Surgical treatment of non-melanoma skin cancer of the head and neck: expanding reconstructive options
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Chapter 5

Composite skin-fat grafts to reconstruct nasal defects

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Submitted
Abstract

Background
Composite skin-fat grafting has long been counter-intuitive. The prevailing paradigm entails de-fatting full thickness skin grafts. It is widely believed that the subcutaneous fat of the skin composite grafts acts as a mechanical barrier, limiting vascularization. This paper questions and investigates this presumption. We report on a series of 43 procedures involving composite skin-fat grafts for nasal reconstruction.

Methods
The literature is reviewed for full-thickness skin grafting and whether the fat must be removed or not. To gain further insight a retrospective study of 43 nasal defects reconstructed with composite skin-fat grafts was undertaken. We assessed graft viability and cosmesis. To assess graft cosmesis, photographs were randomly shown to three observers. The results were scored with a modified Manchester scar scale and a visual analog scale. Patient satisfaction with the reconstruction site with the graft was also documented.

Results
Thirty-five of the composite skin-fat grafts were used on the tip region, and eight on the dorsum/lateral wall of the nose. Five grafts failed (12%) whereas six (14%) showed superficial epidermiolysis. There were 15 (35%) patients with excellent scar-score and 28 (65%) with mediocre score. There were no poor outcomes.

Conclusion
Composite skin-fat grafts are a valuable asset in nasal reconstruction. These composite grafts are associated with a very satisfactory aesthetic outcome demonstrated by the blending in with the surrounding tissue and the absence of significant depression of the grafted site. Even when superficial epidermiolysis or necrosis occurs, the results are still acceptable, but necrosis can result in contour loss and scarring.
INTRODUCTION
Nasal defects pose specific reconstructive challenges, largely correlated to size and depth of the deficit. Size of nasal defects can be classified as small (<1 cm in diameter), medium (1-1.5 cm) and large (>1.5 cm). Whether the defect is small or large, superficial or through-and-through, the psychological and social value of high-quality reconstruction is to be acknowledged. This paper focuses on superficial small to medium-size defects particularly of the lower third of the nose, which were reconstructed with composite skin fat grafts. Composite skin-fat grafting has long been counter-intuitive. The prevailing paradigm entails de-fatting full-thickness skin grafts. It is believed that the subcutaneous fat of the skin-composite grafts acts as a mechanical barrier limiting vascularization.

Full-thickness skin grafts [FTSG] are one of the workhorses for nasal reconstruction. In our series of 766 nasal defects, FTSG are applied in about 20% of cases. Key to successful skin grafting in terms of both survival and appearance are the vascularity of the recipient site and donor-recipient site skin matching. When used with discrimination, aesthetical outcome of FTSG can be very satisfying. However, its indication has been limited to superficial defects. Indeed, traditionally a skin graft is depleted of subcutaneous fat and is relatively thin. It is logical that for deeper defects more tissue volume is needed and skin flaps, which carry their own subcutaneous tissue, might be a good alternative option. Without denying the value of skin flaps, they involve more surgery than skin grafting alone.

When skin is harvested together with an extra layer such as cartilage, perichondrium or fat and grafted as one unit, by definition they are composite grafts. The use of skin-cartilage and skin-perichondrial grafts is well described. On the otherhand, composite skin-fat grafts in facial reconstruction have received relatively little attention and their possible value seems veiled by misunderstanding. Indeed traditional teaching informs us that adding subcutaneous bulk to the graft increases blood supply demand of the graft and reduces the chances of successful revascularization. As has been indicated above, this does not comply with the reconstructive needs of deeper defects, which require more bulk to the graft to minimize contour depression.

The few publications that deal with the use of composite skin-fat grafts have mainly been reported in the last two decades and provide contradictory viewpoints. In other words there is still no consensus among the majority of surgeons on the subject of leaving fat on the skin to be grafted. We present a literature search to define the status quo in skin-fat grafting of facial defects as well as a clinical evaluation of a single surgeon’s (HDV) series of 43 patients with nasal defects after excision of non-melanoma skin cancer.

