Correcting the Lobule in Otoplasty Using The Fillet Technique

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Correction of the protruded lobule in otoplasty continues to represent an important challenge. The lack of skeletal elements within the lobule makes a controlled lobule repositioning less predictable.

OBJECTIVE To present a new surgical technique for lobule correction in otoplasty.

DESIGN, SETTING, AND PARTICIPANTS Human cadaver studies were performed for detailed anatomical analysis of lobule deformities. In addition, we evaluated a novel algorithmic approach to correction of the lobule in 12 consecutive patients.

INTERVENTIONS/EXPOSURES Otoplasty with surgical correction of lobule using the fillet technique.

MAIN OUTCOMES AND MEASURES The surgical outcome in the 12 most recent consecutive patients with at least 3 months of follow-up was assessed retrospectively. The postsurgical results were independently reviewed by a panel of noninvolved experts.

RESULTS The 3 major anatomic components of lobular deformities are the axial angular protrusion, the coronal angular protrusion, and the inherent shape. The fillet technique described in the present report addressed all 3 aspects in an effective way. Clinical data analysis revealed no immediate or long-term complications associated with this new surgical method. The patients' subjective rating and the panel's objective rating revealed "good" to "very good" postoperative results.

CONCLUSIONS AND RELEVANCE This newly described fillet technique represents a safe and efficient method to correct protruded ear lobules in otoplasty. It allows precise and predictable positioning of the lobule with an excellent safety profile.

LEVEL OF EVIDENCE 4.
than optimal because of the resulting scar and because of the nonphysiologic nature of the procedure. Moreover, it does not correct the inherent shape of the lobule. In some cases, skin resection techniques may actually overaccentuate a preexisting concavity of the lobule.

### Methods

The present study includes both a human cadaver model and a retrospective clinical review. The study was approved by our institutional review board, and all identifiable patients or their parents or guardians provided written informed consent.

#### Human Cadaver Model

A total of 4 fresh frozen human cadavers were used to better understand and analyze all anatomic components contributing to lobular deformity. Dissections were performed using headlight illumination and loupe magnification with standard instrumentation. Key findings and surgical maneuvers were documented using macrophotography (Nikon D90, Sigma 17 to 70). In all specimens, a standard retroauricular incision and dissection of the conchal bowl down to the retroauricular sulcus was performed in the supraperichondrial plane.

Subsequently the lobule was dissected in a slowly progressive manner, and each step of dissection was analyzed for its effect on the form of the lobule. First the cauda helicis was identified and freed. Next, various movements and manipulations of the cauda helicis were analyzed. The effect of repositioning of the cauda helicis was found to be somewhat limited. It allowed for inward rotation of the lobule mainly in the coronal angle. More accentuated inward rotation of the cauda helicis caused dimpling and concave deformity of the lobule. It therefore became obvious that overaccentuated repositioning of the cauda helicis alone would be insufficient to correct more pronounced lobular deformities.

The dissection was then taken further posteriorly, and all soft-tissue attachments along the conchal bowl all the way down to the base of the antitragus were released. This maneuver achieved a large degree of additional mobility of the lobule, allowing for more substantial apposition of the lobule in the axial angle. However, the inherent shape observed in some lobules could not be addressed with this maneuver. Lobules with inherent concavity where the tip of the lobule protruded laterally because of inherent soft-tissue attachments remained unchanged.

The next step of dissection was then careful soft-tissue release of the lobular soft tissue. This was performed under direct microscopic vision using scissors. The lobule was divided parallel to its outer surfaces using sharp dissection. This resulted in a partial filleting of the lobule and allowed very effective reshaping of the lobule and very precise control of the angle of protrusion in both the axial and the coronal plane. This could simply be achieved by advancement of the posterior flap superiorly to control the coronal angle as well as posteriorly to control the axial angle. The length of the filleting division of the lobule allowed for effective control of the inherent lobular shape.

This stepwise approach was then repeated in 3 consecutive specimens (6 ears) and resulted in the following algorithm (1) retroauricular incision and dissection of the conchal bowl; (2) dissection of the cauda helicis; (3) dissection posteriorly and inferiorly toward the base of the antitragus; (4) successive filleting of the lobule; and (5) advancement and fixation of the posterior lobular flap. These anatomic observations confirmed our surgical observations and experience.

