objective: In this study, we aimed to quantify the effects of fractional ablative carbon dioxide laser therapy in the treatment of widespread hypertrophic burn scars.
Background: While many different pilot studies have described the potential of the technology and expert groups and current guidelines, alike, recommend its use, the level of evidence for the efficacy of fractional CO_2-laser treatment for burn scars is currently very low.
Methods: 10 patients (3 male, 7 female) with hypertrophic burn scars were treated with a single course of fractional CO2-laser therapy in an in-patient controlled setup, using a standardized treatment paradigm. Documentation was based on modern scar scales and questionnaires, like the VSS, POSAS and DLQI, as well as state of the art clinical measurements (PRIMOS, Cutometer).
Results: Over the course of six months after treatment, VSS and POSAS scores showed significant improvement in the rating of scar parameters, as did the quality of life rating according to the DLQI. In the treated scars surface relief improved significantly, as Smax decreased by 1893µm (- 36.92%) (p = 0.0273) and Sz by 1615µm (- 36.37%) (p = 0.0488). Scar firmness in treated scars could be reduced by 30% after one treatment session, as R0 improved by 0.0797mm (+ 30.38%) (p= 0.0212).
Conclusions: Fractional ablative CO2-laser treatment is a safe and efficacious option for the treatment of hypertrophic burn scars. While more treatment sessions are required for satisfying results, significant improvement is already apparent after a
single course of treatment.

O25.05

Improving Mortality Outcomes of Steven Johnson Syndrome/Toxic Epidermal Necrolysis: A Regional Burns Centre Experience

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Introduction: Steven Johnson Syndrome/Toxic epidermal necrolysis (SJS/TEN) are rare potentially fatal desquamation disorders characterised by large areas of partial thickness skin and mucosal loss. The degree of epidermal detachment that occurs has led to SJS/TEN being described as a burn-like condition. These patients benefit from judicious critical care, early debridement and meticulous wound care. This is best undertaken within a multidisciplinary setting led by clinicians experienced in the management of massive skin loss and its sequelae. In this study, we examined the clinical outcomes of SJS/TEN overlap & TEN patients managed by our regional burns service over an 12-year period. We present our treatment model for other burn centres treating SJS/TEN patients.
Methods: A retrospective case review was performed for all patients with a clinical diagnosis of TEN or SJS/TEN overlap admitted to our paediatric and adult burns centre between June 2004 and December 2016. Patient demographics, percentage total body surface area (%TBSA), mucosal involvement, causation, severity of illness score (SCORTEN), length of stay and survival were appraised with appropriate statistical analysis performed using Graph Pad Prism 7.02 Software.

Results: During the study period, 42 patients (M26; F: 16) with TEN (n=32) and SJS/TEN overlap (n=10) were managed within our burns service. Mean %TBSA of cutaneous involvement was 57% (range 10-100%) and mean length of stay (LOS) was 27 days (range 1-144 days). We observed 4 deaths in our series compared to 16 predicted by SCORTEN giving a standardised mortality ratio (SMR) of 24%.
Conclusion: Management in our burns service with more aggressive wound care involving debridement of blistered epidermis and wound closure with synthetic and biological dressings seems to produce benefits in mortality when compared to predicted outcomes.

O25.06

Cost analysis of a novel enzymatic debriding agent for management of burn wounds

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Introduction: Given its efficacy and safety[1], NexoBrid™ (NXB) has become part of our therapeutic options in burns treatment with satisfactory results. However, no cost analysis comparing NXB to the standard of care (SOC) has been carried out as of today. The aim of this study was to assess the cost of treatment with NXB and compare it to the SOC cost[2].
Methods: 20 patients with 14–22% of TBSA with an intermediate-deep thermal burn related injury were retrospectively and consecutively included. 10 of these patients were treated with the SOC, while the other 10 with NXB. The cost analysis was performed in accordance with the weighted average Italian Health Ministry DRGs and with Conferenza Stato/Regioni 2003 and the study by Tan et al. For each cost, 95% confidence intervals have been evaluated.
Results: Considering the 10 patients treated with NXB, the overall savings (total net saving) amounted to 53300 euros. The confidence interval analysis confirmed the savings.
Discussion: As shown by our preliminary results, significant savings are obtained with the use of NXB[2]. The limit of our study is that it is based on Italian health care costs and assesses a relative small cohort of patients. Further studies on larger multinational cohorts are warranted.
References: Rosenberg L, Krieger Y, Bogdanov-Berezovski A, Silberstein E, Shoham Y, Singer AJ. A novel rapid and selective enzymatic debridement agent for burn wound management: a multi-center RCT. *Burns*. 2014; 40: 466-474. Giudice G, Filoni A, Maggio G, Bonamonte D, Vestita M. Cost Analysis of a Novel Enzymatic Debriding Agent for Management of Burn Wounds. *BioMed Research International*. 2017

O26.02

The use of new skin substitute in the treatment of donor sites

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Aim: to compare the efficacy of new skin substitute - bioplastic materials based on chitosan nanofibers* and fine-mesh gauze in the treatment of donor sites after skin graft.
Materials and methods: the study included 30 patients with burns of II-III degree aged 28 to 55 years, who have operation skin graft. 15 patients were included in group I; after taking the skin graft and careful hemostasis the wounds of donor sites were closed with biological materials based on nonwoven chitosan nanofibers*. Mesh atraumatic dressings** stacked in 2-3 layers. Bandage change at donor sites was not undertaken until complete healing of the wound. In group II donor sites were traditionally bandaged with dry sterile gauze. The effectiveness of different approaches in the treatment of donor sites was evaluated for the following parameters: the terms of healing, the incidence of suppurative complications and the degree of severity of pain by verbal analog scale (VAS).
Results: in group I the terms of epithelialization of donor sites were 9,0 ± 0,1 days. Biodegradation of bioplastic material in the wound stimulated the growth of collagen fibers of skin and wound healing. No purulent complications of the wounds were detected.
In the II group the terms of epithelialization were 11.1 ± 1.3 days. For 20% of the patients in group II the development of peripheral inflammation was noted, which required additional dressing changes. VAS for patients of group I was 2.3± 1.2 points, them to be activated in 3-4 days after surgery. But pain syndrome in group II was more significant - 5,9 ± 0,3 points.
Conclusions: modern bioplastic materials showed their high efficiency for local treatment of wounds of donor sites resulting in reduction of the terms of epithelialization of wounds and the level of pain of patients.
*ChitoPran
**VoscoPran

O26.03

Partial-thickness scalds in children: a comparison of different treatment strategies

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Objective: The aim of this study was to compare the clinical outcomes of different treatment strategies for children with partial-thickness scalds at two burn centers. At the first burn center, these burns were treated with a hydrofiber dressing or silver sulfadiazine , while at the second burn center, cerium nitrate-silver sulfadiazine was used.
Methods: A two-center retrospective study was conducted of children admitted between January 2009 and December 2013 for partial-thickness scalds up to 10% TBSA who were treated primarily with a hydrofiber dressing or silver sulfadiazine (Burn Center Rotterdam) versus cerium nitrate-silver sulfadiazine (Burn Center Groningen). The Dutch Burn Repository R3 and the electronic medical records were used for data extraction. The primary outcome was the time to wound healing. The secondary outcomes were the length of hospital stay, wound infection, and surgical treatment.
Results: The time to wound healing differed between the groups (HR=1.46, 95%CI 1.17-1.82); the shortest time to wound healing was observed in the patients treated with CN-SSD (median 13 days), compared with 15 days for the patients treated with hydrofiber and 16 days for the patients treated with SSD ($p<0.01$). The length of stay was significantly shorter for the hydrofiber patients (medians: hydrofiber 3 days, SSD 10 days and CN-SSD 7 days; $p<0.01$), but their outpatient treatment period was significantly longer (medians: hydrofiber 12 days, SSD 6 and CN-SSD 4 days; $p<0.01$). The proportion of surgeries and the mean time to surgery was similar between the burn centers.
Discussion/Conclusions: This study compared different burn centers' treatment strategies for children with partial-thickness scalds and found a shorter time to wound healing in the CN-SSD group.
Patients treated with hydrofiber had a shorter clinical period in comparison with the SSD and CN-SSD patients. The results of CN-SSD are promising and warrant further study.

O26.04

Rapid enzymatic debridement of chronic wounds: Results of a multicenter phase II trial

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Objective: Current enzymatic and autolytic wound bed preparation agents used in chronic and hard to heal wounds are slow and/or of limited efficacy. There is an unmet need for a non-surgical rapid-acting wound bed preparation agent. We present the results of a multicenter phase II trial assessing EscharEx® (ESX) a new rapid-acting enzymatic bromelain-based debridement agent for chronic wounds.
Methods: Seventy-three patients suffering from diabetic (n=23), venous (n=24), and post surgical/traumatic (n=26) chronic ulcers participated in a multicenter, prospective, randomized, assessor-blinded, phase II trial assessing the safety and efficacy of ESX (versus gel vehicle in a 2:1 randomization ratio). Patients received up to 10 daily treatments and were then followed up for 26 weeks.
Results: The primary endpoint, incidence of complete debridement within 10 treatments, was significantly higher in the ESX group (55% versus 29%, $p=0.047$) despite the wounds being older and larger in this group compared to the gel vehicle group (72.8 weeks versus 30.8 weeks, 33.6cm^2 versuss 25.8cm^2). Additionally, 93% of ESX patients that achieved complete debridement did so within an average of 7.6 treatments ($p=0.075$).The difference in incidence of complete debridement for the combined diabetic and venous ulcers populations was even more significant (56% versus 20%, $p=0.028$), and the time to complete debridement for these populations was significantly shorter for ESX (post-hoc analysis, $p=0.024$). There was no deleterious effect of ESX on wound closure or patient quality of life. The overall incidence of adverse events amongst the study groups was comparable, with one mortality case in the gel vehicle group considered unrelated to study treatment (acute coronary syndrome).
Conclusions: The overall incidence of complete debridement with ESX within 10 daily treatments was significantly higher and completed earlier, with even better results in the diabetic and venous ulcer groups, with no significant safety issues.

O26.05

Lipofilling in the treatment of burn scars

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Over the past years, lipofilling has been used for many pathologies and sequelae. A total of 186 burn scars were assessed (from February 2009 to October 2016). Half of scar area was treated through injection of adipose tissue harvested from subcutaneous fat and processed in accordance with the Coleman technique. Clinically a marked improvement was observed, which can be seen in 3 months, but most of all, documented at 6 months. In addition, from a clinical point of view, an improvement has been documented, both functional and aesthetic. Lipofilling for burn scar complete and improve the results of standard surgical procedures, with long-term care setting and long-acting results.

O26.06

The reliability and cross validation of a panel of objective measurement tools for the burn scar

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Introduction: Traditionally, burns scars have been measured using subjective scores however objective measurements are required to improve the reproducibility of clinical and study outcomes. This study aimed to evaluate the intra- & inter-rater reliability of a panel of objective scar measuring tools consisting of the DSM-II-Colormeter, Dermascan ultrasound & Cutometer and cross-validate them with the modified Vancouver Scar Scale (mVSS) and Patient & Observer Scar Assessment Scale (POSAS).
Methods: 3 independent assessors evaluated 50 scar sites on 50 burn patients. The Intraclass Correlation Coefficient (ICC) was utilised to measure reliability (acceptable when ≥0.70). Pearsons correlation was used to investigate correlations between measures.
Results: The inter-rater reliability of the total score & individual subscales of both mVSS & POSAS fell below the acceptable limit.
DSM-II intra- & inter-rater reliability for a* & Erythema values were acceptable for the measurement of erythema but only the Erythema value correlated significantly with the mVSS vascularity subscale (Pearsons=0.325, p=0.021). L* & Melanin values (but not b* value) had acceptable intra- & inter-rater reliability for pigmentation and correlated significantly with mVSS & POSAS pigmentation subscales (p<0.01).
The Dermascan ultrasound had excellent intra- & inter-rater reliability for thickness & dermal tissue intensity measurements (ICC>0.90). Thickness measurements correlated significantly with both mVSS Height and POSAS Thickness subscales (Pearsons=0.52 & 0.69, p<0.01). Dermal intensity measures correlated significantly with mVSS & POSAS pliability subscales (Pearsons= -0.642 & -0.645, p<0.01).
The Cutometer R0 (Firmness) measure had acceptable intra- & inter-rater reliability and correlated
significantly with mVSS & POSAS (Pearsons=-0.627 & -0.592, p<0.01) pliability subscales.
Conclusion: The DSM II, Dermascan and Cutometer demonstrated acceptable to excellent intra- and inter-rater reliability and outperformed subjective scar scales. Their significant correlations with the matching mVSS and POSAS subscales confirm that these tools are measuring the same traits but in a more objective and reliable manner.

O27.01

Bromelain based enzymatic debridement with NexoBrid from the point of view of nursing

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Introduction: In the recent past various reports in literature presented promising results regarding acute burn wound treatment, wound healing and long term functional and aesthetic outcome following bromelain based enzymatic debridement with NexoBrid. However enzymatic debridement clearly differs from traditional surgical debridement regarding preparation, intervention, wound treatment and follow-up treatment. After more than 100 successful treatments in our unit we found that enzymatic debridement with NexoBrid revealed a particular challenge for nursing workers at our intensive care burn unit (ICBU).
Methods: Retrospectively we analyzed all patients with partial thickness and deep dermal burns treated with NexoBrid between 2013 and 2016 at our ICBU. Complications within treatment were documented continuously in our data base. We identified main problems behind these complications from a nursing point of view. Furthermore we collected our individual treatment recommendations based on our wealth of experience.
Results: We found that sufficient and even distribution of NexoBrid during the whole 4 hours of treatment process requires innovative approaches of bandage technique and barrier construction. Positioning of extremities has an important impact on debridement results. Pressure has to be avoided in case of circular treatment. Pain during initial treatment and dressing changes in the further course of wound healing has to be covered individually adjusted to patients´ wound situation and mental state.
Conclusion: At an advanced state of our learning curve after more than 100 sufficient treatments we found that qualified personnel and optimized workflows are essential for sufficient and stable results both in initial enzymatic debridement and in the further course of the healing process. To our mind, the prolonged healing process in case of spontaneous healing is one of the most challenging aspects in enzymatic debridement.

O27.02

Nurses' experiences with parental presence during wound care

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Objective: Children constitute a high risk group to sustain

burns. European burn centres differ in policy regarding parental presence during wound care. Currently available studies do not provide evidence for or against their presence. The aim of this study was to develop theory by assessing healthcare professionals' experiences.
Method: To explore events as experienced by individuals, a qualitative approach (grounded theory) was used. Semi-structured interviews regarding parental presence with professionals from Dutch burn centres were recorded, transcribed, and analysed using MAXQDA software.
Results: Purposively sampled nurses (13) and child life specialists (5) participated. It was found that parents go through a process starting with providing emotional support by comforting, distracting and soothing. Their presence could evolve to participation, by providing basic and nursing care, like washing and removing bandages, and, at the end of hospitalisation, to partnership, where the parent is the primary care provider. Perceived advantages for nurses are teamwork with parents and parents' interpretation of the child's behaviour. Parents become acquainted with wounds and care procedures and maintain their parental role. Advantages for children are that familiar persons distract and comfort. Reported disadvantages were procedure obstruction when parents take over the lead, push away the nurse or provide incorrect information ('it will not hurt'). Parents may also have difficulty coping with the situation and become overwhelmed by their emotions. This in turn can influence the child in a negative way. Nurses taking care of children without parents present reported that parents' imagination of wounds, instead of seeing real wounds, was a major disadvantage.
Conclusion: Presence is a parental choice and a dynamic process, with new goals in every step, on which professionals anticipate. Parents should have a role during the procedure and receive adequate guidance and instruction. Disadvantages could be solved by providing information and support.

O27.03

Hypnosis in the management of anxiety and pain related to procedures in burn patients.
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Objectives: The aim of this study is to describe how we approach anxiety and procedural pain integrating hypnosis in our local protocol. The project will be describe with special respect to practical skills, techniques used and integration between pharmacological and non-pharmacological strategies.
Methods: In our burn centre we implemented a pain management protocol integrating pharmacological and non-pharmacological strategies in order to approach pain and anxiety related to procedures in burn patients.
Results: Starting in May 2015 more than 50% of professionals of our burn centre (including nurses, physiotherapists, plastic surgeons and anaesthesiologists) were educated to implement hypnosis in their clinical practice. Our approach integrates hypnosis and comfort talk as complementary to pharmacological treatment in all the different phases of burn treatment from the acute phase to scar rehabilitation. We use hypnosis integrated with pharmacological strategies to reduce anxiety and pain and improve treatment compliance related to procedures, in particular dressing changes, wound cleansing and physiotherapy.
Discussion/Conclusion: Burn patients suffer daily from pain and anxiety related to procedures (dressing changes, wound cleansing, physical and occupational therapy). Hypnosis has been proved to be effective in pain management and have a tangible impact on the patients'outcome, reducing costs as well. According to current literature, hypnosis should be included in the management of burn patients requiring multiple interventional painful procedures. Use of hypnosis and its integration with pharmacological approaches require specific practical skills, understanding of the importance of communication and knowledge of the techniques aimed to include therapeutic language in the clinical practice.

O27.04

Neuropathic pain and itch following burns: a prospective study
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Objectives: Pain and itch are problems associated with the healing of burn wounds. The extant literature shows a decrease in pain and itch with the passage of time but a subgroup of burn survivors develops chronic itch and pain complaints. Neuropathic mechanisms in both chronic pain and itch are assumed to be underlying but its longitudinal development was not studied. Moreover, it is unclear whether itch is (always) part of the neuropathic pain spectrum.
Methods: A prospective study with a follow-up of 18 months was performed in 5 regional burn centres. Adult patients with a length of stay in hospital > 48 hours were enrolled. An adjusted version of the LANSS was used to measure neuropathic pain symptoms, i.e., a question about itch was added and the word 'skin' was replaced by 'scar' to ensure measurement of scar-related symptoms.
Results: 215 patients signed informed consent. Patients were predominantly male (n = 144; 67%), on average 41 years old (SD =15) and TBSA ranged from 1 to 75% (M = 9, SD = 9). At 2 weeks post discharge, the majority of the patients (53%) reported pain&itch complaints; 34% reported only itch and 12% had no complaints. At 18 months

post burn, the prevalence rates were 24%, 24% and 51% respectively. The most prevalent neuropathic symptoms were pain described as pricking, tickling, pins and needles and pain associated with the colour of the scars. Factors that distinghuished the pain&itch group from the other groups were higher burn severity and more psychological problems.
Conclusion: Chronic itch seems to occur with and without neuropathic pain symptoms. Making a distinction between these groups may be clinically relevant as they may benefit from other types of medication and interventions. Psychotherapeutic interventions should be considered in the burn population to alleviate pain and itch symptoms.

O27.05

Screening for physical and psychosocial problems in the outpatient clinical setting: a pilot study

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Objective: Patients with burns may be faced with a large variety of physical and psychosocial problems after their hospitalisation period. For various reasons, such as time constraints, problems may be overlooked by health care providers. A systematic screening may help to identify these problems. For example in oncology, a distress list has been used for years with the aim to address personal needs. This instrument comprises six domains of functioning: practical problems, family and social problems, emotional problems, religious and spiritual problems and physical problems. The aim of this study was to explore its usefulness in the burn care outpatient clinic.
Methods: A pilot study was initiated in November 2016 at the outpatient clinic of the burn centre in Rotterdam. All patients visiting the outpatient clinic were requested to fill in the Distress list. The aftercare nurse discussed the answers with the patients.
Results: Over ninety patients filled in the instrument yet. Our first experiences with the instrument are encouraging for two reasons: 1) the use of the screening list helped in detecting problems that assisted referral to other professionals, and 2) it stimulated communication between the health care provider and patients, particularly regarding topics that are often not discussed such as sexuality.
Conclusion: Our first experiences with the instrument indicate its usefulness in the burn care outpatient setting in order to detect health care needs and to stimulate communication. However, not all domains of the instruments were applicable to the burns context which suggests the need for further fine-tuning of the content. In addition, further research into the effectiveness, the timing of the measurements and different modes of application may optimise clinical practice.

O28.01

Production of a glicerolized human acellular dermal matrix harvested from human donor

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Human Acellular Dermal Matrices (HADMs) provide a clean scaffold for host cellular and vascular in-growth. They are used in various reconstructive surgery procedures. The aim of this study was to develop a new type of HADM for clinical use, composed of glycerolized reticular dermis, decellularised through incubation and tilting in a culture media named Base (AL.CHI.MI.A. Srl). This manufacturing method was compared with a different decellularisation procedure already described in literature, based on the use of Sodium Hydroxide (NaOH) on samples of 28 donors. Specimens were processed for histological, immunohystochemical, viability (MTT Test) analysis and DNA quantification, in order to assess which of the two methods can assure the best human derived dermal substitute in terms of potential biocompatibility and structural characteristics. The characteristics of the interstitial matrix showed a preserved morphology, in comparison to the T0 (just withdrawn) in the first phases of treatment with both the methods Base and NaOH. After prolonged treatment artifacts were observed due to the denaturation of the dermal matrix, earlier in the case of the treatment with NaOH (6 weeks – T6) and later in the treatment with Base (8 weeks – T8). The immunohystochemical analysis has shown that NaOH eliminates the cellular component more quickly from the tissue (T2), while an analogous result is obtained with Base to time T4. MTT Test was performed in all specimens and show that they are not viable. Compared to unprocessed dermis, at least 81% of DNA content was removed through processing. Experiments were performed on animal model to evaluate the biocompatibility of the HADM analyzed. Our results, indicated that the use of glycerolised reticular dermis after five-week treatment with Base allows producing an HADM with good handling and biocompatibility properties. *Work supported by Fondazione Piemontese Studi e Ricerche sulle Ustioni and Compagnia di San Paolo.*

O28.02

The Feet Defects Reconstruction by Sural Â«Mega-flapsÂ» Using Propeller-technique

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Materials and methods: The island flap on the artery accompanied with the surface sural nerve have been used

in 11 cases for closure of the wound defects in feet area. We studied the results of using the traditional sural flap at the distal based on the maximum allowable size (118,2 ± 15,7 Ñ m2) of data in the literature (7 operations - Group 1) and the Propeller"-technique (4 operations - group 2).We have performed the plastic wound closure with ''island''- megaflaps (386,7 ± 19,3 Ñ m2 surface), supplied with the sural artery to the distal base, using the ''Propeller'' -technique in 4 patients.
Results and discussion: All flaps have taken root. In all cases, the sural nerve was the part of the flap. The donor wound was closed with the split-skin-graft simultaneously. In the first group, in one case (14%) had signs of venous insufficiency of the flap, with the development of the conflict, in two cases (29%) had developed marginal necrosis of the flap, requiring further autodermoplasty, and in one patient (14%) reported a total necrosis due to progressive venous thrombosis. In the second group in the 2 cases observed phenomena boundary ischemia distal flap, but in any case not required additional autodermoplasty related to its necrosis. Thus, both groups used a reversal on the vascular axis of the beam up to 180 degrees, but when using the equipment "Propeller" leg adequately isolated from the environment by the flap tissues. While the traditional method of raising leg located in a tunnel or from adjacent often abnormal tissue or requires additional free split autograft cover. Conclusions: Plastic operations have been performed in one stage. The sural flap has a wide of rotation arc, and its stability allows to use the described technique in closing of large feet defects.

O28.04

Microsurgical wound cover in burn patients
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The burn patient cover wound could be an overwhelming task in the complex injuries scenario. In this work, we reviewed the patient's outcomes when they suffered a burn wound related, focusing in that whom required a microsurgical flap. Objective. To demonstrated the effectiveness of microsurgery in complex wound treatment at Centro Estatal de Cuidados Críticos (CECC) Burn Unit, Salamanca, Guanajuato, Mexico, enlisting etiologies, kind of microsurgical flap and outcomes. Method. A retrospective study was made of all CECC in-patients, from January 2013 to December 2015; we included all wound complex burn patients that were treated with microsurgical techniques. Were excluded those without complete files and less than 6 months of follow-up. Results. There were attended 522 in-patients at CECC. A total of fifty-four microsurgical flaps were made in fifty-two patients, 11 free radial, 9 reversed radial, 9 free Latissimus Dorsi musculocutaneus, 1 free Greater Omentum, 2 free Gracilis muscle, 6 free anterolateral thigh, 9 reversed Sural, 4 pedicle Latissimus Dorsi, 3 free Rectus Abdominis muscle. Forty-eight flaps had a favorable outcome (89%), with complete and functional recovery into 4 weeks after surgery; six (11%) were complete flap losses (all electrical, 15 days post injury), and took at least a twofold time to be closed. Forty-two (80%) electric burns, six (12 %) combined electric and fire and four (8 %) fire related. Patient age ranged between 10 to 68 years (mean, 39 years). Surgeries were performed between 12 to 21 days post injury, (mean 16.5 days). Conclusions. The complex wound in burn patients represents a great challenge. With microsurgery, the patient has the opportunity to get a shorter period of time to get a functional wound cover as shown in this study.

O28.05

Osteotomies and autografted artificial dermal substitute over bone marrow in burns with wide bone exposure: alternative to free flaps and amputation
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Objective: The aim of this communication is to show an original technique for treating 3rd degree burns which result in wide defects with bone exposure; which we applied in two elder patients with lower limb burns. This technique allowed us to cover those defects avoiding the use of free flaps, and preventing amputation, with a relatively conservative surgical treatment. The technique consisted in using a combination of extensive bone osteotomies, skin grafts, artificial mono-layer dermal matrix (Integra (®)), and negative pressure therapy.
Methods: We present the technique along with the two cases in which it was applied. We also performed a literature review searching for alternative strategies used for the coverage of similar wounds.
Results: Successful wound coverage was achieved; with a short hospital stay, and a technically simple and fast approach.
Conclusions: In cases of elder patients with many comorbidities, and wounds that compromise limb viability, there are some extreme surgical options such as the strategy exposed in this communication, which can be used to avoid limb amputation, without the use of more aggressive surgical procedures such as locorregional or free flaps. This strategy could also be helpful in patients in which free flaps are directly contraindicated, or fail to achieve coverage of the defect.

O28.06

Treatment of Peadiatric Burns in an african country - challenges.
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Objectives: Burns are a major cause of morbidity and mortality in Africa and so also in São Tomé and Príncipe, a former Portuguese colony. During the Pediatric Surgery missions in this country, started in 2011 under the program "Health for all – specialities", developed by a portuguese NGO – Instituto Marquês de Valle Flôr, there have been many challenges. We would like to share our personal experience, along the 9 missions. approaching these children and their parents, treating sequelae of burns, helping them to cope with the pain, watching them regain a place in society and also trying to influence the knowledge of the younger generations.
Methods: Revision of all the reconstructive surgeries performed during the 9 Pediatric Surgery missions in São Tomé and Príncipe, evaluating the functional and aesthetic result.
Results: Surgical interventions for sequelae of burns in children represented 18% of the surgical activity during the 9 missions in São Tomé and Príncipe, in a total of 34 patients. 63 interventions where performed, 22 "Z" plasties, 17 skin grafts and 24 steroid injections for keloid treatment.
Discussion: The poor social, cultural and economical conditions are part of the reason why burns still occur so frequently in this country. After the burn has occurred these children face a path of deep suffering, caused by the physical pain, for which there rarely is a treatment, and the pain caused by social rejection due to physical and aesthetic deformity. Sequential interventions in these children have showed important improvements in their aesthetic, motor function and return to an active life.

O29.01

Swedish burncenter arranged a join venture at IKEA

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Objectives: Burncenters around Europe pay attention to the annual European prevention day for children with scalds and burns on December 7. The day was initiated in 2010 by Paulinchen, a German organization. One purpose with their organization is to heighten the awareness to prevent burn accidents. Uppsala Burncenter is one of Sweden's two burn centers and the first to pay attention to this special day.
Methods: To reach as many in the target group (families with children and different ethnic backgrounds) as possible, the department store IKEA was approached for a join venture. To IKEA child safety is important and they welcomed our idea.
Staff from the Uppsala Burn Center geared up in T-shirts with preventive information printed. The staff approached families with balloons to strike up conversations. Preventive information was given verbally and with pamphlets. The staff used dolls to show how large areas a cup of hot liquid can affect.
To reach even more families with children in the community a digital presentation was made and presented on TV-screens at the Children's hospital outpatient units. One of them was an asylum- and integration health unit.
Results: The prevention day took place December 3, 2016. Around 8 000 visitors passed the staff-group. It was perceived that the initiative and preventive information (written, verbally, and digital) was appreciated. Numerous discussions with parents and children was held. We believe this initiative has heightened the awareness of burns and scalds in the population exposed.
Conclusion: All pediatric scalds and burns are 100 % avoidable. It is necessary to work with prevention in many dimensions and angles, especially when several of the affected has another cultural background and language. Therefore it is important to also develop information in different languages and presented in places where a multicultural population is.

O29.02

Burns prevention in children: empowering the school

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Objectives: In Portugal, burns are the second cause of accidental death in children aged 5 ys and younger and unfortunately the number of burns in children within this age range has been recently increasing and in 90% of the cases could be prevented. The low levels of knowledge regarding risky situations and respective prevention measures are two of the factors, which contribute to the present prevalence of burns in young children. The main objective of this project was to develop in preschool teachers the knowledge and to foster them to take an active role in preventing childhood burns.
Methods: a written manual and a programme of 4 sessions was developed including 2 components, a theoretical and a more practical one. The project involved a partnership (ESS-IPS, the ESE-IPS, AAQ, LATI, Abelhinha and Centeio College). In total 27 preschool teachers were involved. Questionnaire were developed to assess the knowledge (risk factors and preventive behaviours) and the overall satisfaction with the programme.

Results: At the end of the programme the participants correctly identified risk factors for burns (77%), the physical (73%) and psychosocial impact (68%) of a burn. In addition, the participants identified correctly the risk behaviors in the kitchen (73%) and in the bathroom (82%) and the preventative behaviors to adopt in the kitchen (68%) and in the bathroom (86%).95% of the participants were satisfied or very satisfied with the programme.
Discussion / Conclusion: Significant improvements on the knowledge of all participants were observed. The methodologies and the educational materials seem to be adequate. However, there is still deficit in the appropriate knowledge and ability to adopt effective prevention solutions. Projects such as the present one may be an effective and sustainable way of implementing safer behaviors in children, contributing to the diminishing of burn related costs, for families and society.

O29.03

Feasibility of the Safe-Tea campaign: a parent targeted intervention to reduce the incidence and severity of hot drink scalds in pre-school children
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Objective: Hot drink scalds in pre-school children are alarmingly common and traumatic, yet are preventable by a simple action – keeping hot drinks well away from children. Lack of parental knowledge of appropriate first aid further compounds the severity of injury. Despite this, research into effective interventions remain insufficient. Hence, to reduce the incidence and severity of these injuries, we set out to design and test the feasibility of a novel, parent-targeted, multi-media and multi-channelled behaviour change intervention: the 'Safe-Tea' campaign.
Methods: Through public involvement, and close partnership with Flying Start (FS), Welsh Government's early years' programme for families living in disadvantaged areas, we designed and developed a suite of multi-media intervention materials including reach-charts, posters, fridge magnets, flyers, videos and group activities. Between August 2016 and February 2017 these tailor-made materials were used by FS in Cardiff to support one-to-one and group discussions, demonstrations and activities with parents to highlight the campaign's key messages at home visits, playgroups and childcare centres. Before- and after- parent questionnaires and focus groups with staff and parents were conducted to ascertain acceptability, practicality, ease and extent of implementation, and efficacy of the campaign.
Results: Initial results strongly indicate that our materials and delivery positively engaged both parents and community practitioners. At home visits and playgroup sessions, the campaign has improved parents' knowledge of the risk of hot drink scalds and correct first aid. Crucially, parents reported feeling more vigilant around hot drinks and empowered to correct the behaviours of others at home, and relayed first aid messages to family in other countries.
Conclusion: This intervention has great potential to reduce the likelihood of life-long physical and psycho-social effects of children's burns, and the resulting NHS costs. A future controlled trial will test the effectiveness of the campaign in reducing incidence of such injuries.

O29.04

Learn About Burns: A Feasibility Study of a School Based Burns Prevention Program
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Objectives: An educational burn prevention and first-aid intervention was developed for Year 4 primary school children (8 – 9 years old). The objective of this study was to assess the feasibility and acceptability of the program in six primary schools in the Cardiff Local Education Authority. Qualitative and quantitative data were gathered to address the study objective.
Methods: Qualitative data included semi-structured telephone interviews with parents (n=6) and teachers (n=6) and three focus groups with students (n=17) post-intervention delivery. Thematic analysis aided by the framework approach to data management was conducted in NVivo10. Knowledge, attitude, self-efficacy and practice (KASP) quantitative data were collected from 269 students pre- and post-intervention delivery and six months later to assess retention. Descriptive statistics were conducted using SPSS 20.
Results: Data indicate that the program, materials and methods are feasible and highly acceptable. Factors deemed influential for the feasibility and acceptability of the program included student enjoyment, student engagement, age-appropriate content and integration with the curriculum and timetable. Initial descriptive data (n = 269) suggest an improvement in KASP post intervention, and that this is retained at six-months.
Of 269 children there was a 64.4% improvement in knowledge mean score, 6.6 % in attitude mean score and 23.9% in self-efficacy mean score from baseline to six-month follow-up. Post-intervention 81.8% of students self-reported that they changed the way they act whilst making hot food and drinks.
Discussion/Conclusion: Didactic and exploratory learning techniques, engagement, enjoyment and co-learning were shown to be attributing factors for the acceptability of the program for students, teachers and parents. Data support the fact that as well as being an arena for academic development, the primary school is a suitable environment for teaching life-skills and improving student well-being. In conclusion results provide

evidence to warrant further research into the effectiveness of the program.

O29.06

The effectiveness and cost-effectiveness of first aid interventions for burns given to caregivers of children: a systematic review

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Objectives: To assess the effectiveness and cost-effectiveness of first aid educational interventions for burns given to caregivers of children.
Methods: We searched seven databases, five international journals, three trials repositories and contacted international experts.
Results: In total 985 potential studies were identified. Four studies met the inclusion criteria. Critical appraisal demonstrated all were at high risk of bias and the global rating was weak.
Two studies assessed the impact of a media campaign on parental knowledge of burns first aid. King et al. identified a statistically significant increase in knowledge after intervention (pre 41.7% vs post 63.2%, p<0.0001). Skinner et al. demonstrated improved knowledge, resulting in fewer admissions (64.4% vs 35.8%, p<0.001) and surgical procedures (25.6% vs 11.4%, p<0.001).
Hui et al. evaluated a face-to-face education intervention identifying a significant improvement in caregiver's knowledge (pre 22.9% vs post 78.3%, 95% CI 49.2, 61.4). Ozyazicioglu et al. aimed to determine the effect of a first aid training program and showed a reduction in use of harmful traditional methods for burns in children (pre 29% vs post 16.1%, p<0.001).
Conclusions: No data on cost-effectiveness was identified. Although there is a paucity of evidence in this area, the findings are consistent supporting a positive role of educational intervention for burns management. However, there is not sufficient data to judge the quality or strength of evidence to support the effectiveness of interventions in practice. Included studies have tended to be small and of poor methodological quality, making it difficult to offer any definitive recommendations.
Future research needs to focus on RCTs and real life studies with high methodological quality investigating long-term effectiveness and cost-effectiveness of burns first aid in children, impact on quality of life sufferers and family members.

O30.01

Comparative Randomized Clinical Trial of SpinCare™ Innovative Electrospun Dressing in Donor Site Wounds

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Objectives: Management of Donor Site (DS) wounds presents an ongoing challenge. This study evaluates the handheld SpinCare™ wound dressing device, using electrostatic forces to produce an in-situ nano-fibrous dressing that mimics the structure of the extracellular body tissue. The aim of the study was to compare Electrospun nono-fibrous dressing to standard of care with regard to: time to complete healing, infection rate, ease of use and pain.
Methods: Patients in need for skin grafting were randomly assigned to either Electrospun nono-fibrous dressing or the standard-of-care (Jelonet or Biatain Ibu dressing) in 5 medical centers. Dressing was applied in the OR in a sterile manner. The Electrospun nono-fibrous dressing dressing was applied (jet technique) on the wound from a distance of about 20cm, avoiding direct contact with the wound thus reducing the potential for contamination. The Electrospun nono-fibrous dressing is personalized to the surface and shape of the wound as is the thickness of the dressing. Upon application, the Electrospun nono-fibrous dressing is white/opaque but gradually becoming transparent, allowing evaluation of healing/wound-bed without dressing removal. The dressing remains on the wound until full epithelialization and self-peeling takes place thus, secondary dressing was changed as needed.
Results: N=40, mean age of 51.5y, 24 male and 16 female with DS wounds of up to 200cm^2 in area. Time to complete healing was 17.4 vs 17.9 days in the study and control groups respectively. Pain (VAS) was 1.4 vs 2.4 respectively. No infections and no device-related adverse events were reported.
Conclusions: In this study the Electrospun nono-fibrous dressing was found comparable to standard of care with somewhat better scores for pain and time to healing. The Electrospun nono-fibrous dressing System was found to be easy to use. Larger clinical scale data will be needed to confirm these results.

O30.04

The use of a novel dressing Epicite-hydro for superficial and deep partial thickness burns

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Introduction: The treatment of partial thickness burns is often plagued by the presence of small but scattered areas of superficial and full thickness involvement. However, in the first 24 to 48 hours is difficult to establish the depth of the wound, this is the reason to cover with a dressing for helping to prevent desiccation and maybe could be the treatment of the burn. For these reasons, it is important to explore new technologies that promote rapid wound epithelialization.
Objective: To present the small experience with Epicite^{hydro}, a wound dressing that consists of a non-woven 3D network of pure cellulose fibers and a high moisture load. The specific network pattern, which is superior to comparable dressings, is derived by a unique biotechnological process of production and prevents cell adhesion with the wound and less pain during usage.
Materials and Methods: 5 burn patients caused by scalding were treated with Epicite^{hydro}, all patients were in admission to the burn unit this wound dressing, and were evaluated daily by the inflammatory response (clinical) or infection manifestations.
Results: The age of patients varied between 1 and 5 years. There were 2 boys and 3 girls. TBSA involvement varied between 10 to 15%, and the superficial thickness was the most often. All the patients presented a suitable evolution we waited until 5th or 6th day to proceed to remove the dressing and we observe epithelialization in more than 80% of the wound.
Conclusions: The use of this new dressing promotes fast and excellent epithelialization in superficial and deep partial thickness injury, especially scald burns, we need a prospect and comparative study, with more patients to conclude and give us demonstration of the real benefit of this product.

O30.05

Pulse-Dye Laser Therapy is an Effective Treatment For Burn Scars

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Introduction: Burns often cause aberrant wound healing processes that lead to hypertrophic scars.Treatment of hypertrophic burn scars is challenging and often ineffective despite the many options available. The pulsed dye laser (PDL), has provided encouraging results over the past 10 years.
We reported the impact of Pulse-lye Laser (PDL) laser therapies on hypertrophic burn scars.
Methods: We conducted prospective cohort study in burn patients with hypertrophic burn scars. Procedures of PDL therapy were repeated monthly, until clinical improvement. Areas treated included burn scars, skin grafts, and donor sites. All procedures were performed with local anesthesia.Main outcome measures were 1) the Vancouver Scar Scale (range 0”□15) and 2) the patient improvement scale (range 0”□10). Scores before and after treatment were compared by Student’s T test, with statistical significance assigned to p values < 0.05.
Results: we treated 60 patients. The mean age was 22.4 years (2-62 years). Mean TBSA was 12.6 ± 12%). 244 PDL sessions were performed (6 sessions/patient: 1 to 15 sessions). The laser therapy was started in an average mean time of 4 month after burn healing (mean time: 133 ± 151 days) .The Vancouver Scar Scale (VSS) decreased from 8.14 (SD 2.34) to 3.3 (SD 1.27) ($p<0.0001$).The patient improvement scale increased from 5 (SD 2.5) to 9.6 ($p<0.0001$).The therapeutic efficacy has been correlated with the earliness of the PDL therapy treatment. When PDL is used in patient during the first three months after healing the improvement of scar is significantly reached with less session: respectively 5 and 9 session ($p<0.0001$).
Conclusions:PDL therapy, when used in the optimal timing, improves both the signs and symptoms of hypertrophic burn scars, as measured by objective and subjective instruments. The PDL should become an integral part of the management of burn scarring and will significantly decrease the need for surgery.

O30.06

Does NexoBrid allow us to perform conservative treatment on clinically deep burns? A retrospective review.

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Objetives: Intermediate-deep second-grade burns (IDSGB) are often difficult to categorize and decide whether need to be operated or not. In the recent years, new therapies of non-surgical debridement have raised in order to avoid comorbidities produced by aggressive surgeries. The objective of the present study is to evaluate NexoBrid (EMA/751607/2012) (Mediwound, Germany) in the treatment of hand IDSGB as well as if its use have prevented from surgery in initially suspected surgical burns.
Methods: We performed a retrospective review of our prospective institutional database to identify all patients admitted with hand IDSGB treated with NexoBrid between May 2015 and November 2016. Two independent expert burn surgeons evaluated initial photographs. Hands were divided into three groups depending on whether surgery was likely to be indicated or not, or if surgeons disagree. We recorded then if surgical treatment was required in order to achieve burn healing.
Results: Fifty-three hands in 33 patients were collected

(28 males and 5 females). The average age was 47 (range from 18 to 94) Burn expert surgeons agreed in 90.56% of the cases, both indicating surgery in 31 out of 53 hands. All patients went into enzymatic debridement with NexoBrid. Twenty-two hands (41.5%) required surgery. Sixteen out of 31 hands (51.61%) of the suspected surgical burns group and 4 out of 17 (23.52%) of the initially non-indicated surgery group were finally operated. Surgeons disagreed in 5 hands, two of them requiring surgery.
Discussion / Conclusions: NexoBrid treatment has been shown to be effective in the debridement of hand IDSGB. Moreover, we are able to do more accurate diagnosis and to avoid ulterior surgeries in almost 50% of the cases in which we clinically suspected that they would require surgery.

O31.01

Role of Suprathel in dermal burns in children

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The role of Suprathel, a synthetic skin substitute, for superficial and deep dermal burns in children was evaluated. 65 children (25 females, 40 males: mean age 4.9 years, (range 04 months to 11 years) with dermal burns were treated with Suprathel. Flame burns were 14 and 51 were scalds. The burns were superficial dermal (n= 16), mid-dermal (n=34) and deep dermal (n=15); the median %TBSA was 23.6% (range 08-45%). Suprathell was applied after debridement, followed by Vaseline gauze, dry gauze and crepe bandage. The outer dressings were changed every 4-5 days unless clinical problems indicated otherwise. Median healing time was 15 days (range 10-35 days). 20 patients took longer than 21 days to heal, of whom 13 were flame burns and developed hypertrophic scarring, which was strongly associated with wound infection. Healing time of superficial dermal and mid-dermal burns was not significantly different.
Suprathel is an effective skin substitute for the treatment of superficial and deep dermal burns in children. The majority of burns in children are mixed depth, and Suprathel has the advantage that it may also be used to treat deep dermal burns. It behaves like a biological dressing but is not animal derived, so is acceptable to all religious and ethnic groups. Suprathel significantly reduced pain. Its easy handling and patient comfort was superior compared to other materials. The Suprathel membrane adhered rapidly to the wound thus protecting against infections and promoting wound healing. No allergic reactions were observed. The ability of the material to resorb ensured pain-free removal after complete healing of the wound. We observed that the material effectiveness contributes to the reduction of overall treatment costs. Further studies to evaluate the efficacy and cost effectiveness of Suprathel compared to other dressings in children are needed.

O31.02

Neutrophil count and IL-33 predict the risk of death in blast injuries

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Background: Explosive burn-blast (combined) injuries can cause extensive injury to lung tissue within the body. For example, a tragic explosive industrial accident in Jiangsu province (China) killed 146 people and caused severe lung injuries in the survivors. Unfortunately, the body's underlying response and repair mechanisms are poorly understood, especially the role of cytokines, such as interleukin (IL)-33. To investigate such mechanisms, we developed a model of burn-blast combined injury in mice and determined if increased IL-33 expression exacerbates lung injury.
Methods: We studied 18 subjects with Burn-blast combined injury, 10 healthy control subjects. We also studied wild-type and IL-33 transgenic (Tg) mice. Burn-blast combined injury was induced in wild-type and IL-33 transgenic (Tg) mice. After 24 hours, lung injury was assessed through survival studies, lung wet-to-dry weight ratios, bronchoalveolar lavage, transmission electron microscopy, immunohistochemistry, real-time quantitative RT-PCR, micro-computed tomography, and lung function analysis.
Results: Patient with combined injury showed significantly increased mortality. Peripheral blood neutrophil count of roughly 36.38×10^9/L was a crucial threshold for mortality. Mice with burn-blast injury exhibited physiological, biological, and pathological changes similar to those in human patients. In our mouse model, we detected increases in the expression of IL-33 and myeloperoxidase similar to those in human patients. In an IL-33 Tg mouse model, IL-33 blockade attenuated pulmonary expression of G protein–coupled receptor kinase-2, which in turn led to a decreased pulmonary expression of chemokine receptor CXCR2, and subsequently attenuated neutrophils recruitment and lung injury progression.
Conclusions: We show that a peripheral blood neutrophil count of roughly 36.38×10^9/L is a crucial threshold for postinjury mortality. We provide a unique mouse model to study the pathology of burn-blast injuries and show that IL-33 has a pathological role in exacerbating lung injury by recruiting neutrophils in burn-blast injury patients and IL-33 Tg mice.

O31.03

The use of ReCell® in infants and toddlers

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Scalding injuries are the most common cause of burn in

infants and toddlers in many countries including Germany. Commonly most of the scald injuries are treated conservatively. Rapid healing is considered as a major factor associated with improved scar outcome. Therefore if healing does not occur within 10 -14 days, surgery is used to aid healing with the aim of improving scar outcome.
The use of non-cultured skin cells allows rapid cell harvest for immediate use reseeding the viable dermal wound bed with viable cells. In our department, five pediatric patients (age 6 weeks -18 months) with mixed dermal scalding injuries have been treated with this cell suspension provided by Recell®.
Application of the regenerative epithelial suspension promoted epithelisation in four cases, resulting in definitive wound closure and preventing later autografting.
We present the data of all patients and their clinical follow-up up to one year focusing on practical tips and tricks in the use of ReCell® in infantes and toddlers.

O31.04

Three-dimensional imaging is a novel and reliable technique to measure total body surface area

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Objective: The aim of this explorative study was to investigate diverseclinimetric aspects of three-dimensional imaging and current methods used in clinical practice (Rule of Nine and Rule of Palm) for measurement of percentages of TBSA in clinical practice.
Method: To assess reliability, two independent researchers measured percentages of TBSA of 48 burn patients using Artec MHT™ Scanner and software. Subsequently, a resident and a burn specialist estimated percentages of TBSA of the same wounds using Rule of Nine and Rule of Palm.
Results: Three-dimensional imaging showed an excellent inter-observer reliability, with an intraclass correlation coefficient (ICC) of 0.99, standard error of measurement (SEM) of 0.054, and limits of agreement (LoA) between measurements of two researchers was calculated at 0.15 x mean TBSA. The inter-observer reliability of current methods in clinical practice was less reliable, with an ICC of 0.91, SEM of 0.300 and LoA were calculated at 0.78 x mean TBSA. The inter-observer reliability was least reliable when a resident estimated percentages of TBSA, with an ICC of 0.68, SEM of 0.69 and a LoA of 1.49 x mean TBSA.
Conclusion: The inter-observer reliability of three-dimensional imaging found to be superior compared with methods used in current clinical practice. The inter-observer reliability was least reliable when a resident estimated the percentages of TBSA.

O31.05

Omega-3 rich Fish Skin Grafts in the Treatment of Full Thickness Burns: A Comparative Trial of Fish Skin and Cadaver Skin in a Porcine Model

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Objectives: The management of full thickness burns can include an initial application of cadaver skin or skin substitute followed by split thickness skin grafting (STSG).[1] Non existing disease transmission risk from the Atlantic cod (*Gadus morhua*) to humans allows for gentler processing of the fish skin that preserves natural structure and content making the skin more similar to human skin than processed mammalian matrixes.[2] The additional benefits of the pain relieving properties of omega-3 can have significant impact on patients' quality of life.[3]
Aim: To determine the safety and efficacy of acellular fish skin* for temporary coverage and autograft sparing in a full thickness porcine burn model.
Methods: One hundred (100) full thickness burn wounds were produced on the back and flanks of 5 pigs. After debridement, the wounds were randomized; meshed fish skin graft* (n=30); intact fish skin graft* (n=30); cadaver skin (gold standard, n=20) and regular wound dressing (Allevyn, n= 20). At three and ten days following debridement, the wounds treated with the fish skin* and the cadaver skin were grafted with STSG. Half of the fish skin* treated wounds were grafted with either a 3:1 meshed or unmeshed STSG. Punch biopsies were taken for histology.
Results: The fish skin grafts* provided good temporary coverage. Excellent healing was demonstrated for all wounds treated with the fish skin*. No significant wound contracture difference was identified between the cadaver skin group, the standard STSG grafted group and the group treated with 3:1 meshed STSG with a second application of acellular fish skin graft*.
Discussion/Conclusion: In this model, the fish skin graft demonstrated comparable results with cadaver skin for temporary coverage and augmented healing with a meshed autograft in a 3:1 ratio. The results demonstrate proof of concept for autograft sparing and are proposed to be further evaluated on a larger scale in well validated animal models followed by clinical trials.
Footnote: *Kerecis™ Omega3 Burn manufactured Kerecis Limited, Isafjordur, Iceland
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O31.06

A comparison of surgical management, epidemiology and clinical outcomes between an elderly and adult burn population in a 6 year observational nation-based study

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Objective: Despite major advances in burn care, age is still among the most significant predictors of mortality after burns. The primary objective of this study was to compare surgical treatment and clinical outcomes between an elderly and adult burn population. The secondary objective was to compare burn epidemiology in these populations.
Method: Data for the nation-based study were retrieved from the Dutch Burn Repository R3, a uniform national registration for Dutch specialised burn care. All patients from 18 years of age and over admitted in the period from 2009 to 2015 were included. Elderly were defined as 65 years of age and older and subdivided into the three following age categories: 65-74 years, 75-85 and 85 years and over. Adults (18-64) were used as reference group. Surgical management encompassed decisions regarding the timing of surgery, numbers of procedures and surgical technique (debridement technique and grafting). The following parameters were assessed as clinical outcomes: wound infections, length of stay, mortality, discharge destinations and reconstructions.
Results: A total of 3148 adult burn patients (elderly n=516) were eligible for analysis. Median TBSA was comparable and varied between 3.2-4.0%. Time to first surgical procedure was shorter in the elderly (p<0.001). Hydrosurgery was significantly performed less frequent in eldest two age categories (42.0% vs. 23.5-22.6%), whereas avulsion (5.3% vs. 7.3-17.6%) and primary wound closure (6.7 vs. 24.5%) were more frequent with increasing age. The majority in all age categories received meshed skin grafts (79.2-88.6%). Mortality jumped with increasing age, especially in the 85 years and over category (23.8%). Furthermore, major differences were found in etiology, prehospital care (cooling, delay, referrer) and discharge destinations between adults and elderly.
Discussion/conclusion: Elderly constitutes a vulnerable and challenging group for specialised burn care. Differences in etiology, co-morbidity, and pre-hospital care affect surgical management and result in poorer clinical outcomes.

O32.01

A Concentrated Surfactant Technology-based Wound Dressing Causes Dispersion and Sequestration in Established Biofilms

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Objectives: Delayed wound healing and persistent inflammation is, in part, considered to be attributed to the presence of microbial biofilm within the wound. Therefore, products that can breakdown and disperse existing biofilms will allow counterparts of the biofilm to be more easily targeted. This study aimed to test the dispersal and sequestration properties of surfactant-based wound dressings* against biofilms.
Methods: Biofilms were formed in an 8-well chamber slide. *Staphylococcus aureus*, MRSA*, S. epidermidis, Enterococcus faecalis* and *Pseudomonas aeruginosa* were cultured in Tryptone Soya Broth (TSB) or Brain Heart Infusion (BHI) to 10^8 CFU/mL and stained with Live/Dead BacLight ® stain. Bacteria were diluted further to 10^6 CFU/mL and added to the wells of the chamber slide. Biofilms were grown for either 24 or 48 hours at 37°C. Following incubation, biofilms were washed in sterile 0.85% saline solution to remove planktonic cells before adding either an antimicrobial or non-antimicrobial concentrated surfactant technology (CST)-based wound dressing*. Biofilms were repeatedly imaged using confocal microscopy over a course of 24 hours to monitor bacterial viability and dispersal from the biofilm.
Results: Bacterial biofilms were successfully formed in chamber slides after 24 and 48 hours. The addition of both the antimicrobial and non-antimicrobial surfactant based wound dressing to the established biofilm, resulted in the dispersal and sequestration of the biofilm within 10 minutes of treatment.

Conclusions: This study highlighted the potential use of concentrated surfactant-based wound dressings to disrupt biofilms *in vitro*.
The dispersal of bacteria from biofilm and the subsequent sequestration will allow the increased ease of removal of microbes and parts of the biofilm from the wound environment, for example during periodic rinsing of the gel with water or saline. The use of concentrated surfactant-based wound dressings may help to form part of an anti-biofilm strategy.
*PLUROGEL and PLUROGEL SSD

O32.02

Monitoring intradermal inflammatory response after burn injuries in explanted human skin

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This study aimed to investigate the local inflammatory response to a burn injury. Currently, burn injuries are poorly described due to a lack of adequate sampling technologies. Open flow microperfusion (OFM), a minimally invasive sampling method, enables sampling of interstitial fluid (ISF) directly in the dermis. We used dermal OFM sampling in freshly explanted human skin after application of burn and scalding injuries on the skin surface. Resulting OFM samples were analyzed for up to 100 inflammatory biomarkers. We also monitored the temperature in the dermis during and after the burn process to describe the amount of heat that was applied to the dermis.
In this study, three test areas were defined on each skin explant and three OFM probes were inserted into the dermis of each test area at a depth of about 0.8 mm from the skin surface.
One test area was treated with a heated metal block, the second test area was treated with boiling water and the third area was used as a negative control site without any treatment. The temperature in the dermis was measured by using temperature sensors implanted at the same depth as the OFM probes.
OFM was used for time resolved sampling of dermal ISF samples for 48 hours with sampling intervals ranging from 30 to 60 min. OFM samples were analyzed for inflammatory biomarkers and biopsies were also taken for histology.
Preliminary results showed a clear difference between cytokine levels in burn injury samples and the control site. This difference was consistent during the whole monitoring period of 48 hours. Preliminary results will be verified in further experiments.

O32.03

Comparison of Analgesics Provided in the Emergency Department in Burn And Non-Burn Trauma Patients

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Objectives: We compared overall use of analgesics and opioids in the management of pain in emergency department (ED) patients with burns and other types of injuries.
Methods: We conducted a secondary analysis of the National Hospital Ambulatory Medical Care Survey (NHAMCS), a national probability sample of visits to U.S. hospital emergency and outpatient departments. We extracted demographic and clinical characteristics including age, sex, pain scores, and type of injury. Population visits were computed by using the population weights used by NHAMCS to calculate national estimates of the number of ED visits. The main outcome was the percentage of burn and other trauma patients that received any analgesics or opioids while in the ED. Multivariate analyses were performed to determine the association between predictor variables and analgesia administration.
Results: There were over 130 million estimated burn and non-burn injuries from 2010-2013. Mean age was 30, 55% were male, and 64% were white. The percentages of patients receiving any analgesic in the ED by type of injury were burns, 45%; fractures, 58%; dislocations, 61%; and sprains, 49%; ANOVA P<0.001. The percentages of patients receiving opioids were burns, 35%; fractures, 47%; dislocations, 42%, and sprains, 26%; ANOVA P<0.001. Analgesia administration was associated with age (OR 1.002 [95%CI, 1.000-1.004] for each additional year), higher pain scores (OR 1.16 [1.14-1.18] for each additional point on a 10-point scale), dislocations (OR 2.18 [1.42-3.34]), and fractures (OR 1.61 [1.17-2.23). Opioid administration was associated with age (OR 1.001 [1.008-1.013]), pain scores (OR 1.23 [1.21-1.26]), and fractures (OR 1.46 [1.05-2.03]). Sprains were less likely to receive opioids than burns (OR 0.60 [0.43-0.83]).
Conclusions: After adjusting for age and pain scores, ED burn patients were less likely to receive analgesics than patients with fractures and dislocations, and less likely to receive opioids than patients with fractures.

O32.04

Difference between the calculations of the total burn body area at a referral burned hospital VS. at hospitals with no specialized care

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A cohort study was designed from January to December 2015 at the Emergency Hospital for Public Assistance. An

estimated total burn area was registered in the first ward after the entering and the total burn surface from the referral center. The continuous variables were expressed as average ± standard deviation and the categorical variables as frequencies and percentages. Analysis were carried out by descriptive statistics and a Kolmogorov-Smirnov test was performed for the difference. A null hypothesis was rejected with an alpha level of 1 of 20 ($p<0.05$).
Results: The cohort was made up of 108 patients. 84.21% were male patients. Average age was 49.47 ± 16,42. The main etiology was fire (52.63%), followed by electric burns (26.32%). The average hospital stay was 24 days (from 1 to 263) and general mortality was 15.79%. The average of total burn area at our center was 22%, while referral total burn area was 26%, which is an important difference with $p<0,0001$. 15% of patients showed agreement between both diagnosis, while 63.16% over diagnosed the total burn area, and the remaining 21.05% under diagnosed it. The diagnosis difference of the total burn area was 22% between both centers.
Conclusion: A suitable diagnosis of the total burn area is essential for the initial treatment of the patient. We found a difference over 5% in diagnosis in most of the cases, especially due to over diagnosis. It is essential to strengthen knowledge at the hospitals that admit this type of patients to optimize initial reanimation and improve the chances to provide specialized care to those most in need.

