Introduction: Platelet rich plasma (PRP) is a fraction of blood plasma with a platelet concentration above baseline. After activation of the platelets a multitude of growth factors are released, which are involved in wound healing processes. Application of PRP has shown to improve wound healing and is used in several fields of medicine. In burn care it has not been investigated properly. We present the outcomes of the first randomized double blind intra patient controlled study on the effect of the addition of autologous PRP in deep dermal and full thickness burns that require surgery and the application of a meshed split skin graft.

Methods: This study was performed between January 2010 en January 2013 in Burn Center Beverwijk, the Netherlands, after ethical approval. Adult patients admitted to the burn center with deep dermal to full thickness burn wounds of minimal 2 % TBSA were included after written informed consent. Blood was drawn just before surgery and processed to PRP and autologous thrombin, with the GPS-III system. Prior to surgery comparable study areas A and B were appointed, randomized and treated with a split skin graft (SSG) with the thrombin-activated PRP or the standard treatment with a SSG alone. At day 5 to 7 post surgery, epithelialization rate and graft take rate were judged by experienced and blinded burn experts. At 3, 6 and 12 months post surgery, follow-up measurements were blindly performed in the form of POSAS-questionnaires, DermoSpectroMeter and Cutometer measurements.

Results: 52 patients were included. There was no significant difference between the mean take rate nor between the mean epithelialization rate at day 5-7 between the PRP-treated and control areas (Paired T-test p=0,2; p=0,2). However PRP-treated wound areas showed significantly more frequently better or equal epithelialization rates and take rates at day 5-7 than the control areas (Chi-square-tests P= 0,007; P=0,02). Multivariate sub analyses showed that especially patients that were operated on within 7 days after the burn injury, the effect of the PRP was expressed in a better take rate and epithelialization, also younger patients showed a better epithelialization in the PRP treated area’s.

At 3 months, 6 months and 12 months post surgery, POSAS scores from the patients and the observers did not depict a significant difference between the PRP and standard treated areas. Furthermore, the DermoSpectro- and Cutometer measurements did not show significant differences between the PRP-treatment and standard treated areas.

Conclusions/ Discussion: This randomized, double blind, intra-patient controlled study shows that deep dermal to full thickness burn wounds treated with a skin transplant and autologous platelet rich plasma significantly more frequently had an equal or better take rate and epithelialization than control wounds that were treated with a split skin graft only. However this effect does not result in better scar quality, since long-term follow-up results did not show any significant differences.
This is the first study of its kind investigating the application of PRP in burn surgery. Yet there are issues that need more investigation. Thermal injury has a severe systemic impact on burn patients, including on platelets, however it is unknown how the quality and content of the platelets are affected; this could influence the use and timing of PRP in burn care and should be studied in future research.