#### Surgical Technique in Clinical Practice

The algorithmic approach to lobular correction is based on a detailed analysis of lobular deformity. Three components were analyzed. First, the angle of lobular protrusion along the axial plane was studied. Second, the protrusion of the lobule along the coronal plane was analyzed in relation to the protrusion of the entire auricle. It must be noted that the correction of the lobule should parallel the correction of the auricle to achieve a harmonious result. Third, the inherent shape of the lobule was analyzed. Not infrequently, a concavity of the lobule causes protrusion of the tip of the lobule. This may result in an overaccentuated correction by pulling the base of the lobule with anchoring sutures too far medially, which may actually overaccentuate the concave deformity.

The stepwise technique of correction is shown in Figures 1, 2, 3, 4, and 5. Figure 1 illustrates a lobule with predominant protrusion in the coronal plane (Figure 1A) and in the axial plane (Figure 1B). These deformities often parallel the protrusion of the remaining auricle. A deformity of the inherent shape of the lobule should be corrected at the same time to achieve a harmonious result (Figure 1C).

Figure 2 illustrates dissection along the inferior conchal bowl up to the antitragus and release of soft tissue attachments. This allows for better control of the axial angular protrusion of the lobule by advancement of the posterior flap superiorly. Figure 3 shows dissection and transection of the lobular soft-tissue insertions via the fillet technique. At the intraoperative point illustrated in Figure 3B, the anterior and posterior surfaces of the lobule may be moved and advanced freely in relation to each other. The extent of this dissection may be modified intraoperatively as dictated by the deformity. Advancement of the posterior flap allows for correction of angular protrusion in both the axial and the coronal plane by anterior to posterior and superior to inferior advancement, respectively (Figure 3C). Inferior to superior advancement also allows for effective correction of lobular concavity. Figure 4 shows the final positioning of the lobule after correction.

The dissection of the lobule in some cases required transection of auricular piercings. Written informed consent was obtained from all patients or their parents or guardians prior to the procedure. The anchoring suture was completed using a 4-0 nylon suture (Seralon; Serag-Wiessner KG/Germany). The remainder of the auricle was corrected in standard fashion. We avoided all cartilage incisions and typically combined resection of postauricular muscle, anterior percutaneous needle scoring technique of the antihelix, Mustardé sutures, and conchal setback sutures. The postauricular skin incision was closed with 5-0 Monocryl resorbable sutures (Ethicon Inc). The ear was dressed with a mold formed of sterile cotton and Vase-
line petroleum jelly (Unilever) and a light pressure dressing over fluffs. This dressing was left on overnight and, in most cases, removed the following morning and replaced by a headband that was worn for 10 days.

Results

Cadaveric Study
A total of 4 cadavers (eight ears) were dissected. The first 2 ears were used to understand the various soft-tissue attachments of the lobule and their biomechanical behavior. In these first 2 dissections, the position and shape of the lobule were determined, and important soft-tissue attachments were identified. These included attachments to the cauda helicis, to the inferior aspect of the conchal bowl all the way to the antitragus, and in some cases to the transition to the mastoid bone. More importantly, soft-tissue attachments and insertions between the anterior and the posterior surface of the lobule maintained an important shape memory effect. Release of these insertions allowed for controlled correction of lobular deformities in 3 aspects: the angular axis, the coronal axis, and the inherent soft-tissue shape. Correction of the soft-tissue shape required a varying extent of dissection. Pronounced concavities of the lobule, and in some cases convexities, may require dissection of two-thirds of the length of the lobule.

In the remaining 3 specimens (6 ears) these findings were reproduced and confirmed. Moreover, the surgical techniques described herein were studied and modified in minor detail. These surgical maneuvers were found to allow for consistent correction of the lobule in all described aspects.

Surgical Technique in Clinical Practice
The described surgical modifications were integrated into our surgical routine over time. For the present study we reviewed the 12 most recent consecutive patients (operated on by the senior author, H.G.G.) available with at least 3 months of follow-up and photographic documentation. Inclusion criteria were as follows:
• Otoplasty and lobuloplasty performed
• Lobuloplasty performed using the fillet technique as described herein
• Follow-up for at least 3 months
• Preoperative and postoperative photographic documentation available
Details of the surgical and postsurgical period were extracted from the medical chart and the operative notes. These details included duration of surgery, any adverse effects, patient satisfaction, and surgeon satisfaction.

