MONOBLOCK EXPANDED FULL-THICKNESS GRAFT FOR RESURFACING OF THE BURNED FACE IN YOUNG PATIENTS

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SUMMARY. It has been emphasized by many authors that to obtain better aesthetic results in a burned facial area to be resurfaced - if it extends into more than one aesthetic territory - the units involved should be combined into a single large composite unit allowing the largest possible skin graft to be used. Unfortunately, the donor site for full-thickness grafts is limited in young patients and hence tissue expansion is used. A monoblock expanded full-thickness skin graft for facial resurfacing after post-burn sequelae excision was used in 12 young patients after expansion of the superolateral aspect of the buttock. Females made up the majority of the patients (75%) and the ages ranged between 8 and 18 yr. The operating time was 3-3.5 hours, in two sessions. Post-operatively, we recorded partial graft necrosis in two cases (16.7%) and infection in one (8.3%), and some minor donor-site-related complications were reported, such as haematoma in one patient (8.3%), wound infection in one patient (8.3%), and wide scarring in two patients (16.7%). At follow-up, eight of the patients (66.7%) were satisfied with their new facial look as the mask effect of facial scarring had been overcome. With monoblock expanded full-thickness graft we were able to resurface the face in nine cases (75%). A second complementary procedure to reconstruct the eyebrows or reshape the nose was required in two cases (16.7%). We concluded that the monoblock expanded full-thickness graft was a suitable solution for limitation of the donor site in young patients, as the resulting wound could be closed primarily with a scar that could be concealed by the underwear, with limited complications in the donor site.

Introduction

The face is a functionally and structurally complicated organ and severe facial burn sequelae consequently present a great challenge to the plastic surgeon.1,2 The objectives for reconstruction following a facial burn include restoration of function, comfort, and appearance. Facial burn sequelae may impart a tight mask-like look to the face, distorting the features and limiting facial expression.3,4 Traditionally, skin grafting has been used for resurfacing the aesthetic units and subunits of the face and neck.5-7 Good results can be obtained with skin grafting,8,9 although flap coverage provides more normal skin from the nearby regions with normal colour and texture.10-14 Unfortunately, the adjacent tissues are frequently involved in severe burns, and when a local flap fails to resurface a burned face, healthy tissues from remote areas can be transferred as a graft15 or free flap16 in a more complicated surgical procedure. Although even the best full-thickness graft loses some of its innate skin qualities, and although textural and pigmentedary changes may persist, skin grafts advantageously lack bulk and do not therefore mask facial expression.5,5,7 To obtain better aesthetic results, as emphasized by many authors, if the facial area to be resurfaced extends into more than one aesthetic territory, the units should be combined into a single large composite unit, allowing the largest possible skin graft1,2,10 or flap to be used.10,12,14 To overcome the limited extent of full-thickness donor sites in young patients, tissue expansion is used to expand the donor area with primary closure of the defect.5,19-21 The aim of this study was to evaluate the monoblock full-thickness skin graft from expanded skin of the superolateral area of the buttock of young patients for facial resurfacing after post-burn sequelae excision.

Material and methods

Twelve young patients with severe facial post-burn sequelae were subjected to scar excision and facial resurfacing with an expanded monoblock full-thickness graft taken from the skin of the superolateral aspect of the buttock. The patients were admitted to the Plastic and Reconstructive Surgery Unit, Tanta University, Egypt, during the period from January 2003 to May 2005; they all accepted tissue expansion of the superolateral aspect of the buttock and refused further scarring of the abdominal wall or neck (Figs. 1a,b).

The surgical technique

Our procedure was completed in two sessions, in both of which general anaesthesia with prophylactic first-generation cephalosporin antibiotic was the first step, with the patient placed in a supine position. The selected buttock was elevated with a sand bag and the lateral position...
of the lower limb was exaggerated.

1. In the first session, a round or crescentic tissue expander (capacity, 500 to 900 cc) was selected. Through a transverse incision just below the iliac crest at the superolateral aspect of the buttock, a subcutaneous pocket was dissected and the expander was implanted with the valve outside. Inflation of the expander was started two weeks postoperatively and full expansion was completed in another 6-8 weeks (Fig. 2).

2. In the second session, we excised the post-burn facial scars down to healthy tissues, and haemostasis was secured using a bipolar diathermy (Fig. 3). The expander was then deflated and the full-thick-

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**Fig. 1** - Young patient with post-burn deformed face. a. anterior view; b. lateral view.

