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Free Auricular Composite Graft for Acquired Nasal Stenosis

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Background: Acquired nasal stenosis poses a reconstructive challenge for the facial plastic surgeon. Many surgical options are available, ranging from primary closure to skin grafts to free flap reconstruction for complex defects. The free auricular composite graft is a single-stage procedure that can be used to repair nasal vestibular stenosis causing nasal obstruction.

Case Report: We present the case of a patient with acquired nasal stenosis as a result of prolonged nasal tampon placement secondary to severe epistaxis and subsequent nasal vestibular infection. Repair via auricular composite graft was successful, and we provide a thorough explanation of graft design and operative technique.

Conclusion: Free auricular composite grafts can produce desirable functional and aesthetic outcomes and should be considered in patients presenting with acquired nasal stenosis.

Keywords: *Free tissue flaps, graft survival, nose deformities–acquired, nasal obstruction, surgery–plastic, tissue transplantation*

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INTRODUCTION

Nasal stenosis has various etiologies, among which are infection, burns, and iatrogenic procedures. Congenital nasal stenosis is rare. Acquired stenosis is a result of the loss of vestibular lining because of scar contracture or direct injury to the lobule-ala-columella complex.[1,2] Nasal stenosis results in decreased efficiency in nasal breathing and loss of nasal symmetry.[3]

The purpose of reconstruction is to restore the functional and aesthetic effects of the nostril.[4] The contours of the lower nose contain convex and concave shapes in proximity, creating a challenging canvas for reconstruction. Surgeons often select their method of reconstruction based on experience and known outcomes.[5] Many surgical techniques have been used to treat nasal stenosis including stents, flaps, and grafts. The common steps involve removing the obstructing scar tissue, replacing it with new lining, and preventing restenosis.[2] We present the case of a patient with acquired nasal stenosis treated with auricular composite graft reconstruction, explain the risks and benefits of the composite graft, and discuss alternative options.

CASE REPORT

A 74-year-old female presented to the facial plastic surgery clinic with a concern of a 4-month history of left-sided nasal obstruction. Prior to the visit, she had experienced severe left-sided epistaxis requiring nasal packing with a 7.5 anterior-posterior Rhino Rocket (Shippert Medical Technologies Inc.). The Rhino Rocket remained in place for 5 days. After successful removal of the packing, the patient developed intranasal crusting that was debrided and treated with numerous ointments and antibiotics. Cultures at that time grew *Pseudomonas aeruginosa*. She was otherwise healthy, without significant medical, surgical, or family history. She was a former smoker but had quit 30 years prior to presentation. Examination demonstrated scarring and stenosis at the base of the left intranasal vestibule (Figure 1A). No sign of intranasal infection was visible on nasal endoscopy. The right nasal vestibule was widely patent. The patient was scheduled for elective repair of the nasal vestibular stenosis.

In the operative suite under general anesthesia, the donor and recipient sites were infiltrated with 1% lidocaine with epinephrine. Surgical incision allowed full-thickness removal of the left vestibular scar (Figure 1B). The defect was carefully measured, and a composite auricular graft was harvested from the patient's right cymba concha (Figure 2A). The composite graft consisted of full-thickness anterior auricular skin and cartilage. The donor site was closed with 4-0 MONOCRYL (Ethicon US, LLC) sutures in a simple interrupted fashion (Figure 2B). The composite graft was trimmed to fit the defect. The graft was then gently inserted into the recipient site. The native nasal skin was reapproximated with the composite graft skin with 4-0 chromic sutures in a simple interrupted fashion (Figure 2C). Final

