

Rhinoplasty is one of the oldest and most commonly performed facial plastic surgery procedures. It is an operation performed by surgeons of all skill levels with different training backgrounds. As such, it is easier to group all such surgeons who perform this operation into the category of "rhinoplastic surgeons."

No matter what the background or skill level of the rhinoplastic surgeon, most will undoubtedly agree that rhinoplasty is a relatively difficult operation to grasp early on in one's career during residency and that it takes years to gain mastery of the nuances of the procedure. One gains a true sense of the intricacies of the operation after studying the work of the various surgeons who have dedicated their entire careers to this operation. To hear these giants in the field admit humility and see how they have learned from and fine tuned their results after 30 years or more of experience is an opportunity not to be missed or taken lightly.

Even after years of training and years of fine tuning technique, at times each surgeon will encounter a difficult nose or end up with results that are less than satisfactory to the patient or surgeon. Just as a less-than-harmonious unoperated nose attracts undue attention and may have an adverse psychosocial effect on a patient, an operated nose, even when greatly improved from the presurgical state, is placed under scrutiny by the patient, the likes of which were not present preoperatively. Every subtle irregularity is now highlighted and noticed.

When encountering subtle irregularities or imperfections in the immediate postoperative period, whether our own patient or a patient operated on by a colleague, the initial prudent technique is that of patient education and patience. Seldom can an operated nose be improved by haste in the healing period.

For a variety of reasons, a surgeon may need to operate on a nose that has been operated on previously, either by the same surgeon or another. Often, this may be the third or fourth operation, making the term "revision rhinoplasty" possibly more descriptive than the commonly used term, "secondary rhinoplasty." A variety of reasons contribute to the need for revision rhinoplasty. These include, but are not limited to, poor surgical planning, improper technique, underresection or more commonly overzealous reduction rhinoplasty, very thick or very thin nasal-soft tissue envelope, insufficient nasal framework, unpredictable healing,

inadequate surgeon and patient preoperative communication, unrealistic patient expectations, or traumatic injury to the previously operated nose.

Revision rhinoplasty introduces a new series of challenges for the facial plastic surgeon. Variable degrees of scarring, loss of nasal support mechanisms from aggressive reduction rhinoplasty, and lack of adequate septal cartilage for rebuilding, are only some of the obstacles a surgeon may face venturing back into a previously operated nose. The use of auricular cartilage or other suitable building blocks, such as rib cartilage, irradiated cartilage, Gore-Tex Subcutaneous Augmentation Material (GORE S.A.M., W. L. Gore & Associates, Inc., Flagstaff, AZ), AlloDerm (LifeCell, Branchburg, NJ) or other acellular tissue, and other alternatives to autogenous septal cartilage are also more common than in primary rhinoplasty. However, even in secondary rhinoplasty, allografts should be used as an alternative rather than a substitute for the more preferred autografts.<sup>1</sup> A graft material not commonly used but worth consideration is autologous dermal graft especially for patients concerned about the potential of prions and other small infectious particles possibly associated with cadaveric tissue.<sup>2</sup>

Preoperative planning, including in-office patient exam and counseling, is a crucial investment of time. We cannot stress enough the importance of "imaging." This is an opportunity for the surgeon and patient each to communicate visually their respective goals for the operation. This technology also allows the surgeon to show the possible limitations of the operation with respect to each patient's anatomy through the use of morphing software. The office consult provides a forum for the discussion of possible implant choices. The recovery room is not the ideal place to inform a patient that he or she now has a foreign or cadaveric implant if this possibility had not been previously addressed with the patient. Yet each patient must be aware that it is usually after entering the nose that the surgeon can properly evaluate what was previously done and what further needs to be done to correct the problem. The columellar incision must also be mentioned to the patient. More often than not, major revisions, especially of the lobule, will necessitate an external approach, whereas other problems may be approached through an endonasal technique for pocket grafting, alar retraction correction, or dorsal refinement.

## ■ Special Problems

The problems requiring revision rhinoplasty can be categorized in relation to the anatomic site as well as the types of aesthetic and functional defects commonly seen. Common areas to address include the pyramid, lobule, and airway. Most of these issues can be attributed to errors of “omission” or errors of “commission.” We define errors of “omission” as those maneuvers that needed to be done and were not in the previous surgery. On the contrary, errors of “commission” are those maneuvers that were not necessary in the previous surgery or were done too aggressively, leaving the nose usually destabilized with an overoperated appearance. In this chapter, we will present the most common reasons for revision rhinoplasty in our practice and offer some time-tested solutions to add to your surgical armamentarium.

