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Surgery

Original Aesthetic Surgical Experience with the First Skin Graft Surgery for Burn Sequelae Using a Donor Site from Cosmetic Breast Reduction

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Abstract **Case Report**

Reconstructive surgery for burns sequelae is necessary. However, despite technical progress, the goal may not be achieved, particularly due to limited access and availability of autologous tissue. Thus, adequate planning and selection of donor sites are mandatory to minimize morbidity while optimizing results. This present case exhibits a novel donor site, not previously described in the literature, offering sufficient full-thickness skin harvest for resurfacing the whole anterolateral neck, without usual donor site morbidity. It consists of performing cosmetic breast reduction by using the skin underlying the resected pieces and cosmetic goals are then achieved for both the neck and the breast. Following this successful surgical experience, we recommend that whenever possible cosmetic surgery, such as breast reduction or abdominoplasty, be offered, where instead of throwing away the resected skin, it becomes valuable for use as a full-thickness skin graft.

Keywords: Burns; Neck; Full-thickness skin graft; Aesthetic Surgery; Reconstructive Surgery; Donor Site.

INTRODUCTION

Delayed or inappropriate treatment of burns in the neck region results in an uncontrolled healing process, which contributes to the development of disabling contractures and an unsightly scarred appearance of the skin. This results in reduced cervical mobility particularly neck extension, inability to close the mouth with drooling of saliva due to the eversion of the lower lip by pulling of the scar contracture, and in extreme cases, mento-sternal adhesion can occur (Perera C *et al*., 2008). Despite advances in surgical procedures, the treatment of extended burn sequelae is difficult especially since patients often ask for miraculous solutions and perfect results. The gold standard treatment for burn sequelae remains full-thickness skin grafting. However, usual donor sites provide only limited skin sampling, requiring surgeons to perform prior expansion to obtain sufficient surface coverage. Moreover, the principles of reconstructive surgery dictate that the skin defect be replaced with skin of a matching texture and color, often best harvested from a nearby site. In addition, complete scar resurfacing of a large area of the neck may result in donor site morbidity with complex and long-lasting stage procedures such as using tissue expanders and cutaneous perforator flap transfer (Chun JT *et al*., 1998; Tsai FC *et al*., 2006). This article aims to present a single-stage repair of a large post-burn cervical defect using a large skin graft obtained from the resection specimens of a cosmetic breast reduction indicated for this reconstructive purpose. The donor site is then beautified instead of suffering the morbidity generally described for regular donor sites.

CLINICAL CASE

A 27-year-old woman had suffered from a burn sequela of the anterior neck extending from the lower jaws to the thoracic skin. Two years before consulting our department, she had undergone surgical repair using expanders with unsuccessful results due to skin necrosis followed by implant exposure leading to adjuvant scars. For this reason, the patient asked for aesthetic repair of the entire anterolateral cervical region without resorting to another expansion, which had previously been undergone, or further laborious procedures such as using free flaps. On examination, the entire cervical region was affected by marked dyschromia of rough and folded skin,