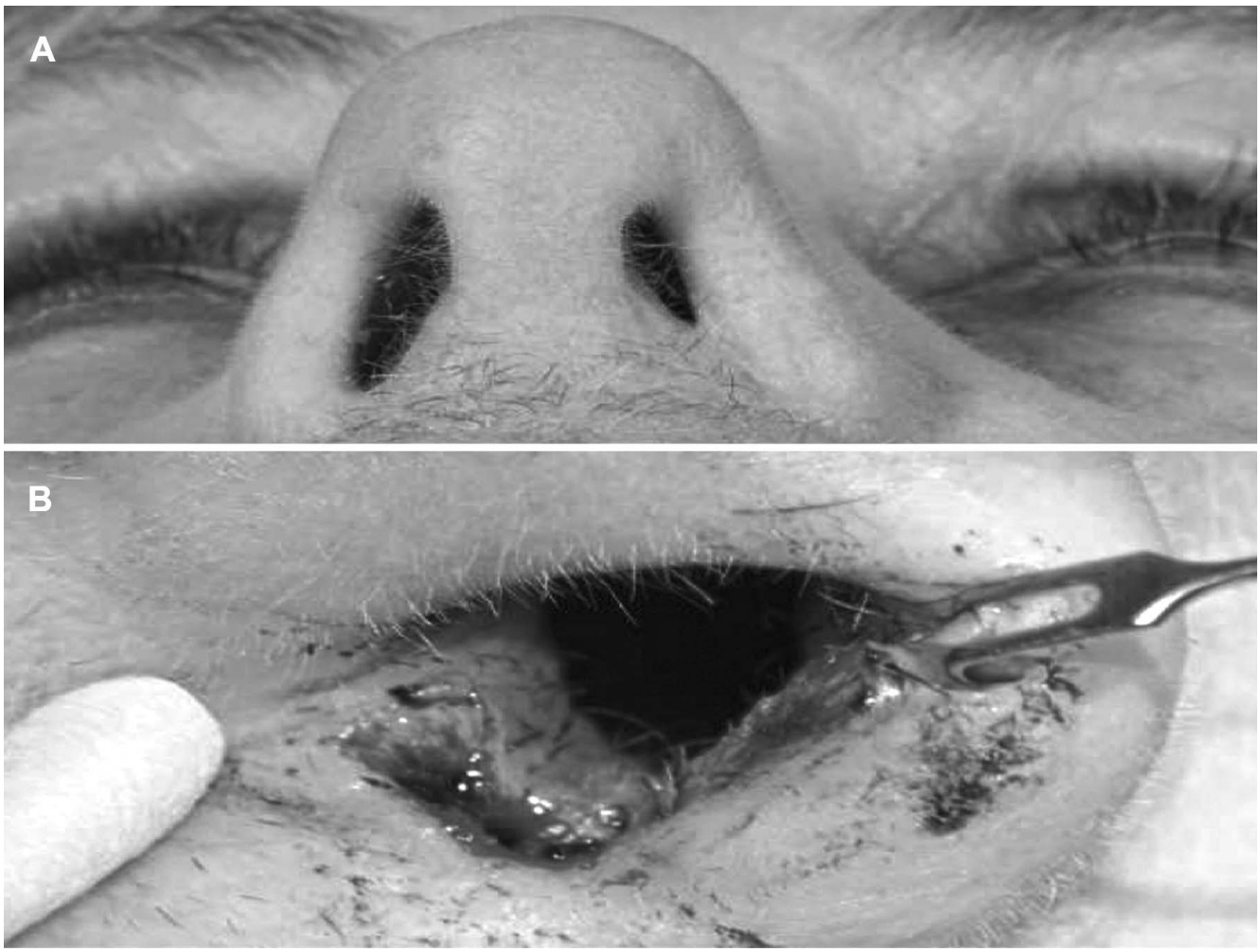

Figure 1. A: Left acquired nasal stenosis from anterior-posterior Rhino Rocket placement and vestibulitis. B: Full-thickness excision of left vestibular scar.

closure camouflaged all incisions well. The defect was repaired completely from both functional and aesthetic viewpoints (Figure 2D).

The patient returned for follow-up appointments at 1 week, 1 month, and 3 months postoperatively, demonstrating 100% graft acceptance with good color and viability. The patient reported marked improvement in nasal obstruction (Figure 3). She denied pain and cosmetic deformity at the donor and recipient sites.

