Autologous Fascia Lata Graft for Contour Restoration and Camouflage in Tertiary Rhinoplasty

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Abstract: Tertiary rhinoplasty is a surgical procedure to correct nasal deformities that have been developed after prior unsuccessful surgeries. Such surgery requires complicated manipulations and tissue grafting for proper restoration. In the current study, we report the use of fascia lata graft combined with cartilage grafts for contour restoring and camouflage. Twenty-three patients who had severe nasal deformities were included, of whom 14 were men and 9 were women. Their ages ranged between 24 and 34 years (mean, 29 y). All patients were twice previously operated on by surgeons other than the authors. An informed consent was obtained from all patients. After harvesting the costal cartilage, the fascia lata graft (mean size, 2–3 cm) was uniformly harvested from the right lateral thigh. Application of the fascia lata and the cartilage graft was achieved through the open rhinoplasty incision. The fascia lata was applied over the cartilage in the dorsal region in 20 patients (86.9%), applied over the reconstructed alar and dome area in the nasal tip in 8 patients (34.7%), and applied over both areas simultaneously in 4 patients (17.3%). Postoperative follow-up was between 14 and 35 months (mean, 24.5 mo); clinical evaluation, photographic documentation, and a questionnaire form related to donor-site morbidity and patient satisfaction were applied after 12 months of the follow-up period. Results showed that all patients had an improved aesthetic result, and no apparent irregularities were observed in the integument of the aesthetic lines. No complications or no requirement for revision surgery was observed later on. In conclusion, refinements of the nasal dorsum and the nasal tip in tertiary rhinoplasty are indeed important and difficult to be managed. Placing the fascia lata over the applied cartilage grafts provide a good cover that conceals the possible irregularities or distortions that may appear in the late postoperative period.

Key Words: Tertiary rhinoplasty, fascia lata, cartilage, camouflage

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Tertiary rhinoplasty is a surgical procedure to correct nasal deformities that have been developed after prior unsuccessful surgeries. Such surgery requires complicated manipulations and cartilage grafting for proper restoration.[1–3]

Costal cartilage grafting in rhinoplasty has gained increasing popularity, and it is actually a valuable method when a significant degree of structural support or dorsal augmentation is required such as in saddle nose deformity, septal cartilage support, or in the case of over resection due to prior surgeries.[4–8] Dorsal nasal grafts present a specific challenge in the way they support the soft tissue envelope of the nose at its thinnest part that more likely produces visible contour defects if they become warped, misplaced, or evident by time.

Karaaltın et al[9] had previously demonstrated the use of autogenous fascia lata (FL) graft for nasal contouring in rhinoplasty. Combining the use of autogenous or processed facial grafts with diced cartilage grafts has been reported in recent studies. In this study, we report the use of FL combined with cartilage graft in restoring the structural deformities in tertiary rhinoplasty.

PATIENTS AND METHODS

Twenty-three patients with severe nasal deformities were referred to our clinic for a tertiary rhinoplasty operation. The patients included in this study were operated on between August 2004 and March 2008, of whom 14 were men and 9 were women. Their ages ranged between 24 and 34 years (mean, 29 y). All patients were twice previously operated on by surgeons other than the authors.

Patients were categorized according to their deformities, and the treatment strategy and graft selection were identified and planned, respectively (Table 1). An informed consent was obtained from all patients for the possible harvest of costal cartilage and FL graft during surgery. In male patients, the costal cartilage was harvested from an incision made at the level of the seventh costochondral cartilage, whereas in women, it was harvested from an incision made in the inframammarian fold (ie, to disguise the scar) at the level of the fifth costochondral cartilage.

As previously described by Karaaltın et al,[9] the FL graft (mean size, 2–3 cm) was uniformly harvested from the right lateral thigh by performing a 1.5-cm incision, located 15 to 20 cm proximal to the insertion of the tensor FL muscle at the lateral side of the knee.