which limited cervical mobility (Figure 1 & 2). In addition, this visible burned area affected her psychological state and was felt as a significant disfigurement. A full-thickness skin graft seemed to us to be a suitable solution to the patient's requirements. However, the extent of the burned area was substantial, and since it was preferable to repair an entire aesthetic subunit with a single-piece skin graft to avoid a "patchwork" skin appearance, the donor site allowing wound closure could not be obtained without conducting skin expansion. On the other hand, the good quality and texture of the glabrous skin underlying the lower quadrant of the ptotic breast raised our attention and led us to propose an aesthetic breast reduction that will allow obtaining a sufficient skin surface, harvested from the resected pieces, allowing the repair of the whole cervical region while respecting the aesthetic subunits. Thus, after obtaining the consent of the patient who was enthusiastic about experiencing this surgical procedure, a cosmetic bilateral breast reduction was performed allowing a cutaneous-glandular resection of 350 and 430 grams on each side, thus offering an embellishment of the chest and providing a generous donor site of hairless skin whose texture is quite close to that of the neck (Figure 3). The skin was then carefully separated without pressure or disruption of the two resected pieces and adequately prepared, cleaning it of glandular remains and fat, to be then applied to the cervical defect following electrocautery excision of the burned skin. A meticulous hemostasis was done before applying a full-thickness skin graft separately in the supra-hyoid and infra-hyoid areas up to the cervicothoracic junction (Figure 4). A layer of gauze, made in the form of several small balls, impregnated with 1% povidone-iodine is placed on the graft and covered with sterile compresses soaked in honey-based ointment. This allowed for some uniform pressure to be applied to prevent shearing or detachment of the graft. A cervical collar was placed after the first dressing change, which occurred one day later and was maintained for 2 months. There were no abnormal postoperative events and the skin graft was well applied with good vitality at 7 days postoperatively, scars were placed beneath the mandibular border and parallel to the relaxed skin tension line at the hyoid bone level while the breast reduction showed good results (Figure 5 & 6). Furthermore, a wide range of cervical mobility was achieved. Obviously, before the reduction mammoplasty, an ultrasound and mammogram were performed as well as the histological examination of the burned cervical skin and the glandular resection which did not reveal any signs of malignancy.

Figure 1: Front view of the neck: severe dyschromia and skin contracture

Figure 2: Profile view showing traction effect on the jaw lines and large extent of contracture bands

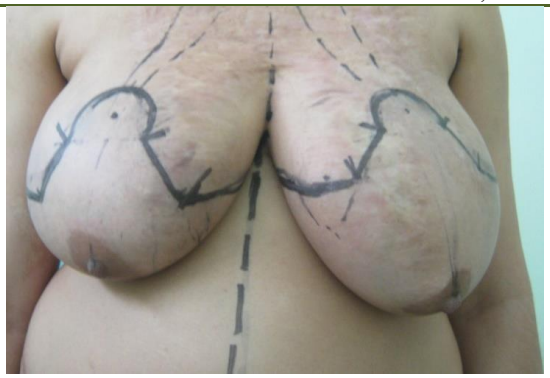

Figure 3: Preoperative design of breast reduction. Healthy skin in the area to be resected

Figure 4: Perioperative aspect of the full-thickness skin graft applied on two parts at the aesthetic subunits of the neck

Figure 5: Embellishment of the donor site

Figure 6: Graft well applied without detachment or shearing at 7 days postoperatively. Scars were performed parallel to the relaxed skin tension line, at 2 centimeters below the mandibular border and the hyoid bone and sternal notch levels

DISCUSSION

Extensive post-burn sequelae of the neck cause significant aesthetic changes with functional impairment due to the presence of retractable bands, sometimes accompanied by unbearable itching that can also lead to carcinomatous transformation (Allepot K *et al*., 2021) involvement of this fairly visible and specialized area of the body can also cause significant psychological distress, burden in sexual life, and negative social interaction (Gilboa D, 2001; Sinha I *et al*., 2019).

Despite advances in reconstructive surgery, the extent of burns is a hurdle for the means usually available, leaving the surgeon perplexed and frustrated by the relentless requirement of a patient who has become increasingly dissatisfied and desperate. The methods used remain skin grafts, expanders use, and pediculed or free flaps whether or not previously expanded. Free flaps are often harvested from the thigh over a limited area, which may be scarring when used as a donor site for a prior split-thickness graft. Additionally, finding a suitable donor vessel in badly scarred tissue is a technical challenge even for expert surgeons. Moreover, microsurgical reconstruction requires high-level skills, and despite this, the risk of a complete flap should be considered. Additionally, they often result in poor aesthetic outcomes owing to tissue color discrepancies, poor texture matching, and bulky appearance requiring an additional defatting procedure (Tsai FC *et al*., 2006; Angrigiani C, 1994).

