Mastoid Fascia Tissue Graft as a Tip Camouflage Technique in Rhinoplasty: A Reliable Alternative to Soft Cartilage Grafts

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Background: Traditional rhinoplasty tip grafts often lead to visibility issues, prompting patients to seek revision surgery. The mastoid fascia tissue graft (MFTG) provides a natural-appearing alternative with an acceptable risk of complication. The MFTG remains less visible through the skin and helps camouflage and conceal tip irregularities. This study of 193 patients examines the MFTG's effectiveness in nasal tip refinement, evaluating revision and infection rates.

Methods: A retrospective analysis of MFTG use for nasal tip appearance during open rhinoplasty in the senior author's (R.G.R.) practice was conducted, covering the period from January of 2019 to June of 2022. Inclusion criteria encompassed open rhinoplasty cases using mastoid tissue for tip appearance with at least 12 months of follow-up. Among 2003 cases, 193 met these criteria and were evaluated for subsequent revision and infection rates.

Results: The average patient age was 34.2 years (175 female patients and 18 male patients). Primary rhinoplasty was performed in 113 patients, with 80 receiving revision operations. The average follow-up was 14.8 months. Six patients (3.1%) overall needed extended antibiotics, including 1 primary rhinoplasty patient (0.9%) and 5 secondary rhinoplasty patients (6.3%). Overall, revision rhinoplasty was required in 6 patients (3.1%) (1 primary patient [0.9%] and 5 secondary rhinoplasty patients [6.3%]).

Conclusions: MFTG use for an aesthetically pleasing nasal tip appearance is a safe, convenient, and effective technique for camouflaging and concealing nasal tip contour irregularities in both primary and revision rhinoplasty. Use of the MTFG is associated with minimal morbidity. *(Plast. Reconstr. Surg.* 155: 255, 2025.)

CLINICAL QUESTION/LEVEL OF EVIDENCE: Therapeutic, IV.

Rhinoplasty is regarded as one of the most challenging and complex procedures in the field of plastic surgery. It is also one of the most commonly performed cosmetic operations in the Unites States and worldwide, with revision rates ranging from 5% for tip rhinoplasty to 15.5% for complex revision rhinoplasty.[1] Dealing with secondary cases poses an even more technical challenge, often requiring graft material to rectify nasal tip deformities arising from previous operations.

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The optimal graft camouflages nasal tip contour irregularities, delivering aesthetically pleasing and durable outcomes, while simultaneously minimizing morbidity and complications, such as infection and distortion.[2] The graft should

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provide a natural and smooth result and also be readily available. Some of the commonly used nasal tip grafts, such as crushed lower lateral cartilage grafts, appear aesthetically pleasing on the table and early on, but sometimes will eventually show through the skin envelope, as the continued cicatricial forces of healing take hold. This process can take years, but an ideal tissue graft is one that never shows through the skin envelope.

The mastoid fascia tissue graft (MFTG), an autologous graft option, can be layered to create a seamless transition between different areas of the nasal tip, blending irregularities and ensuring that the graft integrates smoothly with the surrounding tissues, avoiding any noticeable step-offs or abrupt changes in contour. Some contour irregularities may result in sharp angles or edges in the nasal tip. The MFTG can be sculpted and positioned to soften these angles, creating a more natural and aesthetically pleasing transition between the nasal tip and the rest of the nose. In cases where contour irregularities result in a lack of volume or projection in the nasal tip, the MFTG can be used for subtle augmentation, adding just enough volume to create a more symmetric and refined nasal tip without appearing overcorrected or unnatural. Over the past few decades, several alternative grafts have been used for nasal tip contouring. For example, the "Turkish delight" graft, which is composed of diced cartilage, can cause excessive contouring, postoperative fibrosis, or reabsorption of the graft.[3] Conchal cartilage grafts have an innate risk of warping, resorption, and generally being too rigid.[4] Excised alar cartilage is softer with increased pliability and malleability[5] but can be limited in size and quantity. For any cartilage graft, there is also the risk of increased noticeability beneath the nasal skin after edema subsides. Temporalis fascia is an excellent autologous option that provides successful results, but it is limited by the risk of alopecia at the harvest site.[6] Autologous fat grafting is effective in surface contouring but has limited long-term results and can be insufficient for filling larger defects in patients with multiple rhinoplasties.[7]