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TABLE 1. Describes the Nasal Deformities in All 23 Patients

	Defined Deformity of the Cartilaginous Framework					Applied Costal Cartilage Grafts					FL Graft	
Patient	Alar Rim Collapse or Asymmetry and Notching	Nasal Tip Distortion	Columella Retraction	Partial or Total Loss of the Septum	Saddle Node Deformity	Alar Rim Graft or Battan Graft	Tip and Onlay Grafts	Strut Graft	Buttress Graft for Dorsal Augmentation	Spreader Graft	Onlay Graf t on Nasal Tip	Onlay Graft on Nasal Dorsum
34-y-old woman	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No
25-y-old woman	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No
31-y-old man	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
26-y-old man	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
32-y-old woman	No	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes
25-y-old woman	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
31-y-old man	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No	Yes
28-y-old woman	No	No	No	Yes	Yes	No	No	No	Yes	Yes	No	Yes
27-y-old woman	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
29-y-old man	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No	Yes
24-y-old man	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
25-y-old woman	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
33-y-old man	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No	Yes
24-y-old man	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No	Yes
26-y-old man	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
29-y-old woman	Yes	Yes	No	No	No	Yes	Yes	Yes	No	Yes	Yes	No
21-y-old woman	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
30-y-old man	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
30-y-old man	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes
27-y-old man	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
25-y-old man	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
32-y-old man	No	Yes	No	Yes	Yes	No	No	Yes	Yes	Yes	No	Yes
31-y-old man	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No	Yes

The treatment strategy and graft selection were identified and planned according to their categorized deformities, respectively.

After blunt dissection, the fascia was identified, and a 2-cm incision parallel to the skin incision was made. Using a pair of Metzen Baum scissors, the fascia was cut longitudinally up to 3 cm in length so that the graft was harvested in a rectangular fashion. Application of the FL graft and costal cartilage was achieved through an open rhinoplasty incision.

The FL graft was applied over the costal graft in the dorsal region in 20 patients (86.9%), applied over the reconstructed alar and dome area in the nasal tip in 8 patients (34.7%), and applied over both areas simultaneously in 4 patients (17.3%).

Postoperative follow-up period was between 14 and 35 months (mean, 24.5 mo); clinical evaluation, photographic documentation, and a questionnaire form related to donor-site morbidity and patient satisfaction were applied after 12 months of the follow-up period (Table 2).

RESULTS

All patients underwent tertiary rhinoplasty for functional and cosmetic improvement. The costal cartilage grafts were applied in the form of alar batten, alar rim, strut graft, alar dome onlay graft, spreader graft, and buttress graft for dorsal augmentation. The use of the FL graft was introduced over the dorsal graft or nasal tip and alar graft to camouflage the possible irregularities that might appear owing to the warp or minor distortions of the cartilage grafts in the late postoperative period.

All patients had an improved aesthetic result, and no apparent irregularities were observed in the integument of the aesthetic lines. Results from the questionnaire form showed that all patients were satisfied with their surgical results and actually had no concern about the scars in their donor sites. No complications in the donor area or no requirement for revision surgery was observed, respectively.

TABLE 2. Questionnaire Form for Donor-Site Morbidity and Patient Satisfaction

Are you satisfied with the surgical result?	Yes	No
Are you concerned about the scar on your thigh and chest region?	Yes	No
Did you have pain and/or limping during walking after operation?	Yes	No

CLINICAL REPORT

Patient 1

A 31-year-old man, who had been previously operated on, presented with severe nasal deformity. The first operation was performed 5 years ago, followed by a progressive and gradual saddling of the nose with major distortion in the nasal tip. A revision surgery was performed 1 year later. The conchal cartilage of the right ear was used for dorsal augmentation, yet an acceptable aesthetic and functional result was not achieved. In our examination, the patient had a saddle nose with a right alar collapse and internal valve insufficiency (Fig. 1). The surgical correction included the use of a combination of costal buttress graft and FL graft for dorsal augmentation, bilateral spreader graft for internal valve restoration, strut graft for restoring the tip projection, and bilateral alar rim and batten graft for restoring the alar region. The follow-up period was 30 months, no complications were observed, and the final functional and aesthetic results were satisfactory (Fig. 1).

