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Submental skin graft: A useful donor site for facial skin defects

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ABSTRACT

Full thickness skin grafts (FTSG) are commonly employed for resurfacing facial reconstruction. Donor sites matching in color and texture are limited to a few facial locations such as the eyelids, pre- and postauricular and nasolabial regions. However, they offer limited amounts of skin and the donor site morbidities are not always well tolerated. On the other hand, submental area provides equally matching skin substance in a comfortably large amount, especially in elderly individuals. We are presenting our experience in 20 patients with reconstruction with submental FTSG's following facial tumor ablation. Except for one patient, all grafts achieved full take. There were no donor site related complaints; moreover, the patients were very pleased about the submental cervical lifting effect imposed by the technique. Submental region is a suitable FTSG donor side when considering resurfacing facial defects of the elderly female patients and male patients in whom a hair-bearing site needs to be resurfaced.

1. Introduction

Facial region is commonly incurred by defects associated by trauma, burns and tumor ablation (Dimitropoulos et al., 2005; Leibovitch et al., 2006). While its aesthetic significance usually makes flap resurfacing the treatment of choice, skin grafting is still preferred for superficial defects and defects associated with tumor ablation. A skin graft matching in complexion, texture, photo damage and adnexal quality is required for resurfacing a facial defect, and consequently, most suitable donor sites are either within, or close to the face, such as the eyelids, pre- and postauricular and nasolabial regions (Field, 1994; Tuncali et al., 2005). These regions however, provide a limited amount of skin tissue and when larger amounts are needed, regions such as supraclavicular, deltoid, medial brachial and lateral thoracic regions are resorted (Brown and Cannon, 1945; Celikoz et al., 2001; Custer and Harvey, 2001; Shah et al., 2011). Submental region develops a skin redundancy with age, which can also lead to an aesthetic concern. Its first use as a FTSG donor site has first been reported by Field et al., followed by Shiffman who amended its paddle design (Field et al., 2002; Shiffman, 2002). Suitable as it may be, the publications regarding the submental FTSG's use are few in numbers.

Table 1. Patient data

Patient	Sex	Age	Pathology	Defect locations and dimentions (cm)	Graft's dimentions (cm) (Heigh*width)	Follow-up (month)	Complication
1	M	68	SCC	Temporal hair bearing scalp 2.5x3.5	3.5x5.5	36	No
2	F	66	BCC	Nasal tip 1.5x1.5	2.0x3.5	30	No
3	M	60	BCC	Nasojugal groove 2.5x2.0	3.0x4.5	36	No
4	F	73	SCC	Frontal 3.0x3.5	3.5x6.0	24	No
5	F	56	BCC	Cheek 3.0x3.5	3.5x6.0	18	No
6	F	83	SCC	Nasal Dorsum 3.5x4.5	3.5x5.5	12	Partial graft failure
7	M	72	BCC	Preauriculer 4.0x6.5	4.0x7.0	12	No
8	F	81	BCC	Auricle's cavum conchae 2.5x2.0	2.5x4.0	12	No
9	M	61	BCC	Cheek 3.5x3.0	3.5x5.5	12	No
10	M	81	MM	Temporal hair bearing scalp 3.5x3.5	4.0x6.5	12	No
11	F	66	Keratoacanthoma	Forehead 3.0x3.0	3.0x5.5	18	No
12	F	43	BCC	Nasal side wall 2.5x3.5	3.0x4.5	24	No
13	M	77	BCC	Hair bearing chin 3.5x4.0	3.5x6.0	18	No
14	F	55	MM	Lower lid 2.5x3.5	2.5x4.5	12	No
15	F	76	BCC	Temporal 4.5x6.0	5.0x6.5	36	No
16	F	68	BCC	Nasal dorsum 2.0x3.5	2.5x4.5	36	
17	F	69	BCC	Nasal Dorsum 3.0x4.5	3.0x6.0	24	No
18	F	60	BCC	Temporal 3.5x4.5	4.0x6.0	36	No
19	F	58	BCC	Nasal side wall 3.5x4.5	3.5x5.5	36	No
20	F	47	BCC	Nasal Dorsum 2.0x1.5	2.0x3.5	24	No
Mean		66		3.3x3.6	3.2x5.3	23.4	

M: Male; **F:** Female; **SCC:** Squamous cell carcinoma; **BCC:** Basal cell carcinoma; **MM:** Malign melanoma

In this article, our aesthetic and functional results with the use of submental FTSG's are presented.

2. Materials and methods

Facial skin defects resulting from tumor ablation were resurfaced with submental FTSG's in 20 patients with a mean age of 66 years (range 43-83 years). Their demographical data are summarized in Table 1.

All surgical procedures were performed under local anesthesia. In one patient, the submental graft was used to resurface the frontal flap donor site. Mostly, grafts were designed with an at least 5 mm excess from the excisional diameter, with their anterior border resting on the submental crease (Fig. 1). The submental skin slough was also taken into consideration.

In 4 patients, specimens measuring 5x5 mm were harvested from both grafts and defect margins in order to histologically compare the skin thickness. Donor sites were closed by subcutaneous dissection and advancement of the posterior donor site margin, likewise submental cervical lifting technique (Fig. 2).