The MFTG offers several advantages over other techniques, including versatility, the ability to provide a natural-appearing result, ease of harvest, and minimal morbidity and complications.[8] There is a risk of numbness to the ear if it is harvested too inferiorly, but the risk of numbness is very low if it is harvested higher up in the posterior auricular sulcus. In rhinoplasty, the MFTG has the potential to camouflage and conceal nasal tip irregularities, especially in patients with thinner skin. As such, it is a valuable donor source that can be a reliable option in contouring of the nasal tip compared with alternative sources. Our current study represents the largest single retrospective study on the application of mastoid fascia for nasal tip appearance during rhinoplasty, involving 193 patients. In addition, we provide an evaluation of the revision rates and infection rates in both primary and revision rhinoplasty procedures.

PATIENTS AND METHODS

A retrospective single-surgeon chart review was conducted of the senior author's (R.G.R.) practice from January of 2019 to June of 2022. The review included all patients who underwent rhinoplasty during that time. The study was approved by the Biomedical Research Alliance of New York's institutional review board.

Inclusion criteria consisted of patients undergoing open rhinoplasty where the MFTG was used for nasal tip refinement. Both primary and revision rhinoplasty patients were included. Patients who underwent nasal tip deprojection and/or use of MTF Biologics' fresh frozen costal cartilage (FFCC) if there was insufficiency of septal cartilage were also included if the MFTG was also used for nasal tip refinement. Steroid injections are used in select patients in the supratip area starting at 2 months postoperatively but are not used for the tip area. The MFTG is only placed in the tip area, and therefore does not receive any steroid injections. A minimum of 12 months of follow-up was required for inclusion. Exclusion criteria consisted of patients who had less than 1 year follow-up or underwent open rhinoplasty without the use of mastoid fascia. A total of 2003 rhinoplasty cases were reviewed, yielding 193 patients meeting inclusion criteria and passing exclusion criteria.

Manual chart review was conducted to collect patient demographics and surgical outcomes. Infections were considered to have occurred if patients presented with clinical signs of infection and were treated with antibiotics or surgical intervention after completing the routine course of postoperative prophylactic antibiotics. Routine preoperative antibiotics consisted of 7 days of cefadroxil, or clindamycin for patients with penicillin allergies. In patients requiring extended doses of antibiotics for signs of infection, a 7-day course of ciprofloxacin and trimethoprim/sulfamethoxazole was given. Subsequent revision rhinoplasty was defined as any subsequent operative rhinoplasty procedure. Primary outcomes included rate of revision following rhinoplasty

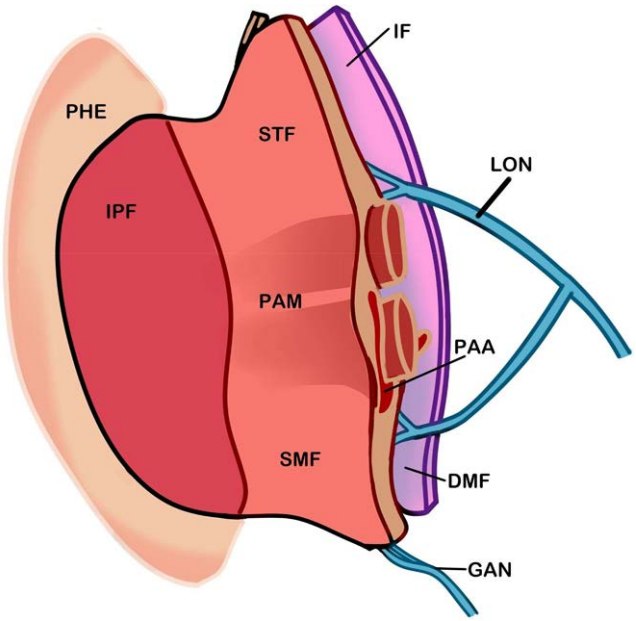

Fig. 1. Cross-sectional diagram demonstrating superficial mastoid fascia. *PHE*, posterior helix of ear; *IPF*, intrinsic postauricular fascia; *STF*, superficial temporal fascia; *PAM*, posterior auricular muscle; *SMF*, superficial mastoid fascia; *IF*, innominate fascia; *LON*, lesser occipital nerve; *PAA*, posterior auricular artery; *DMF*, deep mastoid fascia; *GAN*, greater auricular nerve.

with nasal tip refinement using mastoid fascia and rate of infection. Revision rates were stratified into 3 groups consisting of the overall patient population, primary rhinoplasty patients, and secondary rhinoplasty patients.