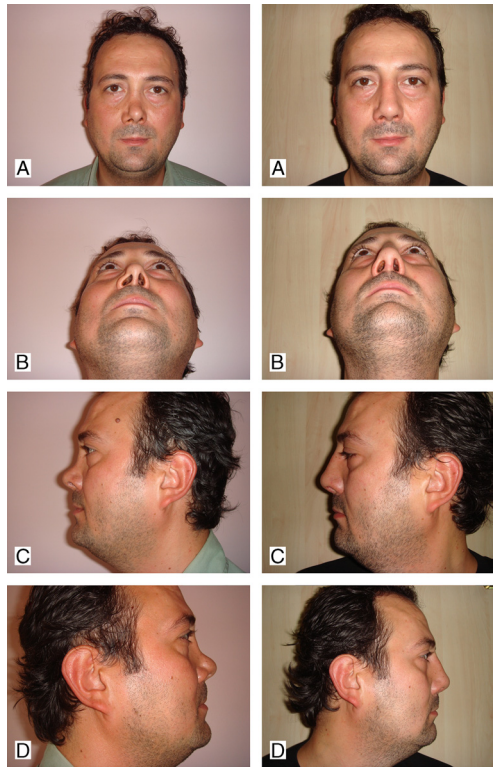

FIGURE 1. A 31-year-old man with a saddle nose deformity with difficulty in breathing. A, Preoperative frontal view. B, Basal view showing the right alar collapse. C and D, Lateral view showing the saddle nose deformity. Postoperative views after 30 months: frontal and lateral views showing the effect of buttress costal cartilage with FL graft in augmenting and camouflaging the nasal dorsum.

Patient 2

A 29-year-old woman with a characteristic thin nasal skin has been operated on twice before because of a primary nasal deformity. In the second operation, the conchal cartilage from the right ear was used to correct the deformities, but the result was unsuccessful. On examination, an overt nasal dome distortion with obvious alar notching was observed; in addition, a depression in the supratip region was present (Fig. 2). The operative plan aimed to correct the irregularities in the nasal tip region by using costal cartilage. On exploration, both alar cartilages were overresected and deficient (Fig. 3). Both medial crus cartilages were previously injured and asymmetric. The dome region was distorted (Fig. 3). Costal cartilages were used to reconstruct both alar cartilages with alar batten and alar rim graft, the strut graft for tip projection, dorsal onlay graft for restoring the supratip region, bilateral spreader graft for internal valve competence, and onlay FL graft in the nasal tip region (Fig. 3). The follow-up period was 27 months, no complications were observed, and the final functional and aesthetic results were satisfactory (Fig. 2).

Patient 3

A 25-year-old woman was operated on twice before in an attempt to correct her primary nasal deformity. Her nose had a severe axis deviation, saddle nose deformity with a nasal tip distortion, and valve incompetence (Fig. 4). The surgical correction included the use of a combination of costal buttress graft and FL graft for saddle nose deformity, bilateral spreader graft for internal valve restoration, strut graft for restoring the tip projection, and bilateral alar rim and batten graft for restoring the alar region. The follow-up period was 14 months, no complications were observed, and the final functional and aesthetic results were satisfactory (Fig. 4).

Patient 4

A 21-year-old woman with a severe nasal deformity had been operated on twice before for breathing complains. On examination, the patient had a saddle nose deformity, bilateral alar flaring, and loss of tip projection in addition to bilateral nasal valve insufficiency (Fig. 5). The surgical correction included the use of a combination of costal buttress graft and FL graft for dorsal augmentation, bilateral spreader graft for internal valve restoration, strut graft for restoring the tip projection, bilateral alar rim and batten graft for restoring the lower alar region, and columellar strut graft and onlay tip graft for correcting tip projection combined with FL graft over the nasal tip (Fig. 6). The postoperative follow-up period was 19 months, no complications were observed, and the final functional and aesthetic results were satisfactory (Fig. 5).