DISCUSSION

Nasal stenosis presents a challenging clinical and surgical dilemma. Acquired nasal stenosis has an array of etiologies. Infection from bacterial vestibulitis or herpes zoster virus has been documented to result in nasal stenosis because the anterior nasal mucosa becomes scarred and then contracts. Iatrogenic causes include nasogastric tube placement, nasotracheal intubation, poor surgical technique, and cauterization of nasal mucosa, all of which can result in narrowing of the nasal aperture.[6] Systemic diseases such as Behçet disease have been documented to cause nasal stenosis. Burns are another common etiology. Stenosis can also result from direct injury to the lobule-ala-columella complex or loss of healthy vestibular lining.[7] Congenital nasal stenosis is a rare clinical entity. Nasal stenosis results in decreased efficiency in nasal breathing as well as a loss of symmetric nostrils, affecting quality of life.

The overarching themes of repairing acquired nasal stenosis are to excise the obstructing cicatrix; replace the scar tissue with a new, healthy lining; and stent the nostril to prevent restenosis.[7] Often, surgery requires multilayer reconstruction because skin, skeletal support, and nasal lining are excised to prevent stenosis recurrence.

Various strategies have been developed depending on the severity of stenosis and degree of reconstructive complexity. Simple small defects can be left to heal by secondary intention. Small defects in an alar groove or perpendicular to the nasal rim can be closed primarily. Full-thickness and split-thickness skin grafts are another viable option if the defect is not full thickness, but these grafts are infrequently used in isolation because of postoperative contraction and a lack of underlying support.

Local flaps present another option. An intravestibular Z- or W-plasty involves excising the existing scar and creating multiple flaps that interdigitate to provide epithelial coverage.[8] These flaps provide healthy, vascularized tissue but result in additional rearranged scarring that can be bulky.