O32.05

Comparing the effect of topical use of honey and Nitrofurazone ointment in wound healing of second-degree burn: A randomized clinical trial

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Background& Aim: The high costs of new dressings have led to an increased tendency of researches to use complementary therapies and inexpensive ingredients such as honey with natural origin. The purpose of this study is to compare the effect of topical use of honey and Nitrofurazone in healing superficial second-degree burn.
Methods and Materials: This study waz performed in YaftAbad Hospital located in Tehran during 2013-2015. Subjects were chosen by convenience sampling method, then randomnly assigned into two groups by software: Random Allocation V. 1. 0. 0. Wounds were dressed daily until the complete wound healing with organic honey and Nitrofurazone ointment and sterile gauze. Factors such as process of wound healing, pain intensity (1rst week), antibacterial activities (1rst week), histopathological parameters (14 days later) and scar (6-12 months later) of two groups were compared in terms of Visual analogue scale, Culture swaps, pathologist's rating and Vancouver scar scale. Data were analyzed in SPSS software.
Results: the comparison of pain intensity in Honey group to Nitrofurazone was better, even though was not significant. The average time of wound healing (P=0.43) and scar score (P=0.28) were not significant in Honey and Nitrofurazone group (P=0.43, P=0.28 respectively). Positive culture was observed the 1rst and 3rd days in both groups, but the difference was not significant. However, the culture on day 7 was not positive in either of the groups. Histopathological studies showed that epithelialization (P=0.52), inflammatory cells (P=0.71), and angiogenesis (P=0.79) did not statistically differ between the two groups.
Conclusion: This study showed that the effect of honey in wound healing in second degree burns with less extended surface area is similar to nitrofurazone. However, for replacement of honey instead of nitrofurazone, more studies are needed.

O32.06

Software Review of Burn Etiology on Education, Safety, and Socio-economic Conditions in Patients Admitted to Motahari Burn Hospital

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Introduction: Burn as one of the most common traumas in the world is among the leading causes of years of lost life and disability. Thus, in this study we investigated the underlying factors of burn with an approach to education, safety and socio-economic conditions.
Materials and Method: This was a prospective cross-sectional study conducted in two years on patients of Motahari hospital. Available samples were selected. After accreditation of form they were examined as a pilot on 1000 patients and inserted into Kobocollect software. Data were collected through interviews. Questions about patients' demographic characteristics, epidemiology of burns and data on burn causes on education and socio-economic conditions and home, work, school safety were completed. The data output was analyzed by SPSS v. 21.
Results: A total of 847 patients (63.2% male, 36.8% female) were interviewed within 6 months. The most common referrals were from Alborz, Mazandaran and Qazvin.

Hot liquids and flame were the most frequent causes of burns in urban and rural areas respectively. 62.3% of burns had occurred in upper limbs. The most common equipment involved in the burn was pot, picnic gas and pressure cooker.Only 4% and 3% of children's parents were trained for burn prevention and 10% for extinguishing fires. The extent of burns in children had a significant relation with maternal education (p = 0.004). In 5.6% of burn cases, houses did not have separate space for kitchen, 93.9% and 67.7% were not equipped with smoke alarms and fire extinguishers respectively.

Conclusion: The results showed that the education about prevention and home safety tips are average and poor. Therefore, serious decisions of specialists about structured training programs are needed.

Poster Presentations (P)

P001

Quantifying The Impact of Inhalational Burns

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Introduction: Inhalational injury is a major cause of morbidity and mortality in burns patients. This study aims to analyze the incidence rate, clinical outcomes and bacteriology of inhalational burns patients.
Methods: A prospective study was done on consecutive admissions to a major burns centre over 15 months from January 2015 - March 2016. Presence of inhalational injury, demographics, TBSA, complications and outcomes were recorded. Diagnosis of inhalational injury was based on history, symptoms and prior diagnosis in referred patients. ARDS was defined using the Berlin definition and AKI was defined as AKIN stage 2 and above. Data was analyzed using SPSS statistical software, Chi-square analyses on categorical variables and Mann Whitney U test for non-parametric continuous variables.
Results: A total of 202 patients were identified and comprised of a 63.4 percent male, 57.4 percent Chinese population. The average age was 43 y (range, 16 – 86) and TBSA was 12.1% (range, 0 – 88). 35 patients (17.3%) had inhalational burns.
Compared to patients with cutaneous injury alone, patients with inhalational burns had significantly more surgeries (3 vs 1 p=0.003), increased length of stay (21 days vs 8 days, p=0.004) and higher in-hospital mortality rate (17.1 % vs 0.6% p=0.000).
Incidence of AKI and ARDS was 48.6% and 37.1% compared to 0.6% and 1.2% in the patients without inhalational injury (p=0.000). Patients with inhalational injury had increased incidence of bacteraemia (31.4% vs 2.4 %, p= 0.000), pneumonia (37.1% vs 1.2%, p=0.000) and burn wound infection (51.4% vs 25.1%, p=0.004). Acinetobacter baumannii was the most frequently cultured bacteria in sputum, blood and tissue cultures with inhalational injury.
Conclusions: The data confirms and quantitates that inhalation injury accompanying thermal trauma significantly increases the length of stay, mortality and occurrence of infective and non-infective complications.

P002

ABDOMINAL COMPARTMENT SYNDROME: Presentation of a case series and proposal of UK Guidelines

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Introduction: The 2015 and 2016 National Burns Mortality Audits identified abdominal compartment syndrome (ACS) as the most common cause of death in patients with significant burns. The occurrence of ACS appears to be directly related to visceral, abdominal wall and retroperitoneal oedema and ascites induced by over-resuscitation. We identified paediatric and adult patients who developed abdominal catastrophe (defined as ACS or ischaemic bowel), and propose a guideline for Significant Burn Injury Fluid Management in adults to mitigate against ACS.
Methods: A retrospective review of all patients who developed abdominal catastrophe in the Burns unit at Alder Hey Children's Hospital and the University Hospital of South Manchester from January 2011 to December 2016 was conducted. Case notes were obtained and evaluated to calculate fluid balance with respect to the Parkland's formula. This was compared with the Ivy score.
Results: In adults, the average Parkland's formula rate was 6.14mls/kg/TBSA burns (range 3.7-10). The average resuscitation fluid administered was 0.26L/kg (range 0.15-0.3) over 24h. Of the five adults, one patient died following the diagnosis of small bowel ischaemia and another from an unrelated cause. The remaining three patients are being followed up with outpatient care. The paediatric case received 12,706mls over 24h (1.5times over the Parkland formula). This child died from multiple ischemic insults.
Discussion: In this case series, we demonstrate the development of abdominal compartment syndrome in patients over-resuscitated with fluids in excess of Parkland's formula and elevated Ivy score (>0.25L/kg over 24h). We posit that patients requiring fluid resuscitation with crystalloids in excess of 4ml/kg/TBSA should be considered for 5% Human Albumin solution boluses in the early post burn period (>8h). We recommend that the measurement of IAP is standardized and propose a guideline for significant burn injury fluid management in adults to mitigate and monitor against the development of ACS.

P003

Correlation of hypothermia and cytokines in burned patients

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Inroduction: Burns generate a local or systemic inflammatory response according to the degree of breadth, depth, agent that burns the skin, age and/or comorbidities; causing an increase in body temperature within the first 24 to 48 hours. It has been observed that patients who present hypothermia are associated with increased morbidity and mortality and no levels of pro-inflammatory and anti-inflammatory cytokines in these circumstances are known, and their possible relationship.
Method: Prospective study was performed from April 2014 to December 2015, to determine the concentration of cytokines in a group of burn patients admitted to a Center

for Specialized Care for Burn with extensions between 15% to 60% of TBSA. Gender indistinct; from zero to 75 years old; hypothermia (≤ 36.5 degrees) during admission or hospital stay. Determination of cytokines IL-6, IL-10, IL-2, INF-Æ', IL1-α and TNF was performed by quantitative immunoassay method. Statistical analysis was performed using descriptive statistics and Spearman correlation.
Results: A group of 10 patients were studied; 60% (n = 6) for the male. The age range was 1-60 years; 30% was pediatric population ≤ 18. 70% by direct fire and 30% scald. TBSA range was 15 to 60%. 90% patients survived. The range of temperatures was 33 to 38.9°C. In the descriptive analysis of one sample had significance of p ≤ 0.001. In the study Spearman correlation with significance of p ≤ 0.5 and 0.1. The older and death patient showed higher levels of IL-6 and IL-10 compared to the rest of the population, lower levels of temperature as the rest of the population with Burn extension of 20%.
Discussion: Hypothermia in trauma patients increase mortality and in burns is no difference.
Conclussion: Interleukins levels are different in the states of hypothermia in this study, we need more investigation studies with burn hypothermic population.

P004

Clinical characteristics of critical burn injury at Vall d`Hebrón University Hospital: a retrospective analysis

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Introduction: Critical Burn patients care requires a highly specialized and complex healthcare service (1). Even though some efforts in Spain has been done to report incidence and outcome of this patients (2,3) these data in our environment is unknown.
Objective: To describe clinical characteristics and outcome of critical burn injury in adults admitted to the burn intensive care unit (BICU) at Vall d' Hebrón University Hospital at Barcelona, Spain between February-13 until January-17. METHODS Retrospective monocentric analysis of adult patients admitted to BICU during the study period. Date, gender, age, cause of admission, total burn body surface (TBBS), ICU length of stay (LOS), Mechanical ventilation (MVLOS) and mortality were recorded. Data is presented as absolute numbers and percentage or median and interquartile range as required.
Results: 148 patients were admitted, 120 (81%) were male. Median age was 47.5 years (IQR25-75:33-60.7). Principal cause of admission was burned by flame in 72 patients (48.6%), followed by deflagration in 56 (37.8%), electrocution 8 (5.4%), hot liquids 7 (4.7%) and other causes 5 (3.4%). Median TBBS was 22% (IQR25-75:15.2-35.7). 44 patients (29.7%) had inhalation smoke injury. ICULOS median was 19 days (IQR25- 75: 8-33.5) and MVLOS median 13 days (IQR25-75: 3-27). Patients were divided according to distribution in: less than 15%TBBS, between 15.1-35.7%TBBS, and over 35.7%TBBS. 26 patients (17.6%) were dead globally. Relation between TBBS and mortality was higher in the over 35.7%TBBS group: 17 patients (65,4% p=<0,001 RR 9.63 CI95%:3.76-24.74).
Discussion/Conclusion: Patients admitted to this BICU during the study period were predominantly middle age men burned by flame with a TBBS between 15.2-35.7%TBBS. High mortality rate is observed globally specially in those with a TBBS over 35.7% of TBBS.
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P005

Algorithm for airway management in critically ill burn patients with smoke inhalation injury at emergency room.

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Introduction: Mortality related to smoke inhalation injury (SII) remains high despite medical advances mostly due to respiratory complications. (1) Airway management (AM) in these patients is a matter of current debate going from observation to prophylactic tracheal intubation (2,3) To date, no such algorithm for identifying SII patients at risk for respiratory complications has been described.
Objective: To describe a bedside clinical algorithm for AM in critically ill burn patients with SII at Vall d'Hebron University Hospital Burn Unit.
Methods: Review of existing AM approach in these population was performed on principal electronic medical databases (PubMed, EMBASE and Medline). Development of clinical algorithm with fast and bedside approach was intended, consensus on medical staff was achieved.
Results: Immediate intubation is indicated if upper airway is threatened, gas exchange mandate mechanical ventilatory support or mental status is inadequate for airway protection. Early elective intubation is performed in case of extensive and deep facial burn with nasogenic affectation and circular neck burn, total body surface affectation >50% or when SII is highly suspected with thermal damage of upper airway (intraoral burn or soot in oral cavity or sputum). However, if low suspicion of SII, thermal damage or face or neck burns are not severe, a direct laryngoscopic evaluation is advised. In case of glotic or supraglotic involvement immediate intubation is indicated, if not present usual A,B,C,D,E approach is advised.

Conclusion: Early identification of SII patients who will require intubation is crucial. Challenge relies in predicting which patients requires intubation. With this bedside algorithm, we aim to unify intubation criteria and approach to the airway management of burned patient in the safest way.

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P006

Pain management in burns and during application of enzymatic escharolisis

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Objective: Pain associated with burn trauma is one of the most dramatic events involving the burn patients.Nociception and peripheral hyperalgesia are considered the major causes of burn pain.We have also the procedural pain that is the most intense pain and sometime is the undertreated pain. It is described after dressing changes or physiotherapy. This pain is often associated with anxiety and distress.A new aspect in the treatment of pain is during the enzymatic escarolysis
Methodology: in this treatment are highlighted 3 moments: the application of the product, the period of action (about 4 hours), the removal. For each of these moments and rated the pain with the numeric scale and, at the end of the procedure, patient's impressions about the procedure were collected.
Results: Local anesthetics , locoregional and deep sedation were used. Patients were evaluated with pain scores during treatment. For the patients with local o regional aneshesia there were no pain in the in -between period. For the patients treated with deep sedation the problems was expecially in the first 2 hours after the application when they describe a burning pain expecially in the first treatment.
Then we improved analgesia introducing benzodiazepine well to opioids and this has enabled us to achieve a better result. Also important is the contact with the patient and to make the person aware of the benefits associated with the procedure.
Discussion: the treatment of procedural pain in burn patient has to take into account that part of this patient with a painful trigger that are already underway analgesics. Information and patient involvement in the procedures is essential. Also important are the resources (regional anesthesia or sedation) and the presence of several figures of specialists. In our experience it is crucial also anxiety sedation to be made early, before starting the procedures.

P007

Deep venous thrombosis in burn patients: a retrospective analysis

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Objective: Deep venous thrombosis (DVT) is a well-known cause of major morbidity in the surgical patient population. The objective of this retrospective study is to evaluate the incidence of DVT in our burn centre, identify burn-related risk factors as well as risk factors for bacterial surinfection of DVT.
Methods: All adult burn patients, with total body surface area more than 10%, diagnosed with DVT and admitted between 2008 and 2016 in our burn centre were retrospectively evaluated. The analysis included demographics, location of central lines, number of surgeries, blood transfusions, pre-existing medical conditions and inhalation injury. DVT patients were matched on age, gender and TBSA with our general burn unit population.
Results: During the study period 611 patients were admitted to the burn unit. All patients received either routine weight-adjusted subcutaneous low-molecular weight heparin (LMWH) prophylaxis or intravenous heparin. 27 patients were diagnosed with DVT (4.4%). The average length of stay in the DVT group was 56 days, compared to 27 days in the control group ($P < 0.01$). No increased mortality was found ($P= 0.34$). Pre-existing medical conditions, inhalation trauma nor blood transfusion were associated with a higher incidence of DVT ($P > 0.05$). DVT was associated with a sub therapeutic daily dose of LMWH, adjusted for length of stay or time to diagnosis ($P < 0.05$). A total of 11 (41%) patients had surinfected DVT, with either bacteria (6/11, 54%) or yeasts (5/11; 46%). In all patients a central line was located on the DVT location, with a more frequent femoral site (18/27, 67%).
Conclusion: This study stresses the importance of routine and correctly dosed LMWH administration in burn patients. It highlights the presence of a central line as a major risk factor and the additional hazard of thrombus surinfection.

P009

Dexmedetomidine vs Midazolam for sedation during prolonged mechanical ventilation in burn patients

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Goal: Long-term sedation with midazolam or propofol in intensive care units (ICUs) has serious adverse effects. Dexmedetomidine, an α2 agonistis, may reduce the dura-

tion of mechanical ventilation and enhance patient comfort. The goal of the study was to determine the efficacy of dexmedetomidine vs midazolam in reducing duration of mechanical ventilation in patients with severe burn injury.
Method: All adult ICU patients receiving mechanical ventilation who needed light to moderate sedation for more than 72 hours and admitted in 2015-2016 were included in this retrospective study. We tested whether dexmedetomidine was superior to midazolam with respect to the duration of mechanical ventilation at the target sedation level measured by Richmond Agitation-Sedation Scale, RASS.
Results: Data of 27 patients were evaluated retrospectively (14 patients in dexmedetomidine group (age 39.4±17, TBSA 42.8±15, SOFA score 2.8±1.1) and 13 patients in midazolam group (age 48±20, TBSA 35.3±10, SOFA score close cardiovascular monitoring median infusion dose was 0.55 µg/kg/hr (range 0.10-1.1µg/kg/hr) and median treatment duration of 6.9±4 days. There was no difference in mean duration of mechanical ventilation between patients with midazolam and dexmedetomidine (11.5±4.9 days vs. 10.8±5.9 days, p >0.05). Similar length of ICU stay was observed (25±18 days vs. 21±10 days). Dexmedetomidine patients had more bradycardia episodes in comparison to the patients with midazolam sedation (3/14 [21%] vs 0/13). There was no difference in percentage of time within the target RASS range. No unplanned extubations were observed in both groups. Conclusions: Dexmedetomidine did not reduce duration of mechanical ventilation compared with midazolam among burn ICU patients receiving prolonged mechanical ventilation. Dexmedetomidine seems to be safe and effective for sedation of burn patients, however close cardiovascular monitoring should be used to detect bradycardia.

P010

Clinical evaluation of the Flotrac/Vigileo™ system for continuous cardiac output monitoring in burn patients.

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Evaluation and management of hemodynamic status are a central challenge in caring for the critically ill burn patients. The aim of this study was to evaluate cardiac output and other hemodynamic parameters obtained by FloTrac/Vigileo™ system during the early postburn period.
Methods: A prospective study enrolling 23 patient with severe burn injury was performed. Hemodynamic parameters were continuously obtained at admission, additional measurements were performed and recorded every 8 hours. Treatment was guided by the combination of dynamic and static parameters. A repeated ANOVA was used for data analysis.
Results: All patients were resuscitated successfully. There was a significant increase in cardiac index (CI) and a decrease in stroke volume variation (SVV) and systemic vascular resistance index (SVRI), ($p < 0.01$) during the first 36 hours after the injury. Cental venous pressure (CVP) showed significant changes over this time period (7.7±3mm Hg vs. 11±4 mmHg, p=0.04). Mean fluid volume of 3.7ml/kg/%TBSA were administered during the first postburn day. Significant decrease in lactate levels was also observed, 3.7 ± 2.7mmol/l vs. 1.8±0.7 mmol/l. However we did not observe any significant change in oxygen delivery index (DO2I, 680±247ml/min/m2 vs. 665±262ml/min/m2) which was within physiological range during the early postburn period.
Discussion and conclusions: Significant positive hemodynamic effects on static and dynamic parameters of initial fluid resuscitation were observed in burn patients. Oxygen delivery index was whithin physiological range during the investigation period.

P011

Detection and parenteral treatment of iron deficiency in anemia of major burns

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Introduction: Classically, anemia of burns has been considered a combination of blood loss and anemia of critical illness. Blood loss is considered a relevant etiology of iron deficiency and anemia. Recent studies established that 17% of all units are transfused after last surgery. Deleterious effects of transfusions are widely accepted, and confirmed in burn population.
Objectives: To determine if progressive anemia in patients after last surgery could be related to iron deficiency. To analyze if parenteral iron supplementation, in patients with iron deficiency after last surgery, would stop anemia progression and diminished transfusion requirements.
Methods: In a period of ten months we detected 12 patients with progressive anemia after last surgery. Serum iron, serum ferritin and transferrin saturation were measured. As serum ferritin was frequently elevated, measurement of serum soluble transferrin receptors (STfR) was added, with the purpose of differentiate anemia of critical illness from iron deficiency. If iron deficiency was suspected, a dose of ferric carboxymaltose was intravenously administered. Hemoglobin evolution and transfusion requirements were recorded.
Results: In ten of the twelve patients studied the results of tests suggested iron deficiency. Eight of them were treated with progressive recovery of hemoglobin levels, avoiding new transfusions. Two of them had very high levels of ferritin, contraindicating iron administration.
Discussion: Nonsurgical transfusions account for the 52% of the transfusions administered to major burns. They are usually related to anemia of critical illness. However, we found that progressive anemia after surgical phase of major

burns can be related to iron deficiency. Parenteral iron is indicated when blood loss exceeds the absorptive capacity for iron. Supplying ferric carboxymaltose allowed to administer high doses of parenteral iron in a single dose, and seemed to stop the process avoiding new transfusions.

P012

Microbiological photograph of the burn center: a standard for targeted antibiotic therapy. Experience 10 years

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Objective: Italy appears to be one of the countries defined as endemic for multi-resistant germs. This situation, as well as for environmental, social factors, etc. depends for the not appropriate due in using antibiotic therapy. Milan burn centre carried out a control in microbiological samples to identify colonization, infection and sepsis for about 12years. Then a restrictive policy should be targeted about the use of antibiotic therapy.
Method: it is performed a retrospective data collection from 2005 with regard to infections detected with blood cultures, the consumption of antibiotics, the determination of colonizing pathogens, preoperative antibiotic therapy.
Results: you have identified three important moments: 1) antibiotic therapy targeted on culture and the patient's blood chemistry results, according to the Microbiology Department; 2) stop with the antibiotic therapy "in preventing" or based only on colonization results without biochemical response; 3) standard antibiotic therapy preoperatively. These were 3-step of growth in our reality that has been able to reduce antibiotic therapy and resistances. Adequate monitoring of colonization and infection has also allowed the identification of a broad-spectrum antibiotic therapy specific to be administered in case of sepsis for the completion microbiological findings.
Discussion: the path of antibiotics careful prescribing has been a growth in the burn center and has also led to a greater focus on contact with the patient as well as a critical evaluation of microbiological and biochemical results. This has led to a decrease in the use of antibiotics and to decrease the resistances of the individual germs.The colonization with multiresitenti germs that requires isolation of the patient, remains an important problem.

P013

Analgesia, sedation and delirium management in adult critically ill burns: a survey

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Objectives: This study aims to assess the current practices of analgesia, sedation and delirium monitoring and treatment strategies in burn ICUs.
Methods: We designed a web survey consisting of four parts: physician and institutional demographics, management of pain, sedation and delirium in burn patients. The questionnaire was distributed by email to 230 burn specialists worldwide.
Results: Physician and Institutional demographics. A total of 40 respondents worldwide submitted valuable data in the 2 months period, equivalent to a response rate of 16%.Of all respondents, 20 (50%) were from Europe, 7 (17.5%) from North America, 6 (15%) from Africa and 12 (30%) from other regions (including Western Pacific, Southeast Asia, Central and South Americas and Eastern Mediterranean). 20 (50%) respondents were intensivists/anaesthesists, 18 (45%) surgeons and 2 (5%) other professionals.
Analgesia: The vast majority (92.5%) reported they routinely screen severe burns for pain, but 27.5% declared no specific score is used. The most popular analgesics were opioids, specifically morphine (75%) and fentanyl (72.5%). Among non-pharmacological approaches, the most used were psychological support (62.5%). Only a minority of respondents apply hypnosis (12.5%).
Sedation: A significant percentage (70%) affirmed they routinely screen their patients for sedation, but 30% do not use a specific scale. The sedatives used more often were midazolam (72.5%) and propofol (55%). 20% of specialists affirmed to use dexmedetomidine frequently in their routine practice.
Delirium: The majority (70%) affirmed to routinely assess burn patients for delirium, but 57.5% do not use a specific score. Burn specialists affirmed to prevent delirium in their patients combining pharmacological and non-pharmacological approaches (62.5%).
Conclusions: Awareness concerning pain, sedation and delirium is increasing among burn specialists. Efforts are still needed to implement guidelines and best practices.

P014

The secondary transfer of burn patient in Tunisia: status of the situation

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Introduction: Early burn resuscitation is the cornerstones of burn care and aims to improve outcome and decreases morbidity and mortality rates. The goal of this study was to examine characteristics of burn patients acutely transferred to our intensive burn care unit and to assess their prognosis.
Materials and methods: A prospective study was conducted in intensive burn care center in Tunis. All consec-

utive adult burned patients acutely transferred to our burn center, from January 1st to December 2016 were included in the study. Demographic and biological data of patients were recorded.
Results: 323 patients were admitted among which 146 patients were acutely transferred from other hospitals (44.6%). The mean age was 37±16 yr. The mean surface burned area announced was 44 ± 22%. Patients were transferred with a delay of 38 H after burns [H1- H264]. Burn injuries were caused by domestic accidents in 44%, self immolation in 28% and work related burns in 14%. Transfer with medical agreement was noted in 58% of cases. At admission, 12% of patients had burn shock and 44,7% had endotracheal intubation. A central venous catheter was placed in 53% of cases, nasogastric tubes in 12% and urinary devices in 58% of cases. Dressing were performed in 72% of cases. Fluid resuscitation was initiated in 75% of cases with crystalloid : Ringer lactate (46%) and/or normal saline (17%).Initial lactate level was 3.65 ± 2 mmol [1- 8.8] with pH at 7.37 [6.6- 7.51] and bicarbonates at 20.8±5 [9-32]. We noted that patients transferred without medical agreement had more burn shock (16.2% vs 8.6%) and a higher mortality (25.5% vs 17,2%).
Conclusion : Early critical care of severely burned patients, especially, fluid resuscitation and monitoring, coupled with appropriate early referral to a specialist, greatly help in minimizing complications and optimizing prognosis.

P015

Stevens Johnson syndrome and toxic epidermal necrolysis: a single center review.

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Objectives: Stevens Johnson syndrome (SJS), toxic epidermal necrolysis (TEN) and their overlap (SJS/TEN) are severe acute mucocutaneous diseases, triggered manly by a newly administered drug, life threatening and rare, which still lack a definite treatment method. Our aim was to describe the clinical aspects and etiologic factors of SJS, SJS/TEN and TEN in order to evaluate treatment responses and different outcomes in morbidity and mortality regarding the therapeutic options.
Materials and Methods: This is a retrospective study of patients with the diagnosis described above, who were admitted to our center between 2000 and 2016 in order to characterize their clinical evaluation, treatment, mortality and morbidity. Detached BSA% was used to categorize the disorder. Logistic regression was used to identify predictive variables of mortality.
Results: The final diagnosis was 18 patients with SJS, 34 patients with TEN and 06 patients with SJS/TEN, with ages comprised between 15 and 91 years old, mainly females. The majority of patients with SJS were treated in the Dermatology Department and the majority of patients with TEN were treated in our Burn Center Unit. The most commonly reported causative agent was antibiotics. Oral erosion was the most reported mucosal erosion and ocular involvement was reported in 47% of patients.
There was no statistical difference in mortality between patients treated with corticosteroids or intravenous immunoglobulin but the use of this agents and plasmapheresis had a positive outcome in mortality.
Conclusions: Although the majority of patients with SJS can be treated outside an intensive care unit like our Burn Center Unit, TEN remains a challenging life-threatening disease and many questions regarding best treatment strategies are still without an answer. In the mean time we can state that the discontinuation of the suspected drug, wound care, early supportive therapies and immunosuppression contribute to lowering the morbidity and mortality rates.

P016

Recruitment of extravascular fluid by hyperoncotic albumin in volunteers

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Background: Hyperoncotic albumin may be used to recruit oedema from the interstitial fluid space, but its effectiveness is unclear. This question was studied during infusion experiments in healthy volunteers.
Method: Fifteen healthy volunteers received an infusion of 3 ml/kg of 20% albumin over 30 minutes. The urinary excretion was measured and venous samples were taken for measurement of haemoglobin (Hb), haematocrit, colloid osmotic pressure and albumin on 15 occasions over a period of 5 hours. Based on these data, mass balance calculations were used to estimate the plasma dilution and the mobilisation of fluids from the tissues.
Results: Maximum effect of plasma dilution was reached 20 minutes after the end of the albumin infusion. Plasma volume dilution and total diuresis during the 5 hours of blood sampling was effectively increased by Albumin 20%. The plasma dilution after 300 minutes correlated inversely to the total diuresis. Total mobilised fluid from the tissues at 300 minutes was 3.4 ± 1.2 ml for every infused ml of albumin 20%.
Conclusion: 20% Albumin significantly increases the blood volume by recruiting interstitial fluid as well as increasing the diuresis. There is a delay of 20 minutes, after the end of the infusion, until maximum plasma dilution is reached.
The duration of the dilution effect expands beyond the 5 hours measuring time.

P017

Assessing the value of the Neaman scale for Bariatric Burn resuscitation

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Objectives: The UK population has demonstrated increasing body mass indexes over the past 20 years. The aim of this study was to determine the value of using the bariatric specific Neaman TBSA scale (NS) compared to the current standard of Lund & Browder charts (LB) for the resuscitation of bariatric (BMI≥30) patients with a burn involving >15% of their total body surface area.
Methods: A retrospective review was conducted of all consecutive adult bariatric patients with a burn >15% admitted to the Burn Centre at the Queen Elizabeth Hospital, UK between Jan 2010 to May 2016. Exclusions were made for death within 24hrs or missing records. The burn percentage was calculated with reference to the admission chart, operative notes and clinical photography. The Neaman TBSA scale was then compared to that of the Lund and Browder charts. The Neaman fluid resuscitation was then compared to the Lund & Browder calculation and actual resuscitation.
Results: We identified 31 patients. The mean and median Lund & Browder burn percentages were 28% and 19.5% respectively. Comparison of the Neaman scale to the Lund & Browder chart revealed differences in burn % calculation ranging from -12.6 to + 6%. Over 90% of differences were within the range +/-7%. The Wilcoxon signed rank test of the burn percentage differences was 0.375, indicating the absence of a statistically significant difference. Whilst the differences in fluid resuscitation ranged from -10,500 to 3169mls, there was only 1 complication of renal failure from under resuscitation in relation to the Lund & Browder calculation. The urine output was >0.5ml/kg/hr in over 75% of cases resuscitated with the Lund & Browder calculation.
Conclusion: The value of the Neaman scale as a tool to resuscitate the obese has not demonstrated any benefit over the Lund & Browder chart in this cohort.

P018

Dexmedetomine and ketamine for procedural pain in children

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Objectives: To change the method for analgosedation to children in the out patient clinic of Uppsala Burn Centre from midazolam/ketamine to dexmedetomidine/ketamine
Methods: Healthy children scheduled for outpatient change of dressings and cleaning of burn wounds were included. Much effort is put on creating a calm and safe environment for children and their parents. BSA was 1-10 %, a majority scalds. Preparations included prescribed analgesics and fasting according to local routines. Dex 1-2 microg/kg nasally, and, 15-20 minutes later, ketamine 5-7 mg/kg rectally was given.
Before, during and after the procedure grade of sedation, pain (FLACC, 0-10), SpO2 and heart rate were recorded. In the case of unsufficient analgesia an additional dose of ketamine (3 mg/kg) was given.
Results: 31 children, age 21,8 months (range 12-69 months) were included. Before the procedure mean FLACC was 0,2. After dexmedetomidine 1,3 microg/kg and ketamine 5,9 microg/kg (mean values) wound care could be performed in 20 of the children. In 6 children an additional dose of ketamine was added and the procedure could be completed. In 5 children medication was not sufficient and was completed with nitrous oxide (50%) or intravenous sedation. After the procedure FLACC was 2 in one child and 0 in all other children. Airway, breathing and circulation was stable in all children. Time to complete recovery from the time of arrival to the clinic, was 128 minutes (range 30-210). No side effects like agitation, nausea or signs of hallucinations were observed.
Discussion/Conclusion: The combination of dexmedetomidine and ketamine for treating procedural pain in children with burns shows high medical safety and high efficacy. Often the bothersome and painful insertion of an iv cannula could be avoided. In addition we have a sense that children comes to rest faster and also wakes up faster without ensuing symtoms of sedation.

P019

Use of bacteriophages in the treatment of extensively drug-resistant Pseudomonas aeruginosa septicemia in a patient with acute kidney injury - a case report

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A 62-year-old man was hospitalized for severe abdominal sepsis with disseminated intravascular coagulation, secondary to a diaphragmatic hernia with bowel strangulation. The patient had a prolonged hospital course complicated by gangrene, resulting in the amputation of the lower limbs and two fingers and the development of large necrotic pressure sores on the back. Three months later, the patient was transferred to the burn wound center of the

Queen Astrid military hospital for surgical management of the pressure sores. Wound cultures on admission revealed MRSA, MDR *P. aeruginosa*, *E. cloacae*, *Klebsiella pneumoniae* and *Candida albicans* colonisation. The patient developed septicemia with extensively drug-resistant (XDR), colistin-only-sensitive, *P. aeruginosa*. Intravenous (IV) colistin and sulfamethoxazole/trimethoprim combination therapy was started. Ten days later, the patient developed acute kidney injury, probably caused by drug-induced acute interstitial nephritis. The patient was in a coma and antibiotic therapy was stopped. Unfortunately, XDR *P. aeruginosa* septicemia re-emerged with positive hemocultures for three consecutive days. Upon expert advice and informed consent from the patient's family, IV and topical bacteriophage therapy were initiated under the umbrella of Art. 37 of the Declaration of Helsinki. Fifty ml of purified bacteriophage cocktail BFC1 (Merabishvili *et al*. 2009), containing two active *P. aeruginosa* bacteriophages in sodium chloride 0,9% at a concentration of 10^7 plaque forming units (PFU) per ml were administered as a 6h IV infusion for 10 days. Wounds were washed with bicarbonate buffer and irrigated with 50 ml BFC1 every 8h for 10 days. Immediately, blood cultures turned negative, CRP levels dropped and the fever disappeared. Kidney function recovered after a few days. Hemodialysis was avoided and no clinical abnormalities related to the application of bacteriophages were observed. This is, as far as we know, the first documented report of intravenous bacteriophage monotherapy against *P. aeruginosa* septicemia in humans.

P020

Burns: a global health burden.

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Rationale: The rationale behind this piece of research is to describe the extent of the burden of burns in both the developing and developed world. The research focuses on comparisons in burn epidemiology across the globe, and reasons to explain these statistics. The secondary focus is upon the management of burns in high and low resource settings.
Methodology: The methodology initially involved analysis of epidemiological data from the World Health Organization (WHO). In addition, it utilized systematic reviews, which looked specifically at management of burns in locations such as Sub-Saharan Africa, including first aid methods commonly employed and management in formal healthcare facilities.
Results: Results show burns as the fourth most common type of trauma worldwide with 90% of the 300,000 annual deaths occurring in developing countries. Global trends show a decrease in mortality rates from burns in developed countries, but rates are stagnant in the developing world. Paediatric burns are of huge concern with children under five in Africa having seven times a higher incidence of burn related deaths than other under fives worldwide. Inadequate resources, lack of personnel and poor initial management limit lower-income localities. Cold water is rarely applied to burns in the developing world due to poor awareness and reliance on traditional healers and remedies leading to an exacerbation of morbidity and mortality rates.
Conclusion: Overall this research has exposed the gravity of the situation of burns worldwide including reasons for the differences in incidence between high and low income countries. It has also identified simple interventions such as educational programs that could play a crucial role in improving survival from burns in low resource settings.

P021

Changes in Biochemical Parameters - pH, PO2, PCO2, Na+, K+, Cl- & HCO3- within 96 Hours of Inhalation Burn Injury

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Objectives: Burn is a common injury in Bangladesh due to varieties of reasons – most importantly lack of awareness. Burn incidence inside a closed place is increased in recent years, which leads to inhalation injury. This may increase the mortality upto 60% according to some research in advanced countries. In inhalation burn injury, biochemical parameters are altered. They are pH, PO_2, PCO_2, Na^+, K^+, Cl^-, & HCO_3^-. The findings in 24, 48, 72 & 96 hours will help the patient management. This study focuses on the alteration of biochemical parameters in inhalation injury patients within 96 hours.
Methods: A prospective, observational study was carried out in the Department of Burn & Plastic Surgery of Dhaka Medical College Hospital from November 2014 to October 2015. Here 40 patients with burn with inhalation injury were selected as per inclusion and exclusion criteria. Investigations of biochemical parameters were done. Information were recorded in data collection sheet and compiled in a master table.
Results: Most of the cases with altered biochemical parameters had increased pH and decreased pCO_2 which were the features of respiratory alkalosis. Because inhaled injured burn patient had received high flow oxygen in first 24 hours to 72 hours. Decreased Na^+ & Cl^- due to shifting ions from blood vessels to ECF due to the porous leaky blood vessels in burn patients. K^+ was normal in maximum patients. In most cases pH, pO_2 & pCO_2 were not significantly changed. It might be due to upper respiratory tract injury.
Conclusions: Most of the cases with altered biochemical parameters had features of respiratory alkalosis. Hyponatraemia associated with hypochloraemia was noted in first 96 hours. K^+ was normal in maximum patients.

P022

The Effect of Mature Adipocyte-Derived Dedifferentiated Fat (DFAT) Cells on Ischemic Tissue.

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Dedifferentiated fat (DFAT) cells, isolated from mature adipose cell, have high proliferative potential and pluripotency. In this paper, we examined whether the flap survival area could be enlarged by administering autologous and allogenic DFAT cells to random pattern skin flaps in back of rats. Methods DFAT cells were isolated and cultured through ceiling cultures of intra-abdominal adipocytes from Sprague-Dawley (SD) and Wistar rats. Random-pattern flaps (2 × 9 cm) were lifted in the back of SD rats. A control group (n = 10) and a DFAT-cell-treated group (DFAT) (1 × 10^6 cells/0.1 mL) were prepared. Two DFAT-treated groups were created; namely, the autologous DFAT (SD rats) injection group (n = 10) and allogenic DFAT (Wistar rats) injection group (n=10) in which cells were injected at 2 cm from the base of the flap. On postoperative day 14, the flap survival area was measured and tissues were collected. Histological analysis was carried out by hematoxylin and eosin (H&E) staining, India ink staining. Results The mean flap survival rate was 53.8 ± 6.5% in the control group, 65.8 ± 2.4% in the autologous DFAT injection group, and 62.8 ± 5.9% in the allogenic DFAT injection group. The flap survival area was significantly enlarged in the autologous and allogenic DFAT injection group ($p < 0.05$). In H&E and India ink staining, increase of the blood vessels was observed in DFAT injection group. Discussion The injection of autogenic and allogenic DFAT cells into the flap base promoted the expansion of survival areas. DFAT has potential for clinical application such as emergency reconstruction of burn wound and reconstruction of chronic scar contracture.

P023

Decellularized Human Dermal Matrices for the Treatment of Burn Patients: development of production process and quality control methods

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Objectives: A novel cryopreserved human dermal substitute, having both 3D structure and composition well preserved, was recently developed at the Queen Astrid Military Hospital in Brussels, Belgium. This Decellularized Human Dermal Matrix (DHDM) can be repopulated *in vitro* by adult human dermal fibroblasts and it permits the proliferation and remodelling activity of the fibroblasts. The main objective of this work was the development of the skin decellularization method (up-scaling) to allow the preparation of sufficient amount of the DHDM to treat patients with large burns.
Methods: Cryopreserved allogeneic human skin (about 0.4 mm thick) was obtained from deceased human donors and was used to prepare DHDMs. A two-steps decellularization method was developed to prepare the DHDMs. The epidermis of allogeneic skin samples was removed after a first incubation in NaCl (1M) at 37°C for 24h. The resulting dermal samples were subsequently incubated in 0.5% Triton X-100 for 96h at room temperature with continuous agitation for the removal of cell debris. After this incubation, the decellularized dermal samples were washed in PBS to remove the detergent and thereafter were cryopreserved. In addition to bacteriological/mycological testing and histological evaluation, MTT viability testing and High-Definition Optical Coherence Tomography (HD-OCT) imaging methods were developed to evaluate the quality of the manufactured dermal matrices.
Results: Results showed that MTT test was useful to evaluate the removal of living cells and histology was useful to evaluate the removal of cell and cell debris. HD-OCT imaging was helpful to evaluate the 3D architecture of the DHDMs (dermal papillae and vascular spaces). Repeated washes (n=6) were necessary to decrease the detergent concentration to about 1 ppm in the washing solution.
Conclusion: Conclusively, the selected DHDM production process and the quality control methods used were found to be appropriate to prepare sufficient amount of DHDMs to treat burn patients.

P024

Estimation of vitamin D3 level in children with burns - Preliminary report.

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Aim: Estimating the level of vitamin D3 in children with burns during healing process and recovery.
Methods: Studies were carried out on the group of 157 children with burns, aged 6 months - 15 y.o., from 05.09.2015 to 25.02.2017. Burns' area varied from 1 to 50% tbs. Blood for studies was collected, depending on the hospitalization duration: on the 1st , between 3rd-5th, between 5th-10th day, between 1-3rd month since the accident.
Evaluation method ELFA (Enzyme Linked Fluorescent Assay).
Research results were compared to the control group of healthy children, admitted for scheduled surgeries.

Vitamin D3's level was stated as optimal (>30ng/ml), low (20-30ng/ml), and very low (<20ng/ml).
Results: Within the studied group, on the first day children with low and very low level accounted for 52% of all children, between 3rd - 5th day - 80.95%, between 5th - 10th - 63.64%, and between 1st - 3rd month - 83.33%
In the control group, children with low level accounted for 58,33% and there were no children with a very low level.
Conclusions: Comparing to the control group, on the first day of the burn, low level of vitamin D3 occurred more often.
Despite the implementation or modification of the supplementation with a vitamin, its level often remained below the optimal level for a long time during the healing and recovering. Studies, however, covered too small group of seriously burned children to be able to indicate dependence between burn severity, healing time and the level of vitamin D3.
Due to reported contribution of vitamin D in wound healing processes and immune responses, it's important to define how its content is formed in the burned children's organisms. It could determine its routine level control and introducing the adequate supplementation. The studies are in progress.
Authors don't declare any conflict of interests.

P025

The exposure of the theatre personnel to the volatile compounds produced during the operation of burn tissue with the use of diathermy

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Objectives: The exposure to the volatile compounds produced during the operation is particularly significant for personnel operating on patients with massive burns, since the optimal procedure for treating massive and deep burns is the early removal of tissue necrosis. For this purpose i.a. electrosurgery is used. The use of such instruments generates high temperature and increases exposure to harmful volatile agents in the smoke discharged from the tissues that are being removed. Our aim of study was qualitative and semi-quantitative analysis of non-polar volatile compounds released during burned tissue excision using cutting diathermy.
Methods: The study was conducted during resection of patient's burned tissue on the first day after the burn (30% TBSA, depth third degree). The analyzed compounds were being absorbed by solid state extraction, using SPME fibers. Exposure time of the fibers was 30 minutes and began with the start of the procedure. The fibers were analyzed by gas chromatography coupled with mass spectrometry.
Results: In our pilot studies which employed SPME technique to test surgical smoke composition, we have demonstrated the presence of several hundred of non-polar organic compounds. They were identified as simple aliphatic and aromatic hydrocarbons, such as acid ester, hexane, acetone and complex organic derivatives of unknown toxicology.
Conclusions: The current tests of electrosurgical smoke and fumes have been connected with the resection of healthy tissue. Our research, for the first time, shows the analysis of smoke resulting from the burned tissue resection. The majority of detected compounds has a potentially toxic effect and may constitute risk factors for the theatre personnel, that had not been previously taken into account.

P026

Fire-related injuries and their burden in Finland 2000-2010

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Objectives: The incidence of fire-related deaths in Finland has been higher than in majority of the westernized countries. In addition, hundreds of severe injuries occur annually. This study attempts to provide comprehensive overview on injuries due to fire and deaths due to fire during 2000-2010 and their costs in Finland as the previous knowledge was very scarce.
Methods: The study is register-based synthesizing several administrative registers which have nationwide coverage such as the Finnish Hospital Discharge Register, data on social security compensations due to injury, Causes of Death register and a sample of cases from Helsinki Burn Centre.
Results: During the study period, the incidence of severe fire-related injuries was some 6 per 100 000 persons-years (males 76%, females 24%) yielding some 300 cases annually. Additionally, some 99 deaths cumulated annually with the same gender profile. Inpatient care cost for those sustained fire-related burn injury was some EUR 25 400 while it was some EUR 3 600 for those with combustion gas poisoning without burn injury. Therefore, annual care costs reached some EUR 6.2 million. Additionally, some EUR 5.7 million annually was lost due to productivity losses induced by the injuries. Mean productivity loss for a fire-related death was some EUR 315 000 and it ranged from some 800 000 among young to less than 100 000 among elderly.
Discussion: Tens of millions of Euros are lost annually due to injuries and deaths from fires. House fires tend to cause large burns that are costly to treat and on the other hand, fire-related deaths occur usually due to house fires. Treatment cost of a very large burn may exceed EUR 500

000. Targeting preventive efforts to house fires substantial burden could be avoided.

P027

Childhood burns - What extent can Emergency Department clinicians identify risk factors for child maltreatment compared to what is known to the child's Health visitor?

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Objectives: To explore the extent to which risk factors for maltreatment were identified by Emergency Department (ED) staff when the child presented with a burn injury in comparison to what is known by the child's Health Visitor (HV). Would access to community child health records in the ED be beneficial?
Methods: The Burns & Scalds Assessment Template (BaSAT) was used to assess children < 16 yrs. of age who attended the ED with a burn.
A standardised questionnaire, based on a validated family risk assessment tool, was then used to follow up children < 4 yrs. with their HV.
HV's were asked about information they held regarding: prior injuries, concern about: care, supervision and discipline and parental mental health issues.
Three questions were common to both the BaSAT and the HV questionnaire: history of social care involvement, history of interpersonal violence. Both proforma were completed for 218 children
Results: Social Care involvement was identified 5% in the ED compared to 18% by the HV. Interpersonal violence was reported for 2% in the ED and 21% known to the HV. Other risk factors known to the HV included prior injury, parental mental health issues, past or current interpersonal violence, with 18% of children were found to be living in homes with three or more risk factors.
Discussion: Data collected in the ED is self-reported by the parent/carer therefore it is not surprising that they may be reluctant to disclose sensitive issues to ED staff afraid of any repercussions and allegations of abuse or neglect, therefore it is important that ED staff have access to additional information that the child's HV holds. This would help to support their assessment of safeguarding risks and to refer appropriately.

P028

Alteration of biomechanical properties of burned skin

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Background: The prevalence of burns in the general population is high. Despite new research findings, skin burns and its resulting tissue damage are still not entirely understood. In particular, little is known about the depth-dependent alteration of skin biomechanical properties of these wounds.
Methods: Thirty-six burn wounds with six different depths were generated on the abdomen of six Go¨ ttingen minipigs. The alteration of skin biomechanical properties was evaluated objectively after 15 and 360 min using a Cutometer device. Biopsies for histological evalua-tion were taken and the depth of burn was correlated with biomechanical properties.
Results: Firmness of skin (R0), overall elasticity (R8) and calculated elasticity (Ue) demon-strated a continuous decrease with an increasing depth of burn 15 min after wound generation. Gross elasticity (R2), net elasticity (R5) and amount of elasticity of the whole curve (R7), however, showed an increase of values with increasing depth of injury. A further decrease of elasticity was demonstrated 360 min after wound generation.
Conclusion: The alteration of skin biomechanical properties is a function of damaged tissue structures. The presented results demonstrate a depth-dependent decrease of principal elastic parameters with an increasing depth of burn and the results indicate progressive tissue damage over the time.

P029

FMS-like Tyrosine Kinase-3 Ligand (Flt3L) reduces Systemic Infection in a Model of Post-burn Pneumonia

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Background: Following burn injury, pneumonia worsens morbidity and mortality. The dendritic cell growth factor Flt3L enhances resistance to bacterial wound infection and abdominal sepsis of burned mice, but concerns were raised towards its safety and efficacy in models of pneumonia. This study examines the effect of Flt3 L on survival, local and systemic bacterial burden in a murine model of burn injury and pneumonia.
Methods: Anesthetized mice received a 35% total body surface area full-thickness scald burn and daily i.p.-injec-

tions of Flt3L (10µg/day) or Ringer's lactate (CTR) for 4 days post-burn. On day 5, pseudomonas aeruginosa pneumonia was induced by intranasal inoculation with doses ranging from 10^5 to 10^8 colony forming units (CFU), representing non-lethal to LD100 models of infection. Survival was monitored for 14 days (n=20). At 24 and 48 hours post inoculation, lung, spleen and blood were harvested to determine bacterial burden and systemic spread of infection (n=40).
Results: At 24h post inoculation with $5x10^5$CFU, lung bacterial burden was lower in Flt3L -treated mice compared to CTR and the incidence of severe lung infection (>10^4CFU/g) was reduced ($p<0.01$). By 48h, pulmonary bacterial burden in the CTR group was comparable to Flt3L. Splenic bacterial burden was significantly reduced in the Flt3L group compared to CTR at 24h (>10-fold, $p<0.05$) and 48h (100-fold, $p<0.01$) and incidence of bacteremia was reduced ($p<0.05$). At highly lethal (10^8CFU), intermediate ($5x10^5$CFU) and nonlethal (10^5CFU) doses, survival of Flt3L and CTR groups was comparable
Conclusion: Bacterial burden and mortality were not worsened and Flt3L may be advantageous in prevention or resolution of systemic infection in post-burn-pneumonia. In support of previous findings regarding improved immune responses and survival after Flt3L-administration in wound infection and abdominal sepsis, we propose continuing investigations into the use of Flt3L as an auxiliary immunomodulatory agent for prevention of post-burn bacterial infections.

P030

Chemical burns; 17-year epidemiological study and evolution in Bilbao, Spain

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Objectives: Chemical burns accidents have decreased in our area during the last years. Our aim with this study is to show the decreasing tendency of chemical burns and to analyze the distinctive features of this type of burns compared with all burns admitted to Burn Unit at Cruces University Hospital (Bilbao).
Methods: 17-year retrospective study including all the patients with chemical burns admitted to our Burn Unit (group A). Epidemiological and demographic data were collected and compared with all burnt patients treated at the same unit (group B).
Results: A total of 35 patients were included in group A in the study. During 2000-2007 25 patients were admitted and 10 during 2008-2016. Sodium hydroxide was the most frequent agent involved (25.71%), followed by sulfuric acid (20%). 17.14% associated some kind of flame. The most injured parts of the body were upper extremities (71.43%) and face (68.57%).
Comparing the two samples, 88.57% of group A were labor accidents while in group B involved 29.3%. The mean age in group A was 42.1 years, and 51.6 in group B. In group A, 94.29% were men and 73.30% in group B. A mean of 18.01% of total body surface (TBSA) was burnt, in group B was 21.6%. The mean stay at the Burn Unit was 18.51 days for group A and 20.27 for group B. ABSI score was 5.86 for group A, and 7.28 for group B.
Discussion/conclussion: We have observed that most of chemical burn accidents involved male younger patients at work, with smaller ABSI and less TBSA than burnt patients globally. We have also seen a decreasing rate of chemical burns probably due to appropriate equipment, employee awareness and regulation laws. Furthermore, the socio-demographic change for a less industrial area has been a decisive factor for the drop of chemical burns.

P031

Clinical Consideration of Contact Burn Caused by Hair Straightener

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Purpose: Hair straightener is a common tool among various household electric appliances used for hair styling. Hair straightener has plate consists of metal or ceramic, which lead to possible burn if contacted. Main users of hair straightener are young women whereas main victims of hair straightener caused-burn are infants. Among patients visiting our burn medical center, the case of attending hospital due to contact burn by hair straightener tends to increase.
Methods: Retrospective research was conducted 72 patients with contact burn by hair straightener among patients admitted to our burn medical center from Jan 2012 to Dec 2014. Subjects were classified by age, gender, affected site and degree and treatment method.
Results: 72 subjects consisted of 39 infants, 9 children, adolescence and 24 adults. Affected sites were presented as hands in 31, face in 21, foot in 13, arms in 5 and legs in 2 subjects. Degree of burn was presented as deep second degrees in 67 and third degrees in 5 subjects; 70 subjects were cured through conservative treatment whereas 2 subjects had local flap.
Conclusion: Contact burn by hair straightener can be ranged from partial to full thickness skin defect. It is important to note this kind of burn develops more frequently in infants and is preventative. Education for young women who use hair straightener is crucial. Training regarding function and design improvement of hair straightener is also essential. Uncovering the heated plate after use through a separate lock device might be great help for prevention of contact burn if develope.

P032

A novel pre-clinical attenuated wound healing model - the partial thickness excision of a porcine full thickness burn

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Introduction: Appropriate pre-clinical models are critical in the development of new rational therapies. Attenuated wound healing is a clinical challenge with limited effective treatment options. However, to date, there has not been a predictable and reproducible animal model of attenuated wound healing to support research (Seaton *et al.,* 2015).
Aims: To create a novel attenuated wound healing model in porcine skin that is predictable and reproducible.
Methods: 6 full thickness contact burn wounds were created on pigs using a 4cm diameter solid stainless steel cylinder heated to 150 degrees centigrade in oil, on experiment day -1. This was held to the marked area for 60 seconds on the skin of the anaesthetized pigs' flanks (after shaving and cleaning). At 24hr (day 0) the central zone of necrosis was excised, leaving the zone of stasis intact. For controls, full thickness excisions of 4cm diameter were also created in unburnt areas. Split thickness skin grafts were applied to both wound groups on day 0 (n=12). Wound healing parameters were observed at 7 day intervals until day 42.
Results: Compared to acute full thickness wounds, the partial thickness excision of the full thickness burn showed a 14-day delay in contraction of the wound edges, a 21-day delay in the vascular ingress of the wound, new capillary formation and vascular perfusion. Skin graft adherence was also delayed. Oedema was persistent in the wound bed until day 28 with a delayed and prolonged inflammatory cell infiltrate. This pattern was seen consistently across the sample of animals.
Conclusions*:* Partial thickness excision of a burn wound delays the healing response. The partial thickness excision of a full thickness burn wound may be a useful experimental model of attenuated healing to develop and study wound treatments.

P033

Key issues in phage therapy

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Phage therapy is increasingly highlighted as a promising 'new' treatment option for bacterial infections, *inter alia* during the recent UN General Assembly on antimicrobial resistance. Countries that had less access to antibiotics during the cold war, such as Georgia, have years of data on the efficacy of phage therapy, but authorities in the Western world hesitate to consider the potential of phage therapy, mainly because research performed in the former Soviet Union is perceived as 'academically inferior'. Meanwhile, in the face of an uncurbed antimicrobial resistance crisis, phage therapy is sporadically applied in the Western world (also in the Burn Wound Center of the Queen Astrid military hospital), often under the umbrella of Article 37 (Unproven Interventions in Clinical Practice) of the Declaration of Helsinki. These cases, however, do not allow for an appropriate evaluation of the efficacy of phage therapy. In 2013, the European Commission decided to fund the first major phage therapy study under modern regulatory standards: PhagoBurn, an ambitious phase I/II clinical trial. Public perception, unnecessarily stringent pharmaceutical requirements, phage specificity and intellectual property protection issues hamper the reintroduction of phage therapy in the Western world. In addition, little is known about the impact of a massive use of phages in the agriculture, aquaculture, food, and human and animal health sectors on the ecology and evolution of bacteria. Upon analysis of these key issues, we argue that the re-introduction of efficient and sustainable phage therapy approaches will require a paradigm shift in our pharmaco-economic model as well as in the treatment of infectious disease.

P034

Dressilk®: a series of case reports on partial thickness burns and donor sites

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Objectives: The management of both split thickness donor sites and partial thickness burns with healing potential within 21 days is often considered to be similar. A suitable dressing should at least promote wound healing, take into account patient and nurse comfort, and be cost effective.
Methods: In a preliminary test, split thickness donor sites and partial thickness burns with healing potential within 21 days were treated with Dressilk®. Healing potential of partial thickness burns was assessed by means of laser Doppler imaging. Dressilk® was applied directly on the donor site or burn and covered with a secondary gauze dressing. Dressilk® was left in situ until it separated spontaneously from the healed wound. Parameters taken into account for dressing evaluation were pain (assessed by the patient), bacterial load, time to wound healing, ease of use and general satisfaction (assessed by nurses).
Results: In total 4 patients with partial thickness burns and 4 patients with donor sites had their wounds treated with Dressilk®. On average patients found Dressilk® to be com-

fortable and only reported no or mild pain with the dressing. Maximum pain observed was assessed as moderate pain. Bacterial problems were mainly caused by Staphylococcus Aureus, but easy to deal with by applying an antiseptic solution on the primary dressing. Average time to wound healing was 18 days in case of the donor sites and 11 days for the burn wounds treated in this test. Nurses were satisfied about the dressing and assessed Dressilk® as easy to use.
Discussion/conclusion: In this preliminary test Dressilk® was assessed as a suitable dressing for both split thickness donor sites and partial thickness burns with healing potential within 21 days. A more elaborate study, also investigating cost effectivity, will be performed in the near future.

P035

A novel keratinocytes and autologous microskin techniques to treat full-thickness skin defect wounds

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The main reason for the high mortality of patients with large deep burns is the lack of autologous skin for wound coverage. This study aims to investigate how to effectively use the limited remaining autologous skin to repair the large deep wound. The human keratinocytes harvested from foreskin were cultured and transfected with EGF by adenovirus vector (Ad-EGF). The full-thickness skin defect wound (3.3cm×3.0cm) was made on the back of rats and EGF gene modified human keratinocytes suspension and autologous microskin covered with allogeneic skin were transplanted on the wound The results show that the EGF gene modified human keratinocytes highly expresses EGF. In addition, CK10, CK14 and CK19 as keratinocyte differentiation markers were elevated in the EGF gene modified human keratinocytes. Wound healing was accelerated noticeably when grafting autologous microskin and EGF gene modified human keratinocytes were combined in vivo. The results suggest that EGF gene modified human keratinocytes suspension might contribute as promising seed cells which can effectively secrete
EGF to accelerate wound repair with the grafting of autologous microskin while reducing the amount of autologous skin used.