### Errors of Omission

Errors of omission most commonly include inadequate tip refinement, dorsal hump reduction, or pyramid narrowing. A nose that is still overprojected or underrotated is yet another example of this error. These problems are easy to address and require completion of the maneuvers that were either done too conservatively in the previous operation or not done at all (**Fig. 20-1**).

Here and elsewhere throughout this chapter, you will appreciate that the first step in correction of any nasal deformity, whether primary or revision, is the appropriate diagnosis of the internal structural variations leading to the external aesthetic or functional abnormality. As in any area of medicine and surgery, diagnosis is the initial, crucial step. The good rhinoplasty surgeon studies each nose, diagnoses the problem, and offers a tailored solution. Far too frequently, surgeons learn a “standard” rhinoplasty operation and apply the same series of maneuvers to each nose, regardless of the problem at hand and the subtle

individual variations in anatomy. Without the appropriate diagnosis, the proper surgery cannot be performed.

### The Overprojected Tip

There are multiple causes of an overprojected tip and hence multiple techniques for addressing this problem. These techniques include excess length of the caudal septum, long lower lateral cartilages, a “hanging” or underrotated tip giving the appearance of overprojection, and previously excessive augmentative use of tip grafts. It is crucial to realize the aesthetic relationship between tip projection and rotation and how each surgical maneuver may affect one or both. Our first choice for deprojection is a complete transfixion incision, disrupting nasal tip support mechanisms. The second maneuver would be appropriate resection of the caudal septum. If further deprojection is needed, the Lipsett technique is used; we use 6.0 PDS sutures for this purpose. This technique involves transection of the medial crus of the lower lateral cartilage somewhere between its upper and middle third, followed by overlapping and suturing to shorten the medial crus of the lower lateral cartilage. In addition to deprojection, this maneuver creates derotation. Although usually done bilaterally, the Lipsett technique can be done unilaterally to correct tip asymmetries. The original description by Lipsett did not include suture stabilization, but we believe given the contracture caused by healing, suturing allows for more predictable results.<sup>3</sup>

### The Underrotated Tip

To increase tip rotation, an inverted triangular wedge of caudal septum may be resected. This procedure will also decrease projection, as hinted at previously, and must be taken into account. Lateral crural flap is also a useful technique, which provides deprojection as well as rotation. This technique involves elevation of vestibular skin and mucosa at the lateral crus of the lower lateral cartilage somewhere between the middle and lateral third followed by division, overlay, and suture stabilization using 5.0 Monocryl sutures. Our technique is a modification of the one described by Kridel in 1991.<sup>4</sup>

Furthermore, it is important to understand that cephalic trim allows for rotation, which is enhanced by domal sutures. Proper placement of a columellar strut also pushes on the medial crus of the lower lateral cartilages and enhances rotation and provides support to the tip. More dramatic tip rotation may be achieved by releasing connections between the lower lateral cartilages (LLC) and the caudal and dorsal septum and resuturing the LLCs in a more rotated position.

### Errors of Commission

Unfortunately, these errors of commission are the more common problems encountered in our practice. It is not uncommon to find a mixture of problems, which combine



**Figure 20-1** “Undersurgery” by another surgeon resulted in a classic pollybeak deformity, which was corrected mainly through completion of dorsal cartilage resection. **(A)** Preoperative and **(B)** postoperative photos.

errors of omission as well as errors of commission. Many of these problems are caused by a combination of factors commonly involving aggressive reduction rhinoplasty with destabilization of the nose, as well as inadequate resection in certain areas, making the proper diagnosis challenging. For example, a nose with saddle deformity may be caused by overresection of the bony dorsum, underresection of the cartilaginous supratip, or both.

