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Use of Tutoplast-Processed Fascia Lata as an Onlay Graft Material for Tip Surgery in Rhinoplasty

Yong Ju Jang, MD, PhD¹, and Ji Heui Kim, MD¹

Abstract

Objectives. Tutoplast-processed fascia lata (TPFL) is a commercially available homograft that has been successfully used as human graft tissue for dorsal augmentation in rhinoplasty. The present study evaluated the use of TPFL as an onlay tip graft material in rhinoplasty.

Study Design. Case series with chart review.

Setting. Academic tertiary care medical center.

Subjects and Methods. The study involved a retrospective analysis of rhinoplasty cases using TPFL as a tip onlay graft. The study included 82 patients (46 men and 36 women) who underwent tip surgery using TPFL from February 2006 to June 2008. By comparing facial photographs before and after the operation, 2 independent rhinoplastic surgeons assessed outcomes of 8 months postoperative time as being excellent, fair, or poor. Using the pre- and postoperative profile view, anthropometric measurements were also made.

Results. The 82 subjects included 71 primary and 11 revision patients. TPFL was used as a tip onlay graft in final tip modification. Postoperative assessment found that only 6 (7%) patients had excellent results, 51 (62%) had fair results, and 25 (31%) had poor results. Pre- and postoperative anthropometric measurements showed the technique resulted in an overall increased nasal tip projection postoperatively (0.56 ± 0.09 vs 0.60 ± 0.08; P < .05). However, the overall nasolabial angle was not changed after surgery (91.35 ± 10.36° vs 93.05 ± 8.3°; P = .08). No patient experienced infection, visible graft contour, or migration.

Conclusion. TPFL was not that satisfactory in terms of aesthetic outcome when used as a tip onlay graft material in rhinoplasty patients.

Keywords

rhinoplasty, Tutoplast-processed fascia lata, tip onlay graft
the use of allograft as a tip onlay graft.9 We have previously reported on the effective use of Tutoplast-processed fascia lata (TPFL) in dorsal augmentation.10,11 However, no study has described the use of fascial material on the tip in rhinoplasty. The present report evaluated the use of TPFL as an onlay tip graft material in rhinoplasty.

Methods

Subjects

This study was approved by the Institutional Review Board of Asan Medical Center before we undertook this study. The present study involved a retrospective analysis of 82 consecutive rhinoplasty patients (46 men and 36 women), treated from February 2006 to June 2008, in whom TPFL was used as a tip onlay graft material. Patients ranged in age from 16 to 53 years and were followed up postoperatively for 8 to 25 months (mean, 13.5 months). All surgery was performed by a single surgeon (Y.J.J.).

The indication for use of TPFL in tip surgery was a lack of enough septal cartilage remaining after the prioritized use of the cartilage in septal reconstruction and dorsal augmentation, particularly in patients who do not want additional morbidity related to cartilage harvesting from the ear or chest. Written informed consent for the use of TPFL was obtained from all patients.

Assessment of Surgical Outcome

By comparing facial photographs before and after the operation, 2 independent rhinoplastic surgeons (Jin-Young Min and Myeong Sang Yu) graded postoperative outcomes as excellent, fair, or poor. Photos of patients before and after the operation were shown to the reviewers. They were informed that these patients had rhinoplasties but were not aware of specific tip surgery techniques. They were asked to analyze the appearance of the tip rather than overall result.

Anthropometric measurements were also made using pre- and postoperative profile photographs. Nasal tip projection and rotation were determined. Nasal tip projection was evaluated using the ratio of alar crease-tip to nasion-tip length.12 Nasal tip rotation was analyzed by measuring the nasolabial angle, which comprises the subnasal point, the columellar point, and the superior labialis point.

Tutoplast Processing

The commercial production of TPFL (Tutoplast, Tutogen Medical GmbH, Neunkirchen am Brand, Germany; 30 × 40 mm) involves numerous processing stages depending on the tissue type. These include delipidization, osmotic treatment, an oxidative step, solvent dehydration, double sterile packaging, and, finally, gamma irradiation (17.8-25 kGy).

Surgical Procedures

Initial tip modification was usually achieved employing a septal extension graft or various tip suture techniques. The dorsal height conformed to the height and shape of the newly created tip. A temporary closure of the transcolumellar incision was performed to assess the shape of the nose prior to final wound closure. If the tip required some elevation, a Peck’s type tip onlay graft was created using TPFL. TPFL was shaped into a ball or cube of 0.5 to 1 cm in size to fit into the domal area. (Figure 1A) The TPFL tip graft was inserted into the tip after suture repair of the transcolumellar incision. (Figure 1B) The TPFL tip graft was placed on the nasal tip. (C) Final location of the TPFL tip graft on the nasal tip.

Results

The 82 study subjects included 71 primary patients and 11 revision patients. TPFL was used as a tip onlay graft in final tip modification. Other tip procedures employed were the
Postoperative assessment showed that 6 (7%) patients had excellent outcomes (Figure 2), 51 (62%) had fair outcomes, and 25 (31%) had poor outcomes. Pre- and postoperative anthropometric measurements showed there was an overall increased nasal tip projection postoperatively (0.56 ± 0.09 vs 0.60 ± 0.08; \( P < .05 \)). However, the overall mean nasolabial angle was not changed after surgery (91.35 ± 10.36° vs 93.05 ± 8.3°; \( P = .08 \)). Of 25 poor cases, 6 underwent further revision surgery at a later stage to improve tip refinement. A poor outcome was usually caused by loss of tip definition and tip projection over time (Figure 3). No patient experienced other complications such as infection, visible graft contour, graft migration, or extrusion.