P036

Burn Patterns and Seasonal Change at a Specialized Burn Facility - 5 years review

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Objectives: In Portugal there are many burn victims, some of them having to be admitted at dedicated Burn Centres. This leads to great social and economic costs. Even though several studies investigated the impact of temporal factors on the incidence of trauma admissions, hardly any data exists concerning the impact of seasonal change on burn profile.
The main purpose of this study is trying to understand the real importance of the "temporal" factor on burn patients, correlating it with other epidemiological data and trying to establish preventive strategies.
Methodology: This retrospective analysis included all burn patients (≥18 years; 420 patients) admitted to the Burn Unit at Hospital São José (Lisboa) between December 2010 and December 2015 (5 years). Data was extracted from medical records and included age, gender, etiology, circumstance, depth and extension of burn. This information was then grouped in 4 temporal categories: Summer, Autumn, Winter, Spring.
Results: This study demonstrates that the number of patients admitted to this Burn Unit didn't show seasonal variation. Females were significantly older than men. The majority of burns was caused by fire and hot liquids. Winter seems to be associated with greater depths of burn and Summer with higher body surface area injured. Fire burns were less predominant during Spring.
Conclusion: The number of burns in Portugal is still very high and preventive measures are sometimes ineffective. With this study, we intended to understand better the burn profiles, establishing patterns of injury and searching for any seasonal variations. It is essential to anticipate all these variables to delineate more effectively the preventive strategy.

P037

Antimicrobial properties of blood-derived products against biofilm-forming bacteria commonly found in burn wounds

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Objectives: Platelet-Rich Plasma(PRP) is widely used to promote wound healing and tissue regeneration. The aim of the study was to explore the antimicrobial properties of blood products against free bacteria and bacteria-forming biofilm commonly found in burn wound.
Methods: *In vitro* studies were conducted to test isolated neutrophils, PRP, Platelet Poor-Plasma (PPP) and Leucocyte and PRP(L-PRP)against planktonic *Staphylococcus aureus*, *Pseudomonas aeruginosa* and *Acinetobacter bau-*

mannii.Blood products were obtained from eight healthy volunteers. Neutrophils were isolated using a Percoll density gradient method, PRP products were obtained using a sterile centrifugation technique. Components of products were confirmed using a full blood analyser(Sysmex XN1000).Assays to determine microbicidal and cytostatic properties of the preparations included disk diffusion, and growth kinetics. The ability of the blood-derived products to prevent *P. aeruginosa* and *A. baumannii* biofilm formation was tested using crystal violet biofilm formation assays and the biomass read as level of absorbance.Linear mixed models, ANOVA, Levene's test were used.

Results: Isolated neutrophils did not show bacterial growth inhibition compared to control. The only preparation showing growth control of *S. aureus* was the L-PRP preparation, where the leukocyte and neutrophil content of the preparation both significantly slowed bacterial growth kinetics.PRP and PPP preparations significantly reduced *Pseudomonas* and *Acinetobacter* growth over a 12-hours period compared to the positive control(p-value <0.0001). Against the Gram-negative bacteria, all the biomaterials tested gave a reduced level of biofilm biomass formation compared to positive control(Donor 1: activated L-PRP, L-PRP, PRP vs *Acinetobacter i*n broth $p < 0.0001$, and PPP $p < 0.05$. All blood-derived products vs *Pseudomonas* $p < 0.0001$).

Discussion: Blood-derived products showed different antimicrobial properties according to the bacterial target and the cellular composition of the product tested. This in-vitro study provides preliminary evidence that blood-derived products can inhibit growth of key burn wound pathogens, both in their planktonic and biofilm forms.

P038

Does Polyacrylate polymer dressing reduce inflammatory response in a partial thickness burn wound?

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Introduction: Previous studies have demonstrated that polyacrylate polymers are highly charged and can bind ions, water and protein rendering them potential anti-inflammatory agents. A burn wound is characterised by a massive inflammatory response and lends itself as an ideal target for clinical application of such polymers. Hypothesis: A polyacrylate polymer dressing reduces post-burn inflammatory response and improves wound healing

Method: 12 Partial thickness burn wounds were created on the backs of 9 large white pigs under home office approval. 4 wounds were treated with a standard silver dressing, 4 wounds with a nonadherent dressing (control) and 4 wounds with a polyacrylate polymer dressing. Wounds were dressed every 3 days and harvested at 7 10 and 14 days post injury under terminal anaesthesia. Wounds were processed for histology and immunohistochemistry (myeloperoxidase, cd163, cd8, alphasmooth muscle actin and PCNA). Quantitative analyses were performed and data subjected to non-parametric statistical analyses.

Results: At 7 days, it was evident that the wounds treated with the polyacrylate polymer had less inflammatory infiltrate and more advanced re-epithelialisation compared to the control or the silver treated wounds. Cell prolieration in the keratinocytes of the neo-epidermis of polymer treated wounds was significantly higher than that seen in the silver or the control wounds. By 14 days, all woundswerealmost completely re-epithelialised. We did not see any increase in wound infections despite reduction of inflammatory response in the polymer treated burn wounds.

Conclusion and discussion: Polyacrylate polymer dressing reduces the post-burn inflammatory response and facilitates early re-epithelialisation of the wounds.

Post-burn inflammatory response both local and systemic, has been correlated with increased catabolic response, poor quality of wound healing and problem scarring. This study highlights the need for clinical investigation into use of polyacrylate polymer dressings in reducing the negative effects of post-burn inflammatory response and improving post-burn scarring.

P039

A Novel Keratinocyte delivery system to burn wounds.

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Objectives: Tailored spray devices can play an important role in improving spray cell delivery to burn wounds. The aim of this study is to develop an effective carrier system for spray cell transplantation to burn wounds and provide a novel spray assessment method.

Methods: Spray characteristics of a potential cell carrier (Gellan® hydrogel) were compared to other hydrogels and water. Spray application through an airbrush with standardized spray angle, distance and delivered air pressure was performed. Expansion rate, droplet size, relative span factor and percentage of surface area covered were determined utilizing a gelatin gel substrate and water-sensitive paper (measuring 26 x 76mm) on a flat and tilted receiving surface. Sprayed paper was scanned and analysed with Image J software. Furthermore, cell viability was assessed following Gellan encapsulation with

live/dead staining.
Results: Our preliminary results demonstrate that Gellan hydrogel shows reduced runoff compared to other hydrogels and water. Gellan expansion rate was 2.74 times and 1.7 times less than water when applied to a flat and tilted surface respectively.Following spray application of 50µl fluid volume, hydrogel droplets preserve structural stability and demonstrate a higher relative span factor (Gellan 5.0 and water 2.4) which potentially explains lower mean percentage area covered (24%, range 22-27%) compared to water (44%, range 40-48%). Cells maintained high viability (84%, range 83-85%) after encapsulation in Gellan for at least 4 days.
Conclusion: Water-sensitive paper is a useful addition to assess spray characteristics. Preliminary *in vitro* results from our studies show that cells tolerate Gellan encapsulation and spray assessment of Gellan demonstrates limited expansion and runoff to the receiving surface. Therefore, Gellan hydrogel seems a promising candidate for both cell encapsulation and spray application.

P040

The Use of a 3-dimensional Biofilm-Infected Wound Model to Test Concentrated Surfactant Technology (CST)-Based Wound Dressings

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Objectives: Biofilms are hypothesized to impede wound healing. Although research of biofilms in chronic wounds is growing, there is still a distinct lack of *in vitro* biofilm-infected wound models to test antimicrobials and wound dressings. The aim of this study was to develop biofilms in a wound based 3-dimensional model and assess the application of wound dressings and antimicrobials.
Methods: The reproducible 3-D *in vitro* skin model was commercially obtained and consisted of a human keratinocyte-rich epidermal layer and a human fibroblast-containing dermal layer. The skin was cultured overnight with supplied cell culture medium and incubated at 37°C, 5% CO_2 in humidified conditions. Wounding was performed using a sterile scalpel blade that cut through the epidermis and partially penetrated the dermis. *Staphylococcus aureus* ATCC 29213, *Pseudomonas aeruginosa* NCTC 10662 and/or MRSA ATCC BAA-43, *S. epidermidis* ATCC 29212 were grown in Tryptone Soya Broth (TSB) overnight at 37°C before being diluted to 10^4 CFU/mL. The microorganisms were then added to the wounded skin and incubated for 24-72 hours at 37°C and 5% CO_2. Immature and mature wound biofilms were treated with a non-antimicrobial and antimicrobial concentrated surfactant wound dressing for 24 hours. To assess biofilm prevention, some skin wounds were pre-treated with the dressings before inoculation. The wounded models were fixed in 10% formalin and processed for histological assessment. ELISA was used to assess the secretion of inflammatory cytokines.
Results: Histology demonstrated a visible reduction in microorganisms within the biofilm when treated with the antimicrobial-containing wound dressing. The pre-treatment of wounds with the non-antimicrobial wound dressing resulted in the sequestration of microorganisms. ELISA showed a significant change in inflammatory cytokines.
Conclusions: The study highlighted the efficacy of concentrated surfactant-based wound dressings against microbial biofilms in an *in vitro* wound model.

P041

The Effectiveness of a Next Generation Anti-biofilm Complex in the Treatment of Biofilms and Inflammation

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Objective: Biofilms have been associated with persistent infection and prolonged inflammation, particularly in wounds, which present with delayed wound closure. There is great demand for products that can manage both biofilm and the effects of biofilm such as inflammation. The aim of this study was to investigate the efficacy of a newly developed, smart, trigger-releasing antimicrobial, anti-biofilm and anti-inflammatory complex on both planktonic microorganisms and biofilms.
Methods: Anti-inflammatory capability of the complexes were evaluated in two *in vitro* wound models: A) Monolayer fibroblast scratch wound model treated with biofilm-conditioned medium and B) 3-dimensional wounded skin model with biofilm growth. The secretory levels of pro-inflammatory cytokines were measured in the cell culture supernatant using ELISA kits. Direct and indirect cytotoxicity tests were performed using L929 fibroblasts to evaluate the cytotoxicity of the complexes. Direct cytotoxicity was measured using the Neutral Red uptake assay and indirect cytoxicity was measured using microscopy.
Results: Histology showed a reduction in the presence of biofilm in the 3D biofilm-infected wound model. ELISA results showed changes in detectable secreted pro-inflammatory cytokines. Cytotoxicity studies revealed that some complexes, but not all, were cytotoxic, and in some cases this was alleviated in lower concentrations. However we clearly identified a smart complex that was not cytotoxic at all concentrations.
Conclusions: This study highlights the effectiveness of our next generation smart, trigger-releasing complexes against biofilms and biofilm-associated inflammation. These complexes can be incorporated into an array of different platforms with significant benefit to the prevention and control of biofilms.
*Asepticate Plus

P042

Insulin therapy in severe Burns - methods of glicemic control and intensive insulin protocol.

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Objectives: The goal of the study was to compare the clinical impact of different methods of glicemic control and intensive insulin protocol. Maintenance of controlled blood glucose levels results in fewer complications (eg. Bacteremia) and reduces mortality in critically ill patients.The accuracy of blood glucose measurement and adopted insulin protocol results in reaching target blood glucose level.
Methods: The analysis of glucose levels measured from capillary blood and/or venous blood according to the tabular method protocol (SPIRINT-Specialised Relative Insulin and Nutrition Table) and computerized intensive insulin dosing (Gluco Stabilizer Program). Any other factors affecting the instability of glucose level [like: healing manipulations, dressings/bandages, surgical procedures] were not analyzed.
Results: Levels of glucose in the venous blood and capillary blood for ICU patients, were compared. On the basis of glucose levels the dose of insulin was calculated - based on the tabular method [SPIRINT Specialised Relative Insulin and Nutrition Table] and using computer analysis method [Gluco Stabilizer Program, computerized intensive insulin dosing]. Cases of hyperglycemia and hypoglycemia where analysed as well.
Conclusion: There is no optimal method for assessing blood glucose levels in patients with severe burns.
In the tabular method [SPIRINT Specialised Relative Insulin and Nutrition Table] the insulin therapy is interrupted as a result of achieving the expected level of glucose. In the computer method [Gluco Stabilizer Program] the insulin therapy is maintained for several hours despite achieving the desired level of glucose. The computer method results may be disturbed by the computer malfunction/computer comptation failure.
Keywords: Severe Burns, Hypergycemia, Insulintherapy

P043

The use of low-intensity laser irradiation of blood in children of early age in the treatment of thermal burns of the skin

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Aim: To evaluate the results of treatment in young children with thermal burns of the skin when included in therapy, nizkointensivnogo laser irradiation of blood.
Material and methods: 47 children were surveyed, from them 32 patients aged from 8 till 36 months with an area of burns from 8 to 25% passing treatment in Children's regional clinical hospital of Grodno of 100% of cases the burn of skin was got owing to effect of hot liquid. All patients were divided into 3 clinical groups: 1st group (n=15): the conditionally healthy; the 2nd group (n=21) - patients to whom treatment according to the protocol was carried out; 3 (n=11) - patients to whom except standard therapy conducted a course of intravenous laser radiation of blood.
Results: Burns 1st degree there is complete epithelialization, and in the case of deeper tissue damage (burns 2nd, 3rd degree) the wound was cleansed from necrotic masses. At the same time (2nd phase of wound process) used wet-drying dressings with antiseptics and antibacterial ointments. After 2-3 dressings were observed in the healing of burn wounds (2nd degree) by the insular and marginal epithelization due to restoration of ischemic tissue and skin derivatives. The duration of the cleansing of wounds from necrotic tissues to the epithelialization when using complex treatment is faster 66.3% ($p<0.05$) than in the group of standard therapy, as the inclusion intraintestinal blood irradiation, provides direct stimulation of reparative processes in the wound. This leads to a reduction of the stages of wound healing, and more rapid epithelialization of wounds (30%, $p<0.01$).
Conclusion: The use of standard therapy with inclusion of sessions of intravenous laser irradiation of blood as we developed the technique is well tolerated by infants, does not cause any adverse reactions and complications, improves reparative processes in the burn wound.

P044

Additional fluid brings better outcomes in burn-blast combined injury resuscitation in a canine model

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Objective: Fluid resuscitation is crucial for the acute management of burn-blast combined injury (BBCI). Patients' requirement on fluid volume remains to make clear.
Methods: 24 beagle dogs were randomly allocated into 3 groups and were subjected to 35%TBSA full-thickness burn followed by moderate primary blast injury. They were then resuscitated with different volume of lactate ringer's solution – parkland formula (group C), parkland formula with a 20% increase (group I) and parkland formula with a 20% decrease (group D). The observation was 24hs. Urine of each dog was collected to calculate hourly urinary output (UOP). Cardiac index (CI), mean arterial pressure (MAP), intrathoracic blood volume (ITBV), extravascular lung water (EVLW), partial pressure of oxygen (P_aO_2) and

arterial serum lactate acid concentration (LAC) were determined 30min pre- and 4h, 8h and 24h post-injury.
Results: UOP in group I was considerably higher than those in the other two groups and was the only one who reached the recommended range within the first 4h post injury (0.77±0.17 $ml \cdot kg^{-1} \cdot h^{-1}$). Group I also demonstrated advantages on hemodynamics and blood gas over the other two groups. In the meanwhile, the increased fluid volume didn't aggravate pulmonary edema as presented by the EVLW (e.g. at 24h group D 126.35±14.80ml, group C 126.01±13.52ml, group I 126.54±11.95ml).
Conclusion: Fluid requirement for BBCI resuscitation exceeds the Parkland formula prediction. Additional fluid is associated with better outcomes while won't exacerbate lung edema.

P045

Characterization of immune and inflammatory responses by using open flow microperfusion in the dermis after burn injuries

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The immune and inflammatory response of burn injuries is commonly measured in blood serum and used to optimize therapeutic treatments. In this project we aimed to investigate the local dermal reaction in burn injuries which is currently poorly understood due to a lack of appropriate sampling methods. Open flow microperfusion (OFM) allows sampling of the interstitial fluid (ISF) directly in the dermal tissue and can thus be used to investigate the inflammatory processes in burn injuries directly in the skin. The minimally invasive OFM sampling technique allows time resolved sampling of ISF in the dermis and in adipose tissue. OFM probes feature a linear design with an outer diameter of 0.5 mm.
Macroscopic openings form the exchange area and constitute the interface to the tissue at a length of 15 mm. OFM probes are certified for human use and permit use of the same experimental design for preclinical and clinical studies as well as for explanted human skin samples. ISF is sampled by continuous perfusion of OFM probes with a physiological solution and OFM samples are subsequently analyzed regarding inflammation markers and immune competent cells for up to 46 hours. Pathophysiological changes caused by a thermic burn stimulus can also be investigated by measuring altered skin penetration of substances.
OFM offers new experimental possibilities for the investigation of burn injuries and the characterization of different burn injuries for an optimization of therapeutic treatments.

P046

Dermabrasion: completing with topical therapy in pediatric patients with type-AB burns

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Introduction: Burns in pediatric patients are a public health problem at the global level, and Type-AB burns with indication for dermabrasion are the most prevalent. This practice is quite painful and creates stress and psychological trauma in the child.
Objective: The present study seeks to determine whether it is possible to diminish the pain, improve the patient's state of comfort and the wound healing, when dermabrasion is complemented with topical treatment with silver sulphadiazine, vitamin A and lidocaine or with topical treatment with collagenase.
Methods: Randomized, double-blind, prospective comparison clinical study between two topical dermatological preparations complemented by the surgical technique of dermabrasion. 20 pediatric patients with AB type burns with indication for dermabrasion, divided into two groups of ten subjects each. A group was treated topically with silver sulphadiazine, vitamin A and lidocaine (Platsul A® Soubeiran Chobet Argentina) and the other with collagenase. Pain was evaluated using pain scales, and the wounds, by clinical and iconographic follow-up.
Results: Patients treated with silver sulphadiazine, vitamin A and lidocaine experienced improvement in the evolution of the pain. Both groups showed improvement in would healing and reduction of after-effects.
Conclusion: Dermabrasion combined with topical treatment with silver sulphadiazine, vitamin A and lidocaine in treatment of AB burns in pediatric patients enables pain control, improving comfort during and between treatments with less stress, which could signify less psychological trauma. Both treatments show improvement in wound healing quality.

P047

Early enteral nutrition, issues to get an adequat progression during first hours until get a complete enteral feeding

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Introduction: Early enteral nutrition is one of the important aspects to decrease the catabolism and maintain better conditions to treat critical burn patients. It seems to be most appropriate for patients start as soon as possible with low volumes per hour and increase progressively until get a complete enteral nutrition. However in real life our expe-

rience to carry out the enteral nutrition protocol presents several issues. There are many factors that can alter the correct administration to provide an optimal enteral feeding. For example, the long time with absolute diet and the long time initiating diet with 20ml/h during first hours can increase the catabolic state and the immunosuppressed state. Not follow properly the algorithms of gastric retention can stop de enteral nutrition many hours unnecessarily.
The aim of this poster is to show the issues that we had to get good enteral nutrition progression trying to start on 24 first hours until complete enteral nutrition needs in first 48h.
Methods: We present an observational retrospective study. Criteria of inclusion: Burn critical patients of both genders with ≥18 years old that need enteral nutrition even if they have less of 20% Total Surface Burned Area. The clinical history and the scoring graph reported daily for every patient had been used for this study.
Results: On average, we started enteral nutrition during first 24h but we not got complete enteral nutrition in first 48h since the patient arrived at our burns unit**.** However, we observed the complications and some of them can be improved.
Conclusion: There are issues that can alter the enteral nutrition protocol. Enteral feeding was improved solving some of this complications and having an exhaustive control.

P048

Burn Camp for teenagers in Germany by Paulinchen - Initiative for Young Burn Survivors

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Since 2012 Paulinchen – Initiative for Young Burn Survivors has been providing a yearly Burn Camp for teenagers from ages 15 to 21.
Methods: An experienced team with a psychologist, a music therapist, a nurse, two young adults with burns and a service woman for the kitchen is organizing the program. In the middle of nowhere, surrounded by beautiful nature the Burn Camp takes place in a self-catering house.
For most of the participating teenagers it's the first time after the accident being away from the protecting family setting and being together with others of the same age and with burn scars. Travelling on their own to the Burn Camp is a challenge which strengthens their self-confidence. Being together without the parents, who are mostly more anxious and painfully touched by the accident, is in a way very relaxing for the young people.
Different activities with handicraft work, small excursions and a visit to a public pool are a good platform for the teenagers to share their experiences and challenges about their life with a burn accident and scars. They give advice to each other from their different perspectives after the accident. And for sure they have a lot of fun together. It`s very important for the team members, that each of the teenagers feels noticed and valued during the burn camp.
Conclusion: A lot of the participants join the Burn Camp each year until they turn 21. Some of them then start to work in the team. During the Burn Camp friendships are built and the teenagers stay in contact also after the Burn Camp. All of them go home with the feeling that they are not alone with their destiny. They know that there are other young people of the same age with similar problems and feelings.

P049

18 years experience of burn holiday camps in Portugal

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Objectives: In Portugal, for the last 18 years the AAQ has been promoting annually a camp for burned children. The main objectives have been to create the opportunity for children to talk freely about the problems they face; to work towards the acceptance of the new image; to develop hygiene routines and organizational skills; to improve adherence to treatments; to develop self-esteem and self-concept and to facilitate the social integration in a group.
Methods: Each year, for a whole week, 15 children with severe burns from all over the country, were invited to attend a burn camp. The staff included 1 doctor, 2 physiotherapists, 1 psychologist, 2 nurses and 2 animators. Each year, a theme has been selected and all the activities were developed around it (anesthetizing sadness, being the same is being different, the future is...). The activities were diverse (painting, pottery, dance, swimming, canoeing, slide, watch the dolphins). All these activities took place in a very enjoyable atmosphere in order to facilitate the interaction between children and staff and set the basis for the final party where a broader team attends: AAQ and friends. During the icebreaking the participants write what they expect. By the end they write what they gained from the experience.
Results:18 burn camps have been successfully imple-

mented (around 270 participants).
The children expected that the camp would make they experience happiness, love, affection, strength, hope, new experiences, friendship, different thinking.
By the end of the week they reported bringing home smiles, joy, adventures, courage, good mood, relaxation, will to live the life, being able to wear a shirt or address without fear, self-esteem, self confidence, good memories and friends.
Discussion/Conclusion: The burn camp has proved to be a unique and valuable opportunity to deal with the devastating impact of a burn in the child's life.

P050

Multi-cultural burn camp - Youth participation experience

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Objectives: The aim of the study is to explore the possible contribution of participation in burn camp for teens growing up with scars. The specific burn camp is multi-cultural and includes both Israeli and Palestinian teens, therefore the study also addresses cultural biases.
Method: The study uses the qualitative methodology phenomenology, to explore the contribution and meaning of participating in burn camp among adolescent burn survivors. In-depth semi-structured interviews are conducted before and after the camp with 15 adolescent (9 boys and 5 girls) burn survivors. The teens were aged 13 to 18 years, and all attended camp at least twice before participating in this research. The interview examines the overall experience of the adolescent and includes probing question exploring participants' perception, thoughts and feeling. In addition, a smaller focus group of 8 campers is held during the camp. All interviews and focus group are recorded, transcribed, analyzed and core themes identified.
Results: Preliminary interviews were completed. Camp dates are April 3rd to 6th 2017. Focus group is scheduled for April 5th. Post-camp interviews will be completed by the end of April. From the preliminary interviews, it seems that there is an increasing participation of the teen in his or her family, community and school, however, this positive impact is more significant in the months following the camp.
Discussion: Following the completion of the interviews and full analysis of the results a comprehensive discussion will be conducted. From the preliminary results, the following important questions arose: The efficacy of a burn camp as a coherent part of the rehabilitation process, what is needed to be done beyond the camp to preserve the positive influence accomplished on the daily routine of the young adult. Also, similar results from both cultures associated in this study may suggest stronger transferability of the conclusions.

P051

The Role of the Burns Unit in Managing Complex Non-Burn Wounds

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Objectives: Large area non-burn skin loss can present a unique set of challenges to the burns unit. We aim to describe the breadth of different presentations and discuss our approach to their management.
Methods: We retrospectively identified all cases of adult non-burn skin loss greater than 5% total body surface area admitted to a single, busy burns unit for an 18 months period, from the British Isles Burns Injury Database. We analysed the aetiologies, clinical presentation and management of these cases and chose 3 cases exemplifying 3 different diagnoses.
Results: Between January 2015 and June 2016 18 cases were admitted under care of our burns team (6 to the Intensive Care Unit and the rest to the Burns Unit) with severe skin loss. Diagnoses were necrotizing fasciitis (NF) 8 (44%), Toxic Epidermal Necrolysis (TENS) 8 (44%) and Purpura Fulminans (PF) 2 (12%). Surgical management of NF included reconstruction with skin graft, and both PF cases required limb amputations. All cases of TENS were managed jointly with dermatology. Five patients died during admission, 3 of which had TENS and 2 had NF
Conclusion: Surgical priorities in non-burn skin loss differ significantly from major burns. In NF the focus is on ensuring adequate debridement, clean wounds and resolution of infection before attempted wound cover. In TENS a conservative approach to wound care and dressings with emphasis on prevention of propagation is best. PF requires timely inspection and debridement of muscle due to high incidence of necrosis and close monitoring and correction of hematological abnormalities. The presence of severe underlying medical conditions, such as immunosuppression in these patients, requires stronger collaboration across different specialties. The resultant poor physiological reserve and propensity for deterioration warrant a high degree of vigilance in their management and contribute to a high mortality.

P052

Virtual Beds Model: a follow-up study

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In the last EBA congress, Hannover 2015, we presented the results of our attention-patient centered model, high-

lighting the teamwork and the consensually oriented decisions; because we can use hospital-beds from the state health system for a long-term detention, we named "Virtual Beds Model" (VBM). Since that date, we have been developing and improving the concept. Objectives. The aim of this study is to show the main VMB quality: adaptability to the supply and demand, with practically non-investment. Methods. We reviewed the files of all attended patients at Centro Estatal de Cuidados Críticos (CECC), in Salamanca, Guanajuato, México. Methods. The Burn Unit is located into a building dedicated to critical care; it is a 12-beds intensive care unit, placed out of a conventional hospital; literally it has no long-term beds. The CECC influence area is around 6.5 millions population. The core of the VBM is grounded on medical education, patients to be attended standardization, communication, and the use of state of the art wound covers. As our experience and recommendations about "no touch" the wound aftercare, we chose to use live cultured human keratinocytes (Epifast) as first choice election. In a more than simplistic explanation, CECC receives the referred patients, provides medical-surgical attention, cover the wound, send them back to their original hospitals, and does the one-week reevaluation. Results. From 2012 to 2016 there were attended at CECC a total of 1681 burned patients, 525 (31%) inpatients, and 1156 (69%) in the VBM model (outpatients). 336.2 year-average patients, 105 inpatient, and 231 VBM. There were no deaths related with VBM. Conclusions. As we probed in this study, the VBM has the property of to be so flexible, in such a manner, that we can to increase or decrease the bed numbers as we need it, without major infrastructure investment.

P053

Comparative study of the cost of care for burn inpatients

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Objectives: To identify studies on costs of burn care and describe the mean total cost of inpatients.
Methods: We searched for cost studies in PubMed and Scielo. We collected data from country of study, methodologies used to compose costs total, total cost of hospitalization and total burned surface area (TBSA). We used the US dollar exchange rate corresponding to the study.
Results: We selected 8 studies carried out in reference hospitals in the treatment of burns, in Europe, Latin America and Asia. Most studies were direct costs only, in one study associated the health-related quality of life questionnaire, one study associated survival analysis and in another the cost-of-illness. The direct costs were calculated considering the consumption of medicines (6 works); clinical support (5); specific procedures (3); and fees of health professionals (4). The types of studies were cohort retrospective (4), prospective (1), cross-sectional (1) and two mixed studies (retrospective-prospective). The mean total cost inpatient, adjusted by the exchange rate, and the mean TBSA was: Spain (US$ 57,090; TBSA 20.2%); Brazil (US$ 39,594.90; 27.9%); Australia (US$ 7,956.92; 23%); India (US$ 1,060.52; 42.46%); Finland (US$ 28,270; no information) in 2013 and (US$ 24,639; TSBA stratified) in 2014; United Kingdom, large burned patient only, (US$ 161,978.46 to 1,014,153.42;) in 2009 and (US$ 4,106.61 to 51,777.54) in 2014.
Discussion/Conclusion: We found the total mean cost inpatient very different between the studies, which may be related to the technologies used in the treatment, the severity of the health problem and also the evaluation methodology used. There is diversity between studies and various components are possible to calculate the cost of treatment. There is a need to stratify TBSA. There is an urgent need for harmonization of the methodology to determine the cost of burn inpatients and implications in Health's Systems.

P055

Myoglobinuria and acute renal insufficiency in patients with electrocution

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Objectives: https://es.wikipedia.org/wiki/Mioglobinuria induces acute renal insufficiency (ARF) and might result in death by electric injury. Myoglobin causes reduced blood circulation through the kidneys where the reduced glomerular filtration already exists as a result of hypovolemia, as well as causing the entire obstruction of the renal channels. The objective of our study is to determine which clinical-pathological variables point to the occurrence of ARF.
Methods: The concentration of myoglobin in serum was determined by the CLIA method (sendwich chemiluminescence assay) on ADVIA Centaur in patients with electrocution, 12h upon hospital admission. In urine myoglobin was detected qualitatively. The examination included 28 patients that suffered electric shock who were hospitalized between the year of 2010 and 2015.
Results: Of all patients 18% had https://es.wikipedia.org/wiki/Mioglobinuria, while only 1 patient developed ARF. Logistic regression analysis proved that the following clinical-laboratory parameters correlate with https://es.wikipedia.org/wiki/Mioglobinuria: creatine concentration in serum, activity of creatine-kinase enzyme as well as the prehospital cardiac arrest, existence of deep burns. Utilizing the prediction model: positive when having ≥2 risk factor, can be significantly increased sensitivity of the method for defining patients at risk.

Conclusions: The patients with https://es.wikipedia.org/wiki/Mioglobinuria had little risk of developing ARF. This rule of prediction can be used as screening whereby patients would be put in two groups: those with low risk and those with the high risk of develop ARF, whose treatment requires a more aggressive therapy.

P056

Year 1: The new Helsinki Burn Centre, Igniting the flame

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Objectives: In January 2016, the Helsinki Burn Centre moved into a brand new facility and was unified with a previously existing general ICU. The new unit comprise a ten bed ICU and six bed Burn ward. The new national Burn Centre, part of the University Hospital, consists of four Intensive beds dedicated to burns patients, a burn ward, outpatient clinic, OT and rehabilitation unit, all situated on the same floor. The previous Burn Centre established in 1988, was only able to treat three intensive care and three ward patients at a time, insufficient to cover the entire country. Consequently some burn patients had to be treated elsewhere."
Methods: To firstly analyse the challenges posed by the unification of two different intensive care units. Secondly, to assess the results of interventions made to solve these problems.
Results: Major differences were observed between the general ICU and previous burn unit cultures. One major issue was the loss of very experienced burn nurses due to the new geographical location of the new unit. In spite of an increased workforce from 2 groups of 30 nurses to 85, following the loss of a third of the burn nurses, education became a key issue.In addition, solutions included: a coordinating nurse for the entire department and a specific burn care coordinator, unified protocols, specified orientation programs and task division such as wound care management and dialysis treatment.
Conclusion: After a year of acclimatisation this journey is far from over. The result of relocating the Helsinki Burn Centre to a new hospital has resulted in problems not anticipated. The learning process is gradual and new functional ways of caring for our patients have been found. Overall however, the moving of the Helsinki Burn Centre has been successful but there are numerous challenges still to be faced.

P057

The Impact of Major Trauma Network Triage Systems on Patients with Major Burns

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Introduction: Trauma is a leading cause of death and disability worldwide. Patients present-ing with severe trauma and burns benefit from specifically trained multidisciplinary teams. Regional trauma systems have shown improved outcomes for trauma patients. The aim of this study is to determine whether the development of major trauma systems have improved the management of patients with major burns.
Methods: A retrospective study was performed over a four-year period reviewing all major burns in adults and children received at a regional burns centre in the UK before and after the implementation of the regional trauma systems and major trauma centres (MTC). Comparisons were drawn between three areas: (1) Patients presenting before the introduc-tion of MTC and after the introduction of MTC. (2) Patients referred from MTC and non-MTC within the region, following the introduction of MTC. (3) Patients referred using the urban trauma protocol and the rural trauma protocol.
Results: Following the introduction of regional trauma systems and major trauma centres (MTC), isolated burn patients seen at our regional burns centre did not show any significant improvement in transfer times, admission resuscitation parameters, organ dysfunction or survival when referred from a MTC compared to a non-MTC emergency department. There was also no significant difference in survival when comparing referrals from all hospitals pre and post establishment of the major trauma network.
Conclusion: No significant outcome benefit was demonstrated for burns patients referred via MTCs compared to non-MTCs. We suggest further research is needed to ascertain whether burns patients benefit from prolonged transfer times to a MTC compared to those seen at their local hospitals prior to transfer to a regional burns unit for further specialist care.

P058

The first Full-Scale Care Process Simulation Training Course for the Management of Severe Burns

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Introduction: Training and simulation is key to the continuous medical education of health care professionals. Proper education is required to increase physicians' performance resulting in improved patients' outcomes. To im-

prove the treatment of burns, we aimed to establish an educational tool to simulate the acute care management of the severely injured.
Methods: With a size of 800 m2, The Medical Simulation and Training Center Styria offers, as one of the leading simulation and training facilities for healthcare professionals in South- and Central Europe, to simulate the management of severely burned patients. This environment is capable of mimicking acute and long-term burn care, as well as treatment procedures using a full-scale process simulation with high fidelity trainers.
Results: We developed a four-day burn injury training program, which simulates the entire process of burn patient management. Within The First Grazer Simulation Course for the Management of Severe Burns, all diagnostic, therapeutic, and logistic decisions will be simulated and trained, starting at the initial patient assessment and management at the emergency department, critical care transfer to the intensive care unit, surgical care in the operating room, to the post-operative management on the ward.
Conclusions: The First Grazer Simulation Course for the Management of Severe Burns could provide education, knowledge, and training for burn care providers. By improving technical and soft skills during the training, we aim to enhance physician performance and patient outcome.

P059

Re-Evaluation of the Online Presence of Burn Centers in Austria, Germany and Switzerland.

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Introduction: Websites serve as information and communication platforms and represent an important tool for the self-promotion of hospitals. In 2010 Selig et al. evaluated the online presence of burn centers in Germany, Austria and Switzerland based on 37 quality criteria. They found that most websites offered a good overview of the services provided by the hospitals. A significant need for improvement was noted in terms of specific information on burns, layout and usability. The aim of this study was to reevaluate the websites to assess their development over the past few years.
Materials and Methods: Within a period of 6 weeks (January - March 2017), the websites of the German-speaking burn centers were re-evaluated according to the quality criteria of Selig et al. divided into the following categories: “general information”, “information brokerage”, “research”, “teaching”, “patient care” and “key aspects of clinical treatment”. Particular attention was paid to specific information on burns. In addition, the implementation of social media platforms such as Facebook and Twitter was investigated.
Results: Overall, we noted an increase of quality of the websites compared to the first evaluation. Especially in the categories of “teaching” and “patient care” significant improvement was recorded. However, burn-specific information was still sparse. Social media platforms were often involved.
Discussion: Well-prepared content is an important quality feature of websites. The homepages of burn centers should serve the population as a medium for information and communication and must therefore be further developed. Furthermore, a clear structure and design of the websites can prevent long searches and lead to uncomplicated and fast information yield. The frequent implementation of links to social media platforms suggests that these have become an important medium for representing a hospital and especially for providing information.

P060

Emergency Management of Severe Burns (EMSB), implementation of the concept in Finland

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Objectives: Finland is sparsely populated large country with only one National Burn Centre located in Helsinki region. In Helsinki Burn Centre we noticed a need to develop more standardized care and guidelines for health care professionals treating severely burnt patients outside burn care facility. Emergency Management of Severe Burns (EMSB) course, originally developed by Australian and New Zealand Burn Association (ANZBA), was found to be the most suitable for Nordic countries. The objective of this presentation is to present the implementation of EMSB course concept in Finland.
Methods: First EMSB course was held in 2012 as a precourse of the Nordic Burn Meeting in Helsinki. The course was organized by Dutch Burn Foundation´s EMSB staff. The next step was to organize EMSB instructor course with in the next year by multinational EMSB staff. Subsequently a joint effort, EMSB Nordic was established in Finland and Norway in 2013. After instructor course, Finnish Burn Association got license to run independently Nordic EMSB courses under supervision of ANZBA. EMSB Nordic are directed by burn intensivist and staff consists of surgeons working with burns, anesthesiologists and burn nurses and the course is coordinated by a provider- and instructor certified burn nurse.
Results: Two courses are organized annually in Finland and participants have been from Finland, Norway and Estonia. Since 2013, 216 candidates have attended the course. All the courses are held by International EMSB staff, instructors attending from Norway, United Kingdom, Netherlands and Finland.
Conclusion: EMSB concept has so far been established

only in few European countries. It has proven to be suitable also for Finnish health care system, since EMSB and course can be adapted to each country´s specific circumstances. In Finland we have already seen the positive outcome in burn patient care.

P061

Video interaction guidance in Dutch burn care; the implementation in burn centre Rotterdam.

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Objectives: Burn injuries and their care are punishing experiences for hospitalized children. It is thought that if nurses have more skills to interact with children during recurring medical events, like wound dressing changes, these would be less distressing and painful. To modify interactional behaviour, video interaction guidance (VIG) can be used. With VIG, adult-child interactions are filmed and edited to produce a short film. In subsequent video review sessions, the interaction is discussed and, focussing on the positive, feedback is given. A recent pilot study showed that interactional behaviour during wound dressing changes did change as a result of VIG and was associated with the (dis)comfort of the child. To gain further evidence on the effect of VIG, it was introduced in a different Burn Centre.
Methods: At the burn centre Rotterdam eleven nurses were randomly selected and allocated to receive VIG (4 nurses) or not (7 nurses). Of the nurses receiving VIG, 3 wound dressing chances were videotaped before they received VIG and three after.
Results: A total of 76 dressing changes were videotaped of 11 nurses. All 4 nurses have completed their VIG training. They learned to look for the initiatives of the child, for the reaction of the nurse and what this reaction meant for the child. By recognizing this pattern, the consciousness of the nurse was triggered: what does the child tell you and what does it mean for the child to be heard. Questionnaires showed that trained nurses are unanimously positive about VIG. In addition, two persons working in Rotterdam became certified VIG trainer.
Conclusions: The implementation of VIG in Burn centre Rotterdam was successful. The formal study regarding its effects on the interaction between nurse and child (process) and the distress of a child during wound care procedures (outcome) will be completed this summer.

P062

The Epidemiology and Management of Electrical Burns in Cairo University Hospital between the years 2010-2015

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Objective: This study attempts to show the prevalence of electrical burns in our burn unit and the epidemiological difference between high and low voltage injuries. It comprises retrospective study including the years 2010-2014 and prospective study of the year 2015.
Methods: The retrospective study is more of a statistical analysis of number of electrical burn patients and mortality rate, while in the prospective study we were able to follow the patients, treatment process, response and outcome.
Results: In the retrospective section, 1233 burn patients were admitted ,118 were due to electric injury, 21 females, 25 high voltage burns, 44 cases of contact injuries, 83 flash burns, 5 cases of amputation and 13 mortality cases. In the prospective section in the year 2015, 277 burn patients were admitted, of which 15 were due to electric injury. Out of the 15 cases, 2 females, 13 males, 10 cases of high voltage burns, 14 cases of contact injuries, 1 flash burn patient, 6 cases of amputation and 2 mortality cases. Five patients got sterile repeated dressing with Silver Sulfadiazine cream, 8 patients got surgical interventions for coverage: 5 flaps (1 groin, 2 abdominal and 2 latissimus dorsi) and 4 grafts.
Conclusion: Electric burns are not common yet dangerous especially direct contact burns. Initial management may need ICU or CCU admission for neurological or cardiological life threatining conditions.Wound management includes dressing, debridement and escharotomy when needed. Definitive treatment will be grafts or flaps according to each case. Amputation may be limb salvage in low voltage type or radical in high voltage type. Early physical treatment and rehabilitation measures are core segments in the treatment process to limit the long term morbidity.
The definitive care of these patients should be delivered in specialized centers in order to maximize good long-term outcome.

P064

Treatment of Second Degree Burns with Lactic Acid Skin Substitute in Out Patient Setting- Pain and Patient Comfort

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Objective: A burn wound coverage has long been sought that, among other requirements, reduces pain, protects the fragile wound bed and minimizes the risk of infection during the healing phase of second degree burns.
The lactic acid skin substitute currently utilized in our burn center appears to meet the needs of pain control, wound bed protection and infection risk minimization.
Methods: Our burn center experience with lactic acid skin substitute spans 3 years treating over 400 patients with partial thickness thermal burns, ages ranging 8 weeks to 95 years old.
Under moderate sedation, Wounds are initially debrided, lactic acid skin substitute and petroleum based gauze is applied. Outer dressings and burn net are then applied.
The patient is discharged with outer layer dressing changes planned every 2-3 days. Over the next 6-14 days, loose edges of the skin substitute are trimmed as they separate from epithelialized wound margins until all has separated in the outpatient setting.
Dressing changes are easily taught to family members at virtually no pain.
Hospital LOS may be decreased as the need for IV pain control for dressing changes is reduced.
The lactic acid skin substitute is generally well tolerated at home.
The outpatient treatment will be described in detail in this presentation.
Results: Overall positive response from patients and families.
Our patients occasionally report the following disadvantages:
1) Itch beneath dressing toward the end of the healing phase, 2) unable to shower, 3) unusual color changes in bilayer as healing progresses which are inconsequential and rarely 4) uncomfortable warmth of dressing.
Conclusion: The lactic acid skin substitute provides a relevant option in the treatment of partial thickness burns.
Most patients and their families welcome the prospect of a “no touch” wound care system as well as decreased need for opiate pain control and dressing materials.

P065

Epidermal Skin grafting ‘CELLUTOME™ in Burns and Plastics Patients with Chronic Wounds

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Chronic wounds continue to present a significant challenge to healthcare providers. For a majority of patients wound healing is straightforward, however some patient healing can be prolonged and require split skin grafts (SSG). SSG have long been the ‘gold standard’ of care but have not gained favour in the treatment of chronic wounds for a multitude of reasons; including creating a second wound in a patient with poor wound healing. Epidermal grafting is a minimally invasive treatment using nominal amounts of autologous tissue offering a viable option and an alternative to autograft in these challenging wounds. Herein we report our experiences of using the ‘CELLUTOME™ for patients that present with these challenging of wounds.
Epidermis was harvested and the cells transferred to the recipient site using Mepitel©. Patients were reviewed weekly, photographs taken at each appointment to assess healing.
Patients wounds ranged from 4 weeks to 4 years. Prior treatments had included split skin grafts, Pelnac© and Integra™ Wound types ranged from ulcer, surgical wounds, phlebitis and burn wounds. Age ranged from 40-92 years. Comorbidities included hypertension, osteoarthritis, MS, gout, vascular disease and heart failure. Healing time ranged between 7-10 weeks. 2 of the patient’s required further surgical interventions. Donor healing occurred in all patients in the first week without complications. No donor pain reported. Patients reported minimal discomfort from the treatment. The treatment varied between 8-45 minutes, depending on the time taken for the device to raise the epidermis.
The ‘CELLUTOME™ is a minimally invasive procedure requiring no pain relief and carried out in an outpatient setting. The procedure is simple, relatively quick and effective in treating patients with chronic wounds. This novel technique could be used as an alternative treatment for some patients with chronic wounds allowing the clinician a treatment option when only the epidermis is needed.

P066

Nutritional screening in minor burns

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Objectives: Nutrition is important to optimize wound healing and is a cornerstone in burn care. This holds also true for minor burns but is frequently overlooked. Can we identify patients with nutritional difficulties after minor burns (< 20 % TBSA) through nutritional screening of outpatients?
Methods: To identify patients with nutritional difficulties, a dietitian screened patients at follow up visits to our outpatients’ clinic. Screening for malnutrition, unhealthy eating habits, and assessment of nutritional intake were conducted. Patients received a “cost-index score” according to their eating habits: (0-4: considerably unhealthy, 5-8: borderline, 9-12: healthy). Nutritional screening and assessment resulted in a nutritional diagnosis.
Results: As of today 7 patients, age 19-76 years old (median 44 years), TBSA 0,4-13 % (median 1%, mean 4%) were screened for nutritional status.
Of these 7 patients 5 (70%) received a nutritional diagno-

sis (2 with considerable unhealthy eating habits, 2 with borderline unhealthy eating habits, and 1 with healthy eating habits). The patients with a nutritional diagnosis showed that 3 had “Inadequate protein intake” (whereof 1 had eating difficulties post burn injury), 1 “Inadequate protein-energy intake”, and 1 “Limited food acceptance”. The patient with “Inadequate protein-energy intake” was found to be in risk of malnutrition.
The remaining two patients were identified as having “No nutritional diagnosis at this time”. They also scored the highest on healthy eating habits, had no risk of malnutrition, or eating difficulties.
Discussion/Conclusion: The role of nutrition in the management of minor burns is often overlooked. This minor screening of 7 outpatients identified that approximately 70% of them needed nutritional intervention. To us this confirms that nutritional status is often overlooked in minor burns as these patients normally do not receive any nutritional intervention. Screening for malnutrition and unhealthy eating habits tends thus to better identify those requiring further nutritional intervention.

P067

Journal Club - not just for doctors
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Introduction: Journal clubs are where a group of individuals meet to critically evaluate appropriate literature in their field of interest. In relation to healthcare, journal clubs usually occur to bridge the gap between research and practice through discussion of evidence based care.
While journal clubs are common practice in the medical profession, they are less prevalent within other healthcare disciplines. In order to improve the standard of care and cohesiveness within the burns multi-disciplinary team (MDT), a journal club was developed which aimed to improve cohesiveness and facilitate best practice and patient care provided by the team.
Method: Members of nursing and therapy staff attended bi-monthly meetings to discuss articles of interest which covered all areas of burn care. The selected articles were not discipline specific but covered areas of burn care where the nursing, physiotherapy and occupational therapy teams were involved.
Results: Journal club members were able to review current literature and utilise the findings to devise standard operating procedures to enhance patient care and experience. It is found that through adopting best practice based on the latest evidence the overall standard of patient care is improved. One specific example of practice improvement was the implementation of strategies to formally record burn associated pruritus. This resulted in an increased awareness and lead to the development of a formal pathway to manage burn associated pruritus.
Discussion: The development of MDT journal club has helped improve the working relationship between the members of the MDT and allowed an increased awareness of non-medical issues associated to burn care. This has enhanced overall patient care and has increased the team cohesiveness.
There is a lack of journal clubs for non-medical members of the multidisciplinary team. A newly developed MDT specific journal club has an overall positive effect on patient care.

P068

Growing our paediatric burn care service; staffing, standards and peer review
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Objectives: In 2011 the Children’s burn service separated from the adults to become a dedicated 5-bedded unit. Initially there were 2.6 WTE (whole time equivalent) children’s burn nurses and 1.0 WTE play specialist, with an additional 3 WTE general paediatric nurses. At this level of staffing the service was considered unsafe. This poster will review the procedures taken to address these issues and provide a service compliant with the National Burn Care Standards (2013).
Methods: Concerns about staffing levels were highlighted externally and following a meeting with hospital management an increase in staffing levels was approved and two nurses were rostered per shift instead of one.
Standards for Burn Care were introduced in 2013, giving further impetus to our concerns. A self-assessment of the service was completed demonstrating compliance against the standards which was followed by a peer review.
Results: The Peer Review Report was positive, but expressed serious concerns regarding staffing levels which added support for further recruitment.
Additional funding enabled the service to expand by 3 further WTE nurses, a ward clerk and clinical nurse specialist.
Discussion / Conclusion: The original staffing establishment was based on historical data. However, since 2011 the paediatric burn service has experienced a five-fold increase in the number of referrals, partly because of national recommendations.
Initially, formal training and education were neglected, compounded by ever-increasing patient numbers. A programme of training is now in place, allowing staff to complete an accredited burns course and the EMSB.
Financial constraints within the NHS have led to more a stringent requirement to demonstrate the reasons underlying requests for additional resource. Our experience of engaging constructively with internal trust management, our burns network, as well as the peer review process based on national standards, indicates that positive change is achievable even in times of austerity.

P069

Nursing procedure in the treatment with Nexobrid and coordination with multidisciplinary team

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Objective: Nexobrid® contains a mixture of enzymes and is indicated for the removal of eschar in adult with deep and full thickness thermal burns, a process also known as debridement. Our objective is the development of the procedure implantation in the burned unit as a coordinated and effective form.
Methodology: The patients will be selected by plastic surgery depending on the protocol of the use of the product, characteristics of the injury and conditions of the patient.
Results: In the actuation during the emergency will be carried out an indication of possible treatment with Nexobrid® by plastic surgery department, starting the process of decontamination of the injures.
Then, we coordinate with intensivist (intubated patients) and/or anesthesia in the rest of patients to start the analgesia and sedation needed for the application of the product, which can be made from two hours after the decontamination.
Nursing apply the product in the times of execution established of way coordinated with the others professional and will be the responsible through their care of maintenance optimum of them tissue result in of the debridement enzymatic.
Conclusion: Nursing is the key in the execution of the treatment, coordination of the different specialists and care of the tissues in the cure process.

P070

Burn wound Irrigation Tubing: A Technical Tip for preparation

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Introduction: Several burns dressings require intermittent irrigation to keep them active. Often the irrigation tubing is simply made from intravenous infusion tubing by haphazardly cutting holes in the tubing with a pair of scissors. We aimed to determine how effective this technique is and to determine what technique creates the optimum distribution of irrigation fluid across the dressing.
Method: I.V. giving set with 3mm diameter at 80cm length of tubing was prepared using varying techniques. Fenestrations were made using traditional method of cutting holes 2-3mm diameter with scissors, vertical scalpel slits, and puncture holes using G14 – G 24 gauge cannulas at 1, 2 or 3 inch intervals. The tubing was then wrapped around a human model with dressings mimicking those used in clinical practice. Betadine solution was then injected into the tubing with upkeep of betadine on the dressings reviewed.
Results: The study found with fenestrations made using scissors, the betadine solution pooled at the start of the fenestrations along the tubing, preventing adequate distribution. When using 2 G16 calibre holes at 2 inch intervals along the tube we found the most satisfactory distribution of irrigation fluid. When the perforations were made at 1 inch intervals this prevented a sustained pressure flow to provide adequate distribution throughout the length of the tubing.
Conclusion: Bernoulli's Principle states that as the speed of a moving fluid increases, the pressure within the fluid decreases. So, decreasing the size of the holes, lets less water through the holes, thus building up the pressure, with increased pressure the water flows faster. A balance is to be made between the number of fenestrations in the tube, their size and distribution in order to maintain adequate pressure. With this information at hand future use of irrigation fluid application to burns dressings can be made more efficient.

P071

Implementation of a pain protocol including hypnosis in a burn centre: the training program

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Objectives: The aim of this study is to present the educational program we used to implement hypnosis in our burn centre as part of our pain management protocol. The project will be described with respect to aims, conceptual framework, structure, target groups, teaching themes, and experiences.
Methods: In connection with other local professional environments promoting clinical hypnosis, we implemented a multidisciplinary educational program to integrate hypnosis and comfort talk into our pain and anxiety management protocol. The educational program (3 days of theoretical classes and 4 days of practical supervision) was targeted on all the professionals involved in burn care in our burn centre. Additional non-mandatory workshops were planned on a weekly basis.
Results: Between May 2015 and March 2017, more than 50% of professionals of our burn centre (including nurses, physiotherapists, plastic surgeons and anaesthesiologists) participated in the hypnosis educational program. After the course, all participants declared a high level of satisfaction and claimed an understanding of the importance of communication and the use of therapeutic language in the clinical practice. Some reported the integration of hypnosis in their clinical practice as challenging.

Discussion/Conclusion: Burn patients suffer daily from pain and anxiety related to procedures (dressing changes, wound cleansing, physical and occupational therapy).
On the basis of international guidelines, pain treatment should include pharmacological and non-pharmacological strategies. In particular, hypnosis has been proved to be effective in pain management and have a tangible impact on the patients'outcome, reducing costs as well. Development of specific training programs may be an important contribution to its implementation.

P072

Material for Burn Victims in the Battlefield

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Objectives: Demonstrate that minimal material for treating burn victims are equally as effective.
Démontrer que des ressources matérielles simples pour la prise en charge des brulés sur le champ de bataille peuvent être aussi efficace que des moyens honnéreux
Methods: Show that what is generally used in a civilian context is rather cumbersome and that "minimalism" as often practiced by the military, is equally as effective.
Décrire les moyens de réponses conventionnels et déterminer sur base de restriction de poids et de volume quel moyen reste le plus efficace pour les premiers soins des brulés sur le champ de bataille pour les militaires
Results: Military minimalism – due to mobile restrictions – has nonetheless come up with efficient ways of dealing with burn victims. Avec des moyens limités, la prise en charge primaire des patients brulés sur le champ de bataille peut être aussi efficace qu'avec des moyens moins limités dans la vie civile
Discussion/conclusion: An exchange/dialogue related to nonconventional experiences in the medical field.
Échange des différentes expériences liées aux situations non conventionnelles

P073

The Brussels Terrorist Attack (22 March 2016): The Job of Military Anesthesist Nurse

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Objectives: Describe the routine functional adaptation of the military anesthetist nurse during a massive influx of victims.
Methods: Describe the ordinary day of a military anesthetist nurse. Decribe the changes that took place during the attacks
Results: The adaptations indicate that the use of a military anesthetist nurses in an unconventional context decreases the otherwise considerable strain on medical personnel in specific hospital sectors.
Discussion/conclusion: The close colaboration and trust between doctors and military anesthetist nurses (due to their experience and knowledge with burn-victims and injuries commonly associated with combat) allowed for a rapid and effective response as resources began to dwindle.

P074

Analysis of nurse dependency of burn patients using national burn injury database information

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Objective: To analyse the nurse dependency data in the International Burn Injury Database (iBID) to see how it can be used to inform workload measurement, quality of care and establish optimal staffing levels.
Methodology: An exploratory statistical analysis of the iBID database, using a correlational design in order to measure the degree of association and prediction between the variables relating to burn severity and nursing activities. This data has been collected from the burn units and burn centres in England and Wales since 2007.
Results: Five workload measurements have been used to formulate a nurse dependency total for each patient every day that could be used as a burn workload model. This presentation will describe the initial results of correlation between this nurse dependency model totals and burn severity variables such as location of care, TBSA, age and outcome.
Discussion: Concerns over balancing nurse staffing levels with patient acuity is not a new phenomenon yet there continues to be difficulty in quantifying workload and the subsequent number of staff required for good patient outcomes. One of the reasons for this could be that there are few suitable and validated nurse dependency tools available to predict or support staffing levels. Those in use in the UK do not address the specific challenges of patients with a burn. The results to date show that there is a complex relationship between the nursing workload measurements described here and burn variables.

P075

Non Medicinal Pain Treatment for Infant Burn-Victims While Dressing the Wound.

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Objectives : 1) Improve the treatment and atmosphere for

infant burn-victims 2) Integrating distraction methods for painful care 3) Gaining the confidence of children so that their treatment apprehensions are decreased.
Method: I chose a simple quantities and qualitative method. This study is an adapted approach as it deals with a subject insufficiently explored and analyzed. Seemingly, only anesthetics are used to decrease pain, but clearly they are not enough. I look into some American studies on the subject and discovered a distraction matrix associated with anesthetics. This allowed me to see how much time was offered by mental distractions and if these distractions can effectively decrease pain. To realize this study, I used virtual reality goggles in combination with gaming apps. (It goes without saying that the application of the gear avoided injured areas.)
Result: I tested this digital distraction on eight children between the ages of 3 and 12. The distraction test considerably decreased the pain of 5 children in 8.
Conclusion: This distraction test only works if the child has received proper pain treatment and if he allows himself to be " carried away " by the game. If the child is afraid or anxious the digital distraction will not work properly. Additionally, the parents have a very important role to play. If the parents are anxious themselves, the child is affected and will not be in the right state of mind to be distracted.

P076

Recent trends in burn epidemiology worldwide: a systematic review.

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Introduction: Burns are more prevalent in societies with lower economic standards and in less developed regions. Incredible socioeconomic advances of the past decades should therefore have placed the worldwide burn incidence in a downwards trend. The aim of this review was to assess the worldwide development of burn incidences during the past two decades.
Methods: The pubmed database was searched for literatury by using the key words "burn", "thermal", "injury", "epidemiology", "trend", "tbsa", "size", "depth" and "mortality". Articles were drafted and only original communications published from 2001 onwards that reviewed a period of at least 5 years were included into further analysis. Development of burn incidence, injury severity (size and depth) and mortality rates were assessed. Socioeconomic development status of each paper's country of origin was assessed according to the human development index.
Results: A total of 46 studies could be found. The absolute majority of studies were from very high income countries (n=32, 69%), fewer from high income (n=10, 22%) or intermediate income countries (n=4, 9%). There were no studies from low income countries. 26/30 (87%) studies described a downwards trend of burn incidence, 4/30 (13%) saw no trend. A decrease of burn severity was described in 15/17 (88%) studies, 2 (12%) reported no trend. A decrease of mortality was described in 22/27 (81%) studies, remained static in 4/27 (15%) and increased in 1/27 (4%).
Discussion: Overall there has been a decrease of burn incidence, burn severity and burn mortality in the past two decades. It would be overhasty to speak of a worldwide trend, since no studies from low income countries could be found. Hence studies on burn epidemiology should be done especially in low income countries.