**Fig. 2** - Full expansion of the superolateral aspect of the buttock.

**Fig. 3** - Facial scarring excised (intra-operative view).

**Fig. 4** - Expander deflated and delivered; the full-thickness expanded sheet taken.

**Fig. 5** - Defect left in buttock after taking the sheet.

**Fig. 6a** - Graft taken fixed as monoblock sheet.

**Fig. 6b** - Aesthetic units can be defined by running suture.

**Fig. 7a** - Donor site closed primarily.

**Fig. 7b** - Local flap can help if the defect is wide.

**Fig. 8** - On follow-up, the patient with eyebrow reconstruction.

**Fig. 9** - Donor-site-related complications.

a. Pre-op.

b. Post-op.
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A monoblock skin graft was taken as a monoblock sheet (Fig. 4). The defect in the donor site (Fig. 5) was closed primarily with a continuous suture using 3/0 polypropylene (Proline) suture with vacuum drainage.

The monoblock full-thickness sheet was adapted and fixed over the raw area of the face, which was prepared in the first step of the second session using 4/0 polyglactin (Vicryl) sutures with some continuous sutures to define the aesthetic units and subunits and to aid fixation of the taken graft (Figs. 6a,b). Dressings were changed on the second post-operative day in order to evacuate any haematoma, and the dressing was changed every other day.

Follow-up was every two weeks for a month and then monthly for six months.

Results

Twelve young patients with severe facial post-burn sequelae were the candidates for this study (nine females and three males; age range, 8 to 18 yr). The donor sites were closed primarily in all cases (Figs. 7a,b). Facial recon-
struction was completed in nine cases (75%). Two patients (16.7%) required a complementary procedure to reconstruct the eyebrows by scalp grafts or to reshape the nose (Fig. 8). The operating time ranged from 3 to 3.5 h (first session, 15-30 min; second session, 2.5-3 h).

Post-operatively we noted partial graft necrosis in two cases (16.7%), managed conservatively with healing completed in three weeks, while wound infection was recorded in a patient with partial graft loss (8.3%).

Early post-operatively, we recorded minor complications at the donor site, such as haematoma (8.3%), wound infection and dehiscence (8.3%), and wide scar in 16.7% of the corrected cases (Figs. 9a,b,c). On follow-up, the majority of our patients (66.7%) were satisfied with their new facial appearance; the mask effect of the post-burn sequelae was overcome with restoration of some expressive facial movements (Figs. 10a,b; Figs. 11a,b; Figs. 12a,b; Figs. 13a,b).

Discussion

The objectives for reconstruction following a facial burn include restoration of function, comfort, and appearance. Good aesthetic results can be obtained by skin graft or flap resurfacing in patients with deep facial burn sequelae, especially when the limits of the aesthetic units or subunits are preserved. Unfavourable aesthetic results are obtained when there are fusion lines in the midline or middle portion of the face. Following the principles emphasized by Feldman, many studies maintained that the aesthetic result obtained with a single graft or flap was better than that obtained when separate sheets were used for resurfacing the facial aesthetic units.

In the light of the results of earlier studies on total facial resurfacing after xeroderma pigmentosum or excision of the sequelae of deep facial burns by expanded lower abdominal wall or upper back as a monoblock full-thickness graft or as a free flap, we used the expanded superolateral aspect of the buttock as a monoblock full-thickness graft for facial resurfacing in post-burn facial sequelae management.

The present study was carried out in 12 patients (nine females and three males) with severe post-burn facial sequelae. The ages of the patients ranged from 8 to 18 years. The candidates for our work were young patients with post-burn facial sequelae affecting the whole face who refused to have new scars in the neck or abdominal wall that would have resulted from a two-staged expanded lower abdominal wall or upper trunk procedure. The monoblock full-thickness sheet that was harvested enabled us to achieve total facial resurfacing in nine cases (75%). Two patients (16.7%) required a complementary procedure to reconstruct the eyebrows by scalp grafts or to reshape the nose. Complementary procedures for reconstruction of eyebrows, restoration of the anterior hair line, or reshaping of the nose have been reported by other researchers who expanded local or remote flaps and grafts for total facial reconstruction after excision of post-burn sequelae. The more complicated free flaps, in spite of the advantage of their one-stage procedure, needed further surgery for remodelling purposes, especially in the perioral area, or for thinning it, as the results were bulky and obscured the facial expressions that could be restored. The total operative time to complete our two sessions ranged from 3 to 3.5 h, which was much shorter than that required for more sophisticated free expanded scapular flaps and nearly the same as for lower abdominal expanded monoblock full-thickness grafts.