METHODS

Literature search
The literature search is summarized in Table 1 and addendum. From 1972 till May 2010, 424 publications alluded to full thickness skin grafting. Twenty-six of these papers contained at least one of the following keywords used: adipose, defat, fat, remove and survival. Of these 26 papers it appeared that 19 authors promote the view to remove the fat from the graft whereas seven authors advocate to preserve it. Before
Table 1. Literature search.

<table>
<thead>
<tr>
<th>Publication date</th>
<th>Donorsite</th>
<th>Defat Y/N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beare (10)</td>
<td>Jul 72 nasolabial fold</td>
<td>Y</td>
</tr>
<tr>
<td>Mehta (11)</td>
<td>Feb 79 postauricular sulcus, inner arm</td>
<td>Y</td>
</tr>
<tr>
<td>Clodius (12)</td>
<td>Oct 79 retroauricular</td>
<td>Y</td>
</tr>
<tr>
<td>Corwin (13)</td>
<td>Oct 82 preauricular</td>
<td>N</td>
</tr>
<tr>
<td>Hill (14)</td>
<td>Dec 83 choosed depending on color, texture and thickness</td>
<td>Y</td>
</tr>
<tr>
<td>Henley (15)</td>
<td>Jan 90 choosed depending on color, texture and thickness</td>
<td>Y</td>
</tr>
<tr>
<td>Wladecki (16)</td>
<td>Nov 91 pre- + postauricular, upper eyelid, supraclavicular</td>
<td>Y</td>
</tr>
<tr>
<td>Haas (17)</td>
<td>Aug 94 inner upper arm, supraclavicular, earlobe</td>
<td>N</td>
</tr>
<tr>
<td>Thibault (18)</td>
<td>Jun 95 postauricular sulcus, preauricular, supraclavicular</td>
<td>Y</td>
</tr>
<tr>
<td>Johnson (19)</td>
<td>Oct 97 blush area/cheek, supraclavicular</td>
<td>Y</td>
</tr>
<tr>
<td>Caldwell (20)</td>
<td>Jan 98 postauricular, supraclavicular, nasolabial</td>
<td>Y</td>
</tr>
<tr>
<td>Brodland</td>
<td>Apr 99 conchal bowl</td>
<td>N</td>
</tr>
<tr>
<td>Fader (21)</td>
<td>Nov 00 nose</td>
<td>Y</td>
</tr>
<tr>
<td>Hubbard (22)</td>
<td>Nov 04 nasolabial fold</td>
<td>N</td>
</tr>
<tr>
<td>Tuncali (23)</td>
<td>Jan 05 upper eyelid</td>
<td>Y</td>
</tr>
<tr>
<td>Silapunt (24)</td>
<td>Feb 05 pre- and postauricular, conchal bowl, dog-ear, inner arm</td>
<td>Y</td>
</tr>
<tr>
<td>Dimitropoulos (25)</td>
<td>Mar 05 forehead</td>
<td>Y</td>
</tr>
<tr>
<td>Geyer (26)</td>
<td>May 05 nasolabial fold</td>
<td>N</td>
</tr>
<tr>
<td>Adams (27)</td>
<td>Aug 05 preauricular</td>
<td>Y</td>
</tr>
<tr>
<td>Shook (28)</td>
<td>Sep 05 choosed depending on color, texture and thickness</td>
<td>Y</td>
</tr>
<tr>
<td>Burm (29)</td>
<td>Jan 06 postauricular</td>
<td>N</td>
</tr>
<tr>
<td>Cabeza-Martinez (30)</td>
<td>Nov 06 temple, cheek, lower eyelid</td>
<td>Y</td>
</tr>
<tr>
<td>Ogawa (31)</td>
<td>Mar 07 groin</td>
<td>Y</td>
</tr>
<tr>
<td>Taifour (32)</td>
<td>Apr 08 abdomen</td>
<td>Y</td>
</tr>
<tr>
<td>McCluskey (4)</td>
<td>Mar 09 forehead, preauricular</td>
<td>Y</td>
</tr>
<tr>
<td>Son (33)</td>
<td>Nov 09 animal study: from the back of a pig</td>
<td>N</td>
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</table>
2000, 25% of publications supported composite skin-fat grafting. In the last decade twenty-nine per cent of publications recommended containment of adipose tissue with the skin graft.