P077

Equity in medical interventions between female and male patients in Swedish Burn Care

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Background: Disparity between male and females in medical treatment has been noticed worldwide. It is generally difficult to determine if this disparity in use of health care resources depends on gender-related discrimination or differences in medical condition and illness severity. The burn trauma population provides an excellent trauma model with a common cause of injury and a measurable impact of injury, the total surface area burned % (TBSA%). The aim of this study was to investigate potential differences between males and females in medical interventions.
Methods: All patients admitted for burns during 2000 – 2015 were included. Daily recordings of the therapeutic intervention using the "Burn Scoring system (BSC)" analysed with a multivariable regression model for panel data to adjust for age, TBSA %, and in-hospital mortality.
Results: The 1363 included patients generated a total of 22,301 in-patient daily recordings. Age was (median) 33 years (10 - 90 centiles: 1-72), 70% were male (930 of 1363), and crude mortality was 5.1%. Unadjusted mean difference of daily BSC recordings was higher in the male group as compared to the female group ($p < 0.001$), but sex was not an independent factor for daily BSC points after adjustment for age, TBSA %, and in-hospital mortality (model R^2 0.60, $p<0.001$).

Conclusion: Equity of interventions between male and female patients has been validated, using a burn based trauma model in Sweden.

P078

Mortality among patients with Baux score less than 100: a retrospective descriptive cohort study

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Introduction: Baux score (sum of age and percentage total body surface area burned, TBSA%) is the strongest predictor for mortality after burn injury. Baux score more than 100 is traditionally associated with a high mortality rate. There is however a small group of patients with Baux score less than 100 who die during burn care, and we aim to explore them.
Methods: All patients admitted during 1993-2015 to our centre for burn care were included (n=1946) in this retrospective descriptive study. The main study group consists of those patients who died with Baux score below 100 (n=23), and their medical charts were thoroughly examined for cause of death and co-existing causes.
Results: Crude mortality was 4.8% (93/1946), and 25% of the patients who died (23/93) had Baux score less than 100 with a min-max range of 64-99. In this group, flame burns was the cause for admission in 18 of the 23 cases (78%), median age was 70 years (46-84 years), TBSA was 20.5% (5.0-40.5), full thickness burn 7.0% (0-27.0), duration of hospital stay 11 days (3-41), and 18 of them (78%) required treatment with mechanical ventilation. The main causes of death were cerebral diseases in 9 of the 23 patients (39%), cardiovascular diseases in 6 cases (26%), respiratory failure in 2 cases (less than 1%) and other organs failure in 6 cases (26%).
Conclusion: Patients with burns who died with low Baux score are a small and heterogenic group and therefore it is not possible to predict them.

P079

Enzymatic burn wound debridement with NexoBrid®: Simulations of Total Treatment Costs and Comparison to SOC

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Objectives: NexoBrid® is a non-surgical, enzymatic tool for selective burn wound debridement providing advantages vs. surgical standard of care (SOC). This empiric cost study compared treatment cost of NexoBrid®-based treatments and SOC, and analysed the cost impact of improved burn wound care using NexoBrid®.
Methods: The analysis is based on two different cost simulation models. Based on the results of a randomized phase III trial and costs specified in the G-DRG system, the Average Outcome Model (AOM) compares total costs of NexoBrid® based treatments vs. SOC to determine cost saving potentials. In the Defined Patient Model (DPM) distinct burn wound treatment pathways in clinical practice were assigned to actual treatment costs to allow economic considerations.
Results: Using NexoBrid® cost savings are inversely related to the treated TBSA (1-15%) and directly related to the savings in burn centre stay (up to 6.5 days) (AOM). Based on quantitative and qualitative aspects, ¾ of all cases in the range of 5-15% TBSA are in favour of NexoBrid®. Main cost drivers are LOS and ICU stay (45-80% of total costs). NexoBrid® becomes a more powerful cost driver with increasing TBSA treated. If NexoBrid® completely substitutes for SOC, total cost per patient can be reduced by nearly 30% (5% TBSA treated) or are in the range of SOC costs (15% TBSA treated) (DPM).
Conclusion: Cost advantages using NexoBrid® emerge in cases with low or medium burned TBSA when costs for enzymatic debridement remain below SOC. Even in severe cases (15% TBSA burned) total costs of NexoBrid®-based pathways do not exceed costs of SOC pathways. Additionally, enzymatic debridement using NexoBrid® can be successfully applied as a strategic tool in order to reduce surgical procedure time and OR room capacity. Beside these quantitative aspects, qualitative improvements of burn wound care influencing overall economic efficiency must be considered.

P080

Bloodstream infections in patients with major burns requiring intensive care in the Vienna Burn ICU

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Objectives: Severely burned patients are at a high risk of developing infectious complications. To identify organisms that cause BSI over an 11 years period we conducted a single-center retrospective cohort study at the ICU for burn trauma of the General Hospital of Vienna, Austria.
Methods: A retrospective single-center cohort study was performed on 472 patients admitted to the Burn Intensive Care Unit of the General Hospital of Vienna between 2003 and 2014. Statistical analysis was conducted by competing-risks regression by the method of Fine and Gray.

Results: 177 pathogens (gram-negative bacteria: 78/171, 46%, gram-positive bacteria: 69/171, 40% and fungi: 24/171, 14%) were detected in blood cultures of 119/472 (25%) burn patients. A greater total burn surface area (TBSA) and abbreviated burn severity index (ABSI) were associated with a significant higher incidence of bloodstream infections (BSI) caused by Pseudomonas *spp.* (p<0.001, p<0.001), Enterococcus *spp.* (p<0.005, p<0.001) and Candida *spp.* (p<0.001, p<0.001). The incidence rate of BSI caused by multi-drug resistant bacteria in our burn ICU was in 2006 (1/51, 2%), in 2007 (1/41, 2%), in 2008 (1/33, 3%), in 2009 (3/38, 8%), in 2010 (0/38, 0%), in 2011 (1/52, 2%), in 2012 (1/27, 4%), in 2013 (1/37, 3%) and in 2014 (2/26, 8%). Before 2006 there were none (Table 3). A considerable number of patients diagnosed with multi-drug resistant bacteria were transferred from aboard (5/11, 45%). The mortality rate among patients suffering from BSIs caused by multi-drug resistant bacteria was 5/11 (45%) and in 3/5 (60%) patients the fatal bacteremia was caused by multi-drug resistant Pseudomonas aeruginosa.
Discussion/Conclusion: Despite a relatively high overall in-hospital survival rate, the results of the current study demonstrate that multi-drug resistant bacteria represent a growing threat for burn patients.

P081

Risk factors for blood stream infections caused by Pseudomonas aeruginosa in severely burned patients

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Objectives: Despite great advances in burns medicine, major infections among severely burn-injured patients remain as a limiting factor for successful treatment in burn medicine. Previous investigations revealed especially high morbidity and mortality in severely burned patients caused by Pseudomonas aeruginosa bacteremia. We aimed to identify risk factors for blood stream infections with Pseudomonas aeruginosa in severely burned patients.
Methods: In our retrospective, single center cohort study, we assessed patient data of 490 patients admitted to our Burns Intensive Care Unit of Vienna´s General Hospital from 01/2003 to 12/2014.
Results: In 21 (4,3%) patients Pseudomonas aeruginosa was found in microbiological blood analysis ("study group"). A greater TBSA (50% versus 30,7%) and ABSI (9,9 versus 7,7), a higher rate of kidney failure (p<0,001), gastrointestinal complications (p=0,006), and number of surgical procedures (4 versus 1) characterized those patients. A significantly higher number of Pseudomonas-isolation in wound swabs (p=0,006) and CVC-infections (p<0,001), were present in the study group. The overall mortality was greatly increased among Pseudomonas-positively tested patients (9/21, 43% versus 101/469, 21,5%) as well as the length of ICU stay (71 versus 27 days). International patient transfer correlated significantly with Pseudomonas BSI (4/21, 19% versus 18/469, 3,8%, p<0,001). In 4 patients, episodes of multiresistant Pseudomonas aeruginosa occurred in 2013 and 2014. These cases showed no chronological connection to each other, transmission within the Burn Unit could be excluded.
Discussion / Conclusion: Our data suggest that high TBSA and ABSI, prior isolation of Pseudomonas in other sites and international transfer pose high risk for development of Pseudomonas-Bacteraemia. We could not show correlation of age, sex, or national patient transfer with acquisition of Pseudomonas-BSI. There was no transmission of multiresistant Pseudomonas aeruginosa within our BICU so far. Strict hygiene standards and close surveillance will remain crucial in the future.

P082

Bacterial and Antimicrobial Susceptibility Profile, and Prevalence of Sepsis Among Burn Patients at the Burn Unit of Cipto Mangunkusumo Hospital

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Background: Infection is major cause of mortality and morbidity among burn patients. Effective measure of reducing infection is routine monitoring of the bacterial infection and antimicrobial susceptibility patterns at burn unit. This will help in creating burn center-specific protocol for empirical antibiotic therapy.
Method: A retrospective, descriptive study was conducted in Cipto Mangunkusumo Hospital (RSCM) Burn Unit between September-November 2016. The data collected include bacterial isolate culture, antimicrobial susceptibility spectrum, and the number of burn patients diagnosed with sepsis.
Result: 36 patients were identified with bacterial pattern changed continuously between *Klebsiella pneumonia* (17%), *Pseudomonas Aeruginosa* (12%), and *Acinetobacter baumannii* (11%). High resistance rates are found in 10 antimicrobials spectrum, particularly cephalosporin. Only Carbapenem, Aminoglycosides and Tigecycline are sensitive to these bacteria. Fourteen patients were diagnosed with sepsis (38,9%), 10 were deceased. Two major sepsis-causing bacteria were *P. aeruginosa* (33,3%) and *K. pneumoniae* (28,9%).
Conclusions: Etiologic agents of burn infection in our setting alternated continuously every month. Almost all bacterial isolates are classified as multi-drug resistant, with high resistance rates to our empirical therapy (ceftriaxone) leading to outbreak of sepsis and mortality rates. Combination of Carbapenem (Imipenem, Meropenem and Doripenem) and Aminoglycosides (Amikacin) are selected as empirical therapy.

P083

Mortality and Causes of Death among Burn Patients at the Burn Unit of Cipto Mangunkusumo Hospital

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Background: All around the world, burns are considered one of the important causes of disability and mortality. We present an investigate and analyses the causes of death after burn injury, to evaluate our burn unit and in an attempt to improve standards through a greater depth of understanding the trends in mortality in our service.
Method: A retrospective study method which collected the data of burn-injured patients who died between January and December 2016 in Cipto Mangunkusumo Hospital Burn Unit.
Result: Thirty-four patients were died in RSCM burn unit (23,3%). average age was 40,08 years. Most victims are male (n=22; 64,7%), average length of stay 14,1 days, 4 patients were diagnosed with inhalation injury (11,8%), 32 patients (96%) have extent of burns over than 20% TBSA. The most common cause of burn due to flame (n=29, 85,3%). MOF was the primary cause of death (n=31; 91,2%). *Pseudomonas aeruginosa* was the most common organisms isolated from burn deaths patients (n=14; 45,2%).
Conclusion: The major cause of burn death in our unit was MOF with the primary trigger of sepsis, which concurs with current literature.
Keywords: Cause of death, mortality, burns.

P084

The Influence Of Predictive Factors On Survival Rate Of Burn Patients: Analysis Of 693 patients

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Objectives: Traditional predictive factors, like %TBSA or patients' age, are essential determinants of mortality risk among burn patients. The aim of this study was to evaluate additional predictive factors that influence the outcome of burned patients at the Dr. Stanislaw Sakiels' Centre for Burn Treatment in Siemianowice ÅšlÄ…skie, Poland.
Methods: All burned patients admitted between 01.01-01.06.2015 were included to analysis. Five models of Cox proportional hazard risk were created. A model consisting of all parameters was chosen.
Results: It was shown, that sex does not influence patients' survival, however, one year increase of age results in 3,2% increase risk of death. An even more significant impact on surviving rate of patients is linked with burn area – risk of death increase 1,47 times for each 20% of burn surface. Type of burn isn't a predictive factor. Performing early excisions in the study group did not influence overall survival. Unsuccessful outcome increased 0,5 times with every consecutive surgery. Patients who underwent limb amputation are at risk of death 1,8 times higher than patients with no amputation. Patients, who due their general health condition had to be admitted to the ICU, were at 9,3 times higher risk of death compared to patients hospitalized in surgery wards. Blood transfusion procedures did not influence patients' surviving rate. Rehabilitation and hyperbaric oxygenation as adjuvant therapies did not impact the risk of death.
Discussion: Despite the fact that age and burn surface are unchanged factors for treatment outcome, created models show that estimation of survival rates based on those two parameters is considered insufficient. ICU patients with burns exceeding 80% and patients who underwent limb amputation are at particular risk of death.

P085

Evaluation of the use of non-specific immunoglobins in burned pediatric patients

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Objective: To evaluate the use and follow-up of the administration of non-specific immunoglobulins (Ig) in burned pediatric patients.
Methods: Retrospective observational study, including all pediatric patients with >10% burned surface area (BSA), who were hospitalized between August 2012 and March 2016.
Different variables were registered: biodemografic data (sex, age, weight), burn data (mechanism and burned BSA) and Ig administration data (plasmatic levels, dose, date and number of administrations).
Results: Forty-eight patients were enrolled (28 male and 20 female). The median age was 2 years (8m-15y) and the median weight was 12kg (7,5-67kg). The 87,5% (42) of burns were caused by scald. The median BSA was 14,5% (10-50%).
Determination of IgG levels was made in 37 patients (77%). Twenty-two patients had below-normal levels and a median BSA of 20,5%. Patients with normal levels had a median BSA of 12%.
Non-specific Ig (400mg/kg) was administered in 52% (25) of the patients. Nineteen of these patients had below-normal levels before the first administration. Seven patients achieved normal levels of IgG (2 with BSA >20%) after the

first infusion but there were 4 patients (3 with BSA>20%) who still had below-normal levels. A new dose of Ig was administered in 3 of them. No IgG determination was repeated after the first infusion in 8 (42,1%) children.
Ig was not administrated in 23 patients. The determination of IgG was done in 12 (52,17%) patients and 3 had below-normal levels.
Conclusions: There is a positive correlation between the BSA and the depletion of immunoglobulins.
By analyzing the results, the authors recommend the determination of IgG levels 72 hours after burn in children with BSA>15%. Moreover, when Ig is administrated in patients with a BSA>20%, it should be necessary a new determination after a week.

P086

Telephone Survey of Electronic Cigarette Associated Burn Injury: A SingleRegional Burn Centre Experience.

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Introduction: Electronic cigarettes are devices that deliver a nicotine containing vapour and have been advertised as a healthier alternative to tobacco. Often used as nicotine replacement therapy, e-cigarettes are utilised to help with smoking cessation. Consequently, the use of e-cigarettes has become increasing popular. The health implications of e-cigarettes are not limited to the inhalation of the e-cigarette vapour and media reports have highlighted the risk of burn injuries as a result of their use.
Methodology: Following the discharge of six patients who had attended our regional burn centre with e-cigarette associated burns, a short telephone interview was conducted to see how the incident which led to their burn injury has altered their attitudes and behaviours towards the use of e-cigarettes.
Result: Response rate was 50%. All patients who responded had 4 or more weeks off work and had purchased their e-cigarettes from abroad or eBay sellers. They received no safety information from the seller or with the product packaging.
Although there were no reported long term disabilities or functional deficits, it was found that all patients complained of cold intolerance, pruritus of the burn and joint stiffness. All respondents continue to use e-cigarettes following their burn. All respondents have become more safety conscious and aware of the need to acquire their e-cigarette device from reputable companies. Following their accidents all had purchased new e-cigarette devices from high street vendors feeling that these products would have a higher safety profile.
Discussion/Conclusion: It is essential that safety information be included on e-cigarette packaging and a need to regulate the standard of these products through governmental legislations. Further regulation of e-cigarette standard and awareness of its potential harm through improper usage is essential with a nationwide effort in collecting e-cigarette associated data to improve the overall standard of care in similar injuries.

P087

Burn Index and Survival Probability of Patients with Massive Burns in China: A Multicenter Prospective Study

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This study was designed to investigate the epidemiological characteristics and evaluate burn index associated with prognosis of massively burned patients in China. A total of 2483 massively burned patients with no less than 30% total body surface area (TBSA) were enrolled in this study, 69.59% of them were males, the male to female ratio of 2.29:1. The mean age was 49.23±16.67 years, 67.34% of the patients were adults aged 15-59 yr. Most of the patients (78.82%) were admitted within 6 hours post-burn, The burn injuries caused by scalds and flames accounted for 81.07% and 14.61%, 18.80% and 66.89%, 20.80% and 74.31% in the age group of 0-14yr, 15-59yr and ≥ 60yr respectively. The mean TBSA of the patients was 42.1± 14.5%, and the mean BI was 39.75 ± 21.59. The case fatality rate (CFR) was 9.79%. The area under the receiver operating (ROC) characteristic curve for BI was 0.941 (95%CI, 0.929–0.954), and BI above a threshold of 41 showed the highest association with mortality of the cases. Multivariate logistic regression analyses showed that aged 60 and above, admitted after 6 hours post-burn (adjusted odds ratio, 1.663; 95% CI, 1.094–2.526; adjusted p =0.017), BI exceed 41 (adjusted odds ratio, 10.930; 95% CI, 6.895–17.328; adjusted p < 0.000) and combined with inhalation injury (adjusted odds ratio, 7.969; 95% CI, 5.033–12.617; adjusted p < 0.000) were significant independent risk factors for death of massively burned patients. Males, adults remain high risk population in massively burned patients. Scalds are the main cause of pediatric burns, while flames predominate in adults and seniors. BI of 41can be a crucial threshold for CFR in massively burned patient. Furthermore, more attention should be paid to patients in view of the increased risk of poor prognosis associated with this BI and other risk factors.

P088

Why and how I do use suprathel in burned patients

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Objectives: The use of skin substitutes after the mechanical, surgical or enzymatic debridement of a burn is crucial

to reestablish the skin barrier, for this we show our experience with suprathel.
Methods: Over almost 2 years he has treated with a dozen patients, both small and large burned, with different depths and mechanisms of cause with suprathel. The application is done directly in the bed (mostly Nexobrid) followed by a cure with Jelonet without the need for anesthesia since its application is not painful. We leave the cure for 5 days and then cure every 2 days with Prontosan or Clorhexidine.
Results: Complete epithelialization of most intermediate or deep burns is done within one month, with a minimal infection rate that was resolved in all cases with topical antibiotic cures in a few days.
Conclusion: Suprathel is very easy to apply, it does not produce pain to the patient, its cures are fast and do not need staple removal or stitches. It can be used in consultation, in the operating room or in the room of our unit. And its princeps indication are the hands and large burned according to our experience.

P089

Retrospective analysis of clinical data of last 3 months at Istanbul wound and burn center

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Objectives: We wanted to determine the patient profile of Kartal Dr. Lütfi KÄ±rdar Training and Research Hospital which is one burn center in Istanbul.
Methods: Patient data of last three months between November and March recorded. The data consisted of patient age, gender, duration of hospitalization, burn type, burn grade, burn percentage and burn area. The age groups were divided into 4 divisions: 0-14, 15-24, 25-64 and over 65 years. The subgroups of burn type were flame, scalding, electric, chemical, contact and hot oil burning. Burn grade divided into 4 divisions as grade1, grade2, grade3 and grade 4. Finally, the burn zones were examined in 6 parts; head, anterior body, posterior body, upper extremity, lower extremity, and multi-area.
Results: A total of 108 patients' records, 38 women and 70 men, with a mean age of 24.22±2.29 were reached. The mean duration of hospitalization was 10 days. 48% of burn cases were scalding, followed by flame burns with 35.2%. The least frequent type of burn was hot oil burn, which had a 0.9% rate. 66.7% of the cases had grade 2 and 31.5% were grade 3 burn. Mean burn percentage was 10.48±8.37. While 58.3% of the cases had multi-area burns, 1.9% of the cases had posterior body. While there was no difference in any of the parameters between the groups ($p>0.05$), there was a positive correlation between age and burn grade ($p=0.003$). It was found that the incidence of scalding burn increased when age decreased (0.016). Additionally, it has been determined that the scalding burns' length of hospitalization was greater than that of the flame burns ($p=0.043$).
Discussion: The most common type of burn was the scalding and it can affect the duration of hospitalization. As the age increased, there was an increment in the level of burns.

P090

Chemical injury: 4 years of experience with an advanced approach

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Objectives: Chemical burns are a specific kind of injury requiring customized therapy. A radical change in skin pH results in tissue damage, sometimes with potentially life-threatening effects.
Water is still considered to be the golden standard in emergency rinsing of chemical injuries but there are additional options involving hypertonic solutions based on amphoteric and chelating molecules. In March 2012 we started applying two varieties of the above-mentioned agents in the emergency management of chemical injuries. One agent is specifically intended for decontamination of hydrofluoric acid splashes.
The other solution is indicated for all further kinds of acid or alkaline splashing. Question remained if the modern solutions really made a difference.
Methods: We retrospectively compared emergency treatment of chemical injuries admitted in our hospital between January 1st 2008 and December 31st 2015. In the "control" group only water was used. In the "advanced approach" group, according to indication, the previously described hypertonic solutions were applied, possibly preceded by rinsing with water. Both research groups were statistically (SPSS 23) compared for composition (gender, age, burn cause, triage), need for surgery and days of hospitalization.
Results: 112 patients were included for statistical analysis, 66 in the "control" group and 46 in the "advanced approach" group.
As far as composition is concerned both research were comparable. Statistics revealed significantly less surgery ($p<0.0001$) and a significantly shorter hospital stay ($p=0.031$) in the "advanced approach" group when compared to the "control" group.
Discussion/conclusion: In our hospital, patients with chemical injury clearly benefited from the application of an advanced approach, involving hypertonic solutions based on amphoteric and chelating molecules, in the emergency treatment of this kind of trauma.

P091

Minimising blood loss and transfusion rates in patients undergoing major burn excision: 5-year results from a tertiary burns centre and a review of the literature

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Objectives: Burns surgery may lead to significant blood loss in physiologically compromised patients. Blood transfusions are associated with significant morbidity and costs, are not readily available in regions or countries without established blood banks, and may not be accepted by patients from certain religious or cultural backgrounds. A study was undertaken at our tertiary burns centre to test the hypothesis that early and total burn wound excision can be undertaken with low rates of perioperative blood transfusion.
Methods: Prospectively collected data from 1 January 2011 to 31 December 2015 were used to identify perioperative transfusions administered to intensive therapy unit (ITU) patients undergoing primary burn excision, and stratified by the percentage total body surface area burn (% TBSA). A literature search for "burn* AND transfusion" was undertaken using Pubmed on 1 January 2017, to provide baseline outcome data comparison and identify alternative approaches to minimising transfusion use.
Results: 49 (32.9%) of 149 consecutive ITU patients received a blood transfusion at the time of their first (total) burn excisional procedure. Rates were 19.1% in those with under 40% TBSA burns, compared to 36.4% in those with 40% or more (chi-squared test of difference, p-value=0.068). 419 papers were found using the initial search terms. Of these, 46 were relevant and included in our review.
Discussion / Conclusions: Intraoperative blood loss and transfusion rates can be minimised by using specific techniques (early total excision, infiltration, topical haemostatic agents and dressings, limb elevation and tourniquet use) and optimising both thermoregulation (e.g. operating table and overhead heaters) and coagulation (e.g. tranexamic acid). Additional methods include erythropoietin use, altered blood sampling regimens, non-surgical debridement, and haemostatic wound coverage techniques and dressings. By augmenting and refining these approaches, we hope to move closer to the ideal of major burn surgery without the need for allogenic blood transfusion.

P092

An overview of 16 years of admissions for electrical burns to Burn ICU of Papanikolaou Hospital, Greece

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Objective: This paper presents demographic data, morbidity and outcomes of patients with electrical burns who were admitted to a four bed Burn ICU.
Method: Using a sample of 36 patients who were hospitalized between 2001 and 2016 in the burns intensive care unit, we outline a retrospective study of our own experience. We had recorded and evaluated: the patients' ages, sex, nationality, socioeconomic status, mechanism of injury, coexistence of and extent of damage from thermal injury, surgical procedures/amputations, severity of the patients' conditions on admission and during hospitalization in the burns ICU (SOFA, APACHE II, SAPS II), duration of ICU stay, complications, duration of intubation, and respiratory support, and outcome.
Results: The 36 patients who had sustained electrical injuries made up 8.2% of all our burns ICU admissions. Of these, 92% were male, 3% < 15 years of age, 72% between 15 and 50, while 27% were over 50. Infection of the burn wound was the most common complication, but renal failure and amputation also presented serious problems. The mortality rate was 5.5%. (Two patients died from septic shock).
Discussion / Conclusion: Those with electrical burns make up a small percentage of the patients treated in the burns ICU. A low mortality was observed, the main cause of death being septic shock.

P093

Abdominal Complications after Major Burn Injury

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Introduction: Abdominal complications in patients with major burns without abdominal injury has been described. We identified this complication within our burns centre, both during acute resuscitation and later during the inpatient stay. We sought to define incidence, outcomes, and associated factors contributing to abdominal complications in major burns.
Methods: We examined all patients with abdominal pathology between November 2003 and May 2016. Data included age, gender, total body surface area burn, inhalation injury, disposition, length of stay, resuscitation volume, time from injury to diagnosis, vasopressors, and early tube feedings.
Results: Among 316 patients admitted to the Regional Burn Centre, 18 (5.7%) were diagnosed with abdominal pathology with mean burn %TBSA of 60 (range 40-95 %TBSA), of which 5 (1.58%) had abdominal catastrophe. 7 (2.2%) patients had upper GI bleeding, 6 (1.9%) patients

had paralytic ileus, 5 (1.58%) patients had small bowel infarction / perforation and 1 patient developed pancreatitis. All but two cases were due to flame burns. All patients were formally resuscitated on admission. 10 (3.16%) patients with abdominal complications died. Of the patients with abdominal catastrophe the mortality rate was 60%. 3 patients were taken to theatre for laparotomy with small bowel resection. 2 patients were not fit for surgical intervention. Average length of stay was 1.07/%TBSA. On average abdominal complications developed 50 days post injury, with abdominal catastrophe occurring on an average of day 16.
Conclusions: Abdominal catastrophe without abdominal trauma occurs in 1.58% of our population. Associated mortality was 60% without obvious cause. More aggressive monitoring for abdominal complications, intra-abdominal compartment pressures and earlier operative management may improve outcomes.

P094

A Retrospective Analysis of Complications of Patients Requiring Single and Multiple Site Escharotomies

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Objectives: Escharotomies are a mainstay of emergency burns care. Neck and chest escharotomies are performed to allow adequate ventilation and Limb escharotomies are performed to improve circulation in circumferential full thickness burns. This study aimed to review the outcomes and complications of Escharotomy patients within the burns population.
Method: A retrospective review was conducted of all patients who required escharotomies seen at a regional burns centre in the United Kingdom over a 10 years from 2006 to 2016. Patients were identified as all those listen with escharotomies on the international burns database. Number of complications and mortality outcomes were recorded.
Results: 116 patients were identified who required escharotomies ranging from 0.5-95% TBSA with a mean TBSA of 40.8%, 79.3% (92) of these had burns > 15%TBSA. Average patient's length of stay was 39 days (range 1-231). 77.5% (90) were male and 23.5%(26) were female. A total of 217 complications were collated from 116 patients. Overall there was a 31% (36) mortality rate. 80 patients received limb escharotomies only, with an average TBSA of 35%, patient to complication ratio of 1.62 and 22.2% (18) mortality. 6 had only chest escharotomies with average TBSA of 45.5%, complication ratio of 2.67 and 50% (3) mortality. 10 patients had chest and limb escharotomies with average TBSA of 73%, complication ratio of 4.3 and 70% (7) Mortality. 9 patients had neck, chest and limb escharotomies with an average TBSA of 80.2%, complication ratio of 2.78 and 77.8% (7) mortality.
Conclusion: The results show that patients requiring neck, chest and limb escharotomies have higher complication and mortality rate. Patients requiring chest and limb escharotomies had higher complication and mortality rates than patients requiring chest escharotomies alone. The results show that patients requiring multiple escharotomies have higher TBSA burns and complication rate.

P095

Studying educational and safety conditions of occupational injured victims in bur patients

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Introduction: Burn is one of the major causes of death and disability in the world. Occupational burn injuries are statistically high. Thus, in this study we examined occupational accidents with safety and education approach.
Materials and Method: This was a prospective cross-sectional study conducted in two years on patients of Motahari hospital. Available samples were selected. After accreditation of form they were examined as a pilot on 1000 patients and inserted into Kobocollect software. Data were collected through interviews. Questions about patients' demographic characteristics, epidemiology of burns and data on burn causes on education and socio-economic conditions and home, work, school safety were completed. The data output was analyzed by SPSS v. 21.
Results: Of 847 patients (2.5% female and 97.5% male, 10-66 years), 118 cases (13.9%) were work-related accidents. Thermal burn 79%, electrical 19.4% and chemical 1.6%. 68.6% had upper extremity burns and 48.30% had third and fourth-degree burns. In 52.1% of cases, safety tips had not been taught. Of these patients 39.8% did not have personal protective equipment and only 80% used protective equipment permanently. Nearly a third of workplaces (27.8%) were not equipped with fire extinguishers. In 30.2% of burns, equipment breakdown and in 75% improper use of tools caused injury. Of whom 75% were unaware of the breakdown and 73.4% claimed carelessness during their work.
Conclusion: The results of this study showed that lack of training and safety tools and non-compliance with preventive tips were the main causes of occupational accidents. This requires developing an educational program by specialists in occupational medicine, occupational health, employers and authorities.

P096

Impact of Air Fluidized Support on the Outcome of Patients with Posterior Thermal Injuries - the Viennese Experience

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Objectives: In extensive thermal injuries with posterior involvement early necrectomy and split thickness skin grafting of the back is notoriously difficult due to exposure of skin grafts to shear stress and pressure. An additional tool in the management of burn wounds is the air fluidized bed. The aim of this retrospective study was to evaluate the impact of air fluidized support on the outcome of patients with posterior thermal injuries.
Methods: All patients with TBSA ≥15% admitted to the Burn Intensive Care Unit of the Division of Plastic and Reconstructive Surgery, Vienna General Hospital, between January 2003 and December 2014 were included in this retrospective study. Demographical data, ICU records and surgical records were collected, and statistically evaluated in respect of different treatment regimens (air-fluidized bed versus conventional pressure reducing mattresses).
Results: A total of 349 patients with TBSA ≥15% were admitted to ICU between 2003 and 2014, 24 (6.9%) died within the first 3 days. Of the remaining 325 patients, 122 (37.5%) showed burn wounds of the back (IIb – III°); in 77 air fluidized therapy was applied.
Long-term survivors managed in the air fluidized bed had significant higher TBSA (median 50% vs. 25%), significant higher ABSI score (median 9.5 vs. 8) and delayed surgical therapy of the back (14 vs. 4 days after admittance) than patients managed with conventional pressure-reducing mattresses.
However, survival rates did not differ between the two groups (29.9% vs. 31.1%). Severe infections due to late necrectomy were not observed.
Conclusion: The use of air-fluidized bed therapy in patients with severe burns and posterior involvement allows to postpone dorsal necrectomy in favour of early ventral or extremity surgical treatment, resulting in the survival of patients with higher ABSI scores as compared to patients managed with conventional pressure-reducing mattresses.

P097

Are we Missing the Consequences of Blast Injuries in Burned Patients?

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Objectives: Recent military experience has allowed mild traumatic brain injury (mTBI) from blast to be investigated extensively with an acceptance that the resultant brain compression and tension may lead to cognitive and neurodegenerative disorders. Early detection and treatment may mitigate chronic sequelae. We reviewed our preparedness to deal with blast-injured casualties and existing treatment protocols to optimise care for this group.
Methods: A 6-year retrospective audit was performed of all patients admitted to a regional burns centre with a mechanism description of 'explosion' or 'blast'. Notes were reviewed to determine mechanism and magnitude of any potential blast injury. Patients were categorised into high, possible, and no risk of blast injury. The subsets were then analysed to determine whether neurocognitive deficits were present and how they responded to our existing treatment protocols.
Results: 384 patients met inclusion criteria. More than 75% sustained trivial injuries with no risk of blast injury. Of the remaining 25%, 15% were possible and 10% high risk. The high-risk category did not show statistically significant differences in mortality or in-patient stay. Neurocognitive deficits were identified in most patients in the early stages of admission but it was difficult to differentiate these findings from the critical care derangements common to burn-injured patients.
Discussion and Conclusions: The identification of patients sustaining a true blast injury is almost impossible from current iBiD datasets. The number of civilian blast-injured patients managed in a regional burn centre is small, however, they represent a population at risk and should be identified if recognised treatment options exist. We propose a scoring system to assist with national data recording, discuss emerging technologies for diagnosis and describe how this can be integrated into modern burn care.

P098

The prevalence of Dysphagia at the burned service

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Objective: To determine the prevalence of dysphagia in patients at the burned service of the HUAP.
Material and methods: A descriptive cross-sectional study that took into consideration patients and survivors at the HUAP Burns service, with hospital stay between June and November 2015 (49 patients). Twenty-four patients met the inclusion criteria: head and neck burn, intubation (OTI)> 48 hrs, inhalation injury, presence of TQT and complaints expressed by the patient, family or team members. Patients with neurological alterations and / or swallowing disorder background (1 patient) were excluded, leaving a final sample of 23 patients.
The variables studied were: dysphagia, dysphagia sever-

ity, head and neck injury, inhalation injury and presence of OTI.
Background and clinical assessment of swallowing by a speech-language pathologist were collected. Data were stored in an Excel spreadsheet and analyzed with the statistical program SPSS 22.0.
Results: 65.2% of the 23 patients had dysphagia (n = 15). The degrees of dysphagia were: 33.3% mild to moderate, 26.7% mild; 20% moderate; 13.3% moderate to severe, and 6.7% % severe.
Conclusion: A wide prevalence of dysphagia was found in the study group, in different degrees. Several variables may contribute to the development of this symptomatology in burn patients, mainly orotracheal intubation.
It is essential to include a speech therapist in the team to treat dysphagia in a timely manner to reduce the associated risks and aid rehabilitation.

P099

Long term result data - 2 years after Colectiv fire disaster

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Objectives: On the evening of October 30th, 2015 Romania and the entire world witnessed the fire disaster that struck the Colectiv Club, which killed 64 people and injured other 186 people. The burn victims were taken to 11 hospitals, including ours – we received 23 burn patients. It was the first time our department, and the entire country, encountered such a mass casualty. Now, after two years since the fire disaster, we present the first outcomes of our patients' care.
Methods: The burned patients we received in our facility, aged between 19-46, had the heads, backs, arms and hands affected by the fire, the depth being mixed, deep partial and full thickness. The TBSA affected by the burns was between 2-90%. The eschar removal was done either surgically (2 patients) or by enzymatic debridement (17 patients). The heads and faces were conducted towards spontaneous epithelisation, whereas the hands and arms were grafted, in 17 patients. The hospitalization duration was between 10-62 days. 5 people out of the 23 died, including the 2 patients treated surgically alone. All patients treated by enzymatic debridement survived.
Results: Despite the fact that we couldn't follow up on all of our patients, who were transfered abroad and remained in the care of other physicians, the ones that stayed in contact with us (11 patients) had a good functional and cosmetic outcome. 5 patients required subsequent reconstructive surgeries at 6 months after the fire or additional procedures (cortisone injections - 4 patients), but overall we are satisfied with the results.
Conclusions: The Colectiv fire was the biggest fire disaster in our country. It required sustained effort on the part of the medical personnel to save the victim's lives, not just on the night of the fire, but also long term.

P100

Isolated foot burns in children in a warm climate

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Background: European studies of paediatric foot burns report scalds as the leading cause. Mechanisms of injury are different in warmer climates. We sought to characterize the mechanisms and outcomes of isolated foot burns in our population.
Methods: Retrospective review of a prospectively collected database of all children aged 0-15 years presenting to a Queensland paediatric burns centre over a 26-month period. Non-parametric analyses such as the Mann-Whitney U and Pearson Chi-square were used.
Results: There were 218 children with foot burns treated over a period of 2 years and 2 months, of which 214 had complete records. There were significantly more boys than girls ($n = 134$, 62.6% cf. $n = 80$, 37.4%, $p < 0.0001$). The leading mechanism of injury was a contact burn accounting for 63.1% ($n = 135$) followed by scalds (23.8%, $n = 51$). Friction, flame and chemical burns were a minority but were significantly deeper ($p = 0.03$) and significantly more likely to require grafting ($p = 0.04$) and scar management ($p < 0.0001$) compared to contact and scald burns.
Conclusion: In our population, contact burns are the most common mechanism of injury causing burns to the feet. The leading aetiology is campfire burns, which account for one-third of all burns to the feet. Prevention campaigns targeted at this population could significantly reduce the burden of morbidity from these burns. Friction, flame and chemical burns constitute a minority of patients but are deeper and more likely to require skin grafting and scar management.

P101

Starchy liquid burns do not have worse outcomes in children relative to hot beverage scalds

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Aim: To characterise children presenting with hot beverage scalds versus scalds caused by starchy water. Initial appearances of starchy burns had led us to be more pessimistic in our prognosis with these injuries, but we did not know if this was an accurate assessment.
Methods: Retrospective survey of prospectively collected

database of all children presenting over a two-year period.
Results: There were 138 starch scalds and 262 hot beverage injuries. Children with hot beverage injuries were significantly younger (18.2 months; IQR 14.1, 27.8) than those suffering starch scald injuries (51.4 months; 18.7, 102.3; $p < 0.001$). Perineal burns were more common in the starch group than the hot beverage scald group (10.9% vs. 2.4%, $p < 0.001$). Chest/breast and abdominal burns were more common in the hot beverage group than the starch group (60.7% vs. 36.9%, $p < 0.001$). Children under three years of age in both groups are significantly less likely to receive adequate first aid at the scene ($p < 0.001$). There are no differences in the need for skin grafting or scar management when comparing hot beverage scalds and scalds caused by starchy liquids.
Conclusions: Scald injuries caused by starchy liquids do not appear to cause a more severe injury than hot beverage scalds. There is a different pattern of injury from starchy liquids in older children. Children under three years old are less likely to receive appropriate first aid at the scene.

P102

Frosties: aerosol cold burns
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Background and Aims: Frosties are intentional frostbite injuries using cold aerosol sprays, predominantly in adolescent females, often as a mutual dare or test of courage. Clusters are common. First aid is infrequent and presentation is often delayed, perhaps due to an underestimation of the severity of the injury or to embarrassment. They are commonly deep injuries, and many require split-thickness skin grafting. Frosties are well documented on social media sites, but not their consequences.
Methods: A single centre prospective database of all new burns was interrogated for frostie burns. Ethics approval was obtained prior to the study. Data from our cohort were then compared against all other reported cases in the literature to confirm patterns.
Results: Nine patients were found over the three years of the database, the largest consecutive series reported to date. Patients were aged between 12.7 and 16.3 years, with seven females. Four presented as two pairs, having injured each other. The limbs were always the affected areas (6 lower, 3 upper). Multiple injuries occurred in three patients. Presentation was always delayed, up to 27 days post injury (1-27 days, median 10 days). In only one case was any first aid applied, and this was inadequate. Three patients required split-thickness skin grafting. Four of the nine patients were already known to school counselors, or other child advocacy services.
The literature yielded a further 19 cases. As with our cohort, the limbs of adolescent females were most commonly affected; with delays to presentation, lack of adequate first aid and a high risk of skin grafting. Early loss to follow-up was common.
Conclusions: Frosties are one example of risky activity amongst adolescent females. The consequences are under-recognised and under-reported, resulting in delays to treatment and a high chance of requiring split-thickness skin grafting. Frosties may be an external manifestation of underlying psychosocial pathology.

P103

Modifiable Risk Factors of Scald Burn in Children under 5 yrs in Bangladesh
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Objetive: Scald burn is very common in our country and most vulnerable population is children. Around the year children come to our hospital from different parts of our country with burn and 72% of them caused by scald. Unawareness ,late presentation from rural areas ,lack of proper initial management scald burn wound become infected and deep and increase morbity. Due to huge load of scald burn occur in children in our country from daily lifestyle make us obliged to find out the risk factors behind the accident which can be modifiable. Scald burn in children is preventable and this study address the modifiable risk factors which can reduce the incidence in our perspective.
Methods: This is a retrospective observational study conducted in Burn and plastic surgery unit, Dhaka Medical college Hospital , Dhaka between 1/1/2016-31/12/2016. Total scald burn patient were 893 in a year among them 562 patients are children and 282 patients are under 5 yrs. 178 patients were male and 104 were female.Cause of scald burn were mostly due to accidentally submersed into hot liquid, unattended child near hot liquids, hot liquid carry without caution, unjustified practice of keeping hot water pot near or under bed of child in rural areas and slums and cooking or drinking hot liquids with the child in lap.Prevalence of incidence according to cause of scald evaluated.
Results: Accidental pouring or submersion into hot liquid in 41% cases, transport of hot liquid carry without caution 24% , unattented child near hot liquids 15% ,practice of keeping hot water vessel near or under childs bed 12% and cooking or drinking hot liquids with child in lap 8%.All the risk factors are modifiable for prevention .
Conclusion: Evaluation of modifiable risk factors is very important in reducing scald burn injury in children.

P104

Danish burn victims compaired to burn victims in other northern European countries. A 5-year retrospective study.
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Objectives: Burn injuries are associated with significant morbidity and mortality. Detailed and updated data regarding incidence, mechanism of injury and mortality of burn injuries is key to improve future care, in terms of both treatment and preventive measures. We have examined the epidemiology of burn injuries in the Danish population from year 2010 through 2014.
Methods: We examined the characteristics of patients admitted at the burns department of The Copenhagen University Hospital, Rigshospitalet, between January 1st 2010 and December 31st 2014. Data on incidence, mechanism of injury and mortality were collected retrospectively.
Results: We found 1158 patients, consisting of 765 men (66%) and 393 women (34%) giving a male:female ratio of approximately 2:1. Children from 0-4 years accounted for 21% of patients, and scalding was the mechanism of injury in 86% of cases. For all remaining age groups the most frequent mechanism of injury was fire. For age 0-14 total body surface area (TBSA) ≥10% accounted for 63/377 (17%) patients, for age 15->90 TBSA ≥10% accounted for 243/781 (31%) of patients. Total mortality-rate was 7,2% (83/1158). No patients under 20 died. Mortality was respectively 2,3% (5/216) aged 20-39, 7,4% (18/244) aged 40-59, 20% (43/208) aged 60-79, 36% (17/47) aged 80 and above.
Discussion/conclusion: In the present study, we report incidence and mortality data from a single, tertiary burns center. Our patient population is comparable to our neighbouring countries in regards to mechanism of injury within age groups and gender distribution but in Denmark we appear to have a higher mortality rate.

P105

Epidemiological Features of Minor-Burns in an Urban-Region: Experience of a Burn Center

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Introduction: We sought to investigate features of urban minor-burns, treated at our center, located in the capital city.
Methods: Subjects were 3023 minor-burn victims during 2003-2016 who lived in urban-region. Study-group was divided into two subgroups according to ages; ***GroupI: ≤****18 years (n=1354), GroupII: >19-years (n=1669).* Data collected were age; sex; occupation; social-security status; home-heating methods; burn-causes; extents of burns; body-sites affected; time of day and seasons in which the injury occurred; account of event, time intervals between injuries and admissions **(TIIA)**; number of other medical-center admissions before our center.
Results: Mean age: 25.7±0.42(range,0-91), Male/female ratio: 0,62/1. Mean TBSA burned: 2.5±0.6%(range,0.5-30). Preschool children comprised 37.8%(n=1142), adults in workforce comprised 26.1%(n=789). Other occupation-groups were students(16.6%,n=502), housewives (11.8%,n=357) and retired adults(7.7%,n=233). Most were insured by social security (95.1%,n=2875). Most had centrally-heated homes(94%,n=2842). The most common burn-cause was scalds(75.1%,n=2180). All burn-causes were more frequent in ***groupII*** except contact-burns (p<.05). Hands were the most common body-sites affected (31.1%,n=941). Higher rates of hand-burns were observed in ***groupII***(59.8%), higher rates of head-burns(52.3%) and neck-burns(60.5%) were observed in ***groupI***(p<.05). Only 2% of injuries occurred between 00:00-06:00 hours, 76.3% of which were in ***groupII.*** 55% of injuries occurred in spring/summer(n=1684). The most common environment in which injury occurred was the home(81.5%,n=2463); outdoor-burns were more frequent in ***groupII***(p<.05). Injuries occurred due to hot food/drinks, heating-devices, electrical-devices, automobile-devices, unsafe self-care, unsafe entertainment-activities, and addictions. Mean **TIIA** was 2.03±0.1days(range,0-30). Median number of other medical-center admissions before the burn-center was 1±0.014(range,0-5). Rates of direct admissions to our burn-center were higher in ***groupII***(p<.05). However, higher numbers of ***groupI*** patients were admitted on the day of injury(p<.05).
Conclusions: Our data revealed that epidemiological features of minor-burns in urban-regions differ in adults and children. They are useful for establishment of preventive strategies for injuries which cause significant loss of urban-workforce and quality of life.

P106

Electronic Cigarettes and House Fires - a need for a national campaign?

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Introduction: In recent years, the use of electronic cigarettes, 'vaping', has become increasingly popular. Since 2015, there have been media reports of significant burn injuries secondary to the lithium ion batteries used in e-cigarettes exploding and causing harm. This has resulted in a number of patients requiring hospital admission, with some requiring surgery. While the major media focus lies in the burns injuries sustained by e-cigarette users, the potential for harm can be far more significant should one consider potential risk for house fires.
This project hopes to highlight the fire hazards from e-cigarettes and ascertain if a national campaign to highlight their danger is required.
Methodology: A survey was sent to the regional fire service to enquire incidences of all fire service attendances/reports involving e-cigarettes and their battery device.

Results: Between September 2014 and October 2016 the regional fire service attended 34 e-cigarette incidents. 60% (n=21) of these incidences were false alarms caused by the e-cigarette vapours activating the smoke alarms. The remaining 13 incidents of fire were secondary to either the e-cigarette or the battery from the device.
Discussion/Conclusion: House fires associated with e-cigarettes do not only have economic implications to the user in relation to loss of property but also to the fire service, as they would have to attend to manage the fire. Even in cases of false alarm the fact that the fire service are called out adds to the burden of the service. Lithium ion batteries are very sensitive, they contain compressed gas and flammable contents and battery failure can result in a violent reaction similar to a firework explosion.
There appears to be less understanding of the dangers of e-cigarettes and/or their batteries in causing house fires. Therefore, a campaign to highlight the dangers of e- cigarettes and their batteries is needed.

P107

Burns First Aid; Are we getting the message across?
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Introduction: The importance of first aid following a burn injury is paramount in reducing the severity of injury. As the majority of burn injuries occur within the home it is beneficial that all individuals have the appropriate knowledge to provide immediate treatment.
Method: A questionnaire was used to establish the knowledge of the general public with regards to first aid following a burn. An identical questionnaire was used to compare the results with individuals who had attended the burn service after sustaining a burn. It was repeated at different stages of treatment to demonstrate how effective the burn service is at giving first aid advice.
Results: General Public – There were 169 respondents of which 12.4 % admitted they did not know what to do following a burn injury. 10.6% were aware of the exact recommendations of cooling the burn wound for 20 minutes with cool running water. 76.9% of the general public asked, suggested that they know what to do but then gave incorrect information.
Burn Service – Out of 138 respondents, 6.5 % suggested they did not know what to do following a burn injury, 34. 7 % were aware of the recommendations and 58.6% indicated that they were aware of the procedure but were incorrect.
Discussion/ Conclusion: This audit has highlighted that the general public do not have the appropriate knowledge in relation to first aid that is required to improve the outcome of burn injuries. It has also raised concerns that the burn service is not as effective at delivering the message of the importance of first aid. Following a burn injury individuals are more likely to be receptive to such advice and every opportunity should be utilised. Given that burn care is expensive and can be complex burn prevention must be integral to future practice.

P108

Qualitative analysis of clinician experience when using the BuRN-Tool in clinical practice
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Objectives: The BuRN-Tool (**Bu**rns **R**ecognition of **N**eglect and Maltreatment) is a clinical prediction tool (CPT) to aid the identification of child maltreatment. As part of a larger evaluation of the BuRN-Tool applied to 100 children who have presented to the emergency department with a burn. Focus groups were conducted with the objective of exploring the views of clinicians on its feasibility, acceptability and impact in clinical practice.
Methods: Three focus groups were conducted (total n = 25) in a paediatric Emergency Department (ED). Focus groups were tiered by clinician seniority to facilitate open and honest discussion between peers. Thematic analysis was conducted. 100% of data were double-coded.
Results: Feasibility and acceptability of the use of the BuRN-Tool was high across all participants and tiers. Participants consistently reported that the BuRN-Tool was easy to use and the results were easy to interpret together with the recommended actions to take. All participants commented that the BuRN-Tool was clinically beneficial, especially for those of a more junior tier or those who do not consistently work in paediatrics. Those with a paediatric specialism placed importance on the 'gut feeling' of the clinician, and expressed how this interacts with clinical examinations and incident history in making a decision for the appropriate next step. They were reassured that the BurN-Tool was giving confidence to junior and less experienced colleagues.
Discussion: Findings suggest that BuRN-Tool was clinically beneficial and supports a positive clinical impact in the ED setting. The results varied with the level of clinical experience and paediatric training. Both play a significant factor in confidence of clinicians when confronted with possible maltreatment. Data suggest that the BuRN-Tool helps to increase the confidence of those lacking experience. Clinicians appreciated the benefit of a CPT in aiding the assessment of child maltreatment in burns.

P109

Effectiveness of Basic Educational Intervention in Paediatric Burns First Aid

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Introduction: Burn injuries are prevalent worldwide. In Singapore, burn injuries are the third most common cause of injury amongst children. Caregiver first aid can mitigate the devastating effects of paediatric burn injuries, however, knowledge has been lacking due to poor public health education. Our aim was to raise the level of knowledge regarding paediatric burn first aid by determining current deficiencies and assessing the efficacy of a short, structured educational intervention.
Method: Over a 12-week period, 263 caregivers were surveyed at the paediatric emergency department and burn clinic of KK Women's and Children's Hospital. The questionnaire recorded caregiver demographics and knowledge of burn first aid pre-intervention. A pictorial educational poster was then given to each caregiver, together with standardised burn first aid advice. The survey resumed thereafter and the post-intervention questions were completed.
Results: Of the 263 surveys conducted, 248 complete responses were obtained. We found a statistically significant increase in knowledge of caregivers immediately following the intervention. A statistically significant predictor of improved post-interventional scores was the caregivers' highest educational level. >60% of caregivers felt a topical agent was essential in burn first aid, which reflected a particular predilection in Asian communities such as in Singapore.
Conclusion: Our study shows it is possible to correct knowledge gaps in the immediate period through a simple pictorial guide, regardless of educational background. Our study also identified a short, structured method for a focused national educational campaign to decrease paediatric burn incidence.

P110

A Ten Year Experience of Firework Injuries Treated at a UK Regional Burns Centre

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Introduction: In the modern era people use fireworks worldwide to celebrate national, religious, cultural festivals and holidays. However the misuse of fireworks is associated with serious preventable injuries. We aim to review cases of burns caused by fireworks presenting to a regional burns unit in UK, in order to ascertain at risk individuals, patterns of injury, and treatment outcomes in this specific burns population.
Methods: A retrospective review was performed of all patients presenting to our tertiary burns unit with burns sustained from fireworks over a ten year period from October 2004 to October 2014. Patient demographics, aetiology of injury, management and patient outcomes were recorded.
Results: A cohort of 93 patients with injuries caused by fireworks were identified from our database. The mean age was 21.2 (range 6 months to 57 years). The identified cases included 82 males (88.2%) and 11 females (11.8%). Flash burns contributed the highest proportion of burn injuries in the cohort 59%, followed by flame burns 20%, with contact burns causing 11% and blast injury 10%. Most burns were to the hands 55%, followed by Head and neck 43%, with the remaining quarter of burns in this cohort were to the arms, trunk, lower limb and perineum. 39% of patient's required surgical intervention, with 11% requiring skin graft and 6% fracture fixation.
Conclusion: Fireworks can result in significant burn injuries, eye injuries and fractures requiring surgery and post-operative rehabilitation. Prevention is key to aim to reduce the incidence of these preventable injuries. Increased public awareness by campaigning has been shown to reduce the incidence of firework injuries. The number and severity of accidents can be minimised by raising awareness regarding safety precautions, motivating manufacturers to adhere to strict quality control and encouraging the use of fireworks as part of professionally organised displays.

P111

Electrical burns: a retrospective analysis over a 10-year period

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Objectives: Electrical burns are still a major problem in our society. Although its incidence is rather low, it is considered one of the most devastating injuries. In this retrospective study, we reviewed the medical records of patients admitted to our Burn Unit during a 10-year period. The aim of this study is to analyze specific aspects of electrical injuries and to delineate a prevention strategy.
Methods: A retrospective analysis of medical records of all the patients admitted to our Unit with electrical burns, during a 10 year period (2006/01/01 – 2015/12/31), was undertaken. Demographic data, mechanism of injury and electric current voltage, total burn surface area (TBSA), location and depth of burns, acute complications, surgical interventions and length of hospital stay (LOS) were analyzed.

Results: During the study period, out of 1695 burn patients admitted to our Unit, 99 subjects (5.84%) suffered electrical burns. 97% of these patients were male. The mean age was 38.3±13.7 years and the mean TBSA was 11.9%±13.2%. The mechanism of injury was occupational in 75 cases. Injuries were classified as low-voltage burns (24.2%), high-voltage burns (30.3%) and flash burns (45.5%). TBSA (p=0.014), mean LOS (p=0.002) and serum creatinine kinase levels (p<0.001) were significantly higher in patients with high-voltage injury in comparison to low-voltage injury, as well as the incidence of escharotomy/ fasciotomy (p=0.049) and flap surgeries (p=0.004). Although there was a higher incidence of amputations in this group (16.7% vs 12.5%), the difference was not statistically significant (p=0.487).
Discussion/ Conclusion: The high prevalence of electrical burn in males and workers emphasizes the need to review occupational safety regulations. Educational efforts regarding potential hazards of electricity and reinforcing compliance with safety measures are essential for avoiding these injuries.

P112

Epidemiology of burns in pediatric patients.
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Introduction: Pediatric burns may cause life-long disability and affect the quality of life as well of patients and their families. The aim of our study was to determine the epidemiological characteristics of burns in children treated in our burn center.
Methods: This was a retrospective study of pediatric outpatients treated in our burn ICU in Tunis between January 2015 and december 2015. Burn patients aged under 16 years wer enrolled. Multivariate analyses were carried out to determine the factors (burn etiology, time and place of injury, living conditions, first-aid treatment methods.
Results: 3584 patients were burned from which 724 were aged less than 16 years (20.2%). Infant's 0-2 years old (40.1%), with male predominance, were the most commonly affected.
The mean TBSA was 4.01%. The most common cause of burns was thermal at 97% and occurred mainly at home (94%) followed by electrical ones at 1.4%, and chemical ones at 0.6%. Burn injuries occurred essentially during summer (34.3%), with a peak during July and August, being the months with the most public holidays and other festivities, and account for 24.6% of total emergencies of the year. In our series, burns affected upper limbs (44.6%), lower limbs (35.4%) and the head/neck (28.6%). Immediate cooling was performed in 39% of patients. Three-quarters of children were brought by their families in the first 24 hours following the accident, almost half of them in the first hour.. Healing was identified in 265 patients with an average healing time of 27.71 days.
Conclusion: Burns in children are frequent (20.2%) . It mainly concern male gender with age under 4 years . Pediatric burns often occurred indoors, especially in the kitchen, and a low proportion receives adequate first aid . Education to parents may reduce burn incidence and improve pediatric patient care following burns.

P113

Powder Laundry Detergent: An Unsuspected Cause of Paediatric Genital Chemical Burns
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Objective: Genital chemical burns are uncommon, more so in children of young ages. The authors report a case of a 16-month-old child who sustained penile and scrotal chemical burns secondary to dermal exposure to powder laundry detergent. Whilst there have been several reports of liquid laundry detergent causing such burns, to the best of the authors' knowledge, no cases secondary to contact with powder laundry detergent have been previously reported.
Methods: A literary search based upon the above case was performed using Pubmed, Medline, Ovid, EMBASE and Google Scholar databases. The words "Paediatric", "Child", "Genital", "Penis", "Scrotum", "Vagina", "Vulva", "Detergent", "Powder", "Chemical" and "Burn" were used to perform the search. Two authors reviewed results from the literary search independently. An experiment was also performed to compare the pH of powder detergent (10mL) from the above case in water (100mL) versus urine (100mL). The pH of each of these solutions was measured using Neutralit® pH indicator paper (pH 5.5-9.0) and values were assigned for each solution's pH by each of the authors independently.
Results: The above literary search yielded 11 relevant results. Whilst several results reported cases of paediatric genital chemical burn secondary to liquid laundry detergent capsules, none of the results identified reported cases of chemical burn secondary to laundry detergent in powder form. The results of an experiment comparing the pH of powder laundry detergent in water versus urine demonstrated no difference in the agreed levels of alkalinity assigned independently to each solution (both approximately 7.0).
Discussion/Conclusions: The above case provides further insight into a previously unreported cause of genital chemical burns in children. Laundry detergent in both liquid and powder forms pose significant risk to children. Parents must be made aware in order to allow institution of appropriate prevention strategies and, when necessary, initiation of adequate decontamination techniques.