Post-operatively we recorded partial graft loss in two patients (16.7%), while wound infection was noted in one case (8.3%), with partial loss of the graft in the upper lip and chin - this was treated conservatively and healed by time as the patient refused further surgery. Partial loss of the grafts was reported early in our study in younger patients because of their over-activity, which affected graft fixation. This was managed by continuous running suturing in order to reshape each aesthetic unit. In time - within six months - 66.7% of our patients were satisfied with their new facial appearance, and the mask effect of the post-burn sequelae was overcome, with restoration of some facial movements and a better aesthetic look.

In our procedure, the expanded monoblock full-thickness graft was thin and closely matched in colour to the facial skin; it did not mask the restored facial expressive movements and there were fewer scar-related complications in the face and the donor site. The final results of our study can be compared with those achieved by expanded abdominal skin graft and the more sophisticated free flaps. The donor area was closed primarily, and if the back was chosen as the donor area for expanded free flaps, the donor site had to be grafted, which increased morbidity in young patients. Although we were encouraged by the functional and aesthetic results obtained with the expanded monoblock full-thickness graft from the superolateral aspect of the buttocks, we believe that expanded local flaps from the neck or upper chest can give a better aesthetic aspect when the patient accepts new scarring in an unburned area. The main disadvantages of the cervical flap transfer to the face in earlier studies were the evident scars, the obliteration of the mentocervical angle, and the tendency of the flap to pull down, which deformed the angle of the mouth and the lower eyelids.

Conclusion

We conclude that facial resurfacing for post-burn sequelae with the expanded monoblock full-thickness graft from the superolateral aspect of the buttocks can be used
safely when the nearby tissues are affected or when a large sheet is required and young patients refuse further scars in a visible healthy area. As a surgical technique it is quite easy, the scar in the donor site is concealed by underwear, there are fewer local complications, and the final cosmetic and functional results of the facial resurfacing are accepted by the patients and their relatives.

RéSUMÉ. Beaucoup d’Auteurs ont souligné l’observation que pour obtenir des résultats meilleurs dans une zone du visage qu’il faut recouvrir, si la zone touche plus d’un territoire esthétique, il faut unir les unités intéressées dans une seule grande unité composée. Malheureusement, chez les patients jeunes, le site donneur pour les greffes à toute épaisseur est limité et pour cette raison nous utilisons l’expansion des tissus. La technique de la greffe à toute épaisseur expantée en monobloc pour recouvrir le visage après l’excision des séquelles des brûlures a été employée chez 12 patients jeunes après l’expansion de l’aspect supérolatéral de la fesse. La plupart des patients (75%) étaient du sexe féminin et l’âge variait entre 8 et 18 ans. Les temps opératoires étaient de 3-3,5 heures en deux sessions. Dans la période post-opératoire nous avons observé une nécrose partielle de la greffe dans deux cas (16,7%) et une infection dans un cas (8,3%) ; en outre, nous avons vu certaines complications mineures liées au site donneur, comme par exemple l’hématome dans un patient (8,3%), l’infection des lésions dans un patient (8,3%) et une cicatrisation étendue dans deux patients (16,7%). Au suivi, huit des patients (66,7%) étaient satisfaits de l’aspect de leur visage puisque l’effet masque de la cicatrisation de leur visage avait été résolu. Avec l’emploi de la greffe à toute épaisseur expantée en monobloc nous avons recouvert le visage dans neuf cas (75%). Dans deux cas (16,7%) il a été nécessaire d’effectuer une deuxième procédure complémentaire pour reconstruire les sourcils ou refaire le nez. Nous avons conclu que la greffe à toute épaisseur expantée en monobloc constituait une solution appropriée du problème de la limitation des sites donneurs chez les patients jeunes, parce qu’il était possible de fermer primairement la lésion que cela provoque. Il était possible de cacher la cicatrice avec les sous-vêtements et les complications au site donneur étaient limitées.

BIBLIOGRAPHY


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