DISCUSSION

The functional and aesthetic restoration of the nose after multiple surgeries is indeed a complicated, labor-intensive, and challenging procedure. In such patients, the contour deformities usually accompany the functional losses that are actually related to each other, and the final aim of the revision surgery is to restore the architectural framework with optimal functional outcome. Therefore, a detailed preoperative preparation must be considered to avoid undesirable results. The structural support and integrity, overlying

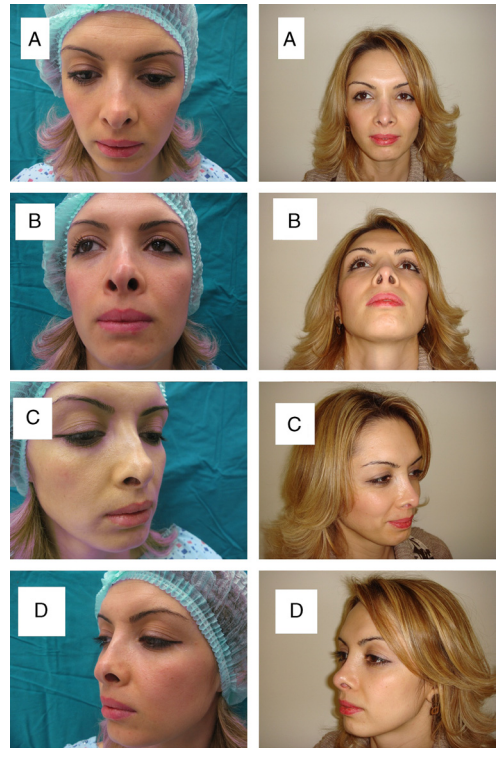

FIGURE 2. A 29-year-old woman with a characteristic thin nasal skin has been operated on twice before because of a primary nasal deformity. Preoperative views: A, Frontal view showing the overt cartilage grafts over the nasal tip and dorsum. B, Basal view showing the distortion and asymmetry in the dome area. C, D, Lateral views showing the irregularities over the dorsum. Postoperative view after 27 months: all showing the effect of onlay FL graft in camouflaging the possible irregularities in the nasal tip region.

FIGURE 3. Intraoperative view: A, Deformities in the nasal tip region. B, Use of cartilage grafts in reconstruction. C, Onlay FL graft in the nasal tip region.

soft tissue and skin quality, intranasal and extranasal valve competence, and cosmetic deformities have to be evaluated precisely. Adding to all these, the psychologic condition of such patients is vulnerable and unstable. Moreover, they lack the confidence and assurance toward physicians because of prior unsuccessful surgeries. Hence, it is mandatory to reestablish the affiance and frankly answer all the questions in regarding the patient's expectations.[1–3]

Overresection of the cartilage framework and loss of structural support seem to be the primary and most common problems that might be encountered during revision surgery. In previous surgeries, the nasal septum is majorly sacrificed; dorsal overresection leading to saddle nose deformity, upper and lower lateral cartilage overresections leading to lateral nasal wall collapse and nasal valve insufficiency, and lack of columellar support leading to nasal tip projection deformities can all be observed. As a result, correcting such deformities requires graft materials harvested from sources other than the nose.

The use of autogenous auricular, septal, costal cartilage, calvarial, metatarsal, and iliac crest bone has been reported previously.[4,10–16] Use of alloplastic materials such as expanded polytetrafluoroethylene (Gore-Tex W.L. Gore and Associates, Flagstaff, AZ), porous high-density polyethylene (Medpor; Porex Surgical, Newnan, GA), and banked FL has also been reported.[17–19] Yet, on the other hand, such materials are actually high in cost and are prone to infection or extrusion especially in cases were multiple surgeries may have led to loss of nasal mucosal integrity and render the foreign material vulnerable to the nasal secretions and external flora.