P114

Prevention of thermal injuries

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Thermal injuries belong among serious injuries that represent health, economic and social problem all over the world. They are significantly involved in morbidity and invalidity of children (especially the youngest age group 0 – 4 years) and underage. An average of 1% of the population are treated for burns each year. Of which 97% are treated as an outpatient and 3% are hospitalized. Children injured by a thermal injury are around fourty percent out of the total number of patients. This count is also featured in numerous abroad studies and single burn centers in Czech Republic. These data suggest an alarming fact that up to 70% of children that suffered from thermal injury were younger than three years. That's why it's needed to focus maximum preventive activities on education of parents of this age group in particular. Thermal injuries are the third frequent cause of child death caused by external source in the age group to fourteen years. Knowledge of all circumstances of origin of injury is important for the prevention of its creation. According to available researches the vast majority (97 %) of thermal injuries of children happened in the home.
Project goals: Design and create an educational leaflet thematically focused on prevention of thermal injuries for the age group 0 – 4 years.
Design and create an educational video thematically focused on chemical burn by sodium hydroxide.
Design and create distinctive reflective stickers warning about the danger of thermal injuries.
Become acquainted with statistical data of thermal injuries of children in the age of 0-4 years.
Teach the target group of the project identify and eliminate possible health risks of injury arising from the normal daily activities of the age group 0-4 years.
The target group of our project are parents, grandparents, people caring for children and older siblings of children.

P115

Virtual Reality as distraction technique during wound care; fine-tuning its application to a better effect

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Objectives: Virtual Reality (VR) as distraction technique to relief pain during wound dressing changes is promising, but more high quality studies are needed to further its effectiveness. This study investigates the effect of VR on procedural pain and patient's satisfaction. In particular, this study identifies patient-related, wound-related and psychology-related variables associated with the effectiveness of VR. Furthermore, need for pain medication, VR side-effects, nurse's satisfaction and user friendliness with the VR equipment are assessed.
Methods: Patients of eight years and older, without physical limitations to use VR and without need for intensive care are randomly assigned to the treatment or control group. Both groups undergo 4 consecutive dressing changes as usual and the treatment group also use VR. The equipment consists of Oculus Rift and Samsung Gear VR. The hard- and software are carefully adapted to the requirements of this specific medical setting.
Results: So far, 4 patients have participated, of which 1 was eliminated because of an unreliable pattern of answers. The VR group (2 patients) experienced moderate pain during 4 consecutive dressing changes (*mdn* 3.5; 0-8.5). They were satisfied with the procedure (*mdn* 7.7; 3.5-10), but less so with the VR system (*mdn* 2.9; 2.1-7.5). The Samsung Gear overheated during the procedure and there was a drifting problem. The nurses of the VR group were satisfied with the procedure (*mdn* 8; 2.1-9.7) and also with the use of VR (*mdn* 7; 4.6-9.0). No adverse effects of VR were found. The use of both systems was feasible and did not interrupt wound care.
Discussion/Conclusion: VR, which is carefully adapted to this specific medical setting, received an enthusiastic welcome. The hard- and software evolve rapidly, which will further benefit this serious application of VR. Completion of this study (*N*=128) will help specify for whom VR is the best option.

P116

Not all dressing changes have to be traumatic

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Objective: Burn injuries are said to be one of the most painful and traumatic injuries to be sustained. Dressing changes alone can be extremely painful; with this in mind we questioned our current distraction techniques and how we could improve this. The majority of dressing changes initially were through the assistance of the play specialist utilising a number of different tools. The Paediatric burns unit was then given the opportunity to trial the use of a mobile VPOD 3D unit
Method: Over a period of 11 months the mobile VPOD 3D unit was trialled on 214 patients aged between 2-16 years using a combination of sedation medications. The dressing was then undertaken with the use of the programme.
Results: From the 214 patients the VPOD 3D unit was trialled on, there was a good verbal response from both patients and parents. Parents felt their children coped better

with the use of certain programmes; however we were unable to compare this against not using the mobile VPOD 3D unit as this could be seen as unethical. It was found the unit was most successful on children aged 3 – 10. Staff also felt the distraction during the dressing changes were made simpler.
Discussion/Conclusion: Achieving the best outcomes from the unit; two members of staff were needed, One to interact with the child and the other staff member to undertake the dressing change. During the process of using the VPOD 3D unit it was found to have advantages and disadvantages for use; it allowed staff to move the unit around the room to allow for optimum viewing and distraction. Having a variety of programmes allowed the children to be able to choose suitable programmes. Trialling the sensory unit, staff on Burns are able to see the benefits relating to the sensory unit.

P118

A multicenter study of self-inflicted burns: Preliminary results

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Introduction: Patients admitted for self-inflicted burns, mostly after suicide attempts, represent a minority percentage of Specialized Burn Units (SBU). However, the complexity of their integral care makes them a differentiated group with very specific clinical characteristics and psychosocial needs.
European studies report that they represent 4% of the inpatients in the SBU. In Spain seems the percentage is lower, like in Catalonia with 1.45% and in Valencia 1,8%. Given the lack of knowledge of whether this value is specific for Catalan SBUs or it can be generalized to other Spanish communities and SBUs, this multicentric study has been design to add to the knowledge in this field.
Objectives: To describe the socio-demographic and clinical characteristics of patients with self-inflicted burns, and to compare data from two sample populations of two different SBU from the Spanish state, during the 2010-2016 period.
Results: A sample of 54 patients was recruited (72% men, 28% women); 41 patients from Vall d'Hebron University Hospital (Barcelona), and 13 patients from Hospital de la Fe (Valencia). Descriptives from the whole sample revealed similarities with other European populations: predominance of males, single, elementary studies and previous psychiatric history, especially of severe mental disorders. When comparing between groups, no statistically significant differences were found in socio-demographic characteristics, except for number of children (Mann-Whitney U=143,500, p=,041, z=-2,049) and severity of the injuries (Chi-squared=8,859, p=,003, Eta=,409) and intoxications (Chi-squared=10,422, p=,001, Eta=,43).
Conclusions: This preliminary study allows us to appreciate similarities between both samples and in relation to other European studies. Due to the limitations in the number of cases and the differences found in the two subgroups, these results serve as a starting point for the continuity of the project.

P119

Burned out soul - A cross-sectional study impact of PTSD and depression towards quality of life of post major burn patients.

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Objectives: The objectives of this study are to determine the effect of Posttraumatic stress disorders (PTSD) and depression towards quality of life (QOL) in major burn cases.
Methods: Majors burn patients that was treated in Hospital Universiti Sains Malaysia were selected based on the inclusion criteria. A total number of 55 patients with 2 years post burn were invited voluntarily and consented to participate in answering the psychometric battery which is the Malay translated and validated questionnaires.
Results: There is a significant relationship between PTSD and QOL ($DF1,53=31.52$, $p<0.05$). The direction of relationship was negative. It reflects the higher PTSD score obtained, it will lead to poor quality of life. Overall, the model explained 37.3% variance changes in quality of life. It was reported that in every 1 score changes in PTSD, we expect the changes of QOL was -1.10. There is also a significant relationship between depression and QOL ($DF1,53=72.66$,$p<0.05$). The direction of relationship was negative. It reflects the higher depression score obtained, it will lead to poor quality of life. Overall, the model explained 57.8% variance changes in quality of life. It was reported that in every 1 score changes in depression, we expect the changes of QOL was -2.237.
Conclusion: PTSD and depression is a strong predictor towards post major burn quality of life. Therefore, treating burn patients holistically and beyond the visible scars will lead to a better quality of life.

P120

Reliability of Patient Information Resources for Scar Revision Surgery Post-Burn Injury

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Objectives: Patients considering treatment of scarring post-burn injury will browse the internet in search of infor-

mation. Not all information is reliable and only a small proportion based on good evidence. Many of the publications available provide inaccurate or confusing advice, making it hard to know which information to rely upon in order to make a decision regarding scar revision surgery. This study aimed to evaluate the quality of information available using the top 6 websites from a web search relating to surgical treatment of scarring post-burn injury and compare these to validated patient information resources.
Methods: Information leaflets from the British Burns Association were used as the gold standard for patient information. Searches for 'Scar Revision Surgery' were performed using search engines 'Google', 'Bing', 'Yahoo' and 'Ask'. The top 6 'hits' were selected and assessed using the DISCERN instrument (http://www.discern.org.uk/discern_instrument.php) to assess the quality of written information.
Results: Each website was scored using 16 criteria that assessed all aspects of information provided and accessibility. Websites were then ranked in terms of reliability.
Discussion/Conclusion: The internet is an unlimited information resource that patients access. As reconstructive surgeons, it is useful to be aware of the most commonly accessed sources in order to help our patients by guiding them to those most appropriate.

P121

Epidemiology and screening of non-accidental burns in children in a Dutch burn centre

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Objectives: International estimates of the incidence of non-accidental burns (NAB) in children admitted to burn centres vary from 1% to 25%. Hardly any data about Dutch figures exist. The aim of this study was to evaluate the incidence, treatment and outcome of burns due to suspected child maltreatment in paediatric burns. We described the process of care and outcome, including the accuracy of the SPUTOVAMO screening tool and examined child, burn and treatment characteristics related to suspicions of child abuse or neglect.
Methods: A retrospective study was conducted in children aged 0-17 years with a primary admission after burn injuries to the burn centre Rotterdam in the period 2009-2013. Data on patient, injury and treatment characteristics were collected, using the Dutch Burn Repository R3. In addition, medical records were reviewed.
Results: In 498 paediatric admissions, suspected child abuse or neglect was present in 43 children (9%). 442 screening questionnaires (89%) were completed. In 52 out of 442 questionnaires (12%) the completed SPUTOVAMO had one or more positive signs.
Significant independent predictors for suspected child maltreatment were burns in the genital area or buttocks (OR=3.29;CI:143-7.55) and a low socio-economic status (OR=2.52;95%CI:1.30-4.90).
Conclusions: The incidence of suspected child maltreatment requiring the set-up of additional support in our population is comparable to studies with a similar design in other countries.

P122

Can we see the person behind the scars? Psychosocial aspects of coping with scars

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The human visible appearance and in particular our face and hands are central to identity and serves as a primary vehicle for expression, emotion, and character; they also play an essential social role in nonverbal as well as verbal communication.
Living with visible differences may impose on the person many challenges.
Living with scars may have a significant psychosocial effect on patients' quality of life. Face scars often limit the movements of the face, thus distorting the expressions of the individual and making it difficult for others to ''read'' the person's feelings from facial expressions.
Children affected by scars may be ignored, teased, bullied and ostracized. Scars may also significantly disturb self-image and psychosocial processes and may increase the emergence of psychiatric disorders such as anxiety and depression.
In this oral presentation I would like to highlight and review some of the obstacles faced by people with scars through the perspective of recent scientific research in this field. I would also like to discuss some of the evidence based psychological treatment programs for example cognitive behavioral therapy (CBT) and rehabilitation options currently offered to people with scars. The structure and effect of camps for children with burns will also be reviewed in this lecture.

P123

Use of co-experiencing psychotherapy in work with burn-injured children

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Co-experiencing psychotherapy is based on a general methodological approach, which L.S. Vygotsky called the "philosophy of practice" or "psychotechnics". Experiencing is a productive meaning-generative activity that helps to

cope with critical situation – situation of impossibility where a person has to change himself, because it is impossible to change the obstacles. Specific activity that the co-experiencing psychotherapist performs may be called co-experiencing and the general method of this activity—the method of understanding.
We believe that this psychotherapy is effective for the treatment of burn-injured children, because burn trauma usually interrupts Experiencing or impedes it.
According to this approach, Experiencing has four levels: Immediate Experience, Apprehension, Reflection and The unconscious. Trauma may cause barriers for these processes. Co-experiencing psychotherapy has instruments for working with each level of Experiencing. There are empathy for Immediate Experience, clarification for Apprehension, maieutic for Reflection and interpretation for The unconscious.
Second basic assumption of this theory is about the topology of life-worlds of the traumatized child. It is supposed that child's path from trauma to recovery lies trough 4 types of the life-worlds. There are infantile, realistic, value based, and creative life-worlds. Each of them has its' own type of critical situation – stress, frustration, value conflict, and crisis. Each of them has its' own language, characters and scenery. For every lifeworld, the adressee of the experiencing is different. For example, psychotherapist responds to the infantile life-world to a child with mothering, to the creative life-world with taking part in creative process etc.
This approach helps a child in her journey to the recovery trough by providing support for the Experiencing and resolution of the life's critical situations.

P124

Biopsychosocial problems of children with burn injuries from parents perspective

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In the Czech Republic children form about 36% of all injuries in proportion to adults. There is a higher count of boys than girls among hospitalized children. More than 2/3 of hospitalized children are in the age group 0-3 years. Burns formed by combustion have the largest average range, most of the areas have deep character and surgical treatment is needed in most cases. There is always burn of one limb in most cases. The most common range of burns is up to 5% body surface. Approximately every 7th hospitalized child is operated. The objective of the study is to describe the influence of burn injury on quality of life and its associated problems. Determine the needs and experiences of children and family members taking cares of children after burn injury.
The research is conceived as a qualitative survey, using interpretative phenomenological analysis which allows to understand the life experience of the individual.

P125

Pressure garment (PG) therapy for the hemangiomas of extremities

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Aim: analyzing the available data about PGT for the hemangiomas of extremities
Methods: The analysis of the treatment of five patients with advanced mixed (simple and cavernous) hemangiomas that took several circular segments limbs. The patients' age was 6,5 ± 1,5 months on the period beginning pression therapy. At birth, all children in these areas were recorded circularly limbs localized hemangiomas bright pink color with a smooth surface. At the age of 1-2 months hemangioma began to acquire crimson, noted a significant increase in local temperature of the skin over the tumor, there was strong growth of hemangiomas. Pressure Clothing was used as recommended by Mayo Clinic.
Results: elastic PG made individually. Initial pressure on the hemangiomas ranging from 28-32 to 40-45 mm. Hg. on cm^2 at the final stages of treatment, corresponding to 2-3 class compression in the treatment of burn scars and chronic lymph-venous insufficiency. PG used 23 hours a day. Compression period was 12-18 months.
State hemangiomas evaluated once a month. along with regression of hemangiomas gradually restored properties of the skin (texture, elasticity, color and strength of the skin), significantly reduced itching. He was removed lymph venous congestion. Children are well perceived compression therapy. Good aesthetic effect was noted.
Conclusions: Methods of compression therapy of frequently complicated hemangiomas children at an early age contributed hemangiomas regress. Hemangiomas have a complex nature and inability etiopathogenetical treatment for patients in early childhood advisable to carry out constant compression PG provided follow-up of children's surgeon once a month.

P126

The relationship between self-rated health and physical function and activity capacity in adult burn patients 6 and 12 months after injury.

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Objectives: Physical function and daily activities are often affected after a burn injury. Many patients experience com-

plications like pain, muscle weakness, scar contractures and scar hypertrophy. As a consequence this might also affect the experience of health related quality of life.
The aim of this study is to examine the relationship between self-rated health, physical function and activity capacity, in adults with burns.
Methods: All patients who come for follow-up at the Burn Center at the University Hospital in Uppsala, Sweden, 6 and 12 months post-burn, and fulfills the inclusion criteria, are asked to participate. The participants are adults over 18 who have been treated at the Burn Center and comprehend Swedish verbally and in writing. Individuals with underlying diseases, that prevent the assessment of the burn effect on the function, are excluded. During the follow-up visits a number of assessments and tests are carried out by the treating PT and OT. The results of these assessments will be used in the study. Data will be analyzed using non-parametrical tests, correlation analysis, and descriptive statistics.
Records of the participants' age, gender, TBSA % and depth of the burn will be collected from medical records.
Results: Fifty consecutive patients were included from November 2015 to February 2017. The final analysis has, at the time of abstract submission, not been carried through, but so far we can see a significant correlation (p=0,001) between perceived health (EQ-5D) and DASH (activity capacity upper extremity) at the 6 months follow-up. There is also a significant correlation (p=0,002) between EQ-5D and IMF (function lower extremity) at 6 months.
Conclusion: The preliminary result of this study indicates that function and ability to carry out personal daily activities affects burn patients´ perceived health. However, the small sample size has to be taken into consideration when interpreting the results.

P127

Occupational reintegration in patients after severe burn injuries

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Objectives: Based on improved surgical possibilities and bettered intensive care, the morbidity and mortality of severely burned patients could be reduced significantly during the last decades. Thus, subsequent occupational reintegration of these patients evolved as a parameter for optimal functional outcome after burn injury and quality of life. In the literature, degree of burn, number of weeks of treatment, and TBSA, among many others, are described as factors possibly impairing occupational reintegration. Moreover, it is thought that during rehabilitation psychological problems are increasing in relevance compared to physical impairment. Satisfaction of social needs such as acquisition of a social task, social status and the individual identity, which are the basis for any occupation, play an important role to wellbeing and health in this patient collective. We aimed to identify factors possibly impairing or favoring successful occupational reintegration of patients after severe burn injury.
Methods: In the present study, we contacted 112 patients, who fulfilled all criteria for study inclusion. 11 patients decided to participate in the study; All patients included in the current study were treated between 2004 and 2013 at our burn ICU.
Results: 7/11(64%) patients were successfully reintegrated in their profession and 4/11(36%) patients reported no occupation after their burn injury. The most frequent reason for failure of reintegration was advanced age. Other factors contributing to non-reintegration were length of hospital stay and ICU-stay, type of burn, occupational accident as cause of burn, and length of rehabilitation. Furthermore, occupational reintegration seems to correlate with education, the severity of pain, impairment of mobility, and problems with aesthetic appearance.
Discussion/Conclusion: Our findings suggest that these above described factors have to be considered and potential risks should be minimized already during hospital stay of severely burns patients in order to achieve successful occupational and social reintegration.

P128

Patient and Observer Scar Assessment Scale, translation into Norwegian, cultural adaptation, and clinimetric properties

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Objectives: The purpose of this study is to achieve a Norwegian version of POSAS with good clinimetric properties for use both in clinical practice and research. The aims are to translate POSAS into Norwegian, examine its intra- and intertester reliability, validity and responsiveness.
Methods: Four experienced burn physiotherapists, fluent in the English language, translated POSAS individually into Norwegian, and agreed on one Norwegian version in 2015. A translation bureau had also translated the scale, and the official Norwegian version (POSAS-NV) is a mix of the two versions. A cognitive debriefing was carried out among patients, nurses and plastic surgeons. POSAS-NV was back-translated according to international guidelines. A cross-sectional design will be used to examine intertester reliability and validity of the POSAS-NV, and a longitudinal design to examine test-retest reliabiltiy and responsiveness. At least 50 patients will be asked to take part in the study and will be included on the basis of written informed consent. In the case of children, informed consent will be asked for from a parent or next of kin. Exclusion criteria are patients with severe cognitive dysfunction

or too poor skill in the Norwegian language to understand information and instruction given and to score the patient scale, as well as mature scars.
Results: The cognitive debriefing resulted in a few suggestions mainly with regard to lay-out of the scale, which has not been incorporated into POSAS-NV as it would differ from the English version. The back-translated version was accepted by the developers in 2016. Examination of clinimetric properties is ongoing. Twenty patients have been included in the study from August 2016 to February 2017.
Discussion: Challenges experienced with patient inclusion and practical issues with carrying out the study will be discussed.

P129

Correlation of pliability with (Visco-) elastic properties of burn scars

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Background and objectives: Patient and Observer Scar Assessment Scale (POSAS) and Cutometer® are the most frequently used assessment tools to investigate pliability of burn scars, subjectively and objectively. We aim to investigate the correlations between POSAS pliability items and the (visco-) elastic properties of scarred skin measured with the Cutometer®. These results could provide information necessary to determine minimal clinically important differences (MCID) for POSAS pliability items and Cutometer®.
Methods: Fifty-eight measurements on 20 patients with burn or surgical scars are performed. Patients completed the POSAS-P, whilst observers assessed pliability using POSAS-O and Cutometer®.
Results: The Cutometer® R0 parameter was most strongly negatively correlated with both POSAS-O-pliability (r=-0.597; p<.0005) and POSAS-P-pliability (r=-0.358; p=.006). When correlating the POSAS pliability scores with the R0 values, a downwards trend is demonstrated. There appear to be 'levels' of change, only showing significant differences between the 'levels' and not between the consecutive individual scores. We observed a significant positive correlation between the observer- and patient-reported pliability scores (r=0.443; p=.001), however imperfect.
Discussion: The strong correlations of the R0 parameter with POSAS pliability scores imply that the Cutometer® could also serve as an anchor to determine the MCID for the POSAS pliability parameter since a cut-off score ≥ 0.3 is present. The presence of 'levels' of change suggests that observers can distinguish between 'levels' of severity, but the differences between certain scores appears arbitrary. The significant but imperfect correlation between the observer- and patient-reported pliability scores suggest that observers and patients are not attributing the pliability in the same way. A difference in the assessment protocol for the observer and the patient could explain this.
Conclusion: The Cutometer® is a valid instrument for measuring the characteristic of pliability when using the R0 parameter, and can serve as an anchor to determine the MCID for POSAS pliability.

P130

Intensive rehabilitation of patients suffering from burns: traditional methods, modern methods and Crenotherapy (Thermal Spa Water Treatment)

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Objectives: The healing of areas affected by burns, especially those involving severe deep burns, even after having undergone appropriate reconstructive surgery. The affected areas are almost always scarred with aspects of dystrophy, hyperaemia, hypertrophy, keloid transformation, ulcerations and in certain parts of the body receding scars which obstruct or limit the functioning of limbs and other affected organs.
We have been dealing with rehabilitation as a result of scarring for over 25 years. Once recovered from the healing of ulcers, patients are then monitored and treated for all aspects concerning a scarring pathology, with the aim of ensuring prevention and functional recuperation, especially in children during their development and growth.
Methods: Individual intensive rehabilitation programme for 3 hours each day.
Patients undergo the following treatment: moisturising deep massage articular / limb mobilisation and movement postural correction recuperation of orthostatism and ability to be ambulentoccupational therapyEndermology (LPG)Roboderm Technology (Icoone) (Thermal) Crenotherapeutic Treatment Prevention and treatment of hypertrophy, through local infiltrative pharmacological therapy, compression therapy through use of silicone sheets and /or appropriate compressive elastic sheathing.
Prevention of deformity, through use of specific braces or splints, both of a static and dynamic nature.
Riconstructive plastic surgery through scar release and elongation plastics, cutaneous skin graft, cutaneous expansion, lipofilling, etc. The fundamental aspect is that every surgical operation is part of a relevant programme of early and associated rehabilitation.
Conclusion: When admitted and discharged patients undergo a general evaluation of results. Their level of autonomy is assessed through the use of internationally

recognised disability indicators, they are photographed and in so doing the pathological areas which require semiotic instrumental evaluation are pointed out through;
- tonometry;
- elastometry;
- colorimetry;

In particular the results of these tests will be useful for monitoring areas that show up pathological scarring the follow up.

P131

Bioavailability of scarred skin during application of a vaso-active substance

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Objectives: The skin acts as a mechanical or insulation barrier in physiotherapy interventions. The evidence of topical applications in physiotherapy is poor or lacking in skin and (burn) scar research. In this study, non-invasive skin measurements will be used to evaluate bioavailability of scarred skin during application of a vaso-active substance.
Methods: Two groups consisting of 14 scar sites and 8 healthy skin sites are selected based upon predefined in- and exclusion criteria. Baseline measurements on a 6cm^2 scar/skin site include skin color, trans epidermal water loss, skin hydration and epidermal and dermal thickness. A filter disk saturated with a Methylnicotinate (MN) solution (0.005M) is applied for 30 seconds on the marked scar/skin site. Bioavailability is assessed by quantification of an MN-induced skin redness observed with the Chromameter® over 65 minutes after the MN application by a standardised protocol. Change in skin color is compared using a repeated measures ANOVA. Spearman correlations between skin color and all independent variables are calculated. Between group differences are tested by the Mann-WhitneyU. Spearman correlation coefficients between skin hydration outcome measures are calculated.
Results: A significant groupxtime effect for chroma a* values is demonstrated (p=0,044). A significant difference between both groups is found for the sum of total color change (p=0,02) and for dermal thickness (p<0,0001). A correlation between the latter parameters is significant (r=,587, p=0,004). Hydration values of the Corneometer correlate significantly with the Grey Index T of the Moisture Map® (r=0,427, p=0,047).
Conclusion: The dermal thickness is a determining factor for bioavailability of MN in scars. Epidermal thickness and TEWL were no significant factors of influence on skin color within the current study. The Moisture Map® can be used as an assessment tool for skin hydration, especially the Grey Index T seems a valuable parameter based upon the current primary study results.

P132

Proof of concept for tension reducing taping as a mechanotherapy for hypertrophic post trauma and burn scars

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Objective: There is strong acknowledgement that mechanical forces can regulate inflammation and fibrosis and therefore may be used therapeutically to stimulate tissue repair and remodeling. This mechanism is referred to as “mechanotherapy”. Although the pathophysiological background of mechanotherapy is well described, evidence based practical applications are lacking within scar treatment.
The goal of this study is to obtain a proof of concept for a newly developed taping technique that can reduce tension on pathological post trauma and burn scars. In a previous study we developed a technique consisting of one piece of elastic therapeutic tape with a longitudinal incision made in the middle of the tape. The latter technique is most suitable for scars in between joints. The current technique is innovative for scars located over joints.
Methods: Scar patients are selected based upon predefined in- and exclusion criteria. Two pieces of tape are applied in a standardised way, thus reducing tension at the scar site. The tape makes no direct contact with the scar site, thereby avoiding maceration of the scar.
Distensibility, which has an inverse relationship with tension, is measured before application of the elastic therapeutic tape with a Cutometer, which measures the vertical deformation of the skin in millimetres when the skin is pulled by means of a controlled vacuum into the circular aperture of a probe.
This measurement is repeated after the application of the tape, one, two and three days later. The more the skin can be deformed, the more tension is reduced on that skin site. Standard descriptive statistics including means and standard deviations are used to summarise patient demographic and presentation data. Paired sample T-tests are used to calculate the difference in the scores for distensibility.
Results: Currently data collection is being finalized and results can be presented at the conference.

P133

The Effect Of Early Rehabilitation Program On Physical Functions In Patients With Lower Extremity Burn Injuries-A Pilot Study

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Objectives: Impairments in joint range of motion, gait ability and balance cause physical disability in patients with lower limb burns. So that, early rehabilitation program (RP) has becoming increasingly important in acute burn care. The purpose of this study was to examine the effect of early RP on physical functions in patients with lower limb burns.
Methods: Seven adults with lower extremity burns (4F,3M; mean age=33±11 years, mean burn surface area= 4.8±3.5%) were included in this study. GAITRite system for gait parameters, timed up and go test (TUG) for dynamic balance and six minute walk test (6MWT) for exercise capacity were used. These evaluations were made twice; initial (admission) and final (discharge). RP was applied by physiotherapist during the acute hospitalization. RP included active range of motion exercises, functional mobility, balance activities and gait training.
Results: The mean sessions of rehabilitation program were 12 days. In the initial and final evaluations were found as step length 42.70±9.01cm vs. 58.29±4.13cm (burned side), 39.64±10.63cm vs. 59.19±3.97cm (non-burned side), cadence 79.11±21.52 vs. 105.11±10.07 steps/min, velocity 56.94±24.67 vs. 102.91±11.74 cm/sec, and distance 6MWT 154.84±47.43 vs. 480.14 ±60.56 m respectively. When the initial and final evaluations were compared there were significant differences for all these parameters(pË,0.05). Although base support was shorter in final measurements, there was no significant differences between the initial and final values (18.34±8.35 vs. 12.56±3.07 cm, pËƒ0.05). Initial TUG values were higher than the final values and the differences were significant (18.30±4.73 vs. 9.51±0.89 sec. p=0.01).
Discussion/Conclusion: This prospective pilot study showed significant improvements in physical functions during early RP. Gait parameters, exercise capacity and balance are very important indicators of effectiveness of early RP after burn injuries. The limitation of this study was its small sample size. Future studies may compare the effectiveness of different rehabilitation programs in larger burned population.

P134

The effects of micro-needling on dermal thickness and density of burn scars: Preliminary results of a pilot study

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Background and Objectives: Scar hypertrophy is characterized by an increased dermal thickness and low echogenic density. Micro-needling is a minimally-invasive technique that needs little after-care and is widely used for skin resurfacing. The aim of this study is to investigate whether micro-needling can improve the dermal thickness and density of hypertrophic burn scars.
Methods: Adult Caucasian patients with hypertrophic scars older than 1 year and located on arms, legs or trunk (excluding hands or feet) were eligible for this study. They received a micro-needling treatment with a Dermaroller® device (needle length 2,5mm) twice with 3 months in between. High Frequency Ultrasound Scans were taken before the first treatment (baseline measurement), before the second treatment and 3 months after the second treatment. A-scans and densitometry were used to measure dermal thickness and density. A one-way repeated measures ANOVA with post-hoc comparisons was used to analyse the results.
Results: Preliminary results of 12 patients with a mean age of 36,6 years (±13,3y) and scars that were on average 22,7 months (±14,5m) old are presented. Dermal thickness decreased statistically significant over time (p=.002) from 3070µm (±760µm) to 2642µm (±698µm). Dermal density improved statistically significant over time (p<.0005) from 15,41 (±8,02) to 26,97 (±10,84). Pairwise comparisons revealed that this significance was reached after the second treatment compared to baseline for both dermal thickness (p=.017, d=0,61) and dermal density (p=.003, d=-1,27).
Conclusion: These preliminary results indicate that two micro-needling treatments with 3 months in between can have a positive effect on dermal thickness and density of hypertrophic scars.

P135

The Facial Scarring Challenge - New Technologies to Assist

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Objectives: There are a variety of treatment modalities available to manage facial scarring and improve function following burn injuries. The use of Lycra pressure garments, facial splints and silicone gel are the mainstay of current clinical intervention in achieving a positive outcome result. This study demonstrates a team approach in providing the best solution to achieve this by exploring ways

of combining effective pressure management with silicone to address the developing scar as it matures.
Methods: This is a single case study demonstrating our experience with technology to manufacture a new product previously not available in our service. The patient had agreed to assist us with our plans to improve our treatments for the benefit of other patients in the future.
Results: The photographs over 4eight months show a visual improvement in the hypertrophic scarring. This is confirmed by his POSAS scoring system- reducing from 8 to 6 in the overall compared to normal skin. The study highlights the benefits of treatment with a light weight silicone lined thermoplastic facial orthotic splint as an alternative to separate modalities to manage challenging facial scarring. It also demonstrates an alternative technique using 3D imaging technology as a non-invasive mechanism to facilitate accurate fabrication of splints that is more acceptable to the patient.
Discussion/Conclusions: Scanners have been shown to improve speed of application, delivery and implementation of facial orthotics. Further research is warranted to access these new technologies and materials to provide long term effective burn rehabilitation solutions. This patient had a significantly improved cosmetic outcome utilising pressure and silicone in conjunction with a supervised rehabilitation program and compliant wearing schedule. The Silon-STS® material proved to be an effective choice in the management of facial scaring and is a treatment modality option for future consideration in burn rehabilitation to effectively manage scar hypertrophy.

P136

Providing Choices to Empower the Patient and Aid Compliance

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Objectives: Custom made pressure garments have been used since the early 1970's and remain one of the most widely used treatment options for hypertrophic scarring post burns injury. Recent advancements in manufacturing and design innovation has modernised the aesthetics of garments and provided choices in fabric colour and trims, offering personalisation of garments to aid client choice with this treatment regime.
It is assumed that beige pressure garments have negative connotations and that coloured pressure garments have positive connotations; this study explores factors like the addition of colour and garment trimmings and what impact this has on patient satisfaction and compliance.
Methods: Questionnaires were collected from twenty patients in a single burns centre pilot study. Compliance and opinion was evaluated from the perspective of the following variables: garment personalisation, style, comfort, colour, self-image garment information.
Results: On the basis of our findings, strategies patients believed to enhance garment use were identified; primarily that colour choice and personalisation in custom made pressure garments does have a positive influence, which can improve compliance and increase self-confidence.
Discussion/Conclusion: Much of what is traditionally understood as 'patient non-compliance' centres around difficulties in everyday activities and comfort factors but little is documented around other factors that influence compliance to treatment. Further detailed studies will allow clinicians to facilitate involvement in patient rehabilitation and explore the positive impact of patient satisfaction in garment choice and personalisation.
It is evident from the data produced that 'colour and personalisation' offers a control mechanism to the patient that has a positive outcome in social acceptance, increased self-esteem and compliance. Identification of these factors is important to assist clinicians to explore choices to empower the patient and aid compliance. A follow up national burns centre study is planned to explore patient perceptions of personalisation of pressure garments and colour-culture relation.

P137

Evaluations Of Gait Parameters Of Patients With Lower Extremity Burn Injuries

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Objectives: Pain, range of motion limitations and impaired sensation are all possible complications of lower extremity with burn injury which cause impaired walking. The purpose of this study was to compare of gait parameters of the burned and nonburned limb in patients with lower extremity burn injuries.
Methods: Twelve adults with lower extremity burns (9F, 3M; mean age=34±10 years, mean burn surface area= 4.3±2.8 %, unilateral limb burns: 7 bilateral limb burns:5 patients) were included in this study. In cases with bilateral lower limb burns, the limb with higher burn surface area was noted as the burned side. Gait parameters were evaluated by GAITRite system which consist of an electronic walkway, within 3 days after burn accident. This equipment collected data on the following components: Step length, cadence, velocity, stance (%Gait cycle) and base support. These values were evaluated using Wilcoxon test.
Results: The results indicated that in the patients with burns step lenght was significantly higher on the burned extremity compared to nonburned extremity (41.36±10.58 cm vs. 37.43±13.59 cm, p=0.008). There was significant difference for stance (%Gait cycle) between burned and nonburned limb (64.32±4.76 % vs. 69.86±8.05 %, p=0.013). Cadence and velocity (81.16±21.65 steps/min vs. 56.63±26.27 cm/sec) were lower than predictive values. Base support (15.31±7.47 cm) was higher than normal values.

Discussion/Conclusion: This study showed that gait parameters of burned lower extremity differ from nonburned lower extremity. The larger base of support, increased step lenght, decreased velocity and cadence have been occured in order to maintain balance and stability. In addition to, pain, fear of movement may have contributed to the decreased stance phase, cadence and velocity. So that reasons gait training interventions should be included in the acute period of rehabilitation programs for adults with lower extremity burn injuries.

P138

Burns Rehabilitation after burn injury upper and lower extremities

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The rehabilitation for patients with burn injuries of extremities starts from the day of injury, lasting for several years and requires multidisciplinary efforts. A comprehensive rehabilitation programme is essential to decrease patient's post-traumatic effects and improve functional independence. Post burn keloid and hypertrophic scars are very common in burn injuries especially in the region of body. After completion of burn treatment at the in patient department most patients need prolonged follow-ups at the out – patient department, dispensarization. Dispensarization system of Samarkand Burn Center is carried out through structural subdivisions (examination room for dispensarization and ambulatory reception of reconvalescents). Every year about 350-400 patients undergo dispensarization from burns. Sanatorium Complex with Rehabilitation Center is located in Samarkand Regional hydropathic establishment "Nagornaya" in Nurabad area of Samarkand Region. In this center every patients is prescribed individual treatment taking into consideration his rehabilitation needs and physical condition. Sanatorium and health resort treatment includes: injections and applications of ferments, magneto therapy, electrophoresis (lidaza, hydrocortisone, irixol) hydrotherapy, pelotherapy, serohydrogen irrigation and bath (radon baths), massage, exercises therapy. Results Thus, to improve the effectiveness of rehabilitation of patients with foot burns, a united rehabilitation system including patient's dispensarization and creation of rehabilitation centers is necessary.

P139

Orthotic Scar Management for Hands

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Objective: To understand the construction of resting hand orthosis with slicone

Introduction: Foremost consideration with a burn injury is wound closure; an achievement that comes with the threat of function and joint mobility in the hand. Scar tissue has the potential to interrupt the intricacy of soft tissue structures along the pathways of usual function. An immediate conservative measure of treatment is introducing scar tissue to silicone. This is a non-invasive proven method to improve texture, pigmentation, and height of scar tissue as well as providing hydration. Silon-lined thermoplastic material allows rigid positioning to provide a sustained stretch as an opposing force to the influence of hypertrophic scar tissue while providing the benefits of silicone. The LTS Silon material allows direct visible contact and conformity to scar features on the hand during fabrication.
Materials Used/Needed: Thermoplastic material dense blue adhesive foam, LTS Silon material, strapping, Scissors, adhesive Velcro, Heat gun **Fabrication:** Determine areas of the affected hand that would benefit from silicone and cut LTS Silon material accordingly. More globally consider the optimal resting position of the hand/digits and fabricate resting orthosis needed Carefully mold the silon side of material onto scar areas; translucency of warmed material will ensure correct placement. Reheat area of resting hand splint to adhere pre-molded Silon LTS. Be sure to adhere securely with appropriate warming of both materials **OR**Place dense blue foam on fabricated orthosis with warmed LTS Silon overlapped and secured around the edges encapsulating the foam. Imbed affected hand into Silon LTS over foam to impress palmar/digital features targeting scar areas. Keep pressure until Silon LTS translucency is opaque/white. Place straps and Velcro to secure hand in desired resting posture.
Results: Maximizing orthotic efforts in the burn injured hand by adding silicone is an effective immediate means of initiating scar management to optimize hand function.

P140

Multidisciplinary management of the burn survivor with %92 Total Burn Surface Area: Case report

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Introduction: Burns that are usually more than 20% of the body surface are considered serious burns. A burn that covers 50% of the body can be a direct cause of death. As survival rates from severe burn are improving, early physiotherapy programs may highly important to obtain functional recovery.
Case report: A 29-year old man was admitted to Istanbul Wound and Burn Center on the 01/03/2016 due to burn injuries. It was a scalding burn due to a work accident. The patient with no medical history had 92% TBSA (II and III

degrees) in the literature.
Debridement and skin graft were performed several times under general anesthesia and the patient is being treated in intensive care unit (ICU).
The multidisciplinary team planned and performed interventions:
- Plastic surgeons prescribed wound treatment.
- Anesthetists and intensivists operated ventilation and medical regimes in ICU.
- Physiotherapist promoted respiratory physiotherapy, splinting, positioning, structered mobilization program at supine,sitting and standing positions gradually in ICU.
- Nurses cared the patient according to the treatment plan.

The patient transferred to the in-patient service on 04/08/2016 and discharged on 30/09/2016. Patient follow-up and individualised physiotherapy program continued in both in-patient and out-patient clinics.
Conclusions:
- A patient with 92% TBSA has a chance to survive under multistage physiotherapy protocol.
- The treatment plan for burn patients should be co-ordinated and implemented by the multidisciplinary team.
- Patient's age and medical status affected the recovery period in burn clinic.
- Physiotherapy applications should be done in ICU, in-patient and out-patient services progressively. It is major determinant of tissue healing and functional recovery in serious burns.

P141

Spinal cord injury after high-voltage electrical burns

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Objective: To describe spinal cord injury characteristics and diagnose following high-voltage electrocution.
Methods: We report two cases of patients which received inpatient care in Vall d' Hebron University Hospital's Burn Unit after electrocution, both diagnosed with spinal cord injury. Case 1: 17 years old male with 3rd degree burns affecting 18% of total surface body area (TBSA) after high-voltage electrocution, presenting an exit wound on his right forearm, bilateral claw hand deformity, and muscular necrosis of both upper extremities that required bilateral transhumeral amputation. The 10th day after injury, the patient experimented an acute urinary retention plus bilateral lower extremities weakness, with physical examination compatible with incomplete epiconus syndrome grade C in ASIA scale. A spinal magnetic resonance imaging (MRI) was performed showing no alterations on dorsolumbar structures. Case 2: 28 years old male with 2nd and 3rd degree burns affecting 7% of TBSA after high-voltage electrocution, complicated with left forearm compartment syndrome that required amputation. The 8 th day after injury, the patient suffered bilateral lower extremities weakness with physical examination compatible with incomplete spinal cord injury dorsal level D7 grade C in ASIA scale. No alterations were found on spinal MRI.
Results: Case 1: after rehabilitation treatment, the patient was discharged with final diagnose of epiconus syndrome grade D of ASIA scale, achieving independent gait capacity, but with total dependence for daily living activities (ADL's) performance, due to intolerance of upper limb myoelectric prosthesis. Case 2: after rehabilitation treatment, the patient was discharged with final diagnose of spinal cord injury dorsal level D7 grade D of ASIA scale, achieving independent crutch-assisted gait capacity and partial dependence for ADL's performance.
Conclusion: Spinal cord injury following high-voltage electrocution is infrequent but needs an early diagnosis and multidisciplinary approach given the severity of the sequels and the immense impact on functionality.

P142

Optimizing functional results in the burn patient: Intensive rehabilitation protocol

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Objective: In this communication, we review existent scientific literature focused on rehabilitation of the burn patient, summarizing recommendations provided by international consensus documents and the most recent evidence. Moreover, we present the method in which this recommendations have been applied to the Great Burns Unit of the Hospital La Fe, in the form of a interdisciplinary intensive rehabilitation protocol.
Methods: A bibliographic search was performed among existent literature and international consensus documents focused on the field of burn patient rehabilitation; presenting and summarizing the obtained information . The way we applied those international recommendations to our Burns Unit is also described.
Results: Existent bibliography supports the development and application of intensive rehabilitation protocols in burn units for the improvement of the functional results of their patients. The experience in our unit in which this sort of protocol is applied, matches the good results described in literature.
Conclusions: Early intensive rehabilitation therapy is a key stone when it comes to prevention and treatment of functional complications. This interdisciplinary approach must focus in prevention of long term complications, such as contractures, abnormal scarring, deformities, muscular atrophy, mobility limitations and other issues which can de-

crease physical function. Its utilization in a Burn Unit, will help optimize functional results of their patients.

P143

The influence of age on quality of life after upper body burns

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Objective: Our objective was to determine the influence of age on the quality of life of patients burned on the upper side of the body, more than three years after burn.
Methods: We analyzed the Spanish version of The Burn Specific Health Scale in a 58 patients with burns only on upper side of the body, divided in two groups: 29 patients 65 years old or younger, and 29 older than 65, all of them attended at the Vall d'Hebron Burn Center, Barcelona, between 2011-2014.Statistical analysis included parametric and non-parametric tests as appropriate with SPSS v20.
RESULTS: Patients age ranged 24-97 years, and averaged 43,71 and 76,53 respectively in both groups; 62,07% were women. The were no differences between groups in the mechanism of burn, nor in the duration of hospitalization or the total burn surface area (9,76% and 11,23% respectively), but diabetes and other comorbidities were significantly more frequent in the older group. Eleven patients died in the older group and two in the younger (p=0.011). At the time of receiving the quality of life test, younger and older patients did not show differences in the domain of physical (48,46 vs 46,84), mental (97,85 vs 91,63), social (40,62 vs 38,05), sexual activity (6,35 vs 5,53) and general health (42,08 vs 39,21).
Conclusion: Mortality after a burn in the upper side of the body burn was significantly higher in older people but, as opposed to what could be expected, in this study there were no significant differences between patients older and younger than 65 years in perceived quality of life when examined three years or more after a the burn.

P144

Use of neuromuscular taping in the treatment of post- burn scars

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Objectives: This study covers burn scar rehabilitation treatment integrated with Neuro-Muscular Taping (NMT).NMT is applied without tension, giving decompression and dilation stimuli, helping to maintain elongation of the skin and underlying tissues regaining functional skin elasticity.
Methods: The NMT application technique used is without tension creating a decompression and dilation stimuli to the skin. The tape was applied over the skin in maximum possible elongation creating the formation of skin folds or wrinkles. This particular method of taping creates a decompression stimulus to help reduce adhesion and improve oxygenation of subcutaneous tissues.
Treatment cycle pre-discharge: N°1 weekly treatment using manual therapy techniques for scars including stretching and manipulation.
Starting at 3 months post-discharge: N°2 treatments weekly
- 1 treatment weekly for NMT application
1 treatment weekly for manual therapy
During this treatment phase there was a gradual increase in tape width to help the decompression stimuli to go towards deeper tissues
- Also applied to the skin donor sites
Results: Improved skin quality of the grafted areas homogeneous skin coloration Improved joint mobility and function. Reduce scarring adhesions. Improved tactile sensitivity, thermal recognition
Conclusion: The use of NeuroMuscular Taping as an integrated therapy to standard burn scar rehabilitation treatment has led to a general improvement of the skin grafted areas. Improvements were noted through homogenous skin coloring as well in terms of skin elasticity and functionality, reduced adhesions and the skin became less rigid gaining a softer quality. All of which allowed the patient to return to the same sport activities prior to the burning trauma. In addition, the level of foot hyposensitivity has improved from a condition of complete anesthesia to an overall normal situation of location recognition and normal response to tactile, heat and pain stimulus.

P145

Use of play-therapy in establishing a program of non-medical support in the Speransky Children's hospital# 9 in Moscow

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Russian hospitals do not provide burn rehabilitation: neither medical nor psycho-social support. The hospitals also provide no non-medical assistance either. The only organization in Russia that provides burn rehabilitation on regular basis is Speransky Children Hospital Fund at Speransky Children's Hospital#9: a Russian non-profit organization that offers support for burn victims.
The presentation focuses on the stages of psycho-social rehabilitation of children at Speransky Hospital: from the patient's admission to the follow-up programs after discharge. We use different methods of play therapy, music therapy, and Child Life support. We work children from different age groups in the hospital playroom. Not offi-

cially being part of the hospital, we face many difficulties trying to convince medical professionals that the psychological condition of the child actually impacts the process of healing.
We would like to talk about our experience of running a psycho-social program in a Russian hospital. We will share the problems we faced and our results in 2015-2016.

P146

What is different about scar management? Physiotherapy and Occupational Therapy perspective

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Objectives: Scars have a significant impact on the quality of life of patients who suffered a burn. Limited functional movements and low self-esteem can affect the ability to cope with daily life activities and engage in meaningful social interactions. As physiotherapist and occupational therapist working in at Hospital de S. José in Lisbon, we face the challenge of selecting at an early stage the most effective and evidence-based treatment strategies that will result in better long term outcomes for patients. In recent years a growing body of evidence is available, fostering PTs to examine and change the traditional approaches. Thus, the main objective is to discuss and analyse the current options and facilitate the point of care decision-making process in order to maximize function.
Methods: a literature review covering the last 5 years has been undertaken and available treatment strategies to minimize the impact of scars were identified and compared on effectiveness, affordability and patient acceptance.
Results: massage, silicone, and splints have been confirmed as having a positive impact on scar management. Evidence suggests the optimal timing when they should be used to maximize the benefits.
Discussion/Conclusion: Scars are an important aspect for patients who suffered a burn.
It is important for physiotherapists and occupational therapist to be up to date with the current options available and the evidence that supports them in order to make the best decisions.

P147

The participation in daily activities of pediatric burn survivors in Arab population

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Introduction: Pediatric burn survivors are known to have major difficulties adjusting and coping with their post injury condition in daily life. This study aimed to explore the level of participation of arab origin children in daily activities of burn survivors, from both perspectives of the child and his/her parents.
Methods: Participants were 20 burn survivors aged 7 to 18 years (11 boys, 9 girls) and their parents. The children completed the Children's Assessment of Participation and Enjoyment (CAPE), a self-reporting questionnaire. The parents completed the Children's Participation Questionnaire (CPQ), a parent reported questionnaire and a bio-socio-demographic questionnaire.
Results: Significant correlations were found between the number of aids and the child independence in participation. No correlations were found between the children and their parents' reports on a child's participation. The parents reported on lower level of participation dimensions (diversity, frequency, independence and enjoyment). At the same time, the children reported on lower score for participation's diversity and higher score for participation frequency and enjoyment, relative to the participation level of typically developing peers.
Conclusions: The participation's diversity and independence level of burn injured children is limited, even years after the injury. However, parents and child hold different perspectives regarding enjoyment in participation. Enhancing participation is a central goal for rehabilitation; therefore, it is important to consider both perspectives.
Discussion: This study is part of a larger research, which aims to evaluate and measure the effectiveness of a pediatric burn camp on the level of participation in daily life activities. Assessing lack of participation in certain domains may lead the rehabilitation, educational team as well as camp leaders and other caregivers towards certain activities to optimize improvement, adjustment and participation in all domains of daily activities. Parents' expectations need to be addresses in order to maximize their support and active involvement.

P148

Rehabilitating approach in a upper lymphedema related to burns sequelae. A case report

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The incidence of lymphedema secondary to burns is uncertain; there are no epidemiological studies in the scientific literature.
We present the case of a burned patient with an affectation of the 80% of the body surface with second and third-degree burns of years of evolution.
The patient has required multiple corrective surgical procedures, presenting important retractions and amputation of upper extremities phalanges.
In spite of everything, the patient partially maintains her autonomy thanks to the functional clamp of both hands. In the postoperative course of an excision of a periarticular

calcification of the elbow, presents clinical edema of the hand dorsum and first right phalanx with the loss of manual ability.
On examination, a pitting edema without stemmer sign is detected due to the absence of skin folds.
The predisposing factors for lymphedema were the circumferential involvement and depth of the burn, scar retraction and the trauma derived from the intervention.
In our case, the challenge was to find a customized decongestant system with which maintain her autonomy, thus we opted for a self-adjusting low elasticity device with lymphatic padding.
Self-adjusting systems allow us to regulate working pressure during the day (dynamic stiffness index) while molding to different surfaces.
They have the additional advantage that they allow self-management with respect to the pathology reducing health costs derived from therapy

P149

Conservative rehabilitation of children with post-burn scars skin

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The goal: is to study the results of conservative rehabilitation in children with post-burn scars.
Material and methods: On the basis of Hrodna regional children's clinical hospital was under the supervision of 60 children with thermal injury. Patients were examined 1 month after healing, then depending on the appointments of conservative therapy. Used silicone coating, customized compression therapy, enzymatic therapy.
Conservative treatment efficacy was evaluated by subjective criteria (pruritus, sleep disturbance) using a visual analog scale from 0 to 10 points, objectively using the Vancouver scale (Vancouver Scar Scale), developed by T. Sallivan and co-authors in 1990 to evaluate the rumen parameters: pigmentation, vascularity, elasticity, height of the scar above the level of healthy skin.
At the beginning of treatment, patients in both groups, the intensity of the itching was 7-9 points, had sleep disorders, the appearance of scars according to the Vancouver scale was estimated to be 8-10 points. Patients of the 2nd group after 3 months of treatment subjective and objective measures of scar process was significantly better than the control. The intensity of itching in patients of the first group decreased to 2-4 points, the normalization of sleep was noted in 12 patients, while the indicators in the second group was 5-6 points 3-4 points, respectively. Objectively the appearance of the scarred tissue in patients in the second group who used combined therapy, was 3-4 according to the Vancouver scale, while in the first group there were 5-6 points, respectively. Particularly quickly in the second group was a reduction in the height and mobility of scar tissue.
Thus, our data show the effectiveness of the use of the complex of enzyme, silicone preparations, individuation of compression underwear that allows to reduce the increase in the scarring process in the skin.

P150

Integration of camouflage techniques into burn scar rehabilitation: the practical experience of our burn centre.

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Objectives: In this paper we describe how we integrated camouflage techniques into burn scar rehabilitation in our burn centre.
Methods: Camouflage techniques are part of the multidisciplinary burn scar rehabilitation in our burn centre. Plastic surgeons and physiotherapists evaluated and selected patients to be involved into the camouflage sessions during the follow up. Patients are considered suitable for camouflage at least 6 months after the wound closure. After having been selected and informed, the patients followed a specific camouflage training consisting of 2 different sessions. In the first session patients have the make up done by camouflage cosmeticians, while in the second session the patients do their own make up under the supervision of the professionals.
Results: From April 2012 to June 2016, 37 patients were involved in the camouflage project. All patients reported at the end of the make-up sessions a positive impression which translates into a social impact of feeling "normal" again. Women with face and neck scars, even not alterating physiognomics, were the most compliant. While, men seemed to be interested in learning camouflage only if having scars massively altering their appearance.
Discussion/Conclusion: Aesthetic damage limits the patients social reintegration due to considerable psychological problems with self-esteem and self-confidence. Moreover, an altered appearance may lead to social stigmatisation. Camouflage techniques may have a positive impact on quality of life, particularly socialisation of burn patients.

P151

Enhanced knowledge on outcome and effectiveness of treatment of hand burns (oid..)

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Introduction: To understand the impact and recovery of burns of the hand and direct, tailor treatment, outcome assessment is essential. There is however, a large variety of measures and outcome assessment is often incomplete. The aim of this project was therefore to develop a core set.
Method: The first concept of the core set was based on the framework of the International Classification of Functioning, distinguished two phases of rehabilitation, three patient states and included patient reported and clinical outcome. Subsequently, potential assessments were allocated to the various outcomes. This concept was presented and discussed during the European Burns Association congress in 2013 and subsequently revised. The revision was sent to 65 international colleagues along with a survey.
Results: Eleven surveys were returned from 16 persons representing 9 institutions from 6 countries. Main bottleneck was the fact that some assessments were not translated or validated in all countries. Based on the feedback, final revisions were made to the core set.
Conclusion: With multidisciplinary and international input, a core set of outcome assessments for burns of the hand was developed. The core set has a dimensional approach which emphasizes the multidimensionality of burns to the hand and their recovery, and will contribute to enhanced knowledge on outcome and effectiveness of treatment of hand burns.

P152

Effect of Aerobic Exercises on Liver Enzymes Post Burn

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Objectives: The current study was conducted to examine the effect of aerobic exercise on liver enzymes post burn.
Methods: Thirty burned patients with burned surface area about 30% to 40% participated in this study. Their ages ranged from 25-40 years. They were selected from Orabi hospital and were divided randomly into two equal groups.
Group (A) composed of 15 patients who received aerobic exercise in form of treadmill exercise for 45 minutes at 60-75% of maximum heart rate, 3times/week for 8 weeks beginning after their release from intensive care unit in addition to their physical therapy program (splinting, stretching ex., strengthening ex. and ROM ex.) and medical treatment (cataflam, alphintern, zinetac and hemacaps, wound dressings).
Group (B) composed of 15 patients who received only their physical therapy program (splinting, stretching ex., strengthening ex. and ROM ex.) and medical treatment (cataflam, alphintern, zinetac and hemacaps, wound dressings). Method of evaluation was measurements of ALT and AST liver enzymes by spectrophotometer device.
Results: There was a significant decrease in ALT and AST plasma liver enzymes levels in aerobic exercise group when compared with the control group.
Conclusion: Aerobic exercise can be considered as an effective method in decreasing ALT and AST plasma liver enzymes levels post burn.
Key words: (Aerobic exercise, Burn & Liver enzymes).

P153

Variability in split-thickness skin graft depth when using an air-powered dermatome: a paediatric cohort study.

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Aim: Earl Calvin Padgett introduced calibrated powered dermatomes in 1938. A year later he presented his experience in a publication emphasising "…particularly the advantages of a type of skin graft which it has not been possible, for the writer at least, to cut previously, namely a skin graft **cut at a predetermined level** in the last quarter of the thickness of the skin…" (emphasis added). This statement introduced the concept powered dermatomes provide uniformity in the depth of STSG, a concept largely unchallenged since. Split-thickness skin grafts (STSG) taken using calibrated powered dermatomes are assumed to yield a graft of uniform thickness, though this assumption has never been analysed statistically. This study aims to test that assumption in a paediatric population.
Method: STSGs from a consecutive cohort of paediatric patients were analysed for mean thickness, measured from a central biopsy. All STSGs were taken from the thigh at a dialled thickness of 0.007 inches. Data were analysed using non-parametric methods.
Results: There were 140 STSGs taken from 91 children. The median thickness was 6.94 thousandths of an inch, with a spread of thicknesses about this median (IQR 5.05-9.28). There were no significant differences when results were analysed by surgeon, patient age or sex, swipe number within the case, or the number of previous passes with the same blade.
Conclusion: STSG thickness is inconsistent, with a broad spread about a median value. This study provides no data to suggest there are pre-operative predictors of STSG thickness being significantly more or less than that dialled on a powered dermatome.

P154

Does 3D Wound Mapping Software Compare to Expert Opinion in Determining Burn Wound Area?

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Introduction: New technologies in the field of burn wound and scar assessment are continually being evaluated. Accurate estimation of total body surface area (TBSA) burn wound is of paramount importance in fluid resuscitation to prevent complications which are associated with morbidity and mortality. Estimating the TBSA is performed by a multitude of different methods, however a gold standard would be ideal. The aim of this study was to compare the estimation of burned TBSA% between 3D photography by Panasonic FZ-M1 Toughpad in conjunction with WoundCare Lite software and expert opinion volunteered by burns doctors.
Methods: Two life sized mannequins were used to simulate burns; an adult and a child. The burn was drawn to mimic real life burn patterns. Burns were measured prior to specialist assessment on the 3D camera. Burns doctors were asked to estimate the TBSA% of the burn. 10 burn sizes were assessed on the adult mannequin, and 8 on the child.
Results: Wound size as estimated from the camera varied from 0.42% to 18.23%, with a mean of 5.246%. Each burn was assessed by a median of 3 assessors (ranging from 2-8). Burn TBSA assessments from the 3D camera and specialist assessment (compared using ICC) showed excellent agreement, 0.985 (95% CI 0.905, 0.996).
Conclusions: This study has demonstrated that the wound mapping software WoundCare Lite in conjunction with the Panasonic FZ-M1 Toughpad 3D camera compares well with expert opinion in determining burn surface area on a mannequin. Further research is needed to establish whether this is the case in burns on patients in an acute setting.