**Study design**

This is a retrospective study of the reconstruction of 43 nasal defects using composite skin-fat grafts between 2005 and 2010. To measure the defect sizes after tumor removal, pictures of a ruler next to the defect were taken. The defect surface area was then calculated using computational imaging software (‘Image J'; www.rsweb.nih.gov/ij/).

To assess graft cosmesis photographs of patients with a minimum follow-up of three months were randomly shown to three independent observers. A modified Manchester scar scale was used to assess the cosmesis (Table 2). The five outcomes measured in this protocol are listed below. A total judgment score of < 7 was scored as an excellent outcome, 7-12 as a mediocre outcome and > 12 as a poor outcome.

Consistent with the Manchester scar scale an overall visual analog scale (1= excellent to 10= poor score) was added to the individual attribute scores. Patient satisfaction with the reconstruction site with the graft was also documented.

**Statistical Methods**

Associations between potential risk factors and necrosis were assessed using Fisher exact tests. Intraclass correlations for scar-score and VAS were assessed using two random effects models with each patient providing the random intercept. The differences between scales were assessed using a linear mixed-effects model where the scaled scores were the outcome; observer, score-type (scar-score vs. VAS) and interaction between these variables were taken as fixed effects. Again random intercept was implemented per patient. To determine the number of patients with an excellent outcome (scar-score), patient was taken as a fixed effect and observer was taken as a random effect. Residual and random-effects QQ-plots were used to assess the distributional assumptions.

To determine the patient-specific contour and

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**Table 2. Modified Manchester scar scale.**

<table>
<thead>
<tr>
<th>1. Color match to adjacent skin</th>
<th>1= perfect, 2 = slight mismatch, 3 = obvious mismatch, 4 = gross mismatch</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Edge and graft contour</td>
<td>1= blending into surrounding skin, 2= slightly indented, 3= scar contour too high/hypertrophic, 4= scar keloid</td>
</tr>
<tr>
<td>3. Texture match to adjacent skin</td>
<td>1= similar, 2 = not similar</td>
</tr>
<tr>
<td>4. Inappropriate hair</td>
<td>percentage of graft surface area affected: 1= 0%, 2 = 1-25 %, 3 = 26-75 %, 4 = 76-100 %)</td>
</tr>
<tr>
<td>5. Dull or shiny</td>
<td>dull=1, shiny=2</td>
</tr>
</tbody>
</table>
color outcome mixed effects models were constructed: a linear mixed-effect model with edge matching as the outcome (perfect = 1, slight = 2 or worse = 3); and two logistic mixed-effect models, one for light and one for dark color matching, were constructed. All three models included patient as the fixed effect and observer as a random effect. The estimated values were used to classify each patient with regards to his/her surgical outcome. In all analyzes 0.05 was taken as the level of significance, and no adjustments were made for multiple testing.

**Surgical details**

All surgery was undertaken by the senior author (HDV). All patients were given prophylactic intravenous flucloxacillin at the beginning of the reconstructive surgery. All lesions concerned non-melanoma skin cancers, which were completely excised either by using Mohs technique (77%) or by conventional excision with delayed histopathology. Only minimal cauterization was performed and additional local anaesthetic applied to ensure haemostasis. The defect was then reconstructed using a composite skin-fat graft, which was harvested from one of four donor sites: forehead (Figure 1), melolabial fold, pre-auricular and post-auricular regions.