Surgical Technique

The retroauricular superficial mastoid fascia (Fig. 1) is extracted using a minimally invasive method. The postauricular sulcus is injected with 5 cc of local anesthetic (1% lidocaine, 0.5% bupivacaine, and 1:100,000 epinephrine) allowing for hydrodissection between the skin and the superficial fascia. A 1.5-cm postauricular sulcus incision is then made, and the skin flap is subsequently raised, allowing for an approximately 1- to 2-cm^2 area of superficial mastoid fascia to be harvested. (**See Video 1 [online]**, which is an intraoperative video in which the senior author [R.G.R.] demonstrates harvest of the MFTG.) Once harvested, the mastoid fascia is then dehydrated by applying manual pressure to it with a sterile gauze, allowing the fascia to achieve its final shape, consistency, and size. The fascial tip graft is positioned at the tip-defining point during placement and subsequently sutured in place at the nasal tip in an interrupted fashion using clear 5-0 polydioxanone sutures. (**See Video 2 [online]**, which is an intraoperative video in which the senior author [R.G.R.] demonstrates insetting of the MFTG.) Ensuring 4-point fixation of the graft is crucial for optimal stability and integration. The postauricular incision is closed with a 5-0 chromic suture in a running fashion. Using the mastoid fascia provides for a reliably large harvest. The fascia is pliable and can be easily shaped, minimizing increased operative time.

Table 1. Patient Demographics

Characteristic	Value (%)
No. of patients	193
Primary rhinoplasty patients	113 (58.5)
Revision rhinoplasty patients	80 (41.5)
Average follow-up time, mo	14.8
Mean age, yr	34.2
Sex	
Male	18 (9.3)
Female	175 (90.7)
Mean BMI, kg/m^2	22.4
Active smokers	8 (4.1)

BMI, body mass index.

Table 2. Surgical Technique Breakdown

Surgical Techniques	No. of Patients (%)[a]
Mastoid fascia only	36 (18.7)
Mastoid fascia and FFCC	22 (11.4)
Mastoid fascia and deprojection	105 (54.4)
Mastoid fascia, FFCC, and deprojection	30 (15.5)

[a]Percentages are based on total number of 193 patients.

RESULTS

A total of 193 patients consisting of 175 female patients (90.7%) and 18 male patients (9.3%) met the inclusion criteria with an average age of 34.2 years (range, 15 to 83 years) and body mass index of 22.4 kg/m^2. Eight patients (4.1%) were active smokers. Among these patients, 113 were primary rhinoplasty cases (58.5%) and 80 were revisions (41.5%). Average length of follow-up was 14.8 months (Table 1).

In our study, we included patients who underwent rhinoplasty with (1) the MFTG only; (2) the MFTG and FFCC; (3) the MFTG and nasal deprojection; and (4) the MFTG, FFCC, and nasal deprojection. Thirty-six patients (18.7%) underwent rhinoplasty with the MFTG only; 22 patients (11.4%) underwent rhinoplasty with the MFTG and FFCC; and 105 patients (54.4%) underwent the MFTG and nasal deprojection. All 3 modalities were used in 30 patients (15.5%) (Table 2).

Overall, 6 of 193 patients (3.1%) required revision rhinoplasty. When stratified into primary and secondary rhinoplasty groups, the revision

Table 3. Rates of Revision and Subsequent MFTG Use

Characteristic	After Primary Rhinoplasty (%)	After Secondary Rhinoplasty (%)	Total (%)
No. of patients requiring revision (% of primary vs. secondary rhinoplasty patients)[a]	1 of 113 (0.9)	5 of 80 (6.3)	6 of 193 (3.1)
No. of patients with mastoid fascia use on revision (% of total revisions)[b]	0 of 1 (0.0)	5 of 5 (100.0)	5 of 6 (83.3)

[a]Percentages are based total primary ($n = 113$) and revision ($n = 80$) patients, respectively.
[b]Percentages are based on total subsequent revisions following primary ($n = 1$) and secondary rhinoplasty ($n = 5$), respectively.