P155

Eschar removal by Bromelain based Enzymatic Debridement (Nexobrid®) in burns: European Consensus Guidelines

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Early eschar removal and debridement in burn wounds is regarded as a significant step in deep and partial thickness burns. It aims to reduce the rate of infection and provides early wound closure by primary healing or secondary transplantation. Early wound closure accompanied by preservation of dermis, is regarded as a necessary step to reduce scar related complication, e.g. functional limitations. Next to the standard of care to remove burn eschar by classical surgical excision, hydrosurgery, maggots and lavae, laser, and enzymatic debridement have been described as adjunctive techniques to the burn surgeon. There is no doubt that early eschar removal in between 72 hours improves the outcome of burn wound treatment by reducing bacterial wound colonization, infection and length of hospital stay. Contrarily, the right technique for eschar removal is still a matter of debate. There is increasing evidence that enzymatic debridement (ED) is a powerful surgical tool to remove eschar in burn wounds, reducing the blood loss, the need for autologous transplantation and the number of wounds requiring surgical excision. In order to assess the role and clinical power of ED and eschar removal by Bromelain based preparation (Nexobrid®) beyond the literature and in view of the users, a European Consensus Meeting was scheduled to provide statements for application, based on the mutual experience of applying ED in more than 500 adult and pediatric patients by the Consensus panel. Issues to be addressed were indications, pain management and anesthesia, timing of application, technique of application, post-interventional care, transplantation after ED, blood loss, training strategies and learning curve and areas of future research needs. 65 consensus statements were provided for the use of ED. The consensus document may serve as preliminary guideline for the use of ED with user-orientated recommendations until further evidence and systematic guidelines are available.

P156

Evaluation of hydrosurgery in burn care Which patients benefit most?

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Objectives: During the last decade hydrosurgery has become popular as a new option for tangential excision in

burn surgery. The Versajet™ hydrosurgery system is thought to be a more precise and controlled manner of burn debridement. To investigate the optimal surgical treatment of patients with deep dermal wounds, we recently started a multicentre RCT to assess scar quality after debridement with hydrosurgical versus conventional tangential excision. A limited number of studies compared the outcomes of hydrosurgery with conventional tangential excision techniques in burns, and only a few did recommendations on the application of both techniques. However, no algorithm for the decision process prior to surgical excision is available, and burn specialists decide individually whether hydrosurgery could be applied or not. The objective of this study was to evaluate the use of hydrosurgical and conventional tangential excision in the Netherlands.
Methods: A retrospective study was conducted in all patients admitted to a Dutch Burn Centre with burns who needed tangential excision between 2009 and 2014. Data were collected using the national Dutch Burn Repository R3.
Results: 1407 patients were treated with hydrosurgical excision (22%), conventional excision (47.1%) or with a combination of both techniques (30.9%). In 2009 hydrosurgery was used in 30% of the cases, compared to 52% in 2014. The proportion of people treated with hydrosurgical surgery differed between the three Dutch burn centres. Hydrosurgery was frequently used in children and scalds. It was often combined with conventional techniques in patients with a TBSA of >20%. Body parts treated most frequently treated with hydrosurgery alone were the face, hands and genitals.
Discussion: The use of hydrosurgery in Dutch burn care is increasing and substantial. To evaluate if this substantial application in the treatment of burns is legitimate, more research into the long-term effects of hydrosurgical excision is necessary.

P157

Importance of initial management and surgical treatment after hydrofluoric acid burn of the finger

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Occupational injuries to digits due to hydrofluoric acid (HFA) are frequently encountered. They have distinctive features, including intense pain, progressive tissue necrosis, and possible bone erosion. To minimize tissue damage, it is of great importance to execute prudent preoperative assessment and determine the correct surgicalmodality to reconstruct and maintain the function of the hand. However, proper protocols for fingers have not been presented in previous studies. Eight cases with HFA burn to digits were presented to the emergency room. Wounds were immediately irrigated with saline, calcium gluconate was applied topically to block destructive effects of fluoride ions. Blisters that could lead to progressive tissue destruction were debrided. A fish-mouth fasciotomy was performed and prostaglandin was administered intravenously tomaintain maximal distal circulation.Wounds were evaluated daily for apparent demarcation for 6 or 7 days. Digits were reconstructed with free sensate second toe pulp-free flap to provide sufficient padding for the fingertip. All patients showed excellent recovery with stable flaps with acceptable external contour, durable softtissue padding, and full range of motion of affected joints. In conclusion, when a patient is admitted due to HFA exposure to the finger, early treatment including irrigation,topicalneutralizers, andfasciotomy are of greatimportance tominimize tissue damage. In addition, a physician should wait atleast 7days untilthe degree of damage to the tissue can be classified so that the physician can decide whether aggressive debridement should be proceeded. In case of deep layer injuries of weight bearing portions such as finger pulp, reconstruction techniques utilizing durable tissues such as partial second toe pulp free flap should be employed.

P158

Thermal burn in a 30 minutes old newborn: Report and two years follow up of the youngest patient with iatrogenic burn injury

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Burns in infants are rare. The majority of neonatal burns occur in the hospital setting. The immaturity of their immune system, their fragile and thin skin, the difficulties in resuscitation, the engraftment paucity limited by donor sites and long- term complications, make taking care of burned newborns extremely difficult. We present the case and a two years follow up of a newborn burned 30 minutes after his birth with a total body surface of 35%, when the hot water bottle used in the hospital accidentally burst. This is a case reported of theearliest iatrogenic burn in a newborn. The newborn wasdischarged home after 30 days in hospital for resuscitation ,dressings and skin grafting. He was under regular observation for the last two years.

P159

Rapid enzymatic burn debridement: Review of seven clinical studies

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Objectives: The ideal debriding agent should be effective, fast, selective and non traumatic with minimal blood loss and maximal preservation of non-injured dermis that may heal spontaneously. Current surgical debridement is effective but traumatic and non-selective, and non-surgical methods are inefficiently slow. The use of NexoBrid (NXB), a concentrate of proteolytic enzymes enriched in Bromelain, is growing steadily in the EU and other areas. The objective of this work is to provide a comprehensive review of all clinical studies done with NXB.
Methods: Seven different clinical studies assessing the short and long term effects of NXB on deep burns were compiled. Of those, four were controlled (compared to the Standard of Care–SOC) and 2 were observer-blinded. The endpoints of debridement efficacy, time to complete debridement, surgical burden, and safety of a 4 hour application were studied in adults and children.
Results: Data from over 550 treated burn patients comparing NXB to SOC demonstrate that debridement in both arms was effective (> 90%). NXB removed the eschar earlier and faster, and the treated wound bed could be visually diagnosed and healed spontaneously (epithelialization) or by autografting. Overall surgical burden (expressed by need for excisional debridement, autografting and escharotomy) was significantly reduced, as was blood loss. The NXB effect on comprehensive burn care and time to wound closure changed according to the general post debridement strategy (surgical or non-surgical) applied. Long term results were at least as good as in SOC. Adverse events were consistent with those commonly seen in patients with deep burns.
Conclusions: NXB has been proven to be effective, fast acting and undamaging to uninjured tissues with the potential for increased chances for spontaneous epithelialization. An overall reduced surgical burden with favorable long term outcomes can be the basis for a minimally invasive approach to burn care.

P160

Delayed and fractional use of enzymatic debridement with Nexobrid for extensive burn injury: A Case report

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A 61-year old male was presented at our Burn Centre with a severe burn injury affecting 95% TBSA second to third degree. On admission, a mechanical debridement, an escharotomy and a tracheotomy were performed. Due to acute respiratory and cardiac failure, no surgical intervention could be performed in the next few days. Thus, a fractional use of enzymatic debridement with Nexobrid was performed to a TBSA of 54% starting on Day 5: Day 5: upper limbs (20% TBSA); Day 7: lower legs and feet (17% TBSA); Day 8: upper legs (17% TBSA). Despite successful enzymatic debridement, the patient died on Day 8 due to acute lung and heart failure.
This Case report reveals that a delayed and fractional application of Nexobrid to a TBSA of more than 15% is possible.

P161

Artificial dermis (AD), an alternative of flaps

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Introduction : Flaps are the gold standard to cover exposed tendons, bones or neuro-vascular pedicles . In difficult situations, as deep and large wound defects, flaps are difficult to realize. Artificial dermis (AD) could be used as an alternative solution.
Material and method: After excision of death and infected tissue, large and deep defects with exposed vessels, nerves, tendons or bones, have been covered by a tridimentional collagen elastin matrix and an epidermal graft . NWPT have been used for deep and infected wound defects. Follow up was clinical and functional assessment.
Results: 39 patients (23to 72 YO) 25 males ,14 females, were treated. 20 for burn,19 for necrotizing fasciitis. 12 hands, 25 lower legs and feet and 5 others locations were grafted. Surfaces grafted were 74 cm^2 to 1280 cm^2 .NWPT was used for 18 patients, and changed every 4 days before grafting AD. Mean time before grafting AD after NWPT was 3 weeks.Mean healing time of the AD was 2 weeks . All exposed zones were covered. By restoring the shearing planes, collagen-elastin matrix thus avoid deep-rotted adhesion and improves the tegumentary suppleness and the final functional by the free tendinous play obtained under the composite grafts. With a final healing time and number of surgical procedures reduced. The good results were obtained with a simple surgical reproducible technic, without disadvantages of difficulties, potential complications, and donor site scaring of flaps. The graft incopore more naturally than a flap and ie allowed to wear normal shoes.
Conclusion: Even in difficult situation,AD could be considered as a surgical alternative to flaps,and could be used without any loose of chance, as the solution of first intention with keeping the possibility to use flaps in second recourse.

P162 Enzymatic debridement by means of Bromelain in burns

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The standard of care for full thickness burns is surgical debridment followed by autografting. Recently the use of enzymatic debriding agent rich in bromelein has been proposed as a non surgical alternative for the removal of burn necrotic tissue. Local application of bromelain has been shown to be rapid, effective, non-invasive, safe, easily performed at the bedside with minimal blood loss. The activity on necrotic tissue seems to be mediated by a non-proteolytic component present in bromelain extract, named escharase.
In this paper it is described a clinical experience in the treatment of patients affected by extensive burns admitted to Turin Burn Center by means of an enzymatic debriding agent rich in bromelein. From January 2016 we treated 15 patients with acute burns, 10 male and 5 female, age ranging from 16 to 84 years. The percentage of the total body surface area ranged from 10% to 80%. Treated surfaces ranged from 5 to 15% TBSA. All the treated burns were deep second and third degree. Anatomical involved regions were mainly located on the limbs. Concomitant trauma and previous diseases were registred. The treatment was applied in an early phase (1-8 days) following the producer recommendation. Debrided areas were immediately grafted with glycerol-preserved allografts or, in case of incomplete debridement, with topical preparations. In 8 cases patients were successively operated with autografts in the same areas; in the other cases a spontaneous healing was achieved.
The effectiveness of enzymatic debridement, prevalence of local infection and healing time, as well as pathological scar occurrence and cosmetic results are discussed.

P163

NexoBrid in large burns - results of a pharmacokinetic study

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Objectives: The growing use of NexoBrid, a concentrate of proteolytic enzymes enriched in Bromelain indicated for enzymatic debridement of deep thermal burns, has lead to interest in the treatment of large burns. The objectives of this study were to assess the safety, efficacy and pharmacokinetics (PK) of NexoBrid in patients with deep burns up to 30% TBSA.
Methods: A multi-center, open label, single-arm study in patients aged 4-70 years old suffering from 4-30% TBSA deep partial (DPT) and full thickness (FT) burns.
Results:Thirty-six patients were enrolled and treated with NexoBrid, 22 with a single application up to 15% TBSA and 14 patients (with a total treated area between 15-30% TBSA) were treated with two separate NexoBrid applications, each up to 15% TBSA (maximal dose of 60 gr). Complete eschar removal was achieved in 89% of cases, in an average of 0.83 days from enrollment (2.16 days from injury). The PK profile in patients treated with 1 or 2 applications is similar; NexoBrid concentration reached Cmax by 2-4 hours and then declined with a mean T1/2 of 12±4.4 hours. Quantifiable serum concentrations were measured through 48 hours after dose administration. NexoBrid systemic exposure increases with dose and %TBSA, and a small increase in the average PK parameters was observed after the second application. The safety profile in patients treated up to 15% TBSA was comparable to that of patients treated between 15-30% TBSA, with no safety findings associated with increased TBSA or number of applications.
Conclusions: NexoBrid use was shown to be safe and the efficacy results are consistent with previous studies. The pharmacokinetic profile following first and second topical applications was comparable, suggesting no concern with accumulation following a second topical application of NexoBrid.

P164

Enzymatic burn debridement in children – first experiences in 10 patients

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Objectives: Enzymatic debridement of deep burns achieves a more selective result by preserving viable dermis, leading to reduced need for surgical debridement and autografting. NexoBrid is currently labeled for adult patients, however surgical treatment of children is challenging even for experienced burn surgeons. We present the results of children treated with NexoBrid in our center in an off-label setting.
Methods: Informed consent with signature of both parents was obtained prior to treatment. NexoBrid was applied in a dose of 2g per 180 cm^2 on deep partial (DPT) or full thickness (FT) burns for 4 hours. Following a 2 hour post NexoBrid wet-to-dry soaking a selectively debrided wound bed allows for a correct burn depth evaluation and conservative or operative treatment can be performed accordingly. All treatments were done under sufficient anesthesia or analgosedation.
Results: Since 2013 we treated 10 children with NexoBrid (which constitue 9% out of the 115 patients treated in our center) according to the above protocol. Cause of burn was flame (n=5), scald (n=3) and contact burn (n=2).Mean age was 9,4 years (1-17), 7 males / 3 females. Mean TBSA was 12 % (3-30). Enzymatic debridement was performed on an average of 7 % TBSA (2-15) at day 4 (1-7) after trauma. Hospital discharge was at day 20 (9-34) after admission. Autologous skin grafts were needed in 6 patients. Time to complete wound closure was 27 days (15-37) after debridement. Compression garments were prescribed in all

cases. In two cases surgical scar revision was needed. No NexoBrid related adverse events were seen.
Conclusion : Off-label use of NexoBrid in children is feasible and safe. The thinner skin in younger patients benefits from selective debridement and preservation of viable dermis to support spontaneous reepithelisation especially in DPT burns.

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Clinical advantages of a selective enzymatic debriding agent (NexoBridTM)

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I**ntroduction:** Patients with severe burns represent a challenge for the need of an early debridement before developing a progressive multiple organ dysfunction syndrome. The current standard of care (SOC) is surgical or non-surgical debridement, depending on the burn depth at the initial diagnosis. Surgical excision often sacrifices viable skin together with necrotic tissue and, in addition, results in significant blood and heat loss. Rapid and selective bromelain-based enzymatic debridement (Nexobrid™) has the potential to offer an alternative method of eschar removal with fewer complications.
Materials and methods: In this study 60 patients affected by intermediate-deep burns, with a mean age of 70,43±3,6 and a mean TBSA of 28,33±13,66% were assessed. Half were treated with Nexobrid™, the other half with the SOC. A series of parameters were evaluated: hospital stay, number of surgical procedures, variations in biochemical parameters (Hb, WBCs, PCR, fibrinogen), blood transfusion and rate of survival.
Results: A decrease in hospital stay, surgical interventions and reduction of blood transfusions were recorded. PCR value drop in few days were observed while WBCs and fibrinogen values did not show significant differences in the two groups. Survival rate were increased in the group of patients treated with Nexobrid™.
Conclusions: Nexobrid™ is a rapid and selective eschar-removal product, which significantly reduces the number of surgical procedures and post-surgical complications, as well as the severity and the onset of septic complications; it also enhances the short and medium term survival rate in severe burn patients.

P166

Rapid enzymatic debridement of deep facial burns in a patient with severe inhalation injury: Case report

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Objectives: To assess the off-label use of rapid enzymatic debridement of deep facial burns associated with severe inhalation injury.
Methods: Fifty-three-year-old female patient sustained 16% TBSAB (Total Body Surface Area Burns) caused by fire to face, neck, trunk, both hands and right thigh associated with severe inhalation trauma. The burn depth was diagnosed clinically as mixed deep dermal/third degree of 12% TBSAB and superficial of 4% TBSAB. Enzymatic debridement of all the deep burn areas (8%TBSA), except the right thigh, was performed by bromelain derived proteolytic enzymes mixture gel (NexoBrid, MediWound). The procedure was accomplished according to manufacturer´s instructions. All the debrided wounds had been covered temporarily by fresh-frozen porcine xenografts. Full thickness skin injury areas were closed by split thickness autografts, deep dermal areas were treated conservatively.
Results: Single debridement efficacy was 95% on the face, neck and trunk and 90% on both hands. Healing by epithelization under xenografts of most of the wounds including face area was achieved within 5 weeks. Only 2,5% TBSA of the debrided areas on both hands and neck required autografts.
Conclusion: Deep facial burns are often combined with severe inhalation injury. The current method of choice for burn eschar removal is tangential excision. However, during tangential excision also viable tissues with good healing capacity are removed, which is important particularly in functional areas as are the face and hands. In our patient enzymatic debridement proved to be safe and effective on the face in a very high-risk patient with severe inhalation injury and unstable circulation as an alternative to tangential excision.

P167

Use of a single layer skin substitute for burn hand cover

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Burns on the hands affect the quality of life, daily living activities and work reincorporation of patients. Skin substitutes may be an option for the reconstruction of these patients, but the use of this type of products in a high-demand service such as ours may lead to prolonged hospitalizations, which are prohibitive for us. The release of a single layer skin substitute, in which the immediate graft is possible, opens up new possibilities of use.
Our goal is to present a case of a burn patient with compromise of both hands, in one of which was used an acellular dermal matrix (Integra Single Layer®).

Clinical Case: A 35-year-old patient with a background of alcoholism, drug addiction and suicide attempts entered the Burned Service of the Hospital of Emergency Public Assistance with self-inflicted burns on face, neck, trunk and upper limbs of 30% of surface area. It emphasizes deep commitment of the left hand and deep partial thickness of the right. A suprafascial escarechotomy was performed on the left hand, and a tangential escarechotomy with a razor to dermal plane on the left. Later, both hands were grafted with lamellar grafts, but in the left hand an acellular single layer skin matrix was used.
Results: The patient progresses favorably, with catching on 90% and progressive recovery of the mobility of both hands. We present the photographic record of the technique, result and follow-up.
Conclusion: Evidence on the use of single layer skin substitutes in a functional area such as the hand is scarce. After this experience, we propose their use in this type of patients, on who classic skin substitute cannot be used due to limitations regarding hospitalization times, and for whom recovery of the functionality is a priority.

P168

Enzymatic Debridement and Prevention of Compartment Syndrome in Electrical Burn Injuries: a case report

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Electrical Burn are affected by a high frequency of complications. One of these is compartment syndrome, requiring emergency surgical management.
We report the case of a patient who reported High Voltage electrical burn injury, 12% TBSA,circumferential skin lesions involving the right hand and elbow.
He was transferred to our hospital 24hrs after the trauma, he presented an high risk of developing compartment syndrome. He underwent enzymatic debridement of the burned areas 48 hours after the trauma, following the application protocol of bromeline (NexoBrid), performed under deep sedation.
At this moment the interstitial pressure at the elbow was 76mmHg. After 4 hours we removed the drug and interstitial pressure was 46mmHg at the elbow and 8mmHg at the hand. Clinically there was a
reduction of oedhema and pain.After 24h the area was covered with allograft.Functional recovery was total after 38days. There was no need to perform escharotomies or fasciotomies. The patient was able to restart his working activity after 40 days. Treatment of electrical burn injury with enzymatic debridement can be considered a use out of label. Its use in prevention of compartment syndrome was successful.Cryopreserved allograft as medication has proven its efficacy, offering the best outcome.In electrical burn injuries we should prevent compartment syndrome. Use of Enzimatic debridment helps in the management of skin lesions.The treatment can be made at the bed of the patient, requiring a proper sedation; Nexobrid is relatively simple to use and requires a short learning curve; patient's recovery is faster compared to classic surgical treatment (escharotomy or escharectomy); The use of Nexobrid for escharolysis in circumferential lesions after electrical burn injuries can be useful in the prevention of compartment syndrome, in absence of motor or sensitive compromission. In presence of a compartment syndrome, even at early stages, emergency surgical escharotomy or fasciotomy has to be preferred.

P169

Demographic Characteristics of Burn Mortality and Its Relation to Tangential Excision at Burn Unit of Cipto Mangunkusumo National General Hospital

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Background: Burn injury is considered as one of major problem because of high mortality and morbidity. One of the several managements to decrease the rate of mortality is wound excision. The aim of this study is to describe the characteristics of burn mortality in our burn unit and the association with timing of tangential excision.
Methods: We collect data of burn patients who died in 2016 at Burn Unit of Cipto Mangunkusumo National General Hospital. We investigate the characteristics and the association of mortality and timing of tangential excision from collected data through literature review. An online database search of PubMed, Cochrane, and Burns Journal was performed to get the literature.
Results: Thirty-four patients out of 146 burn patients died at RSCM Burn Unit from January - December 2016. Most of died patients are male (n=22; 64,7%) in productive age (20 - 29 years old). The most common cause of burn were due to flame (n=29, 85,3%) with the extent of burns over than 40% TBSA (n=29; 85,3%). The major cause of death was multiple organ failure with sepsis (n=31; 91,2%). Only 13 patients (38%) underwent early tangential excision, while the rest were delayed or no tangential excision because of unstable condition of the patiens or delay of referring to our burn unit. From database search, only 5 literatures relevant to our study. From all the literature, early tangential excision decrease rate of infection and mortality.
Conclusion: The major cause of death in our burn unit was multiple organ failure due to sepsis. From the literature, delay in excision were associated with delayed wound closure as well as increased rate of infection and sepsis.
Keywords: Burns, mortality, demographics characteristics, tangential excision.

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Extracorporeal Membrane Oxygenation (ECMO) in Severe Burns Debridement; Lessons Learnt

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Objectives: We present our experience of debridement and grafting of severe burns in a patient on ECMO support. Preservation of physiological homeostasis on the operating table enabled extensive debridement and extended operative time far beyond the normal limits of surgery.
Methods: We retrospectively gathered notes corresponding to the patient's management in five hospitals, including two regional burns centres.
Results: We present the case of a 33 year old male involved in a domestic house fire. The patient sustained 50% TBSA full thickness burns to his back, bilateral upper limbs, and lower limbs combined with a significant inhalational injury. Following initial debridement of 16% TBSA the patient developed acute renal failure and respiratory failure requiring ECMO at a national centre, delaying further operative intervention.
Seventeen days post burn he returned to theatre on ECMO for removal of allograft, debridement, MEEK and meshed autograft of 38% total body surface area. This six hour operation involved five operating surgeons and two scrub nurses. A total of 20 units RBC, 10 units FFP and 4 units platelets were transfused on table.
Discussion / Conclusion: Major burns often require multiple theatre sessions for debridement and coverage. Time on table is limited by extreme demands on homeostatic mechanisms and physiological reserve of the patient.
We describe a single session burns debridement supported by the use of ECMO, allowing for the maintenance of normothermia without the use of external warming devices. This enabled more extensive debridement and extended operative time far beyond the normal limits of burns surgery, thereby reducing the number of trips to theatre and time to complete wound coverage. However, anticoagulation associated with ECMO resulted in transfusion of blood products equivalent to the patient's entire blood volume and may be the new limiting factor in future cases.

P171

Early surgical treatment of burns using wound coverings Burn center Krasnodar Russian Federation

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Aim: To develop methods of early surgical treatment of deep dermal burns with wound dressings.
Methods. Annually in the center 1,300 treated patients with burns (including 700 children). Running up to 2000 operations. In 500 patients with deep dermal burns are performed annually in the early necrectomy 2-5 days after injury to the closure of wound dressing wounds. Since 2015 applies "Suprathel". In order to create optimal conditions for the epithelialization of deep dermal burns after necrectomy the wound impose "Suprathel".
Results. After necrectomy to the lower layers of the dermis perform napkins with epinephrine hemostasis for 5-7 minutes. Then superimposed sterile wound covering "Suprathel", which is fixed with a bandage. Subsequently, only cosmetic dressings performed starting from the third day after surgery. Wound coatings are not removed until complete epithelialization of wounds. Epithelialization occurs depending on the depth of burns 8-12 days after surgery. When staged surgical treatment of painful dressings with ointments, without "Suprathel", made every other day for 15-21 days.
Conclusion: In combustiology clinical picture of wound healing is diverse and depends on the stage of wound healing and burn depth. In the traditional, staged surgical treatment of deep dermal burns tend to deepen with the formation of granulation tissue and the need to follow autoplasty. A more preferred method of treatment of deep burns is a method of early surgical treatment, in which the crust is removed in the early stages after the burn, and the wound is closed wound coverings. Research result has been an advantage once the surgical treatment of wounds using "Suprathel" to the local conservative treatment with long-lasting dressings.

P172

Efficiency evaluation of use of synthetic skin substitute in treatment of children with deep burns

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Aim: The known problem of deep burn wounds is formation of rough scars in the place of damage even after surgical treatment. However, application of a biodegradable dressing[1] over a autologous split-thickness skin grafts allows to improve quality of scars. In this study we assess effect to use of a synthetic analog of skin[1] by means of an objective method of a research.
Method: A comparative analysis of long-term results of treatment of 20 children with deep burns of the skin on the area from 2 to 25% of the body surface. Each patient was compared zone of interest: Zone A - third-degree burns in the treatment of which used synthetic substitute[1]. Zone B – full-thickness wound, which was used traditional surgical treatment: split-thickness skin graft. Zone C – normal skin. Instrumental assessment of treatment results was carried out using the device[2].
Results / Discussion: The bloodstream in Zone A, where

at a stage of treatment of wounds dressing[1] was used, by the end of the 12 months after burn was authentically more approximate to normal skin. Hemoglobin and melanin distribution (absolute and relative) in the areas of use of synthetic skin substitute was more uniform by 1 year after surgery, than in the zone of comparison.
Conclusion: Use of a synthetic skin substitute[1] at children with deep burns, along with early surgical treatment, allows to achieve good esthetic results after surgeries that is especially important at localization of zones of damage to cosmetic significant areas.
[1] "Suprathel®"
[2] "Antera 3D®"

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Limb salvage using acellular dermal matrix (AlloDerm?)
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Objectives: In extensive deep injuries of the limbs, such as electrical, contact burns, and crushing injuries, bones and tendons are easily exposed and injured because of soft tissue defects. The exposed deep structures become dry easily and necrotic changes are accelerated. Amputations are widely performed to those devitalized limbs at many clinics. Among various methods including skin graft, local flap, and free flap, etc., free flap can be a best choice when available donor tissue is present. However it takes long operation time and is affected by patient's underlying disease and vascular condition. Many surgeons think that skin graft can only be applied to the well vascularized tissue. But using acellular dermal matrix properly, bone and tendon exposed extensive wounds can be covered by skin grafts easly without amputation.
Methods: There were 8 burned patients. We debrided necrotic tissue of the wound and removed necrotic tendons and bony cortex with burring until identifying pinpoint bleeding of the bone. The hydrated AlloDerm®‡ (25/1000 inchs, meshed type) was applied on the wound, and then thin split thickness (7-10/1000 inchs) skin graft was performed immediately.
Results: All wounds were well covered by skin grafts and there were no amputations. Mean healing period was 3.2 months and 2.5 times of operations were proceeded on average during that period. **Discussion / Conclusion**: Alloderm® and STSG give us an advantage of short operation time and less limitations in donor site than flap surgery. Alloderm® is resistant to infection and protects bare bone or exposed tendon from dry-up for long period. So, it can make up for the weak points of skin graft only. We propose that Alloderm® and thin split thickness skin graft could be an option to cover soft tissue defects in extensive deep burned wounds of limbs.

P174

The Use of Groin Flap for Upper Extremity Coverage in Electric Burn Injury
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Background: Electrical burn injuries commonly occur in the extremities, especially wrist, forearms, and hand. In high-voltage burns, the injury associated with deep extension and underlying tissue damage, resulting ischemic tissue and eventually, higher
possibility extensive necrotic tissue The importance of nonvital tissue debridement and adequate defect closure in electrical burn injuries determine the outcome of limb salvage.
Method:A case series of electric burn injury extremity with two stage of reconstructive surgery using groin flap. Author questioned clinically whether two-stages surgical method affect morbidity of electric burned patients and relation ship between type of harvesting flap (delayed and non-delayed groin flap) interferes flap vitality.
Result from PubMed, Burns Journal and Google™ search generated 53 articles. Screening articles based on inclusion criteria, exclusion criteria, and full text reading. Three remaining articles appraised in regard of validity, importance, and applicability.
Result: Time of reconstruction did not appear to affect flap survival and outcome. Fasciocutaneous flaps also relatively thin and, therefore ideal for coverage in regions with exposed tendon and bony structure. No evidence found from world literature whether type of flap harvesting will affect flap vitality.
Conclusion: The use of groin flap as distant pedicle flaps, provide alternative where in case of free flap reconstruction was not be able to do. The possibility of compromised does not related with timing of reconstruction surgery, since pathophysiology of vascular occlusion and progressive necrosis tissue in electric burn injury. Pliable characteristic for covering small cross sectional diameter anatomic region such as wrist is advantageous, however, due to bulkyness appearance, secondary reconstruction will be needed for thinning flap.

P175

Single- Stage Reconstruction of Burn Contracture by STSG c artificial dermis
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Objectives: Burn scar contracture cause esthetic, functional, psychological, and social problems. Until now, we consider the best treatment of contracture to be the full-thickness skin graft. However, the donor site of full-thickness skin insufficient to cover the large joint like axillae,

neck, or popliteal area. Clinicians often meet the patient that have burn injury at the inguinal area, the primary donor site of full-thickness skin. In these cases, we use the split-thickness skin graft combined with dermal substitutes. The purpose of this study was to evaluate clinical outcomes of contracture treatment in severe burn scar contracture performing split-thickness skin graft with dermal substitutes as adjuvant method.
Methods: We analyzed the retrospective clinical and photographic records of 30 patients with severe burn scar contracture. We performed split-thickness skin graft with dermal substitutes to minimize recontracture. Surgical procedures were performed in the following manner. Contracture release by centrifugal direction with scar excision. Several marginal darts inserted to prevent the centripedal recontracture. Meticulous hemostasis and irrigation was undertaken. Thereafter, surgical glove changed, and the artificial dermal substitutes were placed on the fresh wound bed, and covered with nonmeshed split skin .
Results: The overall take rate was about 95%, and no grafts failed to affect recontracture. Mean follow-up was 1 year. Excellent/good outcomes were shown in 28/30 patients.
Discussion: Split-thickness skin graft remains the standard treatment of deep dermal and full-thickness burns; however, the delivered dermis is insufficient in most cases to prevent functional and cosmetic disability. Many studies have reported that artificial dermal substitutes improve the quality of skin grafts, that the amount of the dermal component contributes to the prevention of contractures. In extensive burn scar contracture, skin grafting in combination with dermal substitutes can be an alternative to split-thickness skin graft alone for the contracture release.

P176

Improved vascularity in a scarred, post burn transposition flap

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Background: Massive burn injury often has scar complications persisting long after the patient has survived the acute phase. These include neck and limb contractures, eyelid ectropion, microstomia, hypertrophic and keloid scarring, itch and dysesthesia. We present a case of 46% total body surface area burns with recurrent left neck contracture in which a large perforator based transposition flap was performed.
Aims: To compare the vascularity of scarred, post burn skin flaps versus traditional local flaps.
Methods: A 20x5cm transposition flap was planned over the right chest. Preoperatively, a Doppler probe was used to identify thoracoacromial perforators at the flap axis and internal mammary perforators supplying the distal flap. The fasciocutaneous flap was raised, preserving two distal perforators. Full thickness excision of the left neck contracture was performed and the flap was transposed superiolaterally to fit the defect.
Results: Flap vascularity at its distal edges was excellent despite the length of flap. Microvascular augmentation of distal arterial flow was not required. Moderate tension was applied to the underside of the flap using quilting stitches, to allow for improved neck contour. The flap remained well perfused with no skin necrosis and the patient was discharged after 1 week.
Conclusions: Large transposition flaps with narrow bases tend to suffer from distal flap necrosis. This can usually be addressed at the outset by preserving distal flap perforators for vascular augmentation at the recipient site. In our case, we noticed improved vascularity over scarred post burn tissue hence there was no need for vascular augmentation. Unusual lengths of flap can be taken due to the delay phenomenon of burn injury. Post operatively, the flap survived with no complications.

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Caveats and Technique for the Reconstruction of Burns Contractures using an Artificial Dermis in a Tropical Burns Centre

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Objectives: Excision of scar tissue and locoregional flap coverage is the gold-standard in treating hypertrophic scarring and contractures from burns injuries. An artificial dermis with a split-thickness skin grafting is a viable alternative when donor sites are lacking in patients with extensive burns.
There is a paucity of data on the use of artificial dermis in a tropical burns centre, a practise marred by a high infection rate in the Southeast-Asian region. Moreover, the high cost of the artificial dermis demands a successful outcome. We describe our successful experience with the use of bi-layered artificial dermis with split-thickness skin grafting in treating post-burns scar contractures.
Methods: A two-staged procedure of artificial dermis followed by 9:1000th inch split-thickness skin graft was used to reconstruct full thickness wounds after the excision of burns contractures in 7 patients. These were located over 4 wrists, 1 foot, 2 elbows, 2 necks, 1 chin, and 1 pre-auricular region. Cause of burns were flame burns in 3, chemical burns in 2 and scalding in 1.
Results: There was a 100% rate of skin graft take over the wound beds which were covered with a neo-dermis 14-18 days after the artificial dermis was applied. 1 developed hypertrophic scarring but the rest healed with a soft, pliable consistency and satisfactory cosmetic outcome. Patients achieved close to a full range of motion when

treated scars were located over joints. No cases of infection were encountered. At 6 months, hypertrophic scarring developed around the peripheries of 2 wounds while the rest remained soft and pliable. Through this experience, we developed a reproducible, effective technique for the procedure.
Conclusion: We demonstrate that a bi-layered artificial dermis followed by split-thickness skin grafting may be used reliably in a tropical burns centre, whereby a consistent technique contributes greatly to a successful outcome.

P178

Dual perforator flap for the Reconstruction of Large Sacral Defect due to Electrical blanket

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Objectives: Electrical blanket was commonly used in Korea especially in winter season. Contact burn due to electrical blanket was increased in Korea and management of large soft tissue defects in the sacrum has been progressive developed. In this study, we report using the superior gluteal artery perforator flap with additional parasacral perforator supported by different angiosomes to cover large sacral defects due to 4th degree contact burn.
Methods: A 79-year-old female with medical history of hypertension was referred for the treatment of 4th degree burns on the sacral area, caused by an electric blanket. After debridement, the sacral wound size was 11 x 10ãŽ . We subsequently planned the superior gluteal artery perforator super-flap with additional parasacral perforator because of the large defect size. The perforators were identified and mapped with a hand-held doppler. The flap was designed to include the superior gluteal perforator artery with the parasacral perforator artery. The flap size was 19x 16ãŽ and the pedicle lengths of superior gluteal artery perforator and parasacral artery perforator were 4.5cm and 2cm respectively.
Results: Dual perforator flap - Superior gluteal artery and parasacral perforator artery - was well coverd the large sacral defect. Postoperative seroma was developed but resolved by conservative treatment without additional surgery.
Conclusions: The superior gluteal artery perforator super-flap with parasacral perforator with consideration of angiosome territories can be a good option in covering large sacral defect supposed to be unable to be covered by unilateral superior gluteal artery perforator artery flap. This procedure reduces the operation time and prevents unpredictable flap failure. Even though the parasacral perforator is included, versatility of the large superior gluteal artery perforator flap is preserved due to sufficient perforator length gained after adequate dissection.

P179

Burns injures caused by electricity treated with dermal regeneration template

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Burns injuries caused by electric current are injuries resulting from an effect of pathogenic amount of electricity to the surface of body. Electrical current destroys all the tissues that get in the way of the passing current. Very often places of entrance and exit do not correlate with huge and massive destruction in the initial phase.
This paper presents a 27 year old man with extensive burns of body regions (several places of entrance and exit) from electricity. The most severe defects covered the anterior and lateral side of the left thigh and exposed part of femur bone, right gluteus, perianal and sacral regions, left low leg and left foot.
He was initially treated conservatively with HBO and all other substitution therapy. When general condition of the patient had been stabilized the surgical treatment in several phases started.
In absence of donor regions and because of large and massive defects and exposed part of bone femur, dermal regeneration template was applied for the first time in Clinic for Burns, Plastic and Reconstructive Surgery,Clinical Centre Serbia, Belgrade.
Dermal regeneration template use in this case enabled me to save patient's leg instead of amputating it. At the same time we attained better functional and aesthetic outcome for the patient. The patient was threaded for 76 days and 11 operations were done.
After two years of completing the treatment the patient has no functional failure and he has very good aesthetic result.
We can conclude that adequate and early reconstruction of extensive defects after electrocution with application of dermal regeneration template with autografts and as well as eary rehabilitation should be the primary goal of treatment.
M.D. Biljana Ä†ertiÄ‡, Head of Burn Department in Clinic for Burns, Plastic and Reconstructive Surgery Clinical Centre Serbia.

P180

Beneficial effect of platelet-rich plasma (PRP) for healing of infected burn wound in animal models

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Background: The beneficial effect of platelet-rich plasma (PRP) on preventing wound infection through effects of its

hemostatic antimicrobial abilities has been recently pointed. However, the exact therapeutic role of PRP in preventing and treating burn wound infection remains unclear and requires further studies. The present study aimed to assess the effects of PRP on 3rd degree infected burn wound in experimental animal models.
Methods: After induction of burn injury with a contact burn, eighty Wistar rats were assigned randomly to eight groups (four pairs of experiment groups receiving PRP and control groups). The study endpoint was to determine and compare the mean wound area and also mean pathology score across the different study groups at the different time points.
Results: Without any evidences of localized infection on wound area, PRP could improve wound area and also could reduce pathology score without even any surgical intervention. However, by appearing wound infection, the beneficial effect of PRP was effectively trimmed. With respect to pathology score, the lowest mean pathology score was shown in animal group with appearance of local infection after 24 hours of burn induction with early excisional surgery and PRP receiving after 48 hours, while the highest score was found in the group without evidences of local infection or early excisional surgery that received PRP after 24 hours of burn induction.
Conclusion: Although PRP can be introduced as an effective method for treating burn wound, its beneficial effect for infection eradicating is potentially conflicting.

P181

Investigation of complications of free flaps in patients at Hazrat-e-Fatemeh Hospital in 5-year period (2009 to 2014)

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Objective: Free flaps are one of the procedures used to treat patients that need to plastic surgery. This study was performed to determine the complications of free flaps in patients in Hazrat-e-Fatemeh Hospital in five-year period since 2009 to 2014.
Methods and materials: In this observational study that was performed as a cross-sectional descriptive survey, 64 consecutive patients under free flap surgery in Hazrat-e-Fatemeh Hospital in five-year period since 2009 to 2014 were enrolled and the complications of free flaps and contributing factors were determined among them.
Results: The findings revealed that in 79.7% no reoperation was required but in 10.9% the repair and
in 9.4% the flap removal was needed. The outcome was good in 82.8%, 10.9% need to repair for partial necrosis, 3.1% need to removal of flap for partial necrosis and 3.1% need to removal for complete necrosis.
Conclusions: According to the obtained results, it may be concluded that nearly one-fifth of patients under free flap surgery may experience some complications which it would have no known contributing factors to be developed.

P182

Non cultured keratinocytes and melanocytes cells to treat post burn Achromia

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Introduction: Pigmentation of burn scars is hazardous . Hyperchromia are common but also achromia could be observed secondary to burn trauma.The treatment is difficult and quasi non existent.We have tested the efficacy of a non cultured keratino-melanocytes cells graft on those sequels.
Material and method: Patients with a post burn achromia were grafted , after dermabrasion of the lesion,with non cultived keratinocytes and melanocytes obtained after a skin biopsie of the patient.The biopsie was treated with the single use kit Viticell. Successive steps permit to obtain separated cells of the skin. A solution of hyaluronic acid with keratinocytes, melanocytes and langhrerans cells was sprayed over the dermabrased surface.A protect wound dressing (Biobrane) is maintained over the wound until the healing time.The follow up , clinic and photo, was monthsly for 3 months then every 3 months.No PUVA therapy was done.
Results: 11 patients from 23 to 77 YO were treated. The mean healing time was 12 days. 1 local infection was observed and treated with local antiseptic. The follow up is now 7 months to 2 years. No secondary hypertrophy was note.The mean repigmentation evaluated is 70%.
Conclusion: A new way to treat post burn achromia is offer by the possibility to obtain non cultured melanocytes and keratinocytes.This simple technic could also be used to treat the color matching done by graft or flaps.

P183

Treating complications after neck surgery of burn trauma: Case report

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Neck contracture is unpredictable in deep burn and quite often unavoidable. Therefore, the surgical team can face the challenge of additional reconstructive surgeries with

the purpose of managing the complications after the primary procedure.
Objectives: The purpose of this case report is to present our experience in the treatment of functional deformities of the neck after a deep flame burn.
Material and Methods: A 59 year old female patient was admitted to our Clinic with 3rd degree flame burn in the neck area (21% TBSA). The surgical treatment
included debridement and the application of a skin graft which survived completely. Unfortunately, within a month post operation the patient developed a neck contracture. The two-stage reconstruction was made by two pedicle flaps (occipito-cervico-dorsal flaps) without any complications. Primary closure was performed on the donor site. Multiple, small Z-plasty were applied for tissue release. Full functional reconstruction was achieved with satisfactory aesthetic result.
Conclusion: Reconstruction of the post-burn scar is a complex task in plastic surgery. Sometimes several surgeries are needed to restore the functional capacity of the body area and obtaining an acceptable post-trauma appearance.

P184

Distally based sural artery flap for acute and delayed postburn defects

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Objective: To share our experience on managing distal lower limb tissue defects secondary to burn injury using the distally based sural artery flap.
Method: Management of certain defects to the ankle and foot can be challenging to the plastic surgeon often requiring free flap reconstruction. The sural artery flap is a distally based fasciocutaneous flap that has many advantages to offer for coverage of this area. This flap is raised on the posterior aspect of the calf and is supplied by the superficial sural artery that accompanies the sural nerve.
We report our experience with 3 cases: a patient with bilateral foot defects following an electrical burn injury in the acute phase and two patients with chronic heel defects as a result of long burns unit hospitalisation.
Results: All 4 flaps survived without any major complications and minimal donor area morbidity. In the follow up examination all patients were ambulatory without exhibiting any ulcerations or functional deficits.
Discussion / Conclusion: The distally based superficial sural artery island flap is a versatile, reliable procedure useful in reconstruction of the calcaneal area, malleoli and lower part of the limb.This flap not only provides an alternative to microsurgical reconstruction but can also be the first procedure of choice in selected cases.

P185

An analysis of clinical usability of procine skin burn dressings (the Medpig project)

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Objectives: The goal is to assess the clinical usability of two types of porcine skin dressings (treated with 15% glicerin and an acellular tripsinized matrix) in patients with burn wounds, residual and donor fields.
Methods: Porcine skin preserved in 15% glicerol was used for supplying residual and donor fields. An acellular porcine skin matrix was used as a basis for a transplant of autologous cultured keratinocytes and fibroblasts. The clinical usability of both products was compared with that of the standard method of supplying donor and residual fields and burn wounds. Both the research and the control groups were examined using a pain resistance method (VAS - *Visual Analogue Scale*), a clinical wound assesment method (*Bates-Jensen Wound Assessment tool)*, planimetric imaging, photographic documenatation, seeding wound swabs, blood and urine and histopatological examination of the wounds.
Results: Until late 2016, 25 patients were treated with a porcine skin transplant soaked in 15% glicerol. Their average age was 52 years (25-68 years of age). Their average total wound areas was 12% (0-37%), with III/IV degree wound comprising 5% (0-15%). Before the transplant, sterile wounds amounted to 32% while after the transplant - to 36%. The average length of hospitalization was 30 days. 23 patients made the control group. Co-cultures of keratynoctes and fibroblasts were transplanted onto an acellular porcine skin matrix in 5 burn wound patients.
Discussion: The preliminary results of the comparative experiment show that porcine skin treated with 15% glicerol and acellular tripsinized porcine skin are useful for supplying residual and donor fields with a skin cell matrix for transplants.
Presented work was financially supported by The National Centre for Research and Development (grant number INNOMED/I/17/NCBR/2014 as part of "INNOMED" entitled: "Development of Innovative Technologies for the use of Transgenic Pig Tissues for Biomedical Purposes". Acronym "MEDPIG"

P186

A comparison of features of transgeneic porcine skin wound dressings and biostatic allogeneic human skin transplants

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Objectives: The aim of the study was to clinically evaluate a biostatic skin allografts, transgeneic porcine xenografts and revitalized porcine acellular dermal matrix (PADM) in a treatment of burn wounds.
Materials and methods: Transgeneic porcine skin grafts and human skin allografts were used in the
study. Human keratynocites and fibroblasts were used for PADM revitalization. The decellurization methods included: 3% Triton-X, 0,1% SDS, 0.5% tripsin, 2,4 U/ml of dispase II, 85% glicerol and 15% glicerol. Mechanic and biological features of grafts were evaluated.
Results: A porcine skin preserved by use of 15% glicerol is much more clinically effective than 85% glicerol (low elasticity, high hardness and displeasing visual features). Porcine skin incubated in 85% glicerol has a negative effect on live skin cell cultivation and ability to split, which is not the case with 15% glicerol soaked porcine skin.
As the best decellurization method the trypsinization was chosen.
Additionally, trypsinized PADM showed to be the best scaffold for human keratinocytes and fibroblasts *in vitro* culture. Fibroblasts and keratinocytes cultured on porcine skin decelluralized by trypsination have proven to be the most vital ones, hinting at positive results of future transplants using these cells.
Discussion: The decellurization of porcine and human skin by trypsin has proven that both matrix are interchangeable in cases of insufficient supply of autologous human skin. 15% glicerization has proven to be the best method for conserving procine skin.
Presented work was financially supported by The National Centre for Research and Development (grant number INNOMED/I/17/NCBR/2014 as part of "INNOMED" entitled: "Development of Innovative Technologies for the use of Transgenic Pig Tissues for Biomedical Purposes". Acronym "MEDPIG"

P187

What we have learned from using Integra in 6 years of use

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We know that Integra was discovered thanks to the works of Burke and Yannas in the 70's at MIT. It was described as a collagen of bovine origin with a silicone sheet that served as epidermis while integrating the dermal matrix. The initial indication for Integra was for reconstruction of scars by burns as well as diabetic ulcers. The objective of this paper is to describe the indications given by the manufacturer as well as new indications for its use. It also describes our learning curve from the beginning with Integra bilayer to cases of single layer and injected collagen, also called Called Flowable as well as details of how we are doing it now and how to avoid pitfalls.
Material and methods: From July 2010 to July 2016, a retrospective study was carried out on a total of 250 patients, with an age group from 3 months to 70 years. The cases were grouped from acute reconstruction by burn, traumatic sequelae and chronic ulcers.
Results: It is evident that dermal matrix as well as collagen injected is an excellent option to improve sequelae as well as indications in chronic ulcers, reconstruction of scars as well as for fillings as is shown in our results.
Conclusions: Integra in its three presentations offers us to completely change the reconstructive ladder as a viable option for the indications described. New indications are described as post traumatic depressions as well as male intimate surgery also
with permanent results.

P188

Matriderm® Use in Burns Reconstruction: A Series of 55 Cases

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Objectives: Dermal substitutes provide a solution to full-thickness soft-tissue defects that can often have significant functional and aesthetic implications for burns patients. The use of Matriderm®, a scaffold of native bovine type I, III and V collagen fibre template incorporating elastin hydrolysate that is converted into native host collagen within weeks following application, has been previously reported in burns patients. The purpose of this study is to present our results of 55 patients treated with Matriderm® at a Regional Burns Unit based within a medium-sized district general hospital in the United Kingdom.
Methods: Fifty-five patients were treated using Matriderm® at our Burns Unit between June 2009 and August

2016. Indications were soft-tissue loss requiring dermal replacement to enable skin grafting, in most cases to functional and aesthetically sensitive anatomical areas, including the upper limbs and face.
Results: Eleven cases were primarily reconstructed using Matriderm® while fourty-four were treated secondarily following previous procedures. Aesthetic and functional results to date have been encouraging.
Discussion / Conclusion: There is a role for Matriderm® in acute and late burn wound resurfacing particularly when reconstructing full-thickness defects in functional and aesthetically sensitive anatomical areas such as the hand and face. Our series suggests it may improve overall scar quality, reduce lengths of admission and be used successfully in the setting of secondary resurfacing bearing in mind its cost.

P189

Post-burn cervical keloid treatment with surgical excision and reconstruction with a dermal substitute and split thickness skin graft

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Objectives: Facial burns can lead to horrible sequelae. In this regard, keloids represent a difficult challenge for any physician. No single therapeutic modality alone has proven effective although surgical excision is frequently the mainstay of therapeutic protocols. Keloids are very resistant to treatment and have very high recurrence rates. We present a case report of a patient undergoing marginal excision of a massive cervical keloid (post-burn) and a reconstructive strategy using a dermal substitute and subsequent skin graft.
Methods: A two-stage approach was followed. Keloid was completely excised down to normal subcutaneous tissue. Dexamethasone was instilled at the wound bed. A bilayer dermal regeneration matrix was applied to the entire wound with the silicone layer oriented superficially. This was covered with a "tie-over" dressing with paraffin gauze and octenidine.
The second stage occurred 21 days later. The silicone sheet was removed and a split thickness skin graft was harvested from the anterior thigh using an electric dermatome and applied to the neo-dermis. A thight dressing was made with paraffin gauze and octenidine and the first dressing change was 5 days later.
Results: Very good graft intake. Healing was uneventful and donor site morbidity was minimal without keloid formation. There were no signs of infection. The result was aesthetically acceptable and the patient was happy.
No evidence of recurrence 20 weeks post-operative.
Conclusion: The combination of slip thickness skin graft with a dermal regenerative template seems to be very effective. It maintains the pliability of the skin with good cosmetic appearance, limiting skin creep. The removal of the dermis and a substantial amount of extracellular matrix components limits contracture, contributing to a tension-free healing. No recurrence was noted despite the short follow-up.

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The new tissue and cell factory Turin Skin Bank

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Turin Skin Bank, has been the Regional Referal Centre for the preservation of skin for the last 18 years; it has been authorised by the Italian National Transplant Centre since 2005, to harvest, manipulate and distribute human alloplastic skin from multi-tissue and multi-organ donors.
Before distribution, the alloplastic tissues undergo strict quality controls, which include a microbiological and viability screening to certify their suitability in clinical use.
After thorough renovation, the Skin Bank is now a Tissue and Cell Factory composed by 4 sterile rooms and 2 research laboratories, opened in 2016.
The Skin Bank operates on the basis of GMP regulation: an articulated documentation quality system which codifies and regulates all the operative procedure concerned in the handling and preparation of the tissue products, in the laboratories and in the training and updating of the specialised personnel. Two new products are now distribute by our facility: Human Acellular Dermal Matrix (HADM) that is used in various reconstructive procedures (burns, breast, pelvic and abdominal wall reconstruction) as a scaffold for autologous tissue regeneration and autologous adipose tissue for reconstructive plastic and orthopedic purpose. The Turin Skin Bank is also active in the field of research and scientific innovations. Its laboratories carry out studies on projects involving new bio-substitutes and research on mesenchimal stem cells from stromal vascular fraction of adipose tissue.
Work supported by Fondazione Piemontese Studi e Ricerche sulle Ustioni and by Compagnia di San Paolo.

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Negative pressure wound therapy to the dura

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Negative-pressure wound therapy (NPWT) is historically contraindicated in patients with osteomyelitis or exposed dura. Although its beneficial effects on the scalp have been published, there is a lack of literature describing the application of NPWT on delicate vasculature and internal organ such as the dura mater. We present a case of a complex reconstruction of an infected full thickness scalp burn, where NPWT was successfully used over the dura.

P192

Use of MediHoney ™ Wound Gel following Major Thermal Injury

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Active *leptospermum* honey (ALH) has been reported to have salutary effects in the management of both acute[xx] and chronic[xx] wounds. However, the use of ALH for the management of larger thermal injuries has been sparsely reported. MediHoney™ Wound Gel is a topical preparation of manuka honey which has antimicrobial properties, provides a barrier to wound pathogens and maintains a moist and slightly acidic wound environment, conducive to wound healing.
Case study: A 41 year old male sustained a 85% TBSA thermal burn: 40% deep dermal and 45% full thickness. With multiple theatre trips using auto and allograph in a sandwich grafting technique resulting in only 10% wound healing with a static wound bed. On day 60 post burn injury, 13 days post "sandwich" grafts to abdomen and bilateral extremities, wound swabs from fragile, bleeding, malodorous graft sites demonstrated growth of *VRE*, *e. faecium* and *candida*, while the patient exhibited signs of significant multi-organ dysfunction and sepsis requiring systemic antibiotics, steroids, TPN, and CVVHDF. Family was being prepared for his poor prognosis.
In an effort to decrease the wound bacterial burden and potential systemic seeding, the patient was bathed with antimicrobial soap and wounds dressed with paraffin tulle gauze impregnated with MediHoney Wound Gel secured with gauze and gamgee.
This process was repeated every other day with reapplication of MediHoney Wound Gel.
Over the course of the next 10 days, the wounds improved, with decreased bleeding and developed healthy granulating tissue. In addition, the dressing regimen helped maintain normothermia. The patient improved sufficiently leading to further skin grafting, wound closure and recovery.
Conclusion – Although successful in the management of this patient, the use of ALH for the management of large burns requires further study. This centre has embarked on a 12 month observational study to gather additional clinical evidence.

P193

Negative Pressure Wound Therapy with Instillation Use in Burn Wounds - First Experiences

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Objective: Negative pressure wound therapy (NPWT) has been integrated in acute and reconstructive burn care and is now available with the option to instill topical solutions, which can potentially decrease patient discomfort and nursing time when using "irrigation-soak" dressings. We present our experience using NPWT with instillation and dwell time (NPWTi-d*) in managing burn wounds.
Methods: Patients were managed in inpatient burn center with NPWTi-d using hypochlorite- or sulfur-based topical solutions (dwell time of 10 or 30 minutes, followed by NPWT every 6 hours. Wounds were initially debrided in operating room. Patient 1 was a 42-year-old male with bilateral electrical hand burns, patient 2 was a 22-year-old male with severe elbow friction burn, and patient 3 was a 31-year-old female with large subcutaneous degloving-friction injury. Prior to debridement and NPWTi-d, cream dressings were used.
Results: After 1-2 weeks of NPWTi-d, wounds were stabilized for closure: patient 1 closed with local flaps and split-thickness skin grafts (STSG), patient 2 closed with STSG, and patient 3 closed with local advancement and STSG. Patients 1 and 3 were followed in outpatient burn center for 12 months; wounds remained closed. Patient 2 moved out of the area after grafting.
Discussion/Conclusions: In these patients, adjunctive NPWTi-d allowed for optimal wound management in the burn center. We noted reduced dressing changes and improved patient/nurse perception of wound management burden. Prospective evaluation with standardized patient and nurse feedback should be pursued in larger populations of burn wounds.
*V.A.C. VERAFLO™ Therapy; KCI, an ACELITY company, San Antonio, TX)

P194

Application of adipofascial flap in repairing heat-press injury

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Objective: To repair the deep wound with tendon or bone exposed due to heat-press injury .
Methods: After surgical debridement, the adipofascial flap was harvested under healthy skin around the wound. Then, the adipofascial flap was turned over and covered the wound. Skin graft was performed upon the adipofascial flap.
Results: Seven patients of heat press injury were conducted to this study. Six of them were male, and the other

one was female. The injured area included trunk in one case, upper limbs in four cases, and lower limbs in two cases. Four patients exposed tendon, the other three exposed bone. The adipofascial flap was turned 180 degrees to cover the exposed tendon and bone, the skin graft was performed upon the adipofascial flap. The minimum area of flap was 5 cm * 5 cm, the maximal area of flap was 25 cm * 15 cm, the shortest basilar part was 2.5 cm.
Discussion/Conclusion: Comparing with fascial flap, the adipofascial flap had the same blood supply and vascular distribution but with fewer nutrition needed, thus, it' survived area became bigger; Meanwhile, the adipofascial flap could turn 180 °to cover the wound, which had bigger radian of rotation than fascial flap, so the application of adipofascial flap was more extensive. The pedicle of adipofascial flap did not have "cat-ear" malformation, thus, it did not need the secondary modification; On the other hand, the donor site could be sutured without tension and did not need skin-grafting, so the appearance would be better. The adipofascial flap could be used to repair deep wound with exposure of tendon and bone caused by heat-press injury.