Many studies[20–22] have shown that homografts (irradiated rib cartilage or bone or bank FL) carry the risk of prion infection. Therefore, we believe that the use of autogenous sources for cartilage and fascia excludes such risks; moreover, they are the least in cost in comparison to the other sources.

After multiple surgeries, the nasal irregularities in the dorsal and nasal tip region seem to be the most difficult to be corrected. This actually may be due to changes in the quality, pliability, and thickness of the overlying skin as a result of interrupted vascularity and scar formation. Therefore, after the final corrective surgery, any fine irregularities that may result from the applied graft material such as cartilage warping[23,24] or distortion[25,26] might unfortunately be obvious in the late postoperative period.

In the medical literature, many methods have been described for restoring contour and for camouflage during nasal surgery, especially in patients with thin nasal dorsal skin. Diced cartilage, temporal fascia, perichondrium, acellular dermis, and dermal fat graft have been used for such purposes.[27–32] The use of autogenous FL graft for nasal dorsal contouring has been described previously.[9] We believe that the FL graft is indeed cost-effective, easy to harvest, viable, and does not carry the risk of prion infection. On the other hand, the donor-site morbidity was acceptable according to the data

FIGURE 4. Preoperative views on a 25-year-old woman who was operated on twice before in an attempt to correct her primary nasal deformity (A–D). Postoperative views (A–D) after 14 months.

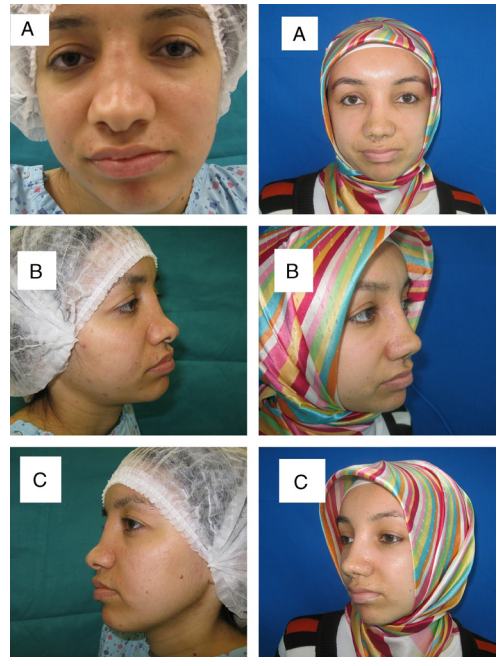

FIGURE 5. A 21-year-old woman with a severe nasal deformity who had been operated on twice before for breathing complains. The patient had a saddle nose deformity, bilateral alar flaring, and loss of tip projection in addition to bilateral nasal valve insufficiency: frontal (A) and lateral (B, C) views. Postoperative view after 19 months: frontal and lateral views (A–C).

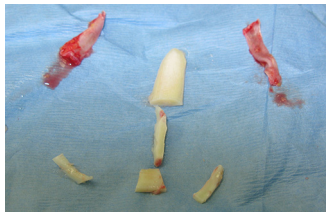

FIGURE 6. The combination of cartilage grafts and autologous FL graft used for the reconstructive surgery.

retrieved from the questionnaire forms provided to the patients in both of our studies.

In comparing with alternate methods, we believe that the vitality and thickness of the FL graft render it to be more reliable from the thin temporal fascia and perichondrium. Also, many studies[33–36] have shown that the surgicel-wrapped diced cartilage is prone to resorption. Moreover, the vitality and durability of the amount of graft are unpredictable. Indeed, homograft or allograft use excludes donor-site morbidity, but the high economic cost, foreign body reaction, and the potential for carrying prion are important drawbacks that have to be considered.

In conclusion, the refinement of the nasal dorsum and nasal tip in tertiary rhinoplasty is indeed important and difficult to be managed and achieved. Placing the FL over the applied cartilage grafts provide a good cover that conceals the possible irregularities or distortions that may appear in the late postoperative period.

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