### Pyramid Abnormalities or Irregularities

The problems usually encountered in this part of the nose include dorsal ridges or visible “humps,” which commonly show up after several months once the nasal edema has subsided, highlighting irregularities that were not addressed initially, or grafts placed intraoperatively, which now show through migration or through thin skin not recognized previously. The treatment of such problems is straightforward and can be done through an endonasal approach with direct shaving of cartilage or use of rasps in addition to crushed cartilage as camouflage “onlay.” Here, thin strips of GORE S.A.M, AlloDerm, or other noncellular dermal matrix, may be used in a patient with thin skin for camouflage and thickening. Nasal fibrofatty tissue or “soft tissue” is also an invaluable contouring tool found usually in abundance in the form of scar in a previously operated nose.

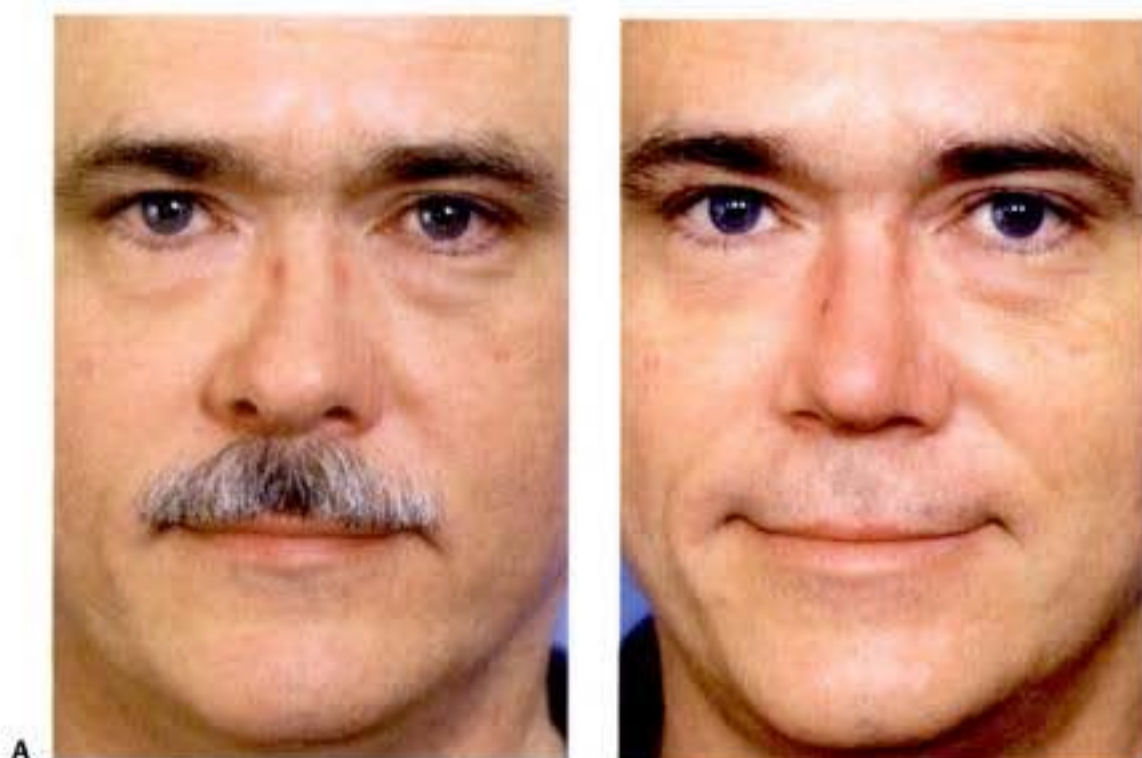
Improper width or asymmetrical nasal bones are the next common dorsal abnormalities requiring attention. The flared nasal bones or wide dorsum is easy to correct with osteotomies. Medial fading osteotomies in combination with lateral osteotomies are the most common technique used by the rhinoplasty surgeon to narrow the nasal width. A nose previously treated with osteotomies can often be remanipulated using firm bimanual pressure.