P195

Managing the Small, Non-Healing Problem Burn Wound with Epidermal Grafting

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Objective: Small (<1% of total body surface area) non-healing burn wounds can be a significant nuisance to patients and providers and sometimes do not respond to conventional treatments. Epidermal grafting, which can be performed in an office setting, may provide an option for patients with small, non-healing burn wounds, who cannot tolerate anesthesia. This case series presents patients who were not surgical candidates and whose small, non-healing burn wounds received epidermal skin grafts (ESGs).
Methods: After wound bed preparation based on institutional protocol was performed, an epidermal harvesting system* was used to harvest ESGs. Donor sites (thigh) were prepared by removing hair and washing with an antiseptic† and saline rinse. The harvester applied heat and suction to raise epidermal skin into microdomes. After harvesting, a fenestrated adhesive dressing was used to transfer microdomes to recipient site. Gauze and self-adherent wrap were used as outer dressing.
Results: Three patients with small, non-healing burn wounds on left leg, right shin, and left foot, respectively, received ESGs. Patients reported minimal pain during harvesting and fewer dressing changes than with conventional wound care. There was no disruption to their daily lives (eg, no hospital stay). Wounds were fully healed by 4 weeks post-grafting. No complications were reported; donor sites healed without complications and little-to-no scarring by week 4.
Discussion/Conclusions: In these patients, epidermal grafting provided a viable option for wound management with minimal donor site morbidity.
*CELLUTOME™ Epidermal Harvesting System, KCI, an ACELITY Company, San Antonio, TX †HIBIBLENS® (Mölnlycke Health Care, Norcross, GA)

P196

Use of SuprathelR as a complete epidermal substitute in a boy with extensive toxic epidermal necrolysis

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Objectives: Toxic epidermal necrolysis (TEN) is a rare, potentially life-threatening condition characterized by extensive loss of skin and mucosa of more than 30% total body surface area (TBSA). It is linked to certain drugs as well as viral or bacterial infections, resulting in a dysregulated immune reaction against epithelial cells. Treatment, as in thermal injuries, should include an early referral to a burn unit. This case report demonstrates a life-saving management of TEN with an epidermal substitute (Suprathel^{R}) in a pediatric patient with epidermal damage of 100% TBSA.
Methods: A ten-year-old boy was admitted to our pediatric burn center complaining of foreign body sensation and photosensitivity of the eyes, headaches, pyrexia and presenting with extensive epidermolysis involving 100% TBSA. A skin biopsy confirmed the diagnosis of TEN with a complete loss of the epidermal layer as well as extensive mucosal involvement. The patient required fluid resuscitation and admission to the pediatric intensive care unit. Wound care consisted of gentle debridement of the blistered areas followed by extensive Suprathel^{R} application.
Results: Repeated Suprathel^{R} application maintained the skin barrier function over time and resulted in almost complete reepithelialization. The mucosa of the urogenital tract and eyes showed an almost complete restitution, as well. After a six-week inpatient stay the patient could be discharged to our outpatient care.
Two years after treatment the patient is satisfied with the results and the skin is virtually free of scars with a normal appearance and elasticity.
Conclusion: In children, TEN with extensive epidermal loss is a rare, life-threatening condition that requires admission to a specialized pediatric burn unit. Suprathel^{R} proves beneficial in the management of these cases by providing a skin barrier until natural reepithelialization occurs.

P197

Primary Burns Dressings and cost implications: A UK National Survey results

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Introduction: Despite abundant literature demonstrating a wide range of dressings' efficacies and costs, there are no national consensus or guidelines available for primary burns dressings applied following the initial burn debridement. The choice of primary dressings must factor in different aspects including appropriate patient care, need for wound inspection and cost to achieve efficient utilisation of resources.
Methods: We conducted a telephone survey with 28 major burns centres across the UK enquiring about the primary dressing applied to superficial partial thickness; mixed depth, deep partial or deep dermal, and full thickness burns injuries. The product literature was used to classify the type of dressings accordingly and analyse the cost of the most frequently used ones.
Results: 19 UK burns units participated in the survey demonstrating a significant variation in the types of dressings used**.** The use of anti-bacterial dressings to prevent wound infections correlated with increased burn depth. Superficial partial thickness and mixed depth burns were frequently dressed with hydrocolloid dressings. Deep partial-to-full thickness burns were frequently dressed with topical ointments. Cost analysis demonstrated hydrocolloid dressings as the most expensive dressing with topical ointments the cheapest.
Discussion: In the absence of robust evidence in the literature, the choice of primary dressings applied to burn injuries is rarely evidence based. In addition, there is lack of national consensus or guidelines directing the choice of primary dressings recommended for burn wounds of varying depths.
Our findings demonstrated a significant variation in the application of primary dressings to partial thickness, deep dermal, mixed depth and full thickness burns with significant cost implications. Level I evidence is required to provide evidence based recommendations for the efficacy of different primary dressings in variable burns wound depth.

P198

Results from 238 applications of an absorbable synthetic membrane to superficial and deep second degree wounds

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Introduction: The care of 2nd degree burns remains challenging because of pain during daily dressing changes and unpredictability of healing time and scarring. Many temporary coverage solutions have been studied in the past under those aspects. Infection and integration into the healing wounds have been the major drawbacks and there are minimal final outcome reports. The ideal treatment of 2nd degree burns would 1-decrease pain, 2-limit dressing changes,3-allow assessment of healing progress, 4-prevent infection, 5-accelerate healing, 6-improve long term outcome, 7-save treatment cost. This study was IRB approved.
Methods: 85 patients (34 female, 51 male, 39 pediatric) were reviewed that received the skin substitute, a porous synthetic copolymer membrane, in 238 applications to their 2nd ºburns (superficial and deep). Debridement was performed in the operating room or under anesthesia in the treatment room. Wound bed preparation was achieved by dermabrasion or hydrodissection or thin Weck® blade excision. The skin substitute was applied and an outer dressing was applied. The outer dressing was removed regularly. The wound bed was followed through the translucent membrane. The dressing separated spontaneously after epithelialization was complete.
Results: All wounds in this series healed without grafting. Our infection rate was 3.5%. Time to epithelialization was accelerated compared to similar wounds treated with other methods (12.05 days vs 14 vs 22). 8.2% wounds progressed partially to full thickness. No integration into wound beds was noted. The only complication was severe itching. Pain was rated at 1.9/10 throughout the treatment period. Hypertrophic scarring developed in 6 patients =10% (vs. 23% with other treatments)
Conclusions: The application of this skin substitute to 2nd degree wounds offers a simple option of treatment with better outcomes and less pain. Overall cost was comparable to cream dressing changes, considering less frequent dressing changes, less pain medication and lower infection rate.

P199

Influence of early admission to the Burn Care Department on the final results of the frostbite treatment.

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Objectives: The seasonal and incidental occurrence of frostbites, as well as specific population involved provokes a negligent approach in assessment and management of this group of patients by the medical personnel from the point of view of timing and type of successive therapeutic activities. Basic procedures, such as thawing and adequate pharmacological therapy, implemented as soon as possible, significantly decrease the number of amputa-

tions. The goal of this trial is to determine the influence of the timing of admission to the Burn Care Department on the amputation rate.
Methods: 43 frostbite patients included to the trial were divided in 3 groups depends on the day of frostbite/day of admission ratio: 0-1 day, 2-5 and >5 days. The estimation of amputation incidence was done in each group, considering only the fact of executed amputation. The assessment of frostbites was only clinical. No tPA (tissue plasminogen activator) substances were applied. On admission all patients have II-III-IV grade frostbites with haemorrhagic or transparent-filled blisters, flaked nails or necrotized tissues in different stage of inflammation.
Results: Patients admitted to a Burn Care Department within first 24 hours have the lower rate of incidence of amputation-26,7%, comparing with a group of those who admitted in 2-5 days - 40% and after 5th day – up to 87 %.
Discussion / Conclusion: The amputation rates mentioned above are comparable with those from literature. According to the recent data published applying of tPA in first 24 hours noticeably increase the survival of affected tissues up to 90 %. Despite of significant technological progress in medicine the outcomes of treatment of frostbites depends not only on appliance of modern diagnostic methods or novel thrombolytic or inhibitor substances. The neglect of procedures of adequate thawing, basic pharmacological therapy and wound management leads to disappointing results.

P200

First experiences with a nanocellulose-based material (Epicite) for donor sites and dermal burns
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Objective: Report on the first experiences with a nanocellulose-based material as part of a single center prospective trial
Methods: Single center prospective clinical trial (ongoing recruitment)
We included the following parameters in our assessments: Hollander Wound Scale, Vancouver Scar Scale, Visual Analogue Scale, duration and frequency of dressing changes, time-to-healing, etc.
Results: All patients in the donor site group (ongoing recruitment, n=6 in 2/2017) or taking part in the superficial dermal burns assessment tolerated the material well, no adverse reactions were observed. Further results of differences in pain assessment, frequency of dressing changes, and time-to-healing will be presented.
Conclusion: The nano-cellulose based material (Epicite) exhibits excellent dressing properties and is a promising candiadate for future applications in burns, including the capability of being a drug-delivery/carrier system for local antiseptics, and the likes.

P201

The effectiveness of the MolecuLight i:X Imaging Device in the management of bacterial load in burns patients.
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The moleculight camera is a new technology which allows to real-time imaging of bacteria in wounds utilising autofluorescence. When wounds are illuminated by violet light, endogenous collagen in the connective tissue matrix emit a characteristic green fluorescent signal (#_ENREF_7), while some bacteria emit a unique red fluorescence signal due to the production of endogenous porphyrins and other bacteria emit a unique cyan fluorescence signal due to the production of endogenous pyoverdine. 30 burns patients were imaged at various points during their treatment (during dressing changes) using the moleculight camera.12 did not have bacterial contamination based on their images and swab results. 18 had growth of *Staphylococcus aureus*, *Pseudomonas aeruginosa* or other bacteria. These findings were supported by typical signs and symptoms of infection, moleculight images and microbiology results. This research has significant implication for improving overall healing because by detecting bacteria. We may be able to prevent critical colonisation, infection and sepsis. Early intervention could reduce the likelihood of graft failure, and determining the accurate bacteria will target antibiotic therapy and prevent antibiotic resistance. The moleculight camera provides guidance for clinicians in regards to the following: highlighting bacteria, identifying the type of bacteria to be treated and pinpointing the location of the colonisation for more accurate swabbing. The camera also has the potential to greatly reduce the number of antimicrobial dressings utilised by targetting the use of thse dressings more intelligently.

P202

Efficacy, safety and costs of 0.1% Timolol gel in healing split-thickness skin grafts donorsite. A Prospective case-control study
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Introduction: Split-thickness skin graft is one of the most commonly performed procedures in plastic and burn surgery, and effectively creates a secondary wound at risk for infection or delayed wound healing. The aim of this study was to assess the efficacy and safety of topical 0.1% tim-

ololol gel in promoting wound healing in split-thickness skin graft donor sites.
Methods: We designed a prospective case-control study to evaluate the effects of 0.1% timolol gel in healing skin graft donor sites when compared to paraffin gauze. A total of 42 burn patients were treated with either daily dressings with 0.1% timolol gel (1 fingertip unit every 2 cm^2) and paraffin gauzes (case group), or to dressings every 4 days with paraffin gauzes (control group). Healing time, infection rate and patient's pain perception were assessed by a blinded physician. Costs were evaluated in both groups. Vancouver Scar Scale (VSS) and patient satisfaction VAS were recorded at the 6 months follow up.
Results: A statistically significant improvement in terms of healing time was found in the timolol group (mean 6.4 days vs 12.7 days in the control group). The infection rate was the same. Significantly decreased pain perception was recorded in the case group. Total cost of the treatment was significantly higher in the case group. At the 6 months follow up VSS and patient VAS were significantly lower in the case group.
Discussion: The role of topical beta-blockers in promoting wound healing is currently emerging in the literature. Various approaches to optimize the healing of split-thickness skin graft donor sites have been described, including back-grafting; however no clearly superior and easily applicable method has gained wide acceptance in daily practice. 0.1% timolol gel may represent a commercially available, safe and simple, painless and moderately expensive treatment for improving skin graft donor site healing.

P203

Using of stem cells technology for accelerate regeneration of deep burns.

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Aim: to study dynamics of wound healing after excision of necrotic tissue and perform grafting using coatings with the inclusion of allogeneic mesenchyme stem cells.
Methods: 26 patients were under our supervision during 2015-2016 with Ð†Ð† b-III degree burns from 10% to 30% TBSA.
The main group consisted of 14 patients, deep burns were excised on 2-7 days after injury, the wounds covered with xenograft primarily, mesh autografting performed on 10 day and coated with mesenchyme stem cells. Cell preparation consists of mesenchyme stromal cells cultured human adipose tissue, it is designed for application in the form of the surface of the dermal equivalent. Deep burn necrotic tissues were excised in 12 patients comparing group for 2-7 days after injury. The wounds were covered xenograft. Mesh autograft performed on 6-10 days.
Results: Regenerative processes were activated in the wound by using bioplastic matrix - cellular complex: epithelialization of perforations holes in the mesh graft accelerated by 1.5 times, area did not take root grafts decreased by 1.3 times,
number of local infection was reduced by 10%. Capillary blood burn wound area showed that there is an earlier decline (by 3.2±0.3 days) of inflammation in the affected area and attracting neutrophils to the wound with a higher functional activity in patients of the main group.
Conclusions: Using bioplastic matrix-cellular material is reasonable and effective in stimulating the functional processes historegeneration. This reduces the risk of infection and allows a 1.4 times improved results autograft.

P204

The miracle of manuka honey

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Objectives: Honey as a wound treatment has been used for thousands of years. Recently its use in burned patients is generating much expectation for its miraculous results.
Methods: We present our experience in the use of medihoney (in the form of gel and hydrocolloid) for both post-nexobrid treatment and superficial burns directly.
Since July 2015 we have treated 48 patients in our unit, in 16 we have used its gel form for facial burns and in 36 its hydrocolloid form for body burns.
Results: The results obtained with its use both in skin quality and in time of complete epithelization, as well as in comfort for the patient in performing cures, make it a star product in our therapeutic arsenal, having made our unit a protocol of use for facial burns that is currently applied throughout Spain
Conclusion: Medihoney is cheap, simple to use, pleasant for the patient and with very promising results both alone and in combination with nexobrid.

P205

Alloplastic skin substitute* dressings in treatment of donor sites in children with burns

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Objectives: Treatment of patients with severe burns remains a serious problem. The aim of this study was to investigate the efficiency of alloplastic skin substitute dressings on pain syndrome and epithelization of donor sites in burned children.
Methods: Twenty-four patients with 2-3 degree burns up 3% to 15% of body surface were studied. Patients were treated in Burn Center from 1 January to 31 December

2016. Split grafts were isolated with disc dermatome. Thickness of grafts was 0.3-0.4 mm. SUPRATEL^{R} was placed on donor wounds in 11 patients. In control group (13 patients) one-level gauze ointment dressings were used. Patients age in SUPRATEL^{R} and control group did not differ (11.9±3.36 vs 14.2±4.94 months, Z=-1.2, P=0.23).

Results: In SUPRATEL^{R} group the dressings were not removed until complete epithelization of donor wounds and changing of SUPRATEL^{R} dressings was not necessary. In control group changing of dressings was needed in 4 patients. The Study has proved that in case of use of alloplastic skin substitute SUPRATEL^{R}, median epithelization time was 5.7±1.01 days, in control group - time was 8.7±1.49 days (Z=-3.8, P<0.001). According to Verbal Descriptor Scale expression of pain syndrome was less in SUPRATEL^{R} group than in control group (1.5±1.04 vs 5.2±0.9 respectively, Z=-4.1, P<0.001).

Conclusions: Our study has shown that use of alloplastic skin substitute SUPRATEL^{R} is effective in treatment of donor wounds in pediatric burns. Time of epithelization is shortened and pain syndrome is reduced.

*- Alloplastic skin substitute - SUPRATEL^{R}

P206

Use of the new atraumatic mesh dressing with Beeswax* in the treatment of III degree burn wounds

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Aim: to evaluate the efficiency of Ð°traumatic dressing with beeswax and povidone-iodine ointment for the local treatment of burn wounds of III degree after surgical necrotomy.

Materials and methods: the study included 40 patients with burns of III degree, with a burn area 10-20% TBSA. 20 patients were included in group I. For these patients after necrotomy and thorough hemostasis postoperative wounds were closed with atraumatic mesh dressings containing povidone-iodine. The dressings is effective against gram-positive and gram-negative bacteria, fungi, viruses and some protozoa. Iodine-povidone complex provides gradual release of iodine. The mesh structure provides a draining effect for the wound exudate with good air permeability. Beeswax, which impregnates the dressing, contains a large amount of aminoacids, minerals and vitamins. So, the dressing ensures the creation of unique internal environment, which provides a stimulating effect on the reparative processes in the wound. 20 patients were included in group II. The wounds after surgical necrotomy were treated in the traditional way using dressings with ointments.

Results: In the group I wounds were prepared for autodermoplasty within 5-6 days after surgical necrotomy. Within these 5-6 days we only once changed the dressing with povidone iodine, the change was Ð°traumatic, painless, required no additional anesthesia. In the group II it took 7-10 days to prepare wounds for autodermoplasty. Dressing changes in the group II were painful, we had to perform them daily. In the group II in 83% of cases we revealed growth of mixed microflora, while in group I - only in 23% of cases.

Conclusions: the dressing with beeswax and povidone-iodine ointment showed its high efficiency in the treatment of burn of III degree after surgical necrotomy, reducing the time of preparation for skin grafting and decreased the risk of development of local infectious complications.

* VoscoPran with povidone-iodine ointment

P207

The use of Silver-Containing Hydrogel wound dressings* in the treatment of burn wounds after necrectomy

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Objective: To evaluate the efficacy of silver-containing hydrogel dressings in the postoperative management of burns.

Materials and Methods: The study included 20 patients aged between 20 and 60 years with burns of II-III degree with the affected area from 7% to 10% of total body surface area (TBSA). Group I included 10 patients. Postoperative wounds after necrectomy were treated with hydrogel dressings. In the other group of 10 patients (group II) the wounds after the necrectomy were treated in the traditional manner by dressings with fat-soluble ointments.

Results: Dressings used in the group I provide an optimal moist wound environment and moderately absorb wound exudate, The upper layers of the wound surface did not dry up. There were no signs of bleeding from postoperative wounds including diapedesis bleeding. Transparency of the dressings allowed to monitor the wound without removing them. Wounds turned prepared for the autodermoplasty within 6-7 days after necrotomy.

Due to their structure the hydrogel dressings didn't stick to the wound bed, and the dressing changes were painless: pain assessed 2.5±1.1 points by visual analogue scale (VAS). Hydrogel dressings showed good bactericidal properties for the content of colloidal silver. In no case generalization of the inflammatory process was observed.

In the group II the wounds were prepared for autodermoplasty only in 9-10 days. Dressing changes for the patients

of the group II were painful, took place with the use of analgesics, level of pain was 6.1±0.5 points. In 50% of cases in the group II the presence of copious purulent discharge was noted.
Conclusions: Hydrogel silver-containing dressings were shown to be highly effective in the treatment of burn wounds after necrectomy, they reduce the time of preparation the wounds for autodermoplasty and minimize the risk of local infection.
*GelePran

P208

Use of alloplastic temporary skin substitute* in the treatment burn wounds of II degree

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Objective: to evaluate the efficiency of alloplastic temporary skin substitute * in the treatment of patients with burn wounds of II degree after debridement.
Material and method: the study included 7 patients with II degree burns on the area from 3 to 5% TBSA (an average of 4.2%), aged from 28 to 55 years. All patients on 3-4 day from receipt of debridement was performed under anesthesia within the living dermis. During the operation, performed a careful hemostasis. Further postoperative wounds were closed alloplastic temporary skin substitute* and a single layer sheet of fatty gauze dressing, which fixed with a bandage. All patients received antibacterial therapy. The effectiveness of alloplastic temporary skin substitute* in the topical treatment of postoperative burn wounds evaluated on terms of its healing, the incidence of purulent complications, number of dressings, according to the degree of severity of pain.
Results: the 6 patients had favorable course of early postoperative period (the absence of suppuration, discharge from the wound, the temperature of the reaction, pain). Therefore, the first ligation was made by 7 days after debridement. Were removed only the surface layers of secondary casts over the alloplastic temporary skin substitute *. The second ligation was performed on 13-15 day, when it was against the backdrop of biodegradable coatings complete healing has taken place. All wore bandaging painless nature and did not require anesthesia.
In the one patient was noted accession secondary infection, necessitating daily dressings with antiseptics, antibacterial therapy has been strengthened. Complete wound healing came only on the 23 day. Pain in this patient during dressing changes were more pronounced pain in group II was more pronounced.
Conclusion: application of innovative alloplastic temporary skin substitute* in the treatment of patients with burns of II degree efficiently and economically feasible.
Suprathel®*

P209

Optimization of storage conditions when banking autologous split-thickness skin grafts

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Objectives: Storage of autologous split-thickness skin grafts (STSG) is a standard method with acceptable results. Numerous different nutritional media are used. The arbitrarily maximum storage time is considered to be approximately 4 weeks. It is well known that there is a successive deterioration of viability and thus graft take with storage time paralleled by a transition from viable grafts to more of a biological dressing. The aim of this study is to explore an optimal storage medium yielding the highest number of viable cells at the time of re-transplantation. In the first step in this project we examined different nutritional fluids used for banking of autologous STSGs.
Methods: Ten nutritional fluids used *in vitro*, clinically, or based on theoretical reasons. Cultured human keratinocytes from healthy donors were diluted to $1*10^6$ cells/mL in various nutritional fluids and stored at 4-7° C for up to 30 days. Sampling was done at day 1, 4, 8, 14, 21, and 30 in storage. Evaluation included cell count, viability, visual check for cell aggregate and ability to resolve.
Results: The procedure was repeated four times. The summarized data at day 30 showed 2 nutritional fluids with 10% or more viable cells (McCoy´s 5A, RPMI 1640), 3 nutritional fluids with 5-9% viable cells, and 5 nutritional fluids with less than 5% viable cells.
Discussion: Over all there were, as anticipated, quite few viable cells after 30 days of storage in all nutritional fluids. For all medias a rapid decline in cell number was seen during day 1-8 and subsequently the reduction was reduced, wherefore days of storage is a central parameter. The aim of this project is to prolong the time viable STSG can be stored and maintain take rate. The project will continue with further studies on different storage media using keratinocytes and human STSG.

P210

Enzymatic debridement of chronic wounds: Preliminary results

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Objectives: Chronic and hard-to-heal wounds represent a major health burden, contributing to substantial disability, morbidity and cost (2-4% of the health care budget). Cur-

rently, non surgical means for wound bed preparation (WBP) used are slow and/or inefficient. There is an unmet need for a fast and effective WBP agent. We present the first proof of concept study assessing the efficacy and safety of NexoBrid® (NXB) in chronic/hard-to-heal wounds.
Methods: A prospective, single arm, multicenter, preliminary study assessing the safety and efficacy of NXB in chronic, hard-to-heal wounds of different etiologies. Patients were treated with consecutive 4 hour applications of NXB until sufficient WBP for wound closure by surgical or not surgical means as judged by the investigators.
Results: Twenty-four patients were included, suffering from wounds due to venous insufficiency (n=6), post traumatic necrosis (n=6), PVD (peripheral vascular disease) (n=4), diabetic foot ulcer (n=1), pressure sore (n=1), and necrosis post: surgery (n=3), lymphedema (n=2) and chronic steroid treatment (n=1). The gross NXB efficacy in all patients was 68% WBP in an average of 14 hours exposure (HE). WBP was found to be more effective in venous insufficiency (82% WBP, 17 HE), post traumatic necrosis (90% WBP, 7 HE), lymphedema (78%WBP, 22 HE), diabetic foot ulcer (95% WBP, 8 HE), pressure sore (95% WBP, 8 HE), and chronic steroid treatment patients (70% WBP, 12 HE). NXB was less effective in PVD with dry adherent eschar (< 30% WBP, 12 HE per patient) and post surgical dry adherent eschar (< 40% WBP, 21 HE).
Conclusions: NXB enzymatic debridement was found to be effective in most etiologies of chronic wounds. Additional studies with larger numbers of patients in each etiology are needed in order to more accurately establish the clinical potential in chronic wounds.
Funding: by MediWound Ltd.

P211

A clinical implementation of in house produced acellular dermal matrix (ADM) inhabited by in vitro cultured cells - case series.
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Objectives: An acellular dermal matrix (ADM) can be repopulated *de novo* by autologous or allogeneic skin cells. The goal was to evaluate a new burn treatment methods based on usage of self produced human biovital skin substitute.
Material and methods: 6 patients were selected for the study (5 females, 1 male; average age 50.8 years). All patients were thermally burned and treated with allogeneic, biostatic skin grafts and in-house produced ADMs revitalized with autologous or allogeneic fibroblasts and keratinocites or allogeneic amnion derived mesenchymal stem cells. Allogeneic, biostatic skin grafts were used as a control. Cells were suspended in autologous platelet leukocyte rich gel PLRG or in buffered saline PBS. Photographic documentation was executed as well as histological and microbial examination.
Results: Photographic and histological images depicted a burn wounds in the appropriate healing progress.
Discussion / Conclusions: The presented method for burn treatment may be the optimal method for burn wound therapy. However, it requires increased number of samples to perform statistical analysis of the results.

P212

Extensive use of Negative Pressure Wound Therapy (NPWT) in severe burned patients
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Negative pressure wound therapy (NPWT) has transformed the management of acute, sub-acute and chronic wounds within the last 25 years.
In the last 10 years the conceptual and wide use of NPWT in large burns was strictly pursued at the Burn Center Murnau. We will provide an overview on this treatment and why NPWT has become standard in our management of large burn injuries.
The retrospective analysis included 520 patients with burn injuries (TBSA up to 90%) treated with NPWT. NPWT was used during all steps of burn treatment from the initial debridement up to the final defect coverage with skin grafts. Intensive care parameters and surgical parameters of tissue repair were recorded during the complete intensive care phase of all burned patients. These parameters were compared to data of burned patients who got conservative wound treatment.
Significant reduction of redressing was shown in all patients with severe burn injuries treated with negative pressure wound therapy. The need of catechoamines and pain medications could be reduced extraordinarily. Furthermore outstanding wound conditioning, as well as excellent take rate after split thickness skin grafting was observed.
Intensive care parameters and surgical parameters of wound healing showed large burned patients treated with negative pressure wound therapy to be more stable than patients treated conservatively.
In conclusion negative pressure wound therapy has shown to be an excellent option especially in treatment of severe burn patients from the initial debridement up to the final step of split thickness skin grafting.
Key-words: burn injury, negative pressure wound therapy, intensive care

P213

Delayed Use of Polylactide-Based Copolymer (Suprathel®) for Pediatric Partial-Thickness Burns: An Option For 'Difficult-To-Decide' Cases

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Objectives: Many partial-thickness burns in children lead to confusion whether they are superficial or deep. In these cases, optimal decisions are achieved during the first 1-3 weeks postburn. Polylactide-based copolymer (Suprathel®) is successfully used for superficial dermal-burns and following surgical-debridement for deeper ones. This study aimed to document the outcomes of delayed outpatient use of Suprathel® in 'difficult-to-decide' cases.
Methods: From 2013-2016, 47 pediatric burn victims were treated with Suprathel® following outpatient burn wound-care including non-surgical debridement methods. Data collected for each case were age, sex, burn cause, burns extent, burn depth, body sites affected. Time between occurrence and admission; time between admission and Suprathel® application; time between injury and completion of epithelialization were evaluated. Numbers of Suprathel® applications, surgical debridements, split-thickness and full-thickness skin-graftings (STSG/FTSG) and reconstructive surgeries; requirements of physiotherapy/ splints were documented (mean±SEM).
Results: Mean age was 5.14±0.81 (range,0-17). Male:female ratio was 0.68:1. Mean TBSA burned was 3.18±0.4% (range, 0.5-13); partial thickness burns were 2.9±0.4% (range, 0.5-13). The most common cause was scalds (72%, n=34). Suprathel® was applied to hands in 18 (38.3%), feet in 15 (31.9%), and genitalia in 2 (4.3%) cases. Although head and neck were involved in 14 cases (29.8%), Suprathel® was applied to 2 (4.3%). Mean time between occurrence and admission was 1.6±0.36days (range,0-10). Mean time between admission and Suprathel® application was 6.5±0.64days (range,0-19), mean time between occurrence and completion of epithelialization was 17.4±1.08days (range,5-34). Only Suprathel® was applied in 31 patients (66%). Eight (17%) underwent surgical debridements, 3 underwent STSG(1)/ FTSG(2). Fifteen (31.9%) required physiotherapy, 5 of them used splints. Two underwent reconstructive surgery in the long-term.
Conclusions: Outpatient wound-care with non-surgical debridements followed by suprathel® application is a functional option for 'difficult-to-decide' partial-thickness burns in children. This method seems to prevent exaggerated surgical approaches which may lead to painful and uncomfortable overtreatment courses.

P214

Use of Dermapace® and Medihoney® gel as a combination therapy in the treatment of complicated diabetic foot burns

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Objectives: Present our experience in the management of diabetic foot burns with the combination of Medihoney® wound gel and Dermapace® in three adult patients.
Methods: We present three cases of diabetic patients with complicated deep foot burns that were admitted in our burn unit between February and December 2016. The three patients had been treated in other centers for more than one week, and one of them had cellulitis signs. We used Dermapace® twice a week (a medium of 9 sessions / patient) and dressings with Medihoney® wound gel changed every 3 days.
Results: The three patients healed uneventfully within one and two months and all of them present a stable skin coverage and have returned to their daily activities.
Discussion: The peripheral neuropathy of diabetes mellitus leads to a loss of heat pain, warmth and cold sensation, so adult diabetic patients have an increased frequency of foot burns. Due to the neurovascular changes associated, burns in these patients are usually deeper and difficult to heal; furthermore, they associate a high risk of infection and may lead to amputation of the extremity.
The clinical evidence in support of the effectiveness of honey in wound care has been reported by many authors. It promotes debridement of necrotic tissue" and stimulates granulation tissue formation by two mechanisms: high osmolarity and low pH. Medihoney® wound gel is a patented formulation with Active Leptospermum Honey and natural gelling agents.
Pulsed acoustic cellular expression (PACE) technology has been developed based on scientific and clinical evidence of the beneficial wound healing effects of extracorporeal shock wave technology. PACE treatment stimulates angiogenesis and growth factor upregulation leading to the regeneration of tissue.
In our experience, this combination therapy is useful in the conservative management of complicated foot burns in diabetic patients, avoiding more aggressive treatments.

P215

Forearm contact burn caused by air bag deployment

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Automobile air bags have gained acceptance as an effective measure to reduce the morbidity and mortality associated with motor vehicle accidents. As more cars have become equipped with them, new problems have been encountered that are directly attributable to the deployment of the bag itself. An increasing variety of associated in-

juries has been reported, including minor burns. Various traumas resulting from air bag inï¬,ation have been reported, and among them, burns comprised 7.8% of all air bag injuries.
We present a automobile driver who was involved in front-impact crashes with air bag inï¬,ation. Superï¬□cial dermal burn was found on her upper arm, hair where the bag had contacted. The wound margin was well circumscribed and blisters were scattered across the region. Conservative dressing treatment was performed and the wound healed completely.
Most burns associated with air bag deployment are believed to be chemical due to contamination with alkaline corrosives, especially the small amount of sodium hydroxide produced in the ignition of the bag. High-temperature gases released upon air bag expulsion can cause direct thermal burns if part of the body comes in contact with the stream of the gas. Also friction burns resulting from physical contact with the surface of the air bag are possible. Tsuneyuki et al. presented a new type burn that the cause of burn was not exposure to hot gas, but direct contact with the high-temperature air bag. Usually, they are found on the face or neck of the occupant. But in our case, the wounds were located at forearm.
Fortunately, these air bag-induced burns are not severe and usually requires only conservative ointment treatment. However, proper diagnosis for the patient and correspondence for the further improvement of air bag system is desirable.

P216

Bromelain based debridement agent: introduction to our daily practise, modifications to the standard protocol and post-debridement wound dressing

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Introduction: In modern burn therapy an optimal debridement must be effective, fast and safe. At present, surgical excision followed by autografting is the standard of care (SOC) for deep burns. However, invasive surgery often results in loss of viable tissue, blood and heat. We present an early single center experience with a new Bromelain Based Debridement agent (BBD).
Methods: From May 2015 to September 2016, we treated 20 patients suffering from deep partial and full thickness thermal burns with TBSA no more than 20%.The BBD application was performed at the patient's bedside under IV analgesia, while removal was performed in the operating theatre under analgo-sedation. We modified the standard protocol of BBD application and immediate post-debridement wound dressing. After eschar removal, full thickness burns were autografted, while viable dermis and mixed wounds were treated with fatty gauze, Suprathel® or UrgoClean®. A retrospective analysis of patients treated with conservative dressings was conducted to evaluate time to wound healing and number of dressing changes.
Results: We treated 20 patients with deep partial and full thickness thermal burns, 12 male and 8 female, aged 19-76 . The mean TBSA treated was 8.7% (range 6-20%). 5 patients were autografted, 15 patients were treated with fatty gauze, Suprathel® or UrgoClean®. With regard to time to wound healing all the 3 dressings were equivalent, while patients treated with Suprathel® and UrgoClean® had a lower number of wound dressing changes.
Conclusions: In our experience, BBD proved to be an effective, fast and selective therapeutic tool for burn wound management. Our modifications to the standard protocol made BBD application easier and more practical and allowed a more effective eschar removal. Suprathel® and UrgoClean® performed better compared to fatty gauze in terms of pain relief and exudate control as a result of the lower number of dressing changes.

P217

The accuracy of burn depth diagnosis: a comparison between clinical evaluation and diagnosis by direct visualisation after enzymatic debridement

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Introduction: The evaluation of burn depth is essential in the therapeutic management of burn patient. The most common technique used to determine burn depth is clinical assessment by an experienced burn surgeon, although this has been shown to be accurate in only 60-75% of cases. We present a retrospective analysis on burn depth based on clinical evaluation compared to diagnosis by direct visualisation after enzymatic debridement.
Methods: Between may 2015 and December 2016, we collected the data regarding burn depth of patients suffering from partial and full thickness thermal burns who were treated with a new Bromelain Based Debridement agent (BBD). Burn depth was assessed by senior burn specialists at patients'admission, before BBD treatment and after BBD treatment. The decision to operate was based on post-BBD assessment of wounds. The clinical evaluation was then compared with the post-BBD diagnosis and final treatment.
Results: Between may 2015 and December 2016, 25 patients were studied (14 men, 11 women), aged 19-76. The mean TBSA treated was 9,7% (range 6-20%).Etiologies were flame (86,7%), scald (11,3%) and contact (2%). In 36% of the cases (9/25 patients) the clinical diagnosis was different from the post-BBD assessment. 5 of the 25 wounds were operated on, while 20 wounds were treated conservatively with protective dressings. Of the 20 wounds treated conservatly, 18 healed within 3 weeks with no surgical intervention, while 2 were treated with delayed excision and grafting.

Conclusions: In our study, the clinical assessment results had a similar degree of accuracy to the data in the literature. The use of BBD as a diagnostic tool of burn depth based on direct visualisation of dermal vital tissue demonstrated to be more accurate. At the same time BBD proved to be an effective, fast, safe and selective therapeutic tool for burn treatment.

P218

Comparative evaluation of effectiveness of Alloplastic skin substitute 'Suprathel' and histoequivalent-bioplastic material for treatment of burn wounds

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Objectives: To investigate effectiveness of alloplastic skin substitute "Suprathel" for treating a burn wounds.
Methods: "Suprathel" represents itself a microporous membrane, consisting of copolymer of polylactide and other polymers. In conditions of wound healing, this synthetic material performs substitute function of damaged skin and stimulates regeneration.
Aforesaid material was used in 20 patients (16 men, 4 women) for treating border and mosaic burns of II-III degrees in Burn Center of F.I.Inozemtsev City Clinical Hospital, Moscow. The average patients age was 35.7 years; the average area of burn wounds, 33.3% of body surface. Group of comparison included 20 patients whose wounds, after dermabrasion, were treated by histoequivalent-bioplastic material (membrane based on hyaluronic acid and collagen).
In the both groups, surface of wounds with simultaneous application of materials ranged from 2% to 5% of body surface.
Treatment of patients started, on the average, on 4th day after injury. Before using materials, burn wounds underwent dermabrasion by synthetic brush, electric dermatome, or hydrosurgical system "Versajet".
Results: When using "Suprathel", the time of epithelialization for border and mosaic burns of II-III degrees took, on the average, 14.8 days after injury; while, in comparison group, it took 15.6 days.
In group with "Suprathel", complete epithelialization of wounds was achieved in 18 (90%) patients; in 2 (10%) patients, partially granulating wounds were formed: which were covered by autoskin grafts. In comparison group, the same results were in 16 (80%) and 4 (20%) patients, respectively.
In group with "Suprathel", pain during dressing changes was less than in group of comparison. Study of long-term results (3 months after injury) showed good quality of newly formed epidermis and absence of pathological post-burn scarring in patients treated by "Suprathel".
Discussion/Conclusion: Application of alloplastic skin substitute "Suprathel" provides effective treatment for border and mosaic burn wounds of II-III degree.

P219

Skin ultrasound after enzymatic debridement in burn care: an objective tool for decision-making process

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Objectives: Enzymatic debridement with Nexobrid is an important tool in early treatment of deep burns nowadays. Debridement is achieved in 4 hours leaving a whitish wound bed after its use. Different protocols in management of the wound bed is done in burn care units with some cases having spontaneous epithelialization while others end up necessitating skin grafts.
There is still no objective tool to assure the success of the debridement, as the wound bed may resembel an eschar to the untrained eye, leading to misjudgment on the efficacy of the product and management of the patient. The development of an objective tool to measure the thickness of the remaining dermis may help in decision-making protocols and thus better outcomes.
Methods: Real time ultrasonography (US) of the skin using high frequency probes (18MHz) was done in 15 burn patients, 12 hours after enzymatic debridement with Nexobrid, providing accurate images of the skin. We measured thickness of the dermis in non-burned skin areas and compared it to the thickness of similar debrided areas.
Results: All skin US showed less dermal thickness in Nexobrid treated areas versus identical non-burned areas in the same patient. Though in all cases the visual diagnosis resembled an eschar, in one case there was practically no dermis and in another one, US diagnosis showed a real eschar. Both patients ended up with skin grafts after some days. When sufficient skin dermis was present, all patients healed spontaneously.
Conclusion: Ultrasound evaluation may provide an objective method for follow up studies and for the assessment of the response to enzymatic debridement with Nexobrid. Skin thickness measurement could be instrumental in providing objective parameters to help predict chances for spontaneous epithelialization or need for early skin grafting.

P220

1% Acetic Acid solution for burn wound care

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Objectives: The aim of our research was to evaluate antimicrobial efficacy and cytotoxicity of 1% Acetic acid solution (AA1%), which is often used for burn wound care in our burn centre.
Methods: The antimicrobial efficacy testing was performed on in vitro burn wound models inoculated with of one of 7 multidrug-resistant bacterial strains (*P. aeruginosa – 2 strains, S. aureus, S. haemolyticu, E. coli, E. faecalis and A. baumannii*). All the bacteria were originated form burn wounds of our burn patients. Four different wound models were prepared using modified method by Hammond et al.: A. wound 30 min following bacteria inoculation B. 4 hrs following inoculation C. 6 hrs following inoculation D. 24 hrs following inoculation
AA1% solution was applied into the models and its efficacy was observed after 24 hrs.
The cytotoxicity tests were realized in cell and tissue bank laboratory using method by Vittekova et al.[2]. The effect of AA1% solution on two live cell systems – murine 3T3 cells and dermal fibroblasts was observed. Results obtained were compared with the control samples (sterile gauze and 20% Sodium dodecyl sulphate).
Results: AA1% solution showed excellent antimicrobial efficacy in models A,B,C inoculated with bacterial strains including *P. aeruginosa* , *S. haemolyticus* and *A. baumannii*. However, it was absolutely ineffective against bacteria in model D. This finding was observed in all the tested bacteria.
As for the cytotoxicity testing, the results obtained were very positive. The effect of AA1% solution on both cell systems was similar than of sterile gauze - no cytotoxicity was observed.
Conclusion: Topical antimicrobial agents are essential in burn wound care. There is an enormous variety of products; however their properties may be different. 1% Acetic acid solution could be a cheap and effective alternative thanks to its antimicrobial activity and no cytotoxicity.
Grant VEGA 1/0290/16

P221

A prospective study comparing flir one with laser doppler imaging in the assessment of burn depth by a tertiary burns unit in the United Kingdom

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Introduction: Laser Doppler Imager (LDI) is the "gold standard" tool for burn depth assessment. It is costly, requires a skilled operator and incurs maintenance costs. The FLIR ONE is a novel infra-red thermal imaging camera attachable to mobile, used to assess burn wound temperature. Our study evaluates its clinical effectiveness and compares the FLIR ONE with LDI in the assessment of burn depth and its accuracy in predicting healing times within 3 weeks.
Methods: Images of the burn wounds between 1 and 5 days were taken using both the FLIR ONE and Moor LDI. Patients aged 16 years and above were included in study. Infected, chemical and electrical burns were excluded. Healing potential was categorised into wound healing in less than 3 weeks and wound healing in over 3 weeks. Healing potential was determined by changes in wound temperature and blood flow when assessment was performed by the FLIR ONE or the MOOR LDI respectively. Pearson's test was used to determine correlation between burn wound temperature and healing potential.
Results: 25 patients were included in the study. %TBSA ranged from 0.25 to 45. With regards to predicting healing potential of <3 weeks, FLIR ONE had comparable sensitivity to LDI (94.12% vs 94.12%) but lower specificity compared to LDI (37.5% vs 50%). Pearson's test showed no correlation between minimum wound temperature with healing times (r=0.1746) and between temperature difference between minimum wound temperature and normal skin with healing potential of 3 weeks or more (r=0.1487). These were not statistically significant.
Conclusion: At £189 per FLIR device, no maintenance costs, instantaneous images and easy portability, there are clear advantages over the LDI device. However, our experience with the FLIR ONE shows poor correlation between temperature changes and healing potential in assessing burn depth and predicting wound healing within 3 weeks.

P222

The use of Suprathel® Skin Substitute for Partial Thickness Burns in a UK Regional Burns Centre

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Introduction: We aim to present our experience with the use and effectiveness of Suprathel®, a synthetic skin substitute, in a range of uses in burn practice for partial thickness burns in children and adults.
Methods: Retrospective analysis of medical case notes from Jan 2014 to Feb 2017. The study evaluated re-epithelialization time, grafting, wound colonization, infection, length of hospital stay (LOS), wound over-granulation and hypertrophic scar formation. Suprathel® was applied after debridement, followed by Vaseline gauze or Silicone dressings, betadine gauze and bandages. Outer dressings were changed every 2 days unless Infection dictated otherwise.
Results: Eighteen patients (mean age 12.15 years, range

1–54) with a mean total body surface area (TBSA) of 9.7% (range 2.5 - 21) were included. 7 cases were superficial partial thickness, 11 cases were mixed depth with mid-deep dermal components. Median LOS was 9 days (range 2 - 26). Median re-epithelialization time was 15 days (range 9–48). 7 patients took over 21 days to heal. One patient developed hypertrophic scarring. 4 patients developed wound over-granulation. Suprathel® was applied to donor site in one case and directly to burn wound in 17 cases. 8 cases underwent Versajet debridement prior to application. Suprathel® failed to adhere in one case. Three patients needed further split skin grafting to areas initially managed with Suprathel®. 16 wounds were colonized during treatment, with 4 developing wound infection clinically.
Conclusions: Suprathel® is a versatile dressing solution for adult and paediatric patients suffering from burns. The different potential uses have learning curves for the multidisciplinary team. Suprathel® has the advantage that it may also be used to treat mid to deep dermal burns. In patients with extensive burns, Suprathel® can be used to cover the deep dermal burn wounds to prioritise skin grafts and their donor sites for full thickness burned areas.

P223

A Review of Face Care Treatment Products for Partial Thickness Injuries at a UK Regional Burns Centre

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Introduction: Wound closure not only reduces potential pain and infection risk but the face is a highly aesthetic feature and is managed less aggressively than burn wounds elsewhere in the body because of the rich vascularity. There is insufficient high quality evidence to enable conclusions to be drawn about the topical effects of wound healing in facial burns. This study aimed to differentiate the time to wound closure between various treatments and to record microbiology colonisation.
Methods: Medical case notes were reviewed for 109 patients with partial thickness facial burn wounds in adults at a regional burns unit in the United Kingdom from 2/04/2015 to 30/03/16. Burn causes included scalds, flame, flash, chemical and contact. The following topical treatments were compared; Polyfax®, GlucanPro® and soft yellow paraffin. Time to re-epithelisation and microbiological colonisation were recorded. Statistical analysis was performed using GraphPad software.
Results: 29 patients were treated with GlucanPro®: 18 (62.1%) healed <14 days, 5 healed >14 days. 6 had no reported healing time. 12 (41%) had positive microbiology. 24 patients were treated with soft yellow paraffin: 15 (62.5%) healed <14 days, 2 healed >14 days. 7 no reported healing time. 7 (29.2%) had positive microbiology. 17 patients treated with Polyfax®: 10 (58.2%) healed <14 days, none healed >14 days, 7 had no recorded data. 2 (11.8%) cases had positive microbiology.There was no statistical significance identified between groups.
Conclusion: There is currently a plethora of face care options available with a lack of high quality evidence to determine which products are superior. Therefore choice of dressing is usually determined by the clinician or nurse caring for the patient. This study found similar healing rates under two weeks between treatment groups. We found Polyfax® had the lowest percentage of positive microbiological colonisation rates however this was not found statistically significant.

P224

Outpatient Minced split-thickness skin grafts for burn wounds

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Objective: we wanted to explore the option of minced split-thickness skin grafting under local anesthesia in outpatients. The costs of grafting under general anesthesia, keeping the patients at the hospitals, are very high. We also want to see if the technique is easy to performer, is painful and consider the benefits of a smaller donor site.
Methods: nine burned areas were grafted. We used a non-powered, hand-held, dermatome and a non-powered, hand-held mincer was used for each procedure. The skin was expanded 10 times after mincing. The split-thickness skin graft was 12/ 1000 inch (.3mm) thick and was minced into .8 mm x .8 mm pieces. The minced skin was applied evenly to the wound surface with a spatula without regard to the orientation of the individual pieces (dermal side up or down). The grafted areas were covered first with an interface of multiperfurated silicone dressing and then with a 3mm thick layer of hydrogel over the burn wounds. A foam controlled hydration dressing was placed on top of this. Every two days post operatively, the foam and the hydrogel were changed without disturbing the interface dressing.
Results: The nine burn wounds were completely reepithelialized at 2 weeks. There were no adverse effects from the any of the treatment components. The patients referred no pain and were very pleased with the small donor sites and the fact that this could be done on an outpatient basis.
Discussion /conclusion: Compared with the others methods we used before, always keeping the patients at the hospital we found this new method easy to perform and concluded in this limited study of micrografting that it seems to be a useful and simple technique for outpatient skin grafting with a high success rate at a lower cost. We are already doing on bigger prospective study.

P225

Epicite-hydro, new dressing helper in the wound bed preparation in full thickness burns

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Introduction: The patients with full thickness burns require a deep excision, and need a special coverage like a dermal regenerators or cadaveric skin at the initial stage and for wound bed preparation that will finally be grafted. However, this kind of dressing represents difficulties from cost, availability and delay in treatment definitive. For these reasons, it is important to explore new technologies that promotes coverage, moisture to the wound, among others.
Objective: To present the small experience with Epicite^{hydro}, to their income to the burn unit we did not have cadaver skin or Integra to offer to that patients, in order to previously experience a wound dressing that consists of a nonwoven 3D network of pure cellulose fibers and a high moisture load. The specific network pattern, which is superior to comparable dressings, is derived by a unique biotechnological process of production and prevents cell adhesion
with the wound and less pain during usage.
Materials and Methods: 3 patients with areas between partial thickness and full thickness.
Results: The age of patients varied between 7 and 17 years. There were 3 boys. TBSA involvement varied between 22 to 35%, and the full thickness area were almost 20% of TBSA. We made a fascio-cutaneous scarectomy with electrocautery or cutaneous resection with versajet, hemostasis and applied the Epicite^{hydro}; after 5 to 7 days removed it dressing, and applied autograft because the wound bed was in optimal conditions.
Conclusions: We have a big problem with the immediate availability of cadaver skin or dermal regenerator for patients with full thickness burns. That's why the use of this new dressing that promotes the wound bed preparation has been an(d) excellent dressing. We need a prospect and comparative study, with more patients to conclude and give us demonstration of the real benefit of this product.

P226

Initial experience with the first application of allogenic skin grafts for acute burns in Croatia

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Objectives: Authors' very first experience with application of glycerol preserved allografts (GPAs) in acute burn treatment applied in a 7-year-old boy with 93% TBSA 3rd degree flame burn.
Methods: After excision of the necrotic tissue during the initial 4 days, INTEGRA DRT was applied on the extremities. Given the fact that the take rate of INTEGRA DRT was around 30%, allogenic skin grafts were imported from the Banc de Sang i Teixits - Barcelona and grafted onto the wound bed, 14 days after the patient's admission. Donor sites on the scalp and the foot were covered with amniotic membranes (AM) from the local Tissue Bank. During 4 months of hospitalization, GPAs were applied 6 times (7,000cm^2),
Results: AM promoted faster healing in small areas of IInd degree burns. Cadaveric skin grafts enabled the preservation of the wound bed for subsequent autologous skin grafting combined with cultured epithelial autografts (CEA). CEA were applied in preconfluent phase with two-component fibrin glue (Tisseel, Baxter).The take rate after wound bed conditioning with allogenic skin was around 90%. An episode of mold infection occurred on the area covered with allogenic skin what prompted immediate removal of the grafts and initiation of antifungal therapy.
Discussion: Allogenic skin grafts provided a beneficial temporary wound dressing and enabled a very satisfying take rate of autologous skin grafts. Treatment of the patient is continuing with uncertain outcome.

P227

Controlling infection in a complex burned patient with Betaine-Polyhexanide in gel: An alternative wound bed preparation method for grafts

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Objective: Infection is responsible of a high rate of mortality among burned patients. Our aim is to assess the effectiveness of betaine-polyhexanide in gel to reduce signs of infection in a complex burned patient, prepare the wound bed for grafts, and diminishing the use of antibiotics.
Material and Method: Case report to describe the effect of betaine-polyhexanide in gel. Female patient (29). Pregnant (8 weeks). Assaulted in her home resulting burned (AB-B) on face, neck, thorax and arms. 17.5% BSA. Initial management performed in a rural hospital where patient revealed inhalational injury. Transferred 9 days later in critical condition to a national reference center for burned. Deep infection managed with one only surgical cleaning. Continued with advanced wound care during three weeks, changed dressings three times per week: Soaked gauzes with betaine-polihexanide solution left over the wounds for 10 minutes. Primary dressing: gel of betaine-polyhexanide. Secondary dressing: polyurethane non-adhesive, semi-permeable and transparent film.
Resulst: Despite of the critical condition, infection control is achieved. Negative tissue cultures and suspension of

antibiotics. 80% of epidermal tissue covered the burned areas and the rest were grafted successfully. 95% of the grafted areas showed excellent adherence. Very good esthetical and functional outcomes. Early discharged. Patient is happy with these results.
Conclusions: This case report sets a baseline to develop more evidence in the use of betaine-polyhexanide in complex burns. Early infection control and excellent wound bed preparation for grafts are valuables outcomes. More studies could be develop to demonstrate its cost-effectiveness by decreasing antibiotics consumption and length of stay reduction in ICU.

P228

Proteomics analysis of split thickness skin graft's response at 1-year follow-up after grafting on excised wound bed, on Integra or on granulation tissue

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Objective: The objective of this study was to investigate how wound bed priming before skin grafting affects outcome in long term. Proteomics approach of three differently treated excised burn wounds were assessed and compared with each other one year after the injury.
Methods: After fascial excision of large deep burns on four adult patients from Helsinki Burn Unit the study areas were divided into three 5x10 cm sections: 1) split thickness skin graft (STSG), 2) an artificial dermal template (Integra®) and 3) a temporary cover viscose cellulose sponge (Cellonex™). The two latter sections then received STSGs two weeks after the primary surgery. Both epidermis and dermis from histological sections of punch biopsy samples from each site were collected using laser-capture microdissection, and the samples' proteomics profiles were analyzed.
Results: 34 proteins in epidermis and 27 proteins in dermis were significantly differently expressed ($p < 0.05$) between treatments. Especially, in the dermis the expression of collagens COL6A2 (alpha-2 subunit of type VI collagen) and COL12A1 (alpha chain of type XII collagen, a member of the FACIT (fibril-associated collagens with interrupted triple helices) collagen family) was highest in the control STSG-group and lowest in the cellulose sponge treatment group.
Conclusion: Even though clinically the differences between the different treatment sections were minimal one year after excision, at the protein level specific differences were found both in the epidermis and the dermis. Our results suggest that the early treatment and wound priming selections can have an effect even after long term on the grafted skin.

P229

Experience with Medihoney® treating deep-dermal burns

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Objectives: There are multiple options for topical treatment of burns. The antibacterial properties of honey have been long known. In addition to avoiding and treating infection, honey has also proven debriding action, anti-inflammatory properties and inmune stimulation. We describe our preliminary experience with Medihoney Wound Gel treating deep-dermal burns evaluating not only the duration of the healing period but the quality of the reepithelization.
Methods: From August 2016 we have treated 32 patients with deep-dermal burns from different etiologies, including chemical and electrical flash burns with up to a 10%TBSA on any anatomical location. Follow up was done every 3 to 5 days until complete reepithelization was achieved, collecting data as time to complete reepithelization, infection and the posterior surgery when needed.
Results: We observed complete reepithelization on 28 patients. Only 4 patients had to be secondarily debrided and covered with split thickness skin grafts in areas not healing after a certain period. We found no other associated complications and did not have any case of infection.
Hyperthopic scarring did not appear on any patient, however, most of our patients with deep dermal burns are treated with pressure therapy garments.
Conclusion: Medihoney is a highly recommended topical treatment for deep-dermal burns, proving to be a well tolerated and easy to apply ointment, with antibacterial and debriding properties that allow for a directed reepithelization of burns with successful wound coverage.

P230

Use of Suprathel® in surgical, non-surgical and enzimatically debrided burns

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Objective: We evaluated the use of Suprathel®, a synthetic copolymer membrane from polylactids that provides

a temporary wound coverage in burn patients.
Methods: Since 2013, 29 patients with mid-dermal or deep-dermal burns were treated with suprathel® and evaluated retrospectively.
Suprathel ® was applied:
- After enzymatically debridement with Nexobrid®
- After hydro-debridement with Versajet®
- On donor sites
- On mid-dermal non surgical burns

The outer dressings were changed every 2-3 days and the evolution closely evaluated.
Results: A total of 4 patients had to be secondarily debrided and covered with split thickness skin grafts in areas not healing after a certain period.
3 patients had Suprathel® removed because of secondary infection.
Optimal scarring results were obtained on the other 22 patients. Supathel® was easily adapted to wound surfaces. It was a well tolerated temporary coverage which reduced pain and lead to complete stable reepithelization of burns without higher incidence of hypertrophic cicatrization.
Dressing changes considerably reduced the average time, as well as the need of additional anesthetic medication.
Conclusions: Supathel® allows a quick and stable reepithelization with a successful coverage result. It has proven to be a safe and effective option, reducing pain and use of opioids, protecting from bacterial and virical infection and allowing, due to its transparency, a good visualization of the wound through the entire healing process.

P231

Eficiency complex AG Alginate

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Complex silver alginate a valid option to treat burns Even if with colonized or infected wound can control to epithelization. We analysed a case series of 22 patients with other than 3rd degree burns .
Complex silver alginate matrix has shown to be a good choice in the treatment of burns.

P232

Evidence of Upregulation of Aquaporin-3 Expression with Alhydran (Aloe vera based Formulation) Following Full Thickness Skin Burn in Geriatric Patients: A Pilot Study

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Objectives: Problems with dehydration of skin and delayed healing after burns in burnt patients are common in clinical care. Geriatric patients present an additional challenge since their skin is naturally less hydrated. Aquaporin 3 (AQP3), one of transmembrane proteins that transport water and small solutes such as glycerol across cell membranes, is abundantly expressed in keratinocytes of mammalian skin epidermis. AQP3 is shown to play a role in the hydration of mammalian skin epidermis, and to regulate the metabolism of lipids in skin and the proliferation and differentiation of keratinocytes. While *A. vera* has a long history of use in the topical care of burns and other wounds, its efficacy and mechanisms of action, particularly in skin hydration of healing burns in geriatric patients have not been reported.
Methods: This study present a case study of a geriatric patient with a deep burn on upper extremities. After tangential necrectomy of burned tissue, split thickness skin grafting was performed. Following the achievement of skin in-growth and healing of donor areas, an *A. vera* based cream (Alhydran) was applied on the transplanted skin for 90 days. Punch skin biopsies were taken from transplanted skin in both upper extremities and donor areas at days 0, 7, 21 and 60 and 90 post-healing. Expression of AQP3 in the skin samples was studied by immunohistochemistry, immunocytochemistry, reverse transcription-polymerase chain reaction (RT-PCR) and western blotting.
Results: Significant upregulated expression of AQP3 was detected in treated skin and in donor areas compared to controls ($p < 0.05$). There was evidence of increased upregulation of AQP3 with time of application.
Dicussion/Conclusion: Topical treatment of split thickness skin transplants and donor areas in elderly patients after deep skin burn with the *A. vera* based cream can better the hydration the upregulated expression of AQP3. Further clinical study will follow.

P233

The influence of Alhydran® of scars after large surface thermal burns and Quality of Life of burn victims

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Question: How influenced scarring the Quality of Life and Alhydran® the itching, skin tension, dryness and redness of the skin in the early stage of scar maturation during the rehabilitation?
Method: We include 75 burns (54 m, 21 f, average age 51 years, average TBSA 25,4% (most scar areas in the thorax and the extremities) during an inpatient rehabilitation program. Scar treatment was performed daily with Unguentum cordes®. Parallel to scar massage, all burns received a complex, activity oriented rehab program. The treatment protocol was modified towards the use of Alhy-

dran®, when patients suffered from itching and skin tension after 14 days furthermore.
Results: The SF-36 showed the biggest underscoring in the scales of Physical Functioning, Role-Physical and General Health. The Pationnaire® showed especially in the fields of redness (20,4%) and skin tension (16,9%) a substantial improvement compared to the initial values. Also the reduction of itching (13,5%) and dryness of the skin (13,8%), were clearly noted in the scoring of the patients. By comparison of scare care products the products Alhydran® and Ungunt. Cordes® are getting rated equally on the VAS from 0 to 100 concerning tolerance (92 to 87) and handling of application (88 to 82). Remarkable, but without statistically significance is the difference in the rating regarding itching and skin tension witch a gap of 12 resp. 9 points. In the same way positive is the impact on the lost of redness with 11 points.
Conclusions: Alhydran® was successfully used during the early maturation of the scars, to reduce the subjective and unpleasant side effects of burn scars such as redness and skin tension. Alhydran® could trouble free be combined with textile garments. Further clinical studies with a larger randomized group and a longer observation period are needed to be able to draw statistically relevant conclusions.