The donor site was closed by one of three methods: primary linear closure, secondary intention or by a V-Y subcutaneous pedicled advancement flap. If the defect was close to the alar rim, in order to prevent post-operative alar notching, conchal cartilage was also harvested and a slender rim graft secured before transfer of the composite skin-fat graft. (Figure 2)

All grafts were harvested with some amount of excess fat. (Figure 3) Each graft was initially sutured along one edge using 6.0 vicryl rapide to function as a hinge enabling sequential fat

*Figure 1. Forehead skin as donor site for the composite skin-fat graft.*

*Figure 2. Defect site with exposed cartilage but intact perichondrium. Because the defect abuts the free alar margin, a conchal cartilage rim graft serves to harness scar retraction and ensures contour maintenance in case graft would fail. The conchal cartilage will contact the composite skin-fat graft only to a very small extend.*
shaping until the contour was flush or slightly below the local anaesthetic-engorged surrounding surface and a precise fit in terms of size and thickness was achieved. Some mattress suturing and only a very small bolster dressing fixed with steristrips stabilized the graft. The forehead donor sites were closed with different techniques: secondary intention healing, linear closure (4C) and V-Y advancement. The patients were advised not to touch the reconstructed area.

The dressing was removed five days postoperatively and the viability of the graft was assessed. Graft viability was scored as success, superficial epidermiolysis or necrosis. If the graft has turned dark, it may not be clear at that time whether only the epidermis is avascular (superficial epidermiolysis) or whether the dermis and subcutaneous tissues have not survived (total necrosis). In case of superficial epidermiolysis, only the epidermis sloughs while underneath the deeper tissues are viable. Wound healing in case of superficial epidermiolysis proceeds rapidly within days while total necrosis will take two or three weeks to settle. All grafts that (partly)

Figure 3. Composite skin-fat graft harvested from forehead showing the subcutaneous fat with its beveled edges.

Figure 4. A-C show the final cosmetic result after 11 months. C shows linear closure of donor site. The aesthetic result of the nasal reconstruction in this case was mediocre according to 3 observers.
failed, were rectified by secondary intention healing. Figure 4 shows the final result of the patient.

RESULTS
Forty-three nasal defects were reconstructed using composite skin-fat grafts. The patients’ ages at surgery ranged from 36 to 88 years (median age: 62 years) there were 13 (30%) males and 30 (70%) females. Thirty-five of the composite skin-fat grafts were used on the tip region and eight on the dorsum/lateral wall of nose. Table 3 shows the surgery details of the composite skin fat grafts.

Five grafts were necrotic (12%) and 6 (14%) showed superficial epidermiolysis. All these grafts healed by secondary intention. After superficial epidermiolysis excellent to mediocre outcomes were observed (Figure 5). After necrosis, four grafts showed a mediocre (Figure 6) and one graft an excellent cosmetic outcome (Figure 7).

Table 4 presents the associations between risk factors and necrosis. Only the use of the cartilage rim grafts was significantly associated with the occurrence of necrosis (p = 0.03) while there was no difference between bare cartilage and non-bare cartilage (p = 0.34).

For cosmetic outcome three observers judged the grafts according to the modified Manchester scar scale and an overall visual analog scale. The intraclass correlation for the scar-score was 0.71, while for the VAS it was 0.66 indicating that there was reasonable agreement between observers of good vs. bad outcomes. Overall there was no difference between the scar-score and the VAS (p = 0.3). There were 15 (35%) patients with an excellent outcome (Manchester scar scale < 6.5; VAS score < 15 on the 0-100