The treatment of the overly narrow dorsum, as well as open roof deformity dictates the use of spreader grafts or onlay grafts (**Fig. 20–2, Fig. 20–3**). This deformity is commonly

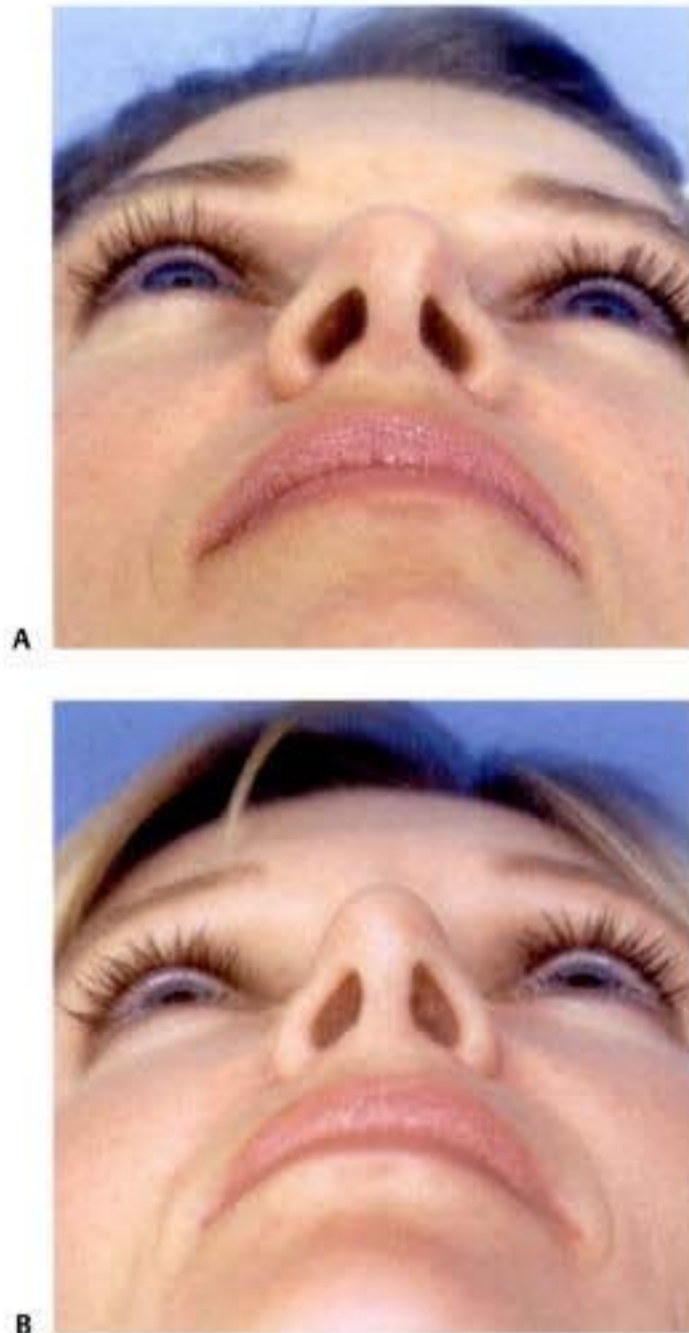
the result of upper lateral cartilage retraction, which usually can be prevented by judicious dorsal height reduction with identification of different bony and cartilaginous components, and stepwise reduction of each offending component as well as identification of the need for spreader grafts during the primary operation. Rohrich actually described this technique in a five-step method.<sup>5</sup> We prefer meticulous separation of the upper lateral cartilages from the dorsal septum followed by placement of fashioned spreader grafts. Two 30-gauge needles may be used to hold the grafts in place while 5.0 Monocryl sutures are used in a mattress fashion to secure the grafts. Crushed or morselized cartilage grafts may be used for dorsal width augmentation and camouflage. In the event no cartilage is available, GORE S.A.M. or AlloDerm may be substituted for this purpose. Proper osteotomies are also crucial in closing an open roof deformity in a nose with previous bony dorsal hump reduction where the surgeon failed to bring the nasal bones together.

Occasionally, a double, or intermediate, combined with a lateral osteotomy or even an external transverse root osteotomy may be necessary to correct a deviated or crooked nasal pyramid. It has been shown that the puncture sites for external osteotomies are very cosmetically acceptable.<sup>6</sup>

The treatment of the deviated nose is one of the most challenging aspects of nasal surgery. Often the bony skeleton requires multiple osteotomies as mentioned earlier, but proper correction requires evaluation of the cartilaginous framework as well. Middle vault straightening is crucial to straightening the nose. Correction of asymmetries here with reduction, augmentation, or spanning sutures may be necessary. The proper correction of a crooked pyramid also may require evaluation of the septum's contribution to the deformity with resultant septoplasty and septal cartilage scoring. In certain revision noses, this may be feasible only through an external approach from above. Unilateral spreader grafts are also viable options in straightening the crooked nose, as are onlay grafts (**Figs. 20–2, 20–3**).