Table 4. Revision Patient Details

Patient	No. of Prior Rhinoplasties	MFTG Use during Revision	Additional Antibiotic Use	Reason for Revision
1	Primary	No	No	Underrotation of tip
2	1	Yes	No	Top of form; bottom of form; deviated nasal septum, chronic nasal obstruction
3	1	Yes	No	Bulbous nature of nasal tip
4	4	Yes	Yes	Contour irregularity of supratip
5	5	Yes	Yes	Asymmetry at soft-tissue triangle
6	1	Yes	No	Contour irregularity of left dorsal aesthetic line

Table 5. Rates of Infection

Characteristic	Primary Rhinoplasty (%)	Revision Rhinoplasty (%)	Total (%)
No. of patients requiring additional antibiotics	1 of 113 (0.9)	5 of 80 (6.3)	6 of 193 (3.1)

rate was 0.9% (1 of 113 patients) and 6.3% (5 of 80 patients), respectively (Table 3), with various reasons for revision (Table 4). During the subsequent revision procedure, the MFTG was used again in 5 of 6 (83.3%) overall patients, or stratified into respective groups, 0 of 1 primary rhinoplasty patients needing revision (0.0%) and 5 of 5 secondary rhinoplasty patients needing revision (100.0%) (Table 3).

Among patients in which the MFTG was used during rhinoplasty, 6 (3.1%) required 5 to 7 days of additional postoperative antibiotics for cellulitis. This was in addition to the routine postoperative antibiotic prophylaxis. These 6 patients consisted of 1 of 113 primary rhinoplasty patients (0.9%) and 5 of 80 revision rhinoplasty patients (6.3%) (Table 5). In most cases, the cellulitis resolved after antibiotic use, without morbidity, and the patient did not require operative intervention. Two of 6 patients, both of whom had undergone revision rhinoplasties, underwent subsequent revision rhinoplasty within 6 months. One of these patients had an incision-and-drainage procedure that yielded scant pus at the site of cellulitis. She later developed a supratip indentation at the incision-and-drainage site that subsequently required 2 revision rhinoplasties. Notably, this patient had 5 previous rhinoplasties performed by other surgeons. Similarly, the other patient had undergone 4 prior rhinoplasties performed by different surgeons. In the senior author's (R.G.R.) experience, patients who are at increased risk of more severe postoperative infections usually have a history of multiple prior rhinoplasties. For both patients, the MFTG was used for the nasal tip in the subsequent revisions performed by the senior author.

During the follow-up period, 1 patient (0.5%) was noted to develop postauricular hypertrophic scarring at the mastoid fascia harvest site. This was managed using steroid injections, leading to improvement. No further complications were reported, and there were no reports of neuromuscular damage from the mastoid fascia harvest. Postoperatively, patients were noted to exhibit edema at the nasal tip during the first few months. Importantly, once the edema resolved by the end of the first year, the fascial graft was noted to maintain its volume, achieving satisfactory appearance (Figs. 2 through 4).

DISCUSSION

In rhinoplasty, grafting of the nasal tip may be required for various reasons, including the need for augmentation, improvement of nasal profile, and coverage of the underlying nasal cartilaginous framework. The primary focus of the senior author's (R.G.R.) practice is on rhinoplasty, with a

Fig. 2. A woman in her 50s is shown preoperatively (*left*) and 2 years postoperatively (*right*). The patient had 2 previous rhinoplasties that left her with severe tip asymmetry, alar retraction, nostril asymmetry, an overprojecting elongated nasal tip, drooping tip, and inability to breathe through her nose. She is now 2 years postoperative from revision rhinoplasty with correction of nasal tip asymmetry; placement of alar contour grafts to correct alar retraction; tip elevation; nasal tip deprojection to shorten the overall length of her nose; and placement of a columellar strut graft and spreader grafts using MTF cartilage to add tip support, tip refinement, and improve her breathing. A mastoid fascia tip graft was placed for tip unification.

significant portion of cases involving patients seeking revision rhinoplasty. In revision rhinoplasty cases, the mentioned concerns are considerably magnified, necessitating an efficient graft that combines soft and pliable characteristics for contouring and concealing nasal tip defects. Mastoid fascia camouflages nasal tip contour irregularities with minimal donor-site morbidity. Furthermore, mastoid fascia harvest yields a reliably consistent and predictable size that provides enough tissue for almost any rhinoplasty surgery with a quick harvest time.[8]