### Table 3. Surgical details.

<table>
<thead>
<tr>
<th>Excision technique</th>
<th>Mohs 33 (77%)</th>
<th>Standard excision 10 (23%)</th>
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<tbody>
<tr>
<td>Location</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dorsum</td>
<td>5 (12%)</td>
<td></td>
</tr>
<tr>
<td>Infra Tip</td>
<td>4 (9%)</td>
<td></td>
</tr>
<tr>
<td>Lat. Tip</td>
<td>6 (14%)</td>
<td></td>
</tr>
<tr>
<td>Lat. Wall</td>
<td>3 (7%)</td>
<td></td>
</tr>
<tr>
<td>Tip</td>
<td>23 (53%)</td>
<td></td>
</tr>
<tr>
<td>Tip/dorsum</td>
<td>2 (5%)</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Total N = 43</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Size</th>
<th>Median 1.15 cm²</th>
<th>Small (&lt; 1 cm²) 12 (28%)</th>
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</thead>
<tbody>
<tr>
<td>Medium (1-1.5 cm²)</td>
<td>21 (49%)</td>
<td></td>
</tr>
<tr>
<td>Large (&gt;1.5 cm²)</td>
<td>9 (21%)</td>
<td></td>
</tr>
<tr>
<td>Not measured</td>
<td>1 (2%)</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Donor site</th>
<th>Forehead 34 (79%)</th>
<th>Melo-labial 6 (14%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-auricular</td>
<td>2 (5%)</td>
<td></td>
</tr>
<tr>
<td>Pre-auricular</td>
<td>1 (2%)</td>
<td></td>
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</tbody>
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<tr>
<th>Closure donor site</th>
<th>Linear 16 (37%)</th>
<th>Secondary Intention 20 (47%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub-cut flap</td>
<td>7 (16%)</td>
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and 28 (65%) with a mediocre outcome. There were no poor outcomes. When considering edge and graft contour 27 patients (67%) had no contour abnormalities and 15 patients (35%) only a slight contour edge difference, using the mixed effect models. Minor hypopigmentation of the graft was noted in 17 patients (40%) (Figure 8) while eight patients (19%) had some hyperpigmentation (Figure 5). Forty patients were satisfied with the cosmetic outcome, one patient was not satisfied and of two patients their opinions were unknown.

**DISCUSSION**

Full-thickness skin grafting is an important, simple option to be considered in facial reconstructive surgery. A favorable wound bed permitting vascular in-growth as well as donor site selection are keys to graft acceptance and final cosmetic outcome. As traditionally skin grafts are defatted, they are only indicated in relatively superficial defects. Most facial skin tumors occur on the nose while a large percentage involves the nasal tip, which is covered typically with relatively thick skin. Thus logically the deeper defects on the lower third of the nose are often reconstructed with (local) flaps because they carry subcutaneous fat into the deficit. Moreover, given the risk of graft failure, patient factors such as smoking and diabetes might also steer the reconstructive endeavor away from skin grafting toward flap repair.

All flaps, whether local or regional, which transport skin and fat have the disadvantage of additional scarring and possible contour deformities of the recipient and donor areas. Moreover, given the thickness of the skin in this area, local flaps may be hard to move and bend into the tip defect. The literature describes the risk of postoperative contour deformities with asymmetry of the tip

![Figure 5 A-C. Example of superficial epidermolysis of the composite skin-fat graft (A) and the result after healing with secondary intention (B and C). There is still a good contour but some hyperpigmentation has occurred. Cosmetic result was scored as excellent by the observers.](image-url)
Figure 6 A-C. Example of composite skin fat graft with necrosis (a) and the final result after secondary intention healing (b and c). Loss of contour and some contraction of the graft occurred. Cosmetic outcome was scored as mediocre.

Figure 7 A-C. Example of necrosis of the composite skin-fat graft (a) and the result after healing with secondary intention (b and c). There is a good contour and skin color match. Cosmetic result was still scored as excellent by the observers.
Figure 8 A-E. An excellent result with some minor hypopigmentation of composite skin-fat graft after 12 months. There is a smooth contour, good texture match and no scarring.
and alar retraction despite the best of design.\textsuperscript{8,10} These deformities can be extremely difficult to correct and again emphasize the careful weighing of skin-fat grafting versus flap reconstruction.

Delaying skin grafting for two weeks or more may be an option to allow granulation tissue to fill in the defect and subsequently provide coverage with a skin graft in a second stage.\textsuperscript{11} Alternatively, one may move vascularized subcutaneous tissue into the depth of the defect, which is subsequently skin-grafted in the same stage.\textsuperscript{12,13} Mobilizing a subcutaneous tissue flap entails additional incisions and a larger scar bed. However, the survival of skin grafts on flaps remains uncertain.