**Figure 20–2** Narrow asymmetric dorsum corrected using spreader and onlay grafts. (A) Preoperative and (B) postoperative photos.

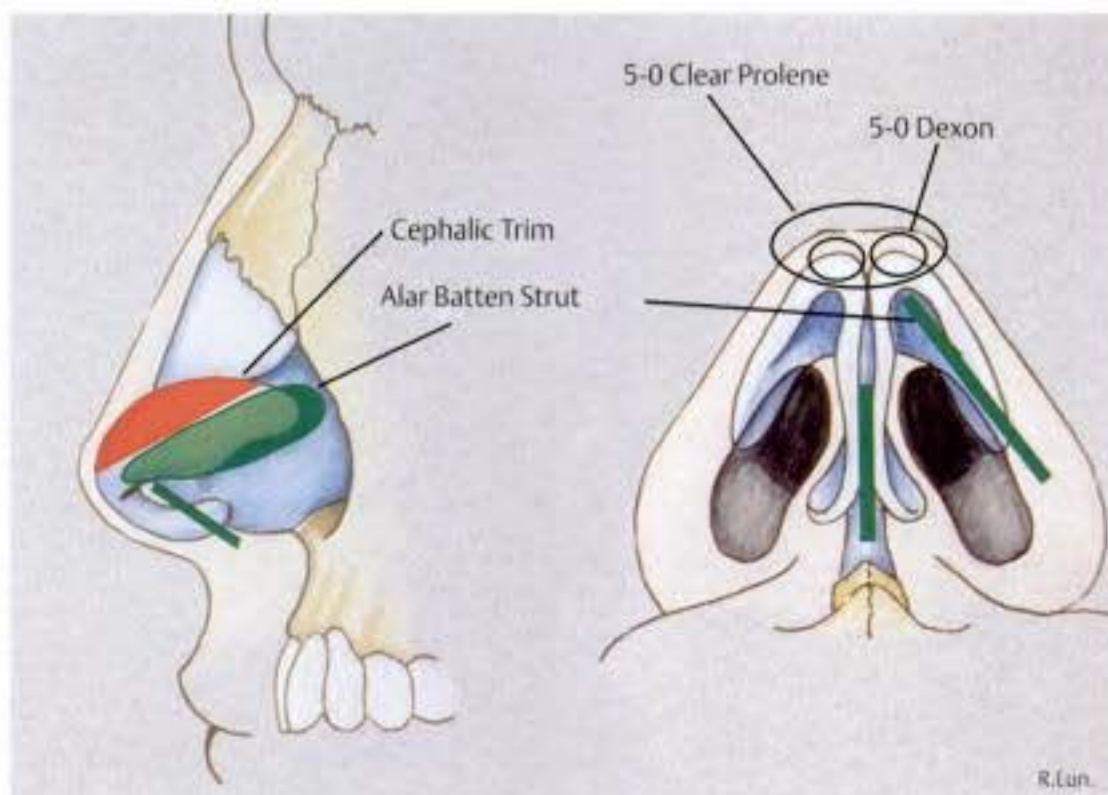


**Figure 20-6** Alar collapse corrected with alar strut and batten grafts. **(A)** Preoperative and **(B)** postoperative photos.

However, often given the findings encountered in a revision nose, such as hostile scar tissue and inadequate lower lateral cartilages, the best approach is the “back to basics” approach. This involves rebuilding of the cartilaginous support scaffolding of the nose from the ground up (**Fig. 20-7, Fig. 20-8**). The rhinoplasty surgeon must be comfortable with nasal anatomy and be able to use septal, auricular, or rib cartilage, in addition to other materials, to recreate the tip architecture. Once the major support mechanisms are restored, fine tuning can be done with a variety of grafts or minor reductive shaves or augmentative onlays and grafts. Dorsal augmentation, infratip lobule grafts, single- and double-layer shield grafts, “cap” grafts, Peck grafts, “blocking” grafts, and excision of posterior caudal septal angle, to name a few, are all techniques that must be learned well and considered in such situations. In more severe cases, the dynamic adjustable rotation tip technique with the use of spreader grafts or a dorsal onlay graft combined with a columellar strut in a cantilever technique may be a viable option (**Figs. 20-9, 20-10**).<sup>12</sup> In yet more radical situations, the use of GORE S.A.M. and other synthetic material may be required. We do not use calvarial bone. Occasionally, in a severely retracted nose, the limiting factor will be the pliability of the skin and soft tissue envelope. In some cases, the surgeon may discuss with the patient the possible need for total nasal reconstruction with the use of paramedian forehead flaps.