P234

The treatment of epidermal and deep dermal wounds with polylactid based membrane. 10 years perspective and outlook.

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In the last 40 years the management of Burns has devolved dramatically, being perhaps early excision of burned tissue the standard of care, which contributed to the reduction in mortality by Burns.
Autologous split skin grafts are the most reliable method for closing third degree burns. The search for other treatment options for the coverage of the breakaway areas has resulted in a synthetic copolymer mainly based on DL-lactic acid substitute. (Suprathel) This polylactide-based membrane, alloplastic, absorbable skin substitute that is highly permeable to oxygen and water vapor, providing a particularly favorable environment for wound healing.
Objetive: Assess the effectiveness of the resorbable skin substitute (Suprathel) in 2nd and 3rd degree burns.
Material and methods: Prospectively were included paediatric patients with burns, who attend to the Hospital Civil de Guadalajara in the period from November 2007 to January 2017.
All the lesions were surgical debridement and then applied the resorbable skin substitute (Suprathel) according to the Protocol of management.
Results: The results show that in the patients treated 80% of the injuries including those of 3rd grade epithelized properly, requiring 2 refills of the substitute on average to achieve the epithelialization.
Other results include that can be applied easily and safely, even to large areas. Immediate pain relief after application, excellent coverage of wounds, no change of the dressing needed, significantly less eff ort for nursing staff, cost reduction due to high efficiency.

P235

Who needs a medical photographer anyway?

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Objective: Since the introduction of making digital photographs in 1996 in the Rotterdam Burn Centre, the Netherlands, it has made the recording and archiving of digital material much faster and more efficient. However, security and confidentiality requirements for patient privacy are even more paramount than ever before. A Medical Photographer (MP) can help achieve these aims by regulating the use of the images. Thus our objective is making clinical practitioners aware of the advantages of requesting a medical photographer to maintain standardisation of digital photographs in a Burn Centre.
Methods: A standardised calibration measure with cm, cm2 and colours is used and patient details are added photographing the burns to be able to follow-up wound healing. A Medical Photographer makes the photographs or a video instead of the burns doctor. The MP uploads and archives the images into the Electronic Patient Dossier (EPD) and can regulate the use of the images as well as create a safe back-up.
Results: There will be a continuous, standardised archive of images of each patient receiving treatment in the Burn Centre. This will allow the Burn Care providers to follow the wound healing in time. This information can be easily but also securely accessed via the EPD. The photographs could also be used in research because they were standardised.
Discussion/Conclusion: A Medical Photographer is a registered member of the institute of Medical Illustration, therefore the photographic material is guaranteed to be handled securely and confidentially enabling patient privacy.
Because the MP is processing the photographs instead of the burn doctors, it alleviates the work load for the Burn Care providers who can use their time more efficiently for patientcare.
By standardising photography with calibration, wound healing and scarring can be followed-up more accurately and research becomes more reliable.

P236

Manuka honey a valuable addition to the wound dressing armamentarium

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Objectives: To outline our experience with Manuka honey at our regional burn center, as an advance wound therapy for complex or stagnant wounds
Methods: We describe the current recommendations made by the manufacturer and outline in the relevant literature.We also summarise our experience with complex and stagnant wounds in the burn patient population.The treatment protocol used at our center consists in applying Manuka honey commercially available paste and then a commercially available impermeable wound contact layer and finally covered up with a dry sterile gauze, this dressing was change once every three days with alternate treatments either at home or a local healthcare facility
Results: Manuka honey is a valuable complement to the available therapies and strategies used to manage recalcitrant wounds in burn patients12 patients were successfully treated during the last year.Our center's Manuka honey protocol allows for outpatient treatment and follow-up with the possibility of scheduling alternate visits at the local health center unburdening our facility.
Discussion / Conclusion: The presence of conditions that impose an insufficient wound bed microvascular-wise represents a difficult challenge where both aggressive and conservative approaches proved inadequate or at least untimely. In this subset of patient population Manuka honey proved an effective strategy to restart the wound healing process albeit some cases still remain challenging.

P237

Spontaneous healing and scar control following enzymatic debridement of deep second degree burns

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Introduction: A major problem in patients surviving thermal injury and being treated conservatively, a long process, is the development of granulation tissue followed by hypertrophic scars. Deeper burns that needed longer healing time were more prone to granulate and scar. Early surgery that removed the offending eschar prevented the eschar related complications (mainly local and systemic infections) and allowed early wound closure by autografts.
Care report: Woman, 25-year-old, who was referred to our Burn Institute after a flame burned, 29% TBSA (forearms, hands, knees, legs and feet). On admission the upper extremities were evaluated to be a rather superficial second-degree burns, while the lower extremities: deep second-degree burns. The upper extremities burns were cleansed and covered with Hg Hydro fiber.
The deep partial thickness burns of the lower extremities deemed to be deep in need debridement. The lower extremities burns were treated with bromelain-based enzymatic debriding agent and deep dermal bed treated with Vaseline gauze and various topical preparations, the dressing changed every 2 days. Autografting was not needed.
The Patient and Observer Scar Assessment Scale POSAS) was used to evaluate the scars and their development on hospital discharge and after 15, 30, 60 and 120 days at out-patient Clinique-.
At discarge the upper extremities score was 68 (26/42) lower extremities score was 87 (38/49 posas scale obs/pat).
At fourth month follow up the upper extremities score was 84 (35/49) lower extremities score was 69 (30/39 posas scale obs/pat).
Discussion: Conservative treatment of the superficial dermal burns ended in a quite early wound closure (20 days) but it followed an inflammatory process that led to the sloughing of the thin eschar followed by epithelialization. The deeper, lower extremities burns were debrided and the deep dermis had the opportunity to epithelialize without an inflammatory process ending in scar-free healing.

P238

Chemical burns treated at the Burns Unit in Debrecen during the last decade

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Among burns, chemical burns are usually of lesser extent but tend to be more serious due to the depth of these wounds. Last year we had to treat an increased number of chemical injuries, the most severe among these was a young man with 45% basic burn injury. In a retrospective study we collected data on patients with chemical burns admitted to our Burn Unit during the last 10 years.
During the period of 2007 January 1st and 2016 December 31st we hospitalized 2499 patients with burns, among these 36 patients suffered chemical injuries. This represented 1,44% of our admissions with a mean age of 39,41 (2-75 years). Extent of the injuries were in the range of 1-45% TBSA with an average extent of 4,6%. The hands were the most common involved body site. The injuries required surgical treatment in 26 patients (72%). Account is given about the causes of injuries and their distribution over the observed years. Based on the presented data, the incidence of corrosive injuries seems to increase over

time at least in the region served by our center. This is in opposition to trends in incidence of burn injuries in general, with its cause unknown to us. We figure that more and more households use cold degreasers which is a strong basic substance. Interesting that these increased numbers still represent the lower threshold of incidence among burn admissions when compared to data from the literature (1,4-8.5 %).

P239

Survival analysis of patients with transplantation of keratinocytes in years 2008-2015.

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Goal: Most advanced treatment of extensive burns is keratinocyte transplantation. It should however highlighted that results of clinical transplant keratinocytes are ambiguous. Limitations of this method include long waiting times for cell culture and its susceptibility to infection. The aim of this work was to verify the impact of the application of keratinocytes on the survival of patients. This study specify a group of patients with the greatest chance of successful of treatment and excluded patients in whom there is no reason to apply this costly treatment.
Methodology: All patients diagnosed with burns treated with cultured skin cells between 01.01.2008 and 01.01.2016 were included in the study. Assessment included: patient age and sex,% TBSA,% burns with a depth of III / IV, the number of days from admission to surgery and the need for rehabilitation. Cox proportional hazards model was used.
Results: The analysis included 81 patients with a diagnosis of thermal burns, who were treated with the use of autologous dermal cells. The obtained result of survival in this study is 88%. The analysis shows that there is only one significant predictor of decease - the surface area of burn of third degree (p = 0.029). With the increase of burns area of 10% the risk of death icreased 75.2% (CI HR 1,06-2,9). The probability of three months survival in the case of burns III/IV comprising more than 40% of body surface area is only 60%.
Discussion: The purposefulness of conducting this expensive and time-consuming procedure isn't clinically justified in groups of patients who may heal spontaneously (burn IIa). Qualification of patients under 50 years old for cell culture is associated with defining age as a negative prognostic factor and the impact of process of aging on the proliferative capacity of cells with normal morphology.

P240

Monitoring the progression of a burn wound using infrared technology - A case series

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The decision making process for managing burn wounds can be complex. Every burn surgeon knows how challenging it is to determine early after an injury which deep second degree burns will heal without surgery and which ones will not. In addition, patients taken for a surgical intervention may have areas of third degree burns mixed with second degree burns. Decisions regarding the debridement technique and amount of tissue to remove are complex and depend on a surgeon's experience.
Algorithms based upon the analysis of burn images have been proposed in the past. Thermography may have potential applications in this area. Studies have suggested that thermal images integrated with digital photo data can be used to estimate burn depth. They also describe the need to add thermal reference points in the camera field to effectively link the thermal and digital images, and note that thermal images are only of value in the first 72 hours after a burn due to the ensuing inflammatory response.
In our study, we imaged burn injuries that presented at the West Penn Hospital Burn Center. Any patient with a burn wound having partial thickness severity or greater were eligible for inclusion in the study.
Thermal and digital images were acquired during wound examination. The camera was positioned in a way that the entirety of the burn could be observed in the frame of the image. The FLIR cameras were manually adjusted to keep the burn injury in optimal thermal focus. The amount of time between injury and imaging was recorded.
On patients admitted to the burn center, pictures were taken daily. Patients receiving follow up care in an outpatient setting were also photographed. The images were captured about 5 minutes after the dressings had been removed and wounds cleaned in an effort to minimize the changes of temperature related to this intervention. We imaged patients for as many days as possible or until the wounds healed.
This pilot study provided preliminary data that helps understand the correlation of temperature changes and depth of burns. We are designing a study aimed at further understanding temperature changes after a burn.

P241

Pilot study: feasibility and effectiveness of Mindfulness for people with burns and parents of children with burns

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Objectives: After a burn event, burn survivors and parents of children with burns experience psychological distress and diverse difficulties that impairs their quality of life. Aim of this pilot study was to examine the feasibility and effectiveness of two Mindfulness group interventions provided to burn survivors and parents of children with burns respectively.
Methods: Twenty-eight participants were recruited, but eight people withdrew because of practical or physical problems, and three participants had traumatic stress symptoms in the clinical range. Finally two Mindfulness groups were formed; 1) including 7 people with burns and 1 spouse, and 2) including 9 parents of children with burns. At baseline, immediately after, and 3 months post-intervention they filled out the Beck Depression Inventory-II-NL, PTSS Checklist DSM-5, Five Facet Mindfulness Questionnaire-Short Form, Self-Compassion Scale-Short form, personal goals, and evaluation questions.
Results: All participants were able to complete the intervention and scored it as very useful (score 8,8 on a scale from 1 to 10) and participants were very satisfied (score 8,8). Mindfulness skills improved significantly (p <.05) on short and long term and self-kindness increased significantly (p <.05) on short term in the parents group. In both groups personal goal scores increased significantly (p <.05) on short term and for the parents also on long term. Decreased scores for depressive and PTSD symptoms were shown on the short and long term in both groups, but not reaching statistical significance. Qualitative data showed that participants experienced more inner peace, more awareness of thoughts and emotions, and more self-compassion.
Discussion: Our pilot study suggests that a Mindfulness intervention can be feasible and effective in improving well-being in people with burns and parents of children with burns, but the first results are most convincing for parents of children with burns.

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A_FAMNAME	A_INITIALS	ABSTCODE1	ABSTCODE2	ABSTCODE3	ABSTCODE4	ABSTCODE5	ABSTCODE6	ABSTCODE7	ABSTCODE8	ABSTCODE9	ABSTCODE10	ABSTCODE11	ABSTCODE12	ABSTCODE13
Abali	A.E.	P105	P213											
Aballay	A.	P240												
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Abbaszadeh Kasbi	A.	O1.03												
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Awal	R.	O8.01												
Aydogan	C.	P105												

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Ayestaran Soto	J.B.	P030	O6.04											
Ayub-Khan	H.	P002												
Baartmans	M.	O26.03	P061	P121										
Bache	B.	P057												
Badawi	D.	P062												
Badiul	P.O.	O20.02												
Baena	J.	P004												
Baena-Caparros	J.	P047												
Bagheri	B.T.	O32.05	O32.06	P095	P180									
Baguena	M.	P004												
Balcells Ramírez	J.	P085												
Baldursson	B.T.	O31.05												
Baltazar Ferreira	J.	O14.02	O14.05	P111										
Bamford	A.	O26.06												
Band	B.	P110												
Barcot	Z.	P226												
Barnes	D.	O1.05	O12.06	O25.05	P057	P070	P091	P110	P221	P222	P223			
Barret	J.P.	O1.04	O2.04	O5.05	O14.03	O15.04	O30.06	P004	P047	P236				
Barreto	S.M.	P049												
Barth	A.	P080	P081											
Basheva	M.H.	P183												
Basso	G.	O7.04	O12.03	P168										
Batarilo	I.	P226												
Batista Domenech	M.	O14.04												
Bayrakçi	E.B.	O15.06												
Beerthuizen	G.I.J.M.	O3.02	O26.03	O31.06										
Belhaj Salah	N.	O30.05	P014	P112										
Ben Dror	A.	P050												
Ben Garsallah	L.	O30.05	P014	P112										
Bene	R.	O2.01												
Benedikt	S.	P059												
Bennett	V.	O29.03												
Benoit	D.	P007												
Berardino	M.	O2.05												
Betriu Sebastià	L.	P085												
Bharj	I.	P017												
Birngruber	T.	O32.02	P045											
Bishop	J.	O26.06	P037											
Bitzani	M.	P009	P010											
Blahutová	P.	P114												
Blakemore	P.	P086	P067	P106										
Blazeby	J.M.	O25.03												
Blears	E.E.	PS1.3												
Blokzijl	S.	P115												
Blome-Eberwein	S.B.E.	P064												
Bocková	S.	P114												
Boekelaar	A.A.	O17.03												
Bogdanov	S.	P171												
Bogdanov-Berezovsky	A.	P163												
Bohác	M.	O8.04												
Boiangiu	A.M.	O18.05	O21.06	P099										
Bolliger	M.	P080												
Bommarito	C.	P071												
Bonamonte	D.	O25.06	P202											
Bonander	C.	O22.03												
Boone	M.A.	P023												
Boorse	D.	P064												
Borisov	V.	O26.02	P206	P207	P208									
Bosacoma Roura	P.	O5.05	P236											

A_FAMNAME	A_INITIALS	ABSTCODE1	ABSTCODE2	ABSTCODE3	ABSTCODE4	ABSTCODE5	ABSTCODE6	ABSTCODE7	ABSTCODE8	ABSTCODE9	ABSTCODE10	ABSTCODE11	ABSTCODE12	ABSTCODE13
Bosmou	Z.	P010												
Bota	B.	O2.01												
Bousema	S.A.	P121												
Bouwmeester	K.	O24.06												
Boyce	M.	O14.01												
Braem	L.	O17.03												
Brandão	C.	O14.02	O14.05	P111										
Branski	L.K.	P076												
Breederveld	S.	O12.05	O21.05	O31.04										
Brianti	R.	P144												
Briseño Villanueva	J.	O15.05	P234											
Brito	I.	O14.05	P189											
Brookes	S.T.	O25.03												
Brosky	I.	P061												
Brown	E.	O13.02												
Budkevich	L.I.	P172												
Bugaj	M.	O3.03												
Cabañas Poy	M.J.	P085												
Cabañas Weisz	L.M.	O6.04	P030											
Cabral	L.	O14.02	O16.02	P111	P231									
Caetano	M.M.	O16.02												
Caleffi	E.	P144												
Cambiaso-Daniel	J.	P076												
Cambieri	I.	O28.01	P190											
Capek	K.D.	PS1.3												
Carames Estefania	J.	O6.04	P030											
Carbajal	J.	O7.02	O16.04	P011										
Carrera Estevez	M.C.	P069												
Carter	E.	P020												
Casado-Perez	C.	O18.02												
Casarin	S.	O28.01	P190											
Casas Beltran	J.J.	O11.05												
Castagnoli	C.	O28.01	P190											
Castellano-Tejedor	C.	O17.02	P118											
Cepeda Diez	S.	O17.02	P118											
Certic	B.	P055	P179											
César	A.	O28.06												
Cetin	Y.K.	O19.03												
Chacon-Gomez	M.	P003												
Chai	J-K.	O31.02	P044											
Chakravarthy	D.	O23.04	O32.01	P040										
Chandra	A.	O21.04												
Chaves	C.	O16.02												
Chavez Velarde	T.J.	O15.05	P234											
Chekanov	D.Y	P125												
Cheng	W.F.	O6.05	O23.06	P035	P087									
Cherry	A.	P029												
Chingwaru	W.	P232												
Chong	S.J.	P001	P176	P177										
Chouhan	G.	P039												
Chrapusta	A.	O18.01												
Ciappi	S.	O15.02												
Cimen	M.	O19.03												
Citterio	A.M.	O7.04	O12.03	P006	P012	P155	P168							
Claes	K.	O12.01	O20.06											
Clarys	P.	P131												
Clijsen	R.	P131												
Colaço	G.	O29.02												
Colomina	M.J.	O14.03												

A_FAMNAME	A_INITIALS	ABSTCODE1	ABSTCODE2	ABSTCODE3	ABSTCODE4	ABSTCODE5	ABSTCODE6	ABSTCODE7	ABSTCODE8	ABSTCODE9	ABSTCODE10	ABSTCODE11	ABSTCODE12	ABSTCODE13
Colpaert	K.	P007												
Condiño-Brito	E.	O28.05	P229	P230										
Conejo-Mir	J.	O7.02												
Conta	E.	O2.05												
Coppola	A.	P216	P217											
Cordova	J.	P187												
Cortés	V.	PS7.2												
Couceiro	C.	O28.06	P049	P146										
Cranmer	K.	P070	P221	P222	P223									
Cronshaw	A.	O18.06												
Cuccuru	F.	P162												
Cui	C.	P029												
Cuttle	L.	O5.02												
Dahmardehei	D.M.	O32.06	P180											
Daigeler	A.	P028	P160											
d'Alessio	R.	P216	P217											
Dalla Costa	D.	O7.04												
Dantzer	E.	P161	P182											
d'Asta	F.	O2.03	P037											
David	K.	O26.04	P163											
De Corte	P.	O21.01	P023											
De Cuyper	L.	O19.02	O19.06	P129	P132	P134								
De Graaf	E.	O26.03												
De Jong	A.	PS4.3	O13.01	O27.02										
De Luca	M.	O2.03												
De Meyere	K.	O12.01	O20.06	P090	P034									
De Nunzio	G.	P144												
De Vos	D.	P019	P023	P033	O21.01									
De Vries	F.	O24.06												
De Wit	M.A.H.	O24.06												
De Young	A.	O13.02												
Deave	T.	P027												
Del Marmol	V.	P023												
Delli Santi	G.	O1.01	P237											
Demertzis	F.	P092												
Demidova	O.	P205												
Demirakca	S.	P196												
Demircan	M.	O15.06												
Depasquale	C.R.	P046												
Depetris	N.	O2.05	O27.03	P013	P071	P150								
Dhooghe	N.	O12.01	O20.06											
Di Caprio	G.D.C.	P130												
Di Gioia	G.	P165												
Di Rubbo	D.	P130												
Diana	D.	P049												
Diaz Gonzalez	E.D.G.	O4.03												
Dimaki	A.	P009												
Dimander	J.	P066												
Dimkic Milenkovic	A.D.	P055												
Disseldorp	L.M.	O25.02												
Djan	R.	P082	P083											
Dobovsek	A.D.	P055												
Dokter	J.	P235	O31.06											
Dolenec	T.	P226												
Donise	G.	O27.03												
Dos Santos	B.	O5.05	P236											
Dragúnová	J.	O8.04												
Draye	J.P.	O21.01	P023											
Druez	V.	O9.02												

A_FAMNAME	A_INITIALS	ABSTCODE1	ABSTCODE2	ABSTCODE3	ABSTCODE4	ABSTCODE5	ABSTCODE6	ABSTCODE7	ABSTCODE8	ABSTCODE9	ABSTCODE10	ABSTCODE11	ABSTCODE12	ABSTCODE13
Duarte	C.	P049												
Dunn	K.	O5.01	P002											
Dye	J.F.	O15.01	P032											
Dziewulski	G.	PS1.4	O10.04	O12.06	O25.05	P057	P065	P070	P091	P093	P110	P221	P222	P223
Ebenberger	K.	P127												
Eberwein	S.	P193	P195	P198										
Edlund	C.	P209												
Edvinsson Gué	G.K.	P126												
Edwards	J.	P002												
Efstathios	E.	P200												
Egberts	M.	O13.01	O17.03	O27.02										
Egozi	D.	P159	O30.01											
Ekström	M.	O22.05												
El Sayed	A.	P152												
El Sharnoby	O.	O18.06												
El-Khayat	B.	P051												
Elmasry	M.	P077	P078	O11.01	O11.02									
El-Muttardi	N.	O12.06	O25.05	P070	P091	P093	P110	P221	P222	P223				
Elof	E.	P224												
Emond	A.	P027	P108											
Enblom	S.	P126												
Enescu	D.M.	O6.03												
Erdei	I.	P238												
Eriksen	E.	PS3.2												
Ersoz	D.	P105												
Escobedo-Lucea	C.	O6.02												
Eshel	I.	P147												
Eshuis	J.	O26.03												
Esko	E.	P228												
Esser	J.	O24.06												
Euser	M.A.R.G.R	O31.04												
Eyuboglu	A.A.	O5.03												
Fakih	I.	P219	O16.05											
Falco	A.	P148												
Falder	S.	P002												
Falk	S.	P048												
Fan	J.	O31.02												
Farnebo	S.	O23.02	O23.03											
Farokh Forghani	F.F.S.	O32.06	P180	P181										
Farrar	E.	P017	P154	P191										
Farroha	A.	P051												
Fatemi	M.J.	O8.03	O32.05	O32.06	P095	P180	P181							
Fatigato	G.	O25.06	P165											
Feldberg	O.A.	P145												
Ferancikova	N.	P166												
Fernandes	F.	P049												
Fernandez-Diez	M.T.	O16.05	P219											
Ferrato	M.	O28.01	P190											
Ferravante	A.	O28.01	P190											
Fidel Kinori	S.G.	PS5.3	O17.02	P118										
Fierens	J.	P007												
Filatov	I.Y.	O26.02												
Filoni	A.	O25.06	P202											
Finnerty	C.C.	PS1.3												
Fischborn	T.	P160												
Fish	J.S.	O7.06												
Fochtmann-Frana	A.	O3.04	O3.05	P080	P081	P096	P127							
Fogarty	B.	O18.04												
Foncerrada	G.	PS1.3												

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Fontaine	M.	O13.05												
Forbes	A.A.	P076												
Forstner	C.	P080	P081											
Foster	T.	P116												
Fox	N.	P070	P222	P223										
Francois	P.M.	O4.04	O9.02	O9.05	P019	P072	P073							
Fransén	J.	P209												
Fredén	F.	P018												
Fredrikson	M.	P077												
Frestadius	A.	P018												
Frew	Q.	O25.05	P110											
Freystätter	C.	O3.04	P080	P081										
Frosing	R.	P079												
Fuchs	P.C.	O12.02	O15.03	O27.01										
Fumagalli	M.	O28.01	P190											
Fumeketter	W.D.	P046												
Funk	M.	O32.02	P045											
Gacto Sanchez	P.	O7.02	O16.04	P011										
Gagliardo	C.	P216	P217											
Gallach Solano	E.G.S.	P118												
Garcia Gomez	L.G.G.	O4.03												
Garcia Gutierrez	J.J.	O6.04	P030											
García Sanchez	V.	O17.02	P118											
García Vilariño	E.	O14.04	O28.05	P142	P229	P230								
Gardiner	F.	O26.06												
Gasri	B.	O30.05	P014	P112										
Gauglitz	G.	O25.04												
Gavetti	D.	P071												
Geblinger	D.	O10.01												
Gentzsch	T.	O11.03												
Geoghegan	L.	O8.05												
Georget	C.O.	O13.05												
German	M.	P125												
Gerrish	H.	O25.05	P065	P070	P222	P223								
Ghanime	G.	O26.05	P158											
Ghosh	S.J.	P120	P188											
Giovanoli	P.	O11.03												
Giretzlehner	M.	O10.05												
Giudice	G.	O25.06	P165	P202										
Giuglea	C.	O18.05	O21.06	P099										
Gjelsvik	B.E.B.	P128												
Glanvill	L.	P170												
Glik	J.	O10.02	P084	P185	P186	P211	P239							
Goei	H.	O3.06	O12.05	O31.06	P156									
Goel	J.	P221												
Goemanne	A.S.	O17.03												
Gómez	P.A.	O1.04												
Gomez Cía	T.	O7.02	O16.04											
Gomez Curiel	J.F.	O16.04												
Gonzalez	E.	O32.04	P167											
Gonzalez Gilarte	L.	O4.02												
Gonzalez Viejo	M.A.	P141												
Gonzalez-Miranda	A.	O18.02												
Goosen	R.	PS7.4												
Gostelie	O.F.E.	P156												
Gottwald	H.	P048												
Graham	H.	O24.04												
Grbavac	J.	P226												
Grilc	O.G.	PS1.1	O8.02											

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Grossi Garriga	L.	O24.01	P143											
Grover	L.	O26.06	P039											
Guerra	A.S.	P036	P189											
Guilabert	P.	PS5.4	O14.03											
Gunawardena	N.	O24.04												
Gunnarsson	E.	O31.05												
Gur	E.	O30.01												
Gürünlüoglu	K.G.	O15.06												
Gutierrez Zurimendi	G.	O6.04												
Haanstra	T.	O7.05												
Haberal	M.	O5.03	P105	P213										
Haddleton	E.	O29.01												
Hafiz	A.A.	P062												
Hahn	R.G.	P016												
Haik	J.	O17.06	O30.01	P159										
Haikonen	K.	P026												
Hajska	M.	P220												
Hakimov	A.	O12.04												
Hakkarainen	T.	O6.02												
Halim	Z.H.	P082	P083											
Haller	H.L.	O10.05												
Halstead	F.	P037												
Hammink	S.	PS7.5												
Hamouda	R.	O30.05	P014	P112										
Happak	W.	O3.05												
Harats	M.	O17.06	O30.01											
Harcourt	D.	O13.03												
Harrison	P.	P037												
Hartmann	B.	P164												
Harvey	J.	O24.04												
Haselbach	D.H.	O23.05												
Haslik	W.	O3.05	P096											
Hassan	S.	P086												
Hawkins	H.K.	PS1.3												
Heath	J.	O13.03												
Heinel	H.	O12.02	O27.01											
Held	M.	P028	P160											
Hemmesian	H.H.	P181												
Henkel	W.	P079												
Herly	M.H.	P104												
Hernandez	L.	O30.04												
Herndon	D.N.	PS1.3												
Herrero Rudo	M.	O17.02	P118											
Hiddingh	J.	O3.02	O26.03											
Hilmarsson	H.	O31.05												
Hirche	C.	P155	P079											
Hjellestad	M.	P128												
Hlutkin	A.	P043	P149											
Hoeksema	H.	O12.01	O20.06	P090	P034	P155								
Hofland	H.	O4.05	O13.01	O17.03	O24.03	O27.02	O27.05							
Hollen	L.	P027												
Holmgaard	R.H.	P104												
Hoogewerf	C.	O9.01												
Horešovská	M.	P124												
Hossain	S.	P021												
Hosseini	H.S.	P180												
Hosseini	H.S.A.	O32.05	P180											
Hoste	E.	P007												
Houschyar	K.	O3.01	O14.06											

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Hu	Q.	P044												
Hult	M.	P060												
Hundeshagen	G.	P029	P076											
Hur	J.H.	O2.02												
Hur	J.Y.	P175												
Huss	F.	O4.01	O10.03	O22.05	O22.03	O29.01	P066	P076	P209					
Hyde	L.I.S.A.	O2.03												
Ihra	G.	O3.04	O3.05	P080	P081									
Ionita	D.	O6.03												
Ipaktchi	R.	O10.06	O14.01											
Iqbal	T.	O31.01												
Isakovic-Subotic	J.D.	P179												
Ismail Aly	M.	P197												
Isometsä	E.T.	O17.05	O22.06											
Ispizua Mendivil	E.	O6.04												
Issa	F.	O8.05												
Jafari	P.	O23.05												
Jai-Koo	J.K.C.H.O	P173												
Jaks	V.	P228												
Jang-Hyu	J.H.K.O.H	P173												
Jeevan	R.	P091												
Jeffery	S.	O31.05	P017	P051	P154	P191	P201							
Jelsma	N.	O24.02	O24.06	P151										
Jennes	S.	O4.04	O9.06	O9.02	O9.03	O9.05	O21.01	P019	P023	P033	P072	P073		
Ji-Young	J.Y.P.A.R	P173												
Johnson	L.	P135												
Johnson	W.	PS2.3												
Jokuszies	A.	O14.01												
Jonsson	A.	O22.03												
Joycey	A.	P009	P092	P184										
Jozsa	G.	O25.01												
Juárez Giménez	J.C.	P085												
Juhasz	I.	P238												
Juhasz	Z.	O25.01												
Jung	T.	P196												
Jung-Hwan	J.H.L.E.E	P173												
Juteau	S.	P228												
Jutkiewicz-Sypniewska	J.J.S.	P024												
Kabát	P.	O8.04												
Kalam	A.	O8.01	P103											
Kamenskaya	M.	P123	P145											
Kamolz	L.P.	O10.05	O32.02	P045	P058	P059	P076	P096	P200					
Kankuri	E.A.	O23.01												
Kaplunova	M.Y.	O26.02	P206	P207	P208									
Karabaev	K.	O12.04												
Karakaya	E.	P105												
Karakoc	Z.B.	O19.04	P089											
Karason	S.	O31.05												
Karlsson	M.K.	O11.02												
Karström	A.	P209												
Kashimura	T.	P022												
Katz-Levy	Y.	O26.04												
Kavola	H.	O6.02												
Kawecki	M.	O10.02	P084	P185	P186	P211	P239							
Keersebilck	E.	O4.04	O9.02	O9.05	O9.06	P019	P072	P073						
Kemp	A.M.	O29.04	O29.06	P027	P108									
Kempf	M.	O5.02	P153											
Kenardy	J.	O13.02												
Kern	A.	P079												

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Khaje Rahimi	A.A.	P181												
Khalaf	M.M.	P152												
Khaled	A.	O30.05	P014	P112										
Kim	B.S.	O2.06												
Kim	J.H.	P175												
Kimble	R.M.	O5.02	O13.02	O20.01	P153									
Kismet	K.	P133	P137											
Kitala	D.	O10.02	P084	P185	P186	P211	P239							
Kjartansson	H.	O31.05												
Klaas	M.	P228												
Klama-Baryla	A.	O10.02	P084	P185	P186	P211	P239							
Klinger	E.	O26.04	P163											
Kneser	U.K.	P155												
Koivuniemi	R.	O6.02												
Kok	Y.O.	P001												
Koller	J.K.	O8.04	P155	P159	P166	P220								
Komen	R.S.	O4.05												
Konan	A.	P133	P137											
Koo Clavensjö	T.	O29.01												
Kool	M.	O17.03	P241											
Koroleva	T.	P172												
Korpusenko	O.I.	O20.02												
Korzeniowski	T.	O3.03												
Kosonen	M.	O6.02												
Koumouridis	A.	P128												
Kovalenko	O.	P125	P203											
Kozicka	M.	O3.03	P042											
Kozinets	P.	P125												
Kozynets	H.	P203												
Krajcíová	L.	O8.04												
Kralj	R.	P226												
Kraut	M.	O10.02	P084	P185	P186	P211	P239							
Krieger	Y.	P159	P163											
Kua	J.	O11.06	P109											
Kudibal	M.T.	P104												
Kuijk-Theijsmeijer	A.	O24.06												
Küpper	S.	P164												
Kurniasari	D.	P169												
Kwa	K.	O12.05	O21.05											
Kym	D.	O2.02												
Labus	W.	O10.02	P084	P185	P186	P211	P239							
Lafaire	C.	O19.02	O19.06	P129	P132	P134								
Lagunes	L.	P004												
Lagus	H.	P228												
Lalueza Broto	P.	P085												
Lamberts	K.	P061	P115											
Lange	B.	P196												
Langthaler	D.	P127												
Lanzoni	A.	P150												
Latarjet	J.	O13.05	O22.01											
Launois	P.	P143												
Lavigne	J.M.	P101												
Lavrentieva	A.	P009	P010	P092	P013									
Leaver	J.	P074												
Leclerc	T.	O9.03												
Lee	J.O.	PS1.3												
Lee	J.W.	P175												
Lee	K.C.	O21.04	O26.06											
Lee	N.	P192												

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Lee	N.H.	P215												
Lee	Y.J.	P157												
Legemate	N.	O7.01	P156											
Lehner	M.L.	P155												
Leikos	C.	P010												
Leo	N.	O7.03												
Leon-Villapalos	J.	P170												
Lepage	L.	P139												
Levetti	S.	O28.01	P190											
Levins	A.	O20.03												
Li	B.L.	P044												
Li	D.	O31.02												
Li	D.W.	O6.05	O23.06	P035	P087									
Li	J.L.	P194												
Li	L.Z.	O6.05	P035											
Liam	F.C.	P001												
Liberman	A.	P122												
Lillsunde	P.	P026												
Lim	J.S.G.	O11.06												
Lim	S.	P031												
Lim	S.Y.	P178												
Limbourg	A.	O10.06	O14.01											
Lindblad	M.	O4.01	O10.03											
Lindford	A.M.	O18.03	O23.01											
Lipova	K.A.	P145												
Liu	L.Y.	P044												
Liu	Z.X.	O23.06												
Llinás Porte	A.F.L.P.	P229												
Lobaton	R.V.	P187												
Logan	A.	O26.06												
Loginov	L.P.	O26.02	P208											
López Lebrato	S.	O24.01	P143											
López-Chozas	J.M.	P011												
Lord	J.M.	P037												
Lord	R.	P091												
Lorda-Barraguer	E.	O16.05	P219											
Louly-Nathan	K.	P094												
Lucena	A.	O28.06	O29.02	P049										
Luengo	M.A.	O16.04												
Luis	L.	P004												
Lumenta	D.	P200												
Lunetta	P.	P026												
Luukko	K.	O6.02												
M. Brito	I.M.	O14.02	P111											
Ma	L.	O6.05	O23.06	P035	P044									
Macher	B.	P164												
Madry	R.	O3.03												
Maertens	K.	O19.02	O19.05	O19.06	P129	P131	P132	P134						
Maes	K.	O19.05												
Maggio	G.	O25.06	P165	P202										
Magi	S.	P150												
Magnusson	S.	O31.05												
Maguire	S.	P027												
Maher	M.	P051												
Maj	M.	O10.02	P211											
Mäkitie	A.	O6.02												
Maldonado-Garrido	D.	P142												
Malutina	N.B.	P218												
Malvasio	M.V.	O8.02	P162											

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Manasseri	M.B.	P006												
Manero Aramburu	A.A.	O6.04	P030											
Mann	M.	O29.06												
Mannil	L.	O11.03												
Manos	K.	P092	P184											
Manushin	S.V.	P205												
Maria Luz	M.L.M.R.	O4.02												
Marinescu	S.A.	O18.05	O21.06	P099										
Markal Ertas	N.	O5.03												
Markowska	M.	P025												
Marquina	M.S.	P004												
Marta	M.B.S.	O4.02												
Martin	N.	O11.04	O25.05	P091	P097	P222								
Martin	P.	PS6.4												
Martin	S.	O18.04												
Martín	N.	O14.03												
Martin Carrasco	P.	O7.02												
Martin Playa	P.	P030												
Martínez de Compañón	Z.	P085												
Martínez-Méndez	J.R.	PS8.1	O9.03	O18.02	P155									
Martins de Sousa	J.	O22.02												
Maruccia	M.	O25.06	P202	P165										
Masellis	M.	PS2.2												
Masoumi	M.Z.	O32.05												
Massagé	P.	O9.02												
Massazza	G.	P150												
Mat Johar	F.	O17.04	P119											
Mat Saad	G.A.	O17.04	P119											
Mata Ribeiro	L.	P036	P189											
Mataro	I.	O21.06	P216	P217										
Mavlyanova	S.	O12.04	P138											
Mcbride	C.	O20.01	P100	P101	P102	P153								
Mcclain	A.	O5.06												
Mclaren	E.	P020												
Meijer	J.	O17.03												
Meireles	A.R.	O14.02	O16.02	P111										
Meirte	J.	O19.02	O19.05	O19.06	P129	P131	P132	P134						
Mendes	J.	P049												
Mendes	M.M.	P189												
Meneses	T.	P049												
Merabishvili	M.	P033	P019											
Meredith	R.	P235												
Merwe	M.	P121												
Messadi	A.A.	O30.05	P014	P112										
Mett	M.	O14.01												
Michelitsch	B.	P200												
Michelson	N.	O17.06												
Middelkoop	E.	PS6.3	O3.06	O7.05	O12.05	O24.06	O31.06	P061						
Miguel Escuredo	I.	O6.04												
Migunov	M.A.	P208												
Mihai	R.I.	O18.05	P099											
Mikhailov	V.A.	P123												
Milivojevic	M.	P055												
Min-Ju	M.J.K.W.O	P173												
Miranda Altamirano	A.	O15.05	P234											
Mirdell	R.	O23.02	O23.03											
Mitichkin	A.E.	P218												
Mittlboeck	M.	P080	P081											
Mlcak	R.P.	PS1.3												

A_FAMNAME	A_INITIALS	ABSTCODE1	ABSTCODE2	ABSTCODE3	ABSTCODE4	ABSTCODE5	ABSTCODE6	ABSTCODE7	ABSTCODE8	ABSTCODE9	ABSTCODE10	ABSTCODE11	ABSTCODE12	ABSTCODE13
Mockenhaupt	M.	P196												
Mohamady	H.M.	P152												
Moiemen	N.	O21.04	O26.06	P037	P039									
Mok	W.L.J.	O11.06	P109	P176										
Mokline	A.	O30.05	P014	P112										
Molon	A.	O27.03	P071											
Momeni	M.M.	O32.05	P095											
Monclús	E.	O1.06	P088	P204										
Mondragon	O.	P225												
Monforte	R.	P004												
Monstrey	S.	O12.01	O20.06	P007	P034	P090	P155							
Montane Quiñonero	M.M.	P069												
Monte	A.	P141	P214											
Monteiro-Jr	A.A.	P224												
Montse	M.G.E.	O4.02												
Moortgat	P.	O19.02	O19.05	O19.06	P129	P131	P132	P134						
Moray	G.	P105	P213											
Morello	M.	O7.04	P168											
Moroz	I.	P125												
Mortazavi Nejad	H.	O32.06	P095											
Moustakis	N.	O10.04												
Mouton	L.J.	O19.01	O24.02	O25.02										
Mrázová	H.	O8.04												
Mullen	S.	O29.06	P027	P108										
Munjiza	A.	P226												
Muro	F.	O27.03	P071											
Murray	A.M.	O8.05	P155											
Muschitz	G.	O3.04	O3.05	P080	P081	P096								
Musgrove	L.	P029												
Nacchiero	E.	O25.06	P165	P202										
Nakazawa	H.	P022												
Nedavn?Y	V.	P125												
Nedomansky	J.	P096												
Nemecková Crkvenjaš	Z.	P114												
Nenkova	N.R.	P183												
Nesheim	A.	P128												
Nessler	M.B.	O18.01												
Neuprez	A.	O9.02												
Newton	T.	O2.03												
Ngu	F.	P100												
Niazi	M.	O8.03	O32.05	P181										
Nickl	S.	O3.04	P096											
Niemeijer	A.S.	O3.02	O24.02	O25.02	P061									
Nieuwenhuis	M.	O3.02	O7.05	O19.01	O24.02	O24.06	O25.02	O26.03	P061	P115	P151			
Nightingale	P.	O21.04												
Nijhuis	T.H.J.	P156												
Nijran	A.	P113												
Nikolic	N.M.	P055												
Nilson	F.	O22.03												
Nizamoglu	M.	O10.04	O12.06	O25.05	P057	P065	P070	P091	P093	P110	P221	P222	P223	
Nor	N.	O20.02												
Nowak	M.	O10.02	P084	P185	P186	P211	P239							
Nurmatov	U.	O29.06												
Nuttall	D.	P027	P108											
O'Boyle	C.	O8.06	O18.06											
O'Connor	F.	P057												
Oehlbauer	M.	O1.02	P212											
Oen	I.M.M.H.	O27.05	P121	P156	P235									
Ogawa	R.	P176												

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Øglænd	O.	O18.03												
Ojeda-Regidor	A.	O18.02												
Oliveira	C.	O7.06												
Oliveira	P.	P049												
Olofsson	P.O.	O11.01	O11.02											
Olsson	M.	P066												
On Behalf of The		O9.01												
Onyekwelu	O.	P002	P197											
Oosterwijk	A.M.	O19.01												
Oproiu	A.	O21.06												
Osborne	M.	PS4.1												
Osman	N.	O32.03												
Öster	C.	O4.01												
Ozgun	G.	O5.03												
Ozkal	O.	P133	P137											
Pablo	P.	O30.06												
Pacey	V.	O24.04												
Pagkalos	G.	P092												
Pagnozzi	E.	P216	P217											
Palackic	A.	P059												
Palao	R.	O1.04												
Pallua	N.	O2.06												
Palmu	R.	O17.05	O22.06											
Palombo	M.P.	P237												
Pantazi	G.	P092	P184											
Pantet	O.	P013												
Pantoja-Gómez	H.P.	P052												
Papadopoulou	S.	P092	P184											
Papaioannou	M.	P009	P010											
Parmentier	C.	O9.02	O9.06											
Partonen	T.T.	O17.05	O22.06											
Pascua Gomez	L.A.	O6.04												
Pascual	B.	O21.01	P023											
Passos Meireles	R.	O14.05	P015											
Patel	B.	P100	P101	P102										
Pauzenberger	R.	O3.05												
Pavez	A.	P098												
Payre	J.O.	O13.05												
Pek	W.	P177												
Perchenet	A.S.	P161	P182											
Percival	S.	O23.04	O32.01	P040	P041									
Pereira	S.	O28.06	P049											
Pereyra	J.J.	O7.02												
Pérez	L.	P004												
Perez del Caz	M.D.	O14.04	O28.05	P142	P229	P230								
Pérez del Prado	M.L.	O4.02												
Persoons	P.	O4.04	O9.02	O9.05	O9.06	P072	P073							
Persson	A.	O29.01												
Peter	P.	O11.04	P097											
Petersen	W.P.	P028												
Petra	P.	P200												
Pezas	T.	P113	P120	P188										
Phillips	G.	O11.04	P097											
Philp	B.	P091	O25.05											
Pidchenko	N.E.	P207												
Pijpe	A.	O7.05												
Pinheiro	C.S.	O14.05												
Piperidou	M.	P010												
Pirnay	J.P.	O9.02	O9.06	O21.01	P019	P023	P033							

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Piszczek	J.	O3.03												
Pivat	C.	P056												
Plock	J.	O11.03	P155											
Polat	M.G.	P089												
Polinder	S.	O7.01												
Pompermaier	L.	P077	P078											
Popov	S.V.	P218												
Porter	C.	PS1.3												
Poupelin	J.C.	O13.05												
Presterl	E.	P080	P081											
Prevosti	O.	P046												
Pudya Hapsari	N.	P174												
Pujji	O.	P017	P154	P191										
Pujol-Blaya	V.	P148												
Pursad	M.	PS7.3												
Quinn-Scoggins	H.	O29.04	O29.06	P108										
Quispe	D.A.	P227	O32.04											
Radtke	C.	O3.04	O3.05	O10.06	P080	P081	P096	P127						
Raffoul	W.R.	O23.05												
Ragaccio	A.	P071												
Ragunathan	N.	O15.01												
Rahmani	I.	O30.05	P014	P112										
Rahmanian-Schwarz	A.R.S.	P028												
Raineri	S.	P013												
Rakkolainen	I.	O16.01												
Raktoe	R.	O5.04												
Ramos	S.C.	O14.02	P111											
Rantalahti	R.	P060												
Rasero	C.	O16.04												
Rashaan	Z.	O21.05	O31.04											
Rath	T.	O3.04	O3.05	P080	P081	P127								
Ravat	F.O.	O13.05												
Ravindran	N.	O15.01	P032											
Rea	D.	P027												
Reischies	F.	O10.03	P058											
Renkert-Baudis	M.	P196												
Rennekampff	H.O.	O2.06												
Rey Perez	A.	P005	P004											
Ribeiro	L.M.	O22.02												
Ricard	R.	O30.06												
Ricca	C.	O27.03												
Ringbaek	T.	O22.05												
Rios	M.A.	O32.04	P167											
Risso	D.	P162												
Rivas Nicolls	D.	O30.06												
Riveiro	M.	P004												
Ro	H.	P215												
Robinson	J.	O18.04												
Robles	A.	P004												
Rodrigues	J.N.	O1.05	O6.06	O15.01	P032									
Rodriguez	P.	O30.04	P225											
Roh	S.G.	P215												
Rolf	G.	P224												
Romeo	M.	P162												
Rosch	C.	O4.06												
Rose	T.	O4.04	O9.02	O9.05	O9.06	O21.01	P019	P023	P033	P072	P073			
Rosenberg	L.	O26.04	O10.01	P159	P163	P210								
Rossich Verdés	R.	P085												
Rothenberger	J.R.	P028												

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Ruiz	M.	PS8.2	P141	P214										
Ruiz	S.	P216	P217											
Ruiz-Cases	A.	O28.05	P142	P230										
Ruiz-Padilla	J.B.	O13.06	O28.04	P052										
Rumsey	N.	O25.03												
Russi	C.	O11.03												
Saavedra	P.	O17.01	P053											
Saavedra Ramos	J.C.	O28.01	P190											
Saberi	M.	O8.03	O32.05											
Safont-Albert	J.	P142												
Sakfi	D.	O30.05	P014	P112										
Salazar	K.	O14.03												
Salehi	S.	O1.03												
Salloum	M.	P164												
Salmerón-González	E.	O28.05	P142	P229	P230									
Salonikidou	E.	P184												
Samaras	N.	P184												
Samizadeh	S.	O15.01												
Samoylenko	G.	O28.02												
Sanches Pinto	D.C.	P224												
Sanchez Garcia	M.J.	O4.03												
Sanchez Peña	J.	O16.04												
Sanchez-Balado	A.	O16.05	P219											
Sanchez-Sanchez	M.	O18.02												
Sander	F.	P155	P159	P164										
Sanderson	A.	P067												
Sandrone	N.	P071												
Santacreu	E.	O24.01	P143											
Sanz-Garcia	A.	O6.02												
Sanz-Granda	A.	O18.02												
Šarkozyová	N.	O8.04	P166											
Sawwidis	N.	P024												
Schackert	C.	P079												
Schäfer	B.	O3.05												
Schaller	H.E.	P028	P160											
Scheer	H.S.	O7.06												
Schiefer	J.	O15.03	O27.01	P028										
Schiestl	C.	PS7.2	O7.06											
Schildt	A.	P056												
Schöler	M.	P196												
Scholten	S.	O3.02	O7.05	O24.06	O26.03									
Schriek	K.	O31.03												
Schueler	T.	O24.05												
Schulz	A.	O12.02	O15.03	O27.01	P155									
Sciascia	B.	P075												
Scioli	S.M.	P130												
Segovia Donoso	C.	O20.04												
Sen	S.	P057												
Senyildiz	B.	O19.03												
Seo	D.K.	P175												
Seoane	J.L.	O15.04												
Serafim	Z.	O28.06												
Serracanta	J.	O5.05	O15.04	O30.06	P214	P236								
Serras	R.P.	P189												
Seyyah	M.	O19.03	O19.04	P089	P140									
Sgabussi	P.	O7.04	P168											
Shah	M.	P038												
Shakirov	B.	O12.04	P138											
Shalom	A.	O26.04	P210											

A_FAMNAME	A_INITIALS	ABSTCODE1	ABSTCODE2	ABSTCODE3	ABSTCODE4	ABSTCODE5	ABSTCODE6	ABSTCODE7	ABSTCODE8	ABSTCODE9	ABSTCODE10	ABSTCODE11	ABSTCODE12	ABSTCODE13
Shang	Y.R.	O6.05	O23.06	P035	P087									
Sharma	A.	P129												
Sharma	V.	O15.01	P032											
Sharp	A.	O14.03												
Shaw	A.	O25.05	P091											
Shelley	O.	O25.05	P091											
Shen	C.	O6.05	O23.06	P035	P087									
Sherren	P.	P057												
Shin	J.Y.	P215												
Shobeyri	H.	O8.03												
Shoham	Y.	PS1.5	O10.01	O18.05	O21.06	O26.04	P099	P159	P163	P210				
Siemers	F.		O3.01	O14.06										
Sigurjonsson	G.F.	O31.05												
Silberstein	E.	P163	P210											
Simão	J.E.	P146												
Simões	L.	P231												
Simonovs	V.	O20.03												
Singer	A.	O5.06	O32.03	P159	P210									
Singh	M.	P170												
Sinnig	M.	O31.03												
Sizoo	S.	O24.06	P151											
Sjöberg	F.	O9.03	O11.01	O11.02	O23.02	O23.03	P077	P078						
Škaric	I.	P226												
Sliesarenko	K.S.	O20.02												
Sliesarenko	S.V.	O20.02												
Slobodnikova	L.	P220												
Slomski	R.	P185	P186											
Smailes	S.	O11.04												
Smirnov	K.S.	O26.02	P206											
Smirnov	S.V.	P207	P208											
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Smirny	V.	P125												
Smola	H.	P038												
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Soejima	K.	P022												
Soentjens	P.	P019	P033											
Soete	O.	O9.02	O9.05	P019										
Sommeling	C.	O12.01	O20.06											
Song	J.	P178												
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Sroková	M.	P114												
Stas	H.G.	P121												
Steinvall	I.	O11.01	O11.02	P077	P078									
Stella	M.	O2.05	O27.03	O28.01	P071	P150	P162	P190						
Stockton	K.	O20.01	P101	P153										
Stoicescu	S.	O6.03												
Strand	L.I.	P128												
Stritar	A.	PS1.1	O8.02											
Stromps	J.P.	O2.06	O12.02	O15.03										
Struzyna	J.	O3.03												
Succo	G.	O2.05												
Suleman	L.	O23.04	O32.01	P040	P041									
Sultana	T.	O8.01	P103											
Suman	O.	PS1.3												
Sundin	E.M.	P126												

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Suominen	K.S.	O17.05	O22.06											
Suss	J.L.	O24.05												
Swales	C.	P068	P106	P107										
Szabo	L.	O2.01												
Tacinelli	T.G.	P130												
Tagaev	R.	O12.04												
Talbot	A.	P020												
Tamir	E.	P210												
Tammela	P.	O6.02												
Tan	A.	O10.04	P221											
Tan	K.C.	P001												
Tanash	A.	O22.05												
Tano	E.	O10.03												
Tanveer Ahmed	T.A.	P021												
Tasçi	A.T.	O15.06												
Tatar	R.	O6.03												
Tay	X.Y.	P001												
Tedeschi	L.	P071												
Teodorescu	S.	O9.02	P019											
Ter Horst	B.	O21.04	O26.06	P039										
Tesselaar	E.J.	O23.02	O23.03											
Theodorakopoulou	E.	P057												
Thode	C.	O32.03												
Thomlinson	A.	P038												
Thorfinn	J.	P078												
Thumfart	C.	O10.05												
Thumfart	S.	O10.05												
Tiffner	K.	O32.02	P045											
Tirado	A.	O15.04	P047											
Tlaili	S.	O30.05	P014	P112										
Toland-Mitchell	F.	P135												
Toliver-Kinsky	T.	P029												
Tominac Trcin	M.	P226												
Tompkins	R.G.	PS6.2												
Topuz	S.	P133	P137											
Torrent Bertran	M.L.	O24.01	P141	P143	P148									
Torres Andres	D.	P069												
Toscano	D.	O27.03												
Toth	E.	O25.01												
Towery	H.	O5.06												
Tredget	E.	PS6.1												
Trommel	N.	O4.05	O24.06	P061										
Tromp	M.	PS1.2												
Troncoso	E.V.	O32.04	P167											
Trueman	P.	O7.03												
Tsioulis	I.	P010												
Tsygankov	V.P.	P203												
Tuca	A.C.	P058	P059											
Tuinebreijer	E.	O3.06	O21.05											
Turnikov	Y.I.	P218												
Tyler	M.	P113												
Tzimorota	Z.	P009	P092	P184										
Ullman	Y.	O30.01												
Unlu	B.	O19.03	O19.04	P140										
Usúa	G.	O14.03												
Uysal	C.A.	O5.03												
Valtonen	J.	O6.02	O18.03	O23.01										
Van Baar	M.E.	O3.06	O4.05	O7.01	O7.05	O12.05	O24.02	O24.06	O26.03	O31.06	P061	P121	P151	P156
Van Brussel	M.	O25.02												

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Van Brussel	M.	O9.02												
Van Daele	U.	O19.02	O19.05	O19.06	P131	P132	P134							
Van de Steenoven	J.	O27.05												
Van den Kerckhove	E.	O19.05												
Van der Auwera	A.	O4.04	P072	P073										
Van der Schans	C.P.	O19.01												
Van der Velden-Veen	M.	O24.06												
Van der Vlies	C.H.	O3.06	O7.05	O9.03	O12.05	O26.03	O31.06	P156						
Van der Wal	B.A.	O21.05												
Van der Woude	L.H.V.	O24.02	O25.02											
Van Ingen Schenau	S.A.	P061												
Van Laeke	P.	O9.02	O9.06											
Van Loey	N.	O7.01	O7.05	O13.01	O17.03	O24.03	O24.06	O27.02	O27.04	P241				
Van Raemdonck	H.	O21.01	P023											
Van Schie	C.H.M.	O7.05	O9.01	P241										
Van Zoonen	E.	O22.04												
Van Zuijlen	P.M.M.	O3.06	O7.05	O21.05	O31.04	P151								
Vandermeulen	E.	O17.03												
Varanda Pereira	A.	O22.02												
Vaz	M.P.	O14.02	O16.02	P111										
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Verbelen	J.	O12.01	O20.06	P034	P090									
Verween	G.	O21.01	P019	P023										
Vestita	M.	O25.06	P165	P202										
Vicente Sanchez	M.V.S.	O4.03												
Vidmar	J.	P232												
Vieira	L.	O22.02	P036											
Vivo Benlloch	C.	O14.04												
Vizcaino	C.	P004												
Vloemans	J.	O31.06												
Vogt	P.M.	O10.06	O14.01											
Von Depka	N.	P079												
Vorstandlechner	V.	O3.05	P080	P081	P127									
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Wakure	A.	O12.06												
Walley	G.	P116												
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Wan	J.	P197												
Wang	X.	O23.06												
Ward	J.	O11.04	O25.05	P097										
Wardhana	A.	P082	P083	P169										
Waroquier	F.	O4.04	P072	P073										
Webber	M.	P037												
Wegscheider	T.	P058												
White	J.	O29.04												
Whybro	N.	P065												
Wicks	S.	O24.04												
Williams	L.	O13.03												
Williamson	H.	O13.03												
Wilson	D.	O2.03												
Winter	R.	P058												
Wolrich	J.	P170												
Wright	D.	P135	P136											
Wurzer	P.	O32.02	P045	P058	P059	P076								

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Xie	F.	P044												
Yang-Seo	Y.S.P.A.R	P173												
Yarza	M.Y.	O20.04												
Yeh	J.P.	O7.06												
Yim	G.	P017												
Yin	H.N.	O31.02												
Yin	K.	O6.05	O23.06	P035										
Yli-Perttula	M.	O6.02												
Young	A.	O25.03												
Young-Chul	Y.C.J.A.N	P173												
Youssef	A.	O20.05												
Yu	Y.H.	P044												
Yurdalan	S.U.	O19.03	O19.04	P089	P140									
Zakour	W.	P062												
Zarb Adami	R.	O1.05	O6.06	O15.01	P032									
Zayakova	Y.	P183												
Zdolsek	J.H.	P016												
Zdolsek	M.	P016												
Zehiri	H.	P112												
Zerban	J.	P048												
Zhai	H.	P194												
Zhang	D.	P044												
Zhang	X.L.	P044												
Zhao	D.X.	O6.05	O23.06	P035	P087									
Ziccardi	Z.P.	P130												
Ziegenthaler	R.	P233												
Ziegler	B.Z.	P155												
Zikos	I.	PS7.2												
Zini	O.	O30.05	P014	P112										
Zissman	S.	O30.01												
Zuchowska	K.	O3.03												
Zuiker	J.K.	P061												
Zwaard	N.	P061												

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