Because of the limited full-thickness skin harvest area available at conventional donor sites, tissue expansion is the norm in post-burn repair. They are well indicated in scalp post-burn reconstruction. However, their use for neck resurfacing is not advisable. Indeed, the dense capsule, rich in fibroblasts and vascular structures, surrounding the expander and thus underlying the cutaneous expanded layer, is responsible for stiffness and inelasticity improper to the neck area resulting in a less optimal cosmetic appearance. Furthermore, the tension due to skin expansion increases the metabolic activity of fibroblasts and melanocytes with the overproduction of altered collagen synthesis that promotes scar contracture (Pasyk KA *et al*., 1987; Hoffmann JF, 2005). Surgeons should be well aware of the limitations and potential complications that may be encountered, such as exposure or extrusion of the expander due to the thinner skin of the neck as well as neuropraxia encountered from nerve lengthening during progressive expansion (Milner RH, 1992).

In contrast to tissue expansion, tissue expansion, skin grafting is a safe, one-stage procedure that provides complete functional and excellent aesthetic results especially when using a full-thickness skin graft due to less retraction and color changes. However, the mostly used split-thickness graft allows epidermis restoration but cannot provide cutaneous appendages, and inflict additional scars at the donor sites (Boyce ST *et al*., 2018). Furthermore, usual donor sites cannot offer sufficient full-thickness skin to resurface a large area such as the integument of the neck. It has been reported that such harvests performed for total facial repair have required a complementary split-thickness graft leading to additional scarring in a previously healthy area (Bogdanov SB *et al*., 2021). To our knowledge, this present case exhibits a novel donor site, for women, that can provide enough skin to reconstruct the entire surface of the neck while beautifying it rather than adding scars that cannot be hidden as commonly done and avoid us using additional material such as expanders or bioengineered dermal template (Integra). Indeed, gigantomastia and ptotic breast, as for pregnancy, are natural expanders for skin providing smooth and pliable skin without any underlying fibrotic capsular formation causing skin stiffness. In addition, the lower quadrant of the breast is a relatively protected area from burns, so it is often healthy and of reliable quality to be used. However, this must be done perfectly, which consists of performing an aesthetic breast reduction in order to properly conceal the scars and beautify the chest, which is generally well appreciated by patients. Full-thickness skin is then harvested from the breast resection specimens.

Overall, we apply what has been said in Lavoisier's citation "*Nothing is lost, and nothing is created, everything is transformed"*, especially since autologous tissues are not easily available, cosmetic surgery can be a complementary tool to reconstructive surgery which must be performed aesthetically. This has also been objectified for cheek defects following the excision of a basal cell carcinoma where full-thickness skin was taken from the submental area allowing its improvement. As well as for the performance of double chin surgery to improve a receding chin (Mehri Turki, 2012; Mehri Turki, 2023). On the other hand, as considered in this present case, the neck segmentation into two aesthetic subunits, the submental plane, and the vertical plane at right angles to the submental plane is important to create a cervicomental angle with a better cervical profile (Perera C *et al*., 2008).

CONCLUSION

Reconstructive surgery is not only about mastering technical skills but also requires innovative ideas and an artistic global vision to make the best therapeutic choices and achieve the best possible results. Extensive post-burn scars on the neck are visible and burden the patient's quality of life. A full-thickness skin graft in a single piece applied in each aesthetic subunit of the neck allows for excellent functional and aesthetic results. However, common donor sites provide limited harvesting and cause additional visible scars. The author describes a relevant donor site for women, not previously described, which is the breast skin allowing to obtain a large harvested surface of both breast reduction pieces.

Thus, the surgical procedure achieves two aesthetic goals for two contiguous sites. Thus, the neck is restored and the chest is enhanced without donor site morbidity responsible for emotional burden and dissatisfaction. Similarly, following this successful experience, we can suggest a cosmetic abdominoplasty to use the underlying skin of the dermolipectomy piece whenever a large surface is needed.

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Clinical Registration: Not applicable

Conflict of Interest Statement: None

Patient Consent: Written informed consent for participation and consent for publishing patient details in the study has been obtained.

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