## Summary

Entering a previously operated nose brings with it a long list of challenges as well as the satisfaction of completing an often mentally tasking procedure. The first requirement for success is the proper diagnosis of the aesthetic



**Figure 20-7** Nasal diagram showing graft placement.



**Figure 20-8** Short, overrotated nose with severe scarring corrected using total lobular reconstruction techniques. **(A)** Preoperative and **(B)** postoperative photos.



**Figure 20-9** Total lobular reconstruction. Notice use of grafts to replicate the shape and structure of lower lateral cartilages.

and functional problem at hand. Even minute cartilage, bony, and soft-tissue asymmetries will become present down the line and may bother the patient and the surgeon. Although diagnosis is the first step, each surgeon must have a variety of techniques available to address each diagnosed problem. With such a combination approach and respect for the nasal tissue, good operative results may be expected.

Surgeons benefit from being comfortable with the external approach, as well as the variety of endonasal approaches. Many of the techniques discussed here are commonly used in the complicated primary rhinoplasty as well. What each facial plastic surgeon must be able to rely on is the back-to-basic approach. When all else fails, do not be afraid to take the nose, the scar tissue, and whatever remnant cartilage apart and build from the ground up. This is the essence of being able to properly revise a previously operated nose.

Also, make all the minor adjustments as needed as you see them at the time of the operation. Chances are if some minor detail bothered you during the case but you "let it go," with time and resolution of edema, this annoyance will



**Figure 20-10** Demonstration of dynamic adjustable rotation tip technique using two spreader grafts and a columellar strut graft.

be further highlighted and may distract you and the patient from appreciating an otherwise great surgical result.

## References

1. Rokade AV, Hughes K. Outcome of GORE-TEX implants in augmentation rhinoplasty. *Otolaryngol Head Neck Surg* 2004;131:81.
2. Erdogan B, Tuncel A, Adanali G, Deren O, Ayhan M. Augmentation rhinoplasty with dermal graft and review of the literature. *Plast Reconstr Surg* 2003;111:2060-2068.
3. Lipsett E, New A. Approach to surgery of the lower cartilaginous vault. *Arch Otolaryngol* 1959;70:42-47.
4. Kridel RW, Konior RJ. Controlled nasal tip rotation via the lateral crural overlay technique. *Arch Otolaryngol Head Neck Surg* 1991;117:411-415.
5. Rohrich RJ, Muzaffar AR, Janis JE. Component dorsal hump reduction: The importance of maintaining dorsal aesthetic lines in rhinoplasty. *Plast Reconstr Surg* 2004;114:1298-1308.
6. Hinton AE, Hung T, Daya H, O'Connell M. Visibility of puncture sites after external osteotomy in rhinoplastic surgery. *Arch Facial Plast Surg* 2003;5:408-411.
7. Hanasono MM, Kridel RWH, Pastorek NJ, Glasgold MJ, Koch RJ. Correction of the soft tissue pollybeak using triamcinolone injection. *Arch Facial Plast Surg* 2002;4:26-30.
8. Constantian MB. Indications and use of composite grafts in 100 consecutive secondary and tertiary rhinoplasty patients: Introduction of the axial orientation. *Plast Reconstr Surg* 2002;110:1116-1133.
9. Kridel RWH, Yoon PJ, Koch J. Prevention and correction of nasal tip bossae in rhinoplasty. *Arch Facial Plast Surg* 2003;5:416-422.
10. Kridel RW, Konior RJ, Shumrick KA, Wright WK. Advances in nasal tip surgery. The lateral crural steal. *Arch Otolaryngol Head Neck Surg* 1989;115:1206-1212.
11. Goldman IB. The importance of the mesial crura in nasal-tip reconstruction. *Arch Otolaryngol Head Neck Surg* 1957;65:143-147.
12. Dyer WK II, Yune ME. Structural grafting in rhinoplasty. *Facial Plast Surg* 1997;13:269-277.