To overcome the aforementioned complex surgical measures, composite skin-fat grafts may fill in the defect directly to create a convex contour, blending into the nasal shape.\textsuperscript{5} Our experience with the skin grafts challenges the paradigm of routine defatting of these grafts which has permeated the training programs of all spe-

<table>
<thead>
<tr>
<th>Table 4. Associations between risk factors and necrosis.</th>
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<td>--------------------------------</td>
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<tr>
<td></td>
</tr>
<tr>
<td><strong>Smoking</strong></td>
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<tr>
<td>No</td>
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<tr>
<td>Yes</td>
</tr>
<tr>
<td><strong>Vascular disease</strong></td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td><strong>Donor site</strong></td>
</tr>
<tr>
<td>Other donor sites</td>
</tr>
<tr>
<td>Forehead skin</td>
</tr>
<tr>
<td><strong>Graft Bed</strong></td>
</tr>
<tr>
<td>Rim graft</td>
</tr>
<tr>
<td>Bare Cartilage</td>
</tr>
<tr>
<td>Non-bare Cartilage</td>
</tr>
<tr>
<td><strong>Size</strong></td>
</tr>
<tr>
<td>Median</td>
</tr>
<tr>
<td>(Range)</td>
</tr>
<tr>
<td>Missing</td>
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* Pairwise tests:
  - There is no difference in rate of necrosis between bare cartilage and not bare cartilage ($p = 0.34$).
  - The difference in occurrence in necrosis between rim and non-rim grafts is significant ($p = 0.03$).
cialties involved in such reconstructions: plastic surgery, otolaryngology, and dermatology.  

Traditional teaching informs us that leaving the fat impedes the processes of imbibition and inosculation necessary for graft survival, thereby risking high rates of graft loss. Supposedly, contact between the graft dermis and the recipient bed is of vital importance for establishment of neo-vascularization. However, an animal study by Son using microangiograms showed vessel connections not only between the vessels of the dermis, but also between the subcutaneous fat of the graft and perforators from the basal surface of the wound. They stated that direct vessel-to-vessel anastomosis between the vessels of the subcutaneous fat of the graft and the basal surface of the recipient wound is important for the success of composite grafts. In other words, the subcutaneous layer does not produce a barrier but may work as a significant source of vessel communication.

In the literature, Hubbard reported on melolabial fold grafts with fat applied to the lower one third of the nose (no antibiotics, no bolster dressing) with a take rate of 29 out 33 cases (88%) while Gurunluoglu reported 93% take rate with composite skin-fat grafts (Tie-over dressing, no antibiotics) taken from the preauricular and neck area in a series of 15 patients.

In our series of 43 grafts the survival rate was 88% while only five grafts showed necrosis. The use of rim cartilage grafts was associated with necrosis (p =0.03) but we found no difference in rate of necrosis between bare and non-bare cartilage (p =0.34). Menick already suggested that bare cartilage is not an ideal graft bed and puts the skin fat grafts at risk. So, not surprisingly, cartilage rim graft in combination with skin-fat grafts carries a high risk for necrosis. Statistical analysis did not show that size was a significant risk factor for necrosis (p =0.24), however, in our series, as in others, composite skin grafts were preferably limited to relatively small defects (median size of 1.15 cm²). One of our necrotic grafts was significant in size (2.7 cm²; the largest in our series). It is well known that exposed cartilage, smoking and diabetes are considered relative risk factors for skin graft necrosis.