Among the 12 patients, follow-up ranged from 3 to 12 months. All patients and/or their parents were noted to be very satisfied with the result. Postsurgical results were also independently reviewed by a panel of noninvolved experts. These individuals were 3 medical students who evaluated the preoperative and postoperative photographs and rated the results on a 6-point visual analog scale (VAS) (1, very good; 2, good; 3, satisfactory; 4, unsatisfactory; 5, poor; 6, very poor). As presented in Figure 5A, the assessors were asked to rate preoperatively and postoperatively the overall global appearance. They were not informed about the surgical details, and they had no specialized interest in otoplasty.

Figure 5B represents the average preoperative and postoperative VAS score. The preoperative VAS score averaged 5.33 (range, 4-6). The postoperative VAS score averaged 1.25 (range, 1-2). Average duration of the otoplasty including lobule correction on both sides per patient was 104 minutes. Ten of 12 patients were admitted to the hospital and observed per routine. Two of 12 patients were treated in an outpatient setting. No complications were noted. No hematoma and no extensive swelling particularly of the lobule were observed or documented.

A, Protrusion evident in the coronal plane. B, Predominant protrusion in the axial plane. C, Protrusion of the remaining auricle, with inherent shape causing a concavity.
Lobuloplasty is regarded as a more difficult aspect of otoplasty. Ideal results are challenging to achieve because of various factors. First, a comprehensive and practical system of lobular analysis appears to be lacking. We believe that the system used in our study is simple enough for routine use yet comprehensive enough to guide the physician in selecting the appropriate surgical steps. It is important to address the 3 aspects of lobular deformity: axial angular protrusion, coronal angular protrusion, and inherent shape.

Discussion

Figure 2. Dissection Along the Inferior Conchal Bowl up to the Antitragus and Release of Soft-Tissue Attachments

Dissection allows for better control of the axial angular protrusion of the lobule by advancement of the posterior flap superiorly. A, Illustration; B, anatomic cadaver dissection; C, clinical intraoperative image.

Figure 3. Intraoperative Otoplasty Images of the Fillet Technique

Left panels are illustrations; middle panels, cadaver dissections; right panels, intraoperative clinical images. A, Suture dissection and transection of the lobular soft-tissue insertions via the fillet technique; the extent of this dissection may be modified intraoperatively as dictated by the deformity. B, After dissection, the anterior and posterior surfaces of the lobule may move and advance freely in relation to each other. C, Advancement of the posterior flap allows for correction of angular protrusion in both the axial and the coronal plane by anterior to posterior and superior to inferior advancement, respectively. Inferior to superior advancement also allows for effective correction of lobular concavity.
Second, lobuloplasty is challenging because the shape and position of the lobule is determined by soft-tissue attachments and not by bony or cartilaginous skeletal elements. Therefore, modification of the shape must rely on soft-tissue mass movements rather than repositioning of skeletal elements. The methods of analysis and correction described heretofore not have not completely accounted for this characteristic.4,6,7,9

We present an alternative technique that differs in important aspects from those previously described in the literature. The fillet technique described herein allows for complete release of all soft-tissue insertions that maintain the deformity. The lobule in its entirety is divided along its longitudinal axis into 2 halves, enabling a shearing movement in opposing directions. This movement can be adapted and controlled to allow for predictable repositioning of the lobule in all 3 dimensions: axial angular protrusion, coronal angular protrusion, and inherent shape.

This technique differs in important aspects from the lobular anchoring stitch described by Siegert.9 The Siegert method encompasses the placement of an absorbable mattress suture through the prominent soft-tissue edge of the lobule and the conchal bowl. It changes shape and position of the lobule with suture tension, but does not release the soft-tissue memory of the lobule along its entire length or allow for rearrangement of the lobular soft tissues to alter its inherent shape.

We believe that the fillet technique adds versatility over established techniques. It allows for control in all 3 dimensions (axial, coronal, and inherent shape). The degree of soft-tissue release may be adapted in a “cut as you go” manner until all relevant soft-tissue memory has been released. The suture subsequently placed only serves the purpose of immobilizing the lobule in the new position until this position is fixated by scar tissue. No tension is applied to the suture material, and fine, quickly resorbable suture material is sufficient for this purpose.