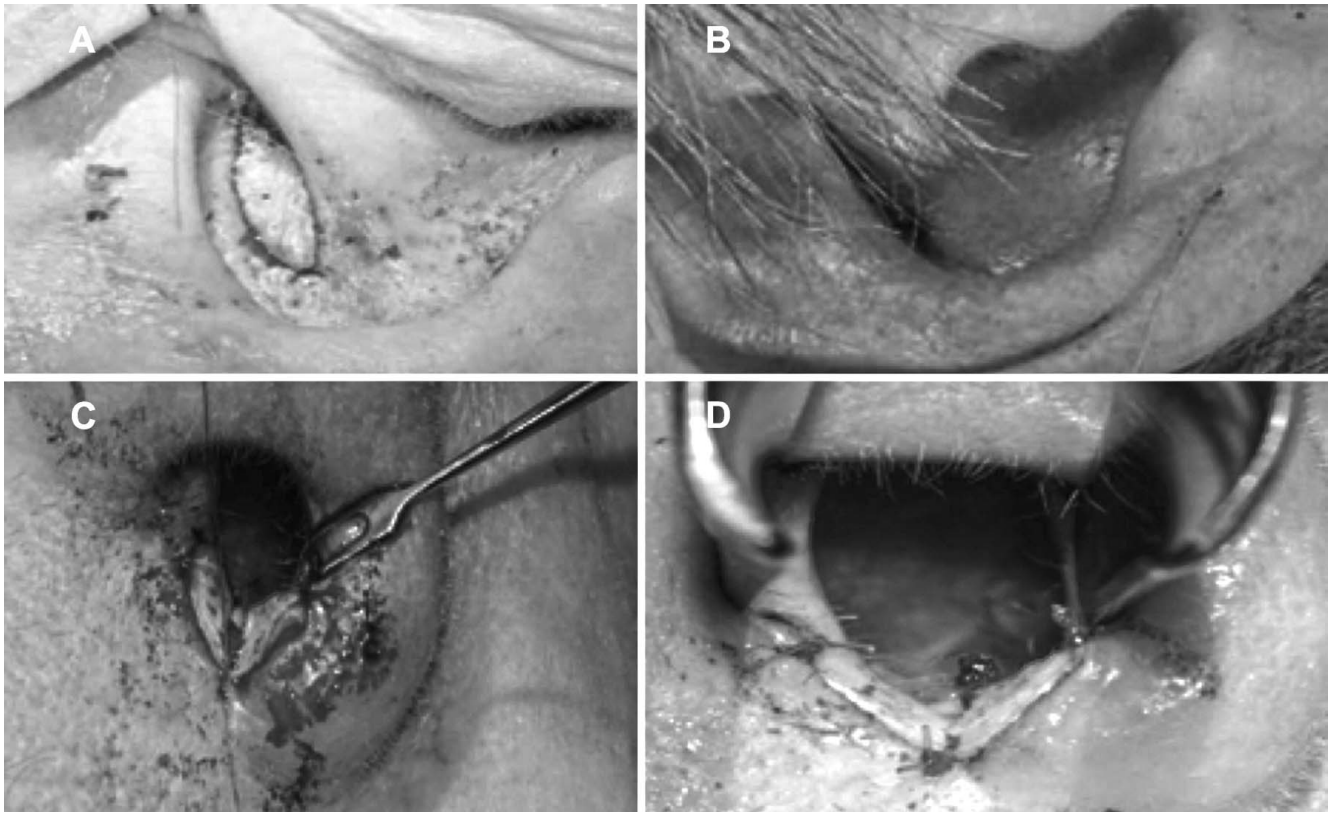

Figure 2. A: Right auricular composite graft harvest. B: Inconspicuous donor site scar. C: Insetting the auricular composite graft into the recipient site. D: Intraoperative view of the repair of vestibular stenosis with graft in place.

Yamawaki reported 2 cases in which a local para-alar crescentic subcutaneous pedicle flap was used to correct severe anterior nasal stenosis, thus avoiding the need to harvest cartilage.[1] The paramedian forehead flap is another option with its robust and reliable blood supply via the supratrochlear artery and minimal comorbidity at the donor site. However, the 2-stage procedure, flap contraction, and distortion of initial symmetry can minimize the paramedian forehead flap's desirability. Other authors have argued for conservative management of nasal stenosis with serial stenting.[3] Stenting creates a longer columella, improves nasal tip projection, and increases the 3-dimensional size of

Figure 3. At 1 month postoperatively, the patient demonstrated 100% graft acceptance with good color and viability and reported marked improvement in nasal obstruction.

the lobule. Drawbacks to stenting include ulcers, skin abrasion from adhesive tape, prolonged use of nasal stenting, and low compliance.

Auricular composite grafts include skin, subcutaneous tissue, and cartilage that are harvested en bloc. Frequently, they are used for full-thickness defects of the lower one-third of the nose.[6] Auricular composite grafts are ideal for nasal reconstruction because auricular tissue is autologous and has natural contours that fill the convexities of the nose, providing valuable structural support. These grafts are elastic with a high degree of memory; have a good color and texture match to the nose; and contract minimally, reducing distortion and restenosis postoperatively.[4] The composite graft is harvested at the time of scar excision for a single-stage repair and reconstruction. Donor site morbidity is minimal; the graft harvest site is frequently closed primarily, resulting in an inconspicuous scar.[9]

A limitation of auricular composite grafts is the unpredictable survival of the graft. Consequently, this technique should be avoided in patients who smoke and in patients who have a history of radiation to the area, systemic diseases, or diseases such as diabetes that affect small vessels.[10] To avoid necrosis, the graft needs to be approximately 1 cm in length. Infection and chondritis are rare complications. Additionally, a second surgical wound creates a risk for donor site morbidity.[9] However, perioperative and postoperative use of steroids may improve graft survival.[10] Additional studies with hyperbaric oxygen are necessary to determine its effectiveness in improving graft survival.[10]

In patients with acquired nasal stenosis, the auricular composite graft is a reasonable option