Mastoid fascia is composed of 3 layers. First is the superficial layer; beneath this is an areolar layer known as the deep mastoid fascia; and further beneath this is the innominate fascia.[9] The mastoid region is supplied by the occipital, postauricular, and superficial temporal arteries with their trunks arising in between the superficial and deep fascial layers. As the senior author obtains

Fig. 3. Preoperative (*left*) and postoperative (*right*) oblique views of the patient shown in Figure 2.

superficial fascia only, the chance of injury to the vasculature or nerves is minimized. Given the nature of its location, the incision is both hidden and cosmetically benign. If further graft is needed, the incision can easily be extended distally and/or proximally; however, this was not found to be necessary in the great majority of cases. The mastoid fascia has an added benefit that is realized in rhinoplasty, which is "tombstone deformity" prevention.[10] This deformity occurs when the pressure of a solid graft such as cartilage causes atrophy of the overlying skin, leading to visibility of graft margin. As a much softer graft, the MFTG incorporates into the nasal tip area, providing a gradual, soft contour around its edges and, therefore, a natural and cosmetically appealing tip shape.[11]

Although other traditional options exist for the nasal tip, they are limited by the nature of their composition. For example, conchal grafts, which have been used for many decades, can lead to complications with resorption, migration, and graft visibility in thin-skinned patients.[12,13] In complications that require removal of material, revision rhinoplasty may prove to be more complex, leading to further volume loss and, subsequently, inferior results. Filler materials, such as those used during a "liquid rhinoplasty," are temporary measures and can lead to infectious complications and as increased complexity of subsequent revision rhinoplasties if indicated in the future.[14] Because they are autologous, temporoparietal fascia and tensor fascia lata[15] can also provide excellent results. However, these modalities are associated

Fig. 4. Preoperative (*left*) and postoperative (*right*) frontal and basal (worm's eye) views of the patient shown in Figure 2.

with donor-site morbidity such as alopecia in the former and scar formation on the thigh in the latter. Furthermore, given the divergent anatomical location of these graft sources, the operative time is often found to be increased.[16]

Overall, we do not believe the MFTG to be directly related to the need for revision in our 6 revision patients (Table 4). However, patient 3 required revision for bulbous nature of the nasal tip, which may have been slightly worsened by the placement of an onlay MFTG. Revisions in patients 1, 2, 4, 5, and 6 were unrelated to anatomical locations in which the MFTG was placed. Notably, patients 4 and 5 had several prior revisions, suggesting multiple factors contributing to tip asymmetry, leading to subsequent revision.

Our revision rate was 3.1% overall, 0.9% for primary rhinoplasty, and 6.3% for secondary rhinoplasty. As anticipated, the rate of subsequent revision in secondary rhinoplasty was higher because of the nature of revision surgery. These data suggest the potential reliability of the MFTG, especially in the context of revision rhinoplasties. However, there are limitations to our study.

In our patient follow-up, we assessed cosmetic outcomes through the perspectives of the patients and the surgeon, primarily relying on patient feedback. It is important to note that validated patient satisfaction and outcome surveys were not conducted, representing a notable limitation of our study. Furthermore, although our study indicates a low rate of revision within the first year of follow-up, it is crucial to recognize that the need for revision may arise later in subsequent years. Consequently, our longer term revision rate will likely be higher than reported in this study. Because there are no standardized follow-up cutoffs for rhinoplasty, conducting a subsequent

study with at least a 5-year duration is essential for a more accurate determination of the revision rate associated with this technique.

CONCLUSIONS

This case series has the most patients to date with the MFTG in primary and revision rhinoplasty for nasal tip appearance. In our study's group of 193 patients with at least 12 months of follow-up, the use of the MFTG to achieve an aesthetically pleasing nasal tip appearance was associated with reasonable revision rates for overall, primary, and secondary rhinoplasty patients, with minimal donor-site morbidity. Using the MFTG for nasal tip contouring has proven to be a consistent, efficient, and safe method, producing satisfactory aesthetic results and minimizing complications that lead to revision, such as the visibility of cartilage edges over time.

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DISCLOSURE

Dr. Richard Reish is a consultant for MTF biologics. The remaining authors have no financial interests to declare in relation to the content of this article. The authors received no funding for this study.

PATIENT CONSENT

Patients provided written informed consent for the use of their images.

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