All necrotic grafts healed by secondary intention. Of course graft necrosis harbors an increased chance of contour loss and/or scarring. Surprisingly, one patient showed an excellent outcome (Figure 7) while four patients showed a mediocre outcome. In six cases (14%) there was superficial loss of the graft. In case of superficial epidermolyysis skin slough prevents early proper judgment of the viability of the underlying tissue layer. Superficial epidermolyysis is rectified in a couple of days and necrosis will take two to three weeks to heal. Hubbard reported superficial epidermolyysis in 60% and stated that superficial epidermolyysis did not result in any objectionable scarring. Mc Cluskey describes a series of 36 defatted forehead skin grafts and found that it is not unusual for the most superficial portion of these grafts to initially undergo a period of partial slough. It is suggested that this is possibly due to the stiffness and thickness of the forehead skin. Also, Menick stated that, possibly due to the underlying compact fibrofatty subcutaneous layer being thicker and stiffer than other donor sites, the composite forehead graft could give good cosmetic results even in cases of superficial epidermolyysis.
All in all, the relatively recent publications reporting the successful repair of nasal defects with composite skin-fat grafts indeed challenge the paradigm of defatting the skin graft to ensure success. Hubbard\textsuperscript{10} from his clinical experience even argued that defatting would in fact compromise the results of nasal reconstruction. The survival rates of composite skin-fat grafts in these series are comparable to the survival rates for FTSGs mentioned in the literature, which range from 70 to 95\%\textsuperscript{2,11,17-19}.

The overall aesthetic success of full-thickness skin grafts not only depends on take rate but also on careful donor site selection. The skin of the preauricular area, melolabial fold and forehead closely matches that of the nose.\textsuperscript{5,15,18} The skin of the preauricular area is very smooth and does not have a population of glands so is not suitable for the lower nasal third. The melolabial area matches the nasal tip. Even when used as composite skin-fat grafts, they have a high rate of survival and contour is consistently good to excellent.\textsuperscript{10} We know from flap repair that forehead skin mimics nasal skin extremely well in terms of color, thickness, oily and sebaceous texture.\textsuperscript{20} However, skin from the forehead is traditionally not used for skin grafting. The forehead skin and its underlying compact fibrofatty subcutaneous layer are thicker and stiffer than other donor sites.\textsuperscript{18} The use of the forehead donor site for composite skin-fat grafts, carrying significant amounts of soft tissue to permit the replacement of the deeper soft tissues has been advocated by Menick\textsuperscript{5}. In our series of 43 patients 34 (79\%) of the donor composite grafts originated from the forehead.

Several authors promote the addition of subcutaneous fat to the skin graft to provide soft-tissue volume and contour to the reconstruction.\textsuperscript{5,10,15} However, no independent rating of contour/scar outcome has been performed up till now. In our series 63\% of the grafts blended into the surrounding skin whereas 35\% had only slight contour edge difference. The improved contour and symmetry in these relatively deep defects allow for satisfactory nasal appearance in the majority of the patients. Advisably, as composite skin-fat grafts seem to heal with some degree of hypopigmentation, the indication may be limited to fair-skinned individuals.\textsuperscript{10}

**CONCLUSION**

We feel that composite skin-fat grafts are a valuable asset in nasal reconstruction with a very satisfactory aesthetic outcome demonstrated by the blending-in with the surrounding tissue and the absence of significant depression of the grafted site. The step of defatting the skin graft is probably unnecessary so the inherent problem of a depressed appearance of the reconstructed region may be avoided. Even when superficial epidermiolysis or necrosis occurs, the results are still acceptable, however, with a risk of contour loss and scarring. A significant advantage of the composite skin-fat grafting is that it is technically less demanding compared to local flap repair. Prominent extra scars, dog-ears, trapdoor phenomenon and obliteration of facial grooves are also avoided.
Addendum literature search to define status quo in skin-fat grafting of facial defects.

Aim to compile current techniques and opinions derived over time

Methods used were the following. The first step was the search for published articles regarding FTSG in reconstruction of the face and/or nose in the medical data basis PubMed of the NCBI until Mai 2010, which yield

- 310 publications concerning “full-thickness skin graft and face”,
- 65 regarding “full-thickness skin graft and success” and
- 49 in reference to “full-thickness skin graft and fat”.

In a second step all 424 articles that have been found were searched through in the headline and abstract, to determine if they contain facts about FTSG for reconstruction of facial/nasal defects. This 93 papers, which where then scanned by using the find option of the Adobe PDF reader looking for the keywords: adipose, defat, fat, remove and survival.

The following was found:
Twenty-six articles contained at least one of those above-mentioned keywords.

References
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