Conclusion

The authors recommend the newly described technique for correction of lobular deformities. The described technique must be based on comprehensive anatomic analysis, which includes the analysis of the angles of protrusion in both the coronal and the axial plane as well as analysis of the inherent shape of the lobule.
Three New Awards for American Academy of Facial Plastic and Reconstructive Surgery Members

Research provides the foundation on which clinical advances occur. This is true for facial plastic surgery, just as it is for other clinical specialties. Today, our journal is an important conduit for communicating advances in both basic science and clinical research in facial plastic surgery. Still, we recognize that we need to do more, and we have asked our readers to commit to doing 1 quality research project per year (Larrabee WF Jr. More science—please. Arch Facial Plast Surg. 2008;10(1):8. doi:10.1016/j.archfac.20076).

The importance of research has been recognized by the American Academy of Facial Plastic and Reconstructive Surgery (AAFPRS) as well. The AAFPRS Research Center, made possible through the successful efforts of the Many Faces of Generosity Capital Campaign, is pleased to announce 3 exciting new awards for AAFPRS members. The Research Center Committee (RCC) was created by Capital Campaign directors Jonathan Sykes and Vita Quatela with the intent to create funding mechanisms that would support academic training in the principles of clinical research design, research management, and statistical analysis. The RCC leaders (Sam P. Most, chair; Lisa Ishii, subcommittee chair; and Benjamin Marcus, subcommittee chair), as well as members Michael Brenner, Patrick Byrne, Steven Dayan, Paul Leong, Amir Moradi, Mary Lynn Moran, Michael Sullivan, and Brian Wong, all participated in the vision, design, and creation of the awards.

These awards will provide a resource for members to further their training in conducting research, funds to expand research efforts, and opportunities for members and industry to collaborate in discovery. These new awards consist of 2 grant mechanisms and 1 scholarship:

1. The Research Scholar Award
2. The AAFPRS Clinical Investigation Award
3. The Facial Plastics Clinical Research Scholarship

The largest of the awards, The Research Scholar Award, is a $30 000 grant that will be awarded annually and is potentially renewable for an additional 2 years. The Research Scholar Award will be awarded to the candidates who demonstrate the potential to make an important contribution to the profession of facial plastic and reconstructive surgery and then make meaningful contributions to the field. It could be ideal as seed funding for an investigator or as seed funding for an investigator building a new research program. This award will be evaluated through the American Academy of Otolaryngology–Head and Neck Surgery Centralized Otolaryngology Research Efforts (CORE) grant review process, in the manner similar to prior AAFPRS awards, such as the Bernstein grant.

The AAFPRS Clinical Investigation Award will be awarded for smaller projects as a grant of $2500. This mechanism is intended for investigators who may not routinely participate in research projects but have smaller project ideas with the promise of contributing to the field. These grants are meant to foster continued scientific contribution from members and will be offered twice a year, in July and January. The applications for this award will be reviewed and selected for funding by members from the RCC, with the opportunity to fund multiple grants at each cycle.

Understanding that sound research methodology leads to meaningful discovery, The Facial Plastics Clinical Research Scholarship was designed to support members who wish to receive formal clinical research training. This $15 000 award will allow recipients to study clinical research design, data management, statistical analysis, and manuscript and grant preparation through an approved program of their choice. While some applicants may choose to pursue training in a degree program, others may desire a shorter certificate program. The award will be administered directly to the recipient’s institution of choice to be applied for tuition. The Center will maintain a list of recommended programs, although applicants are welcome to present opportunities they identify independently. Applications for the award will be reviewed by the Research Center Committee members, who may approve more than 1 scholarship based on the annual budget for the Research Center. In addition, an individual may receive the scholarship for 2 years in a row for a 2-year degree program.

In summary, the RCC is excited to present these 3 new awards to members. They are valuable opportunities that will enhance the specialty by supporting scientific training for our future leaders and by providing additional funding options in an era of shrinking government resources. While the Research Scholar Award application process will follow the CORE grant timeline, with application acceptance beginning in December 2013, applications for the Clinical Investigator Award and the Clinical Research Scholarship will be accepted beginning January 2014.

Soon we will be celebrating the first 50 years of the AAFPRS. During this time, we have seen incredible growth of our academy. With the Research Center, we hope to not only sustain our growth, but also to ensure that we continue to be innovators in clinical and basic science in facial plastic surgery.