3. Results

There were 6 male and 14 female patients. Of the 20 patients, 14 patients had basal cell carcinoma (BCC) excision, 3 patients had squamous cell carcinoma (SCC) excision, 2 patients had malign melanoma (MM) excision and 1 patient had an excision of keratoacanthoma. The average dimension of the defect was 3.3x3.6 cm with a range of 1.5x1.5 cm to 4.5x6.0

Fig. 1. There was a malign melanoma lesion on the right lower lid in Patient 14. After removal of the lesion, resultant defect was repaired with submental skin graft. **A:** Appearance of the lesion on the right lower eyelid. **B:** Surgical landmarks of the lesion. **C:** Submental skin graft island is drawn 2,5 cm in width and 4,5 cm in length. **D:** Immediate appearance of reconstructed lower lid with submental skin graft. A good color match is seen between the graft and surrounding tissues

cm. The avgerage dimensions of the grafts harvested were 3.2 cm in height and 5.3 cm in width (range of 2.0x3.5-5.0x6.5 cm). The tie-over-dressing was applied on 7 days. All but one grafts took uneventfully, while one developed partial failure. All patients were followed up for at least 12 months (mean 23.4 months). Examination of the grafts in late follow up revealed a slightly decreased pigmentation, but an excellent match in texture and thickness (Fig. 3). None of the grafts developed an evident hypertrophy or contracture. The comparison of the specimens sampled from the grafts and recipient sites revealed that submental skin relatively thicker than other facial regions (Table 2).

Table 2. Comparing the skin thickness of the submental and recipient regions in four patients in whom operated

Patient no	Submental region Thickness (mm)	Recipient region Thickness (mm)	Recipient region
1	1.25	1.11	Nasal tip
2	1.40	0.86	Lower lid
3	1.23	0.95	Nasal side wall
4	1.30	0.87	Forehead
Mean	**1.29**	**0.94**	

Fig. 2. A: In patient 15, whom operated for BCC on the right temporal region, texture and contour matching of the graft to the recipient area look perfect after three years (arrows are remarked boundaries of skin graft. **B:** Subtle and very reasonable scar has been remained in the donor site (arrows)

Fig. 3. In patient 6, color and texture matching of the skin grafts from both supraclavicular and submental region is seen. **A:** Supraclavicular skin graft has been used for frontal skin defect 1 year ago and also, submental skin graft was used for nasal dorsum skin defect. Texture and color matching of the submental graft is better than supraclavicular skin graft. **B:** Submental graft donor scar on the submental crease. **C:** Scar seen as a well hidden in lateral view.

4. Discussion

When resurfacing facial skin defects via FTSG, donor site, which provides matching skin in sufficient amounts, is needed (Brown and Cannon, 1945; Johnson and Zide, 1997; Kurul, 2001). While the inguinal fold remains as the most commonly resorted FTSG donor site, its use in the facial region is limited by color mismatch, hair growth and increased risk of infection (Field, 1994; Johnson and Zide, 1997; Dimitropoulos et

al., 2005; Tuncali et al., 2005). While the posterior and anterior aspects of the ear, upper eyelid, and nasolabial regions are recognized as potential donors for facial skin, the amount they can offer is little. Tuncali et al. have reported that FTSG harvested from a single eyelid may not suffice to resurface defects wider than 2x4,5 cm (Tuncali et al., 2005). Also, the critical location of that donor side is daunting for surgeons who are not experienced in working in that area. Forehead grafts provide a very good skin match for especially nasal defects, however their donor reserve is also limited. A large amount of graft can be harvested from the postauricular area, however, the donor site needs to be resurfaced with a split thickness skin graft. The facial asymmetry imposed by the use of nasolabial FTSG's can pose a serious donor site morbidity. Medial arm, lateral thoracic wall and supraclavicular regions are proposed for grafting facial defects as well, however donor site scarring has been deemed as a cosmetic concern by some authors.

Gonzalez and Ulloa have researched the skin thicknesses on various body regions, and listed the submental region as a donor site for grafts suitable for nasal resurfacing (Gonzales-Ulloa, 1956). Likewise, the submental skin is utilized as a component of the submental artery flap for facial reconstruction (Faltaous and Yetman, 1996; Shen et al., 2015). In children, use of expanded full thickness submental skin graft for skin resurfacing has been reported (Bauer et al., 1993; Jeong and Lee, 2012). Unexpanded submental skin grafts can be used for small defect reconstruction in the face, but literature reporting its use is limited (Field et al., 2002; Shiffman, 2002; Jeong and Lee, 2012). For male patients, submental FTSGs are suitable for resurfacing hair-bearing areas. Its sebaceous quality makes it a good match for reconstructing thick and hair-bearing regions such as jaw and cheek. On the other hand, the very same property limits its use in male patients to hair-bearing regions only (Faltaous and Yetman, 1996). Submental skin is thicker than those of neck and periauricula, and thinner than that of the cheek (Gonzales-Ulloa, 1956). While its thickness is advantageous for contour restoration, it also makes it susceptible to complications associated with graft take, secondary contracture and hypertrophic scarring. A series of 2673 cases has revealed contracture and hypertrophy rates of skin grafts as 1.8% and 4.9%, respectively (Leibovitch et al., 2006). In their reports of the prospective study they conducted on 50 patients, Stephenson et al. have concluded that the late graft contractures are associated with the condition of the recipient bed, rather than donor site selection (Stephenson et al., 2000). In their experimental study conducted on porcine models, Walden et al. have pointed out that graft thickness is a preventative factor against graft contracture (Walden et al., 2000).

Submental region matches most of the skin regions in thickness, sebaceous texture and color, and provides skin grafts up to 5.0x6.5 cm in size. Larger amounts can be harvested from patients with submental fullness and skin slough; and primary closure following lipectomy can yield an aesthetically pleasing result. Additional measures such as platysma plication and liposuction can also be undertaken at will (Field et al., 2002).

As a conclusion, we believe that submental region should be kept in mind as a feasible donor site for FTSG resurfacing of moderate sized facial defects in elderly female patients. For male patients, it can also be the donor site of choice, provided that the recipient site is hair bearing.

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