### Discussion

Since we have observed that the use of TPFL in the nasal dorsum is safe and effective,\(^1\)\(^1\) the usefulness of TPFL as an alternative tip onlay graft material was tested in this study but resulted in an unsatisfactory aesthetic outcome. The use of septal cartilage in rhinoplasty depends on the type of deformity and the attitude of the surgeon. Prioritizing the use of harvested septal cartilage is a critical decision for ultimate success in rhinoplasty conducted on Asian patients. When reconstruction of the septal support is imperative, septal cartilage should first be used in the form of spreader grafts or caudal septal extension grafts to create a new septal cartilage framework. Any remaining septal cartilage can be used as a columellar strut, a shield graft, or a tip onlay graft at the final stage of tip modification. However, for some patients, insufficient septal cartilage remains for tip use, and an additional incision in the ear or chest for cartilage harvesting is not desired by the patients. In such patients, we employed TPFL for tip onlay grafting in the present study.

The merits of a TPFL graft include the following: the graft is rarely visible through the skin, seldom becomes infected, and conforms well to the overlying skin. TPFL also tends to migrate less often than seen with cartilage grafts. A fascial tip graft can be sutured onto the domal area or can be placed into the domal area via a marginal incision after closing the transcolumellar incision.

### Table 1. Tip Techniques Used in Addition to Tutoplast-Processed Fascia Lata Grafting (N = 82)

<table>
<thead>
<tr>
<th>Technique</th>
<th>Excellent, No. (%)</th>
<th>Fair, No. (%)</th>
<th>Poor, No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Septal extension graft (n = 34)</td>
<td>2 (5.9)</td>
<td>20 (58.8)</td>
<td>12 (35.3)</td>
</tr>
<tr>
<td>Columellar strut (n = 11)</td>
<td>2 (18.2)</td>
<td>5 (45.5)</td>
<td>4 (36.4)</td>
</tr>
<tr>
<td>Suture technique (n = 5)</td>
<td>2 (40.0)</td>
<td>2 (40.0)</td>
<td>1 (1.0)</td>
</tr>
<tr>
<td>Shield graft (n = 4)</td>
<td>0 (0)</td>
<td>2 (50.0)</td>
<td>2 (50.0)</td>
</tr>
</tbody>
</table>

Figure 2. Preoperative (A) and 8-month postoperative lateral views (B) of a 47-year-old woman with tip plasty using a Tutoplast-processed fascia lata tip graft.
The disadvantages of a TPFL graft include difficulty in production of sharp tip definition, and the graft may be resorbed over time. We believe these issues resulted in suboptimal aesthetic outcomes observed in some patients of the present series. Therefore, the use of a TPFL tip graft might be contraindicated in patients with very thick skin, as a tip graft is hardly visible through such skin, and graft placement may increase the amorphous nature of the tip. We believe a TPFL tip graft has only limited usefulness in selected individuals with thin nasal skin, as they are at greater risk of graft visibility, and such patients are more suited to the soft contour of the TPFL graft.

This study has some limitations. First, as various procedures other than TPFL graft were used on the tip, it is difficult to judge the exact role of solely the TPFL graft on the tip, excluding any possible effects of combined procedures. Second, the study design is retrospective and not a controlled study. Third, the quality of the photographs was not always optimal, and thus the validity of the analysis may depend completely on the quality and reproducibility of the photos. Fourth, the description of the subjective rating of excellent, fair, and poor results may be too simple and could lack reliability and validity. Although the analysis method is not that sophisticated, it has worked well in our previous research. We, therefore, previously published our modified vertical dome division procedure by a single surgeon (Y.J.J.) using similar analysis methods of preoperative and postoperative photographs and anthropometric measurements. Assessment by 2 otolaryngologists showed 48.6% excellent, 40.5% good, 8.1% fair, and 2.7% poor outcomes. Pre- and postoperative anthropometric measurements showed significantly increased nasal tip projection and improved nasolabial angle after surgery. In this study, we used a similar analysis method and found that overall nasal tip projection was increased and that the overall mean nasolabial angle was not changed postoperatively in anthropometric measurement when TPFL was used as a tip onlay graft material. However, subjective assessment resulted in 7% excellent, 62% fair, and 31% poor outcomes, suggesting poor aesthetic performance of this technique. Poor aesthetic results despite increased overall tip projection might be a result of loss of tip definition caused by resorption of the fascial tip graft.

In the present series, although no serious complications were seen, the revision rate was high (7%), and approximately 30% of patients had a cosmetically unfavorable outcome. The high aesthetic failure rate was caused by loss of tip definition and projection, probably attributable to fascia resorption over time. The cosmetic outcomes in the present study are in sharp contrast to those of our previous work in which use of TPFL on the nasal dorsum resulted in a subjective satisfaction rate of 85%. It is likely that TPFL is resorbed more readily from the tip area, probably because this region is more mobile than the dorsum. Therefore, we would conclude that TPFL was not that satisfactory in terms of aesthetic outcome when used as a tip onlay graft material in rhinoplasty patients.

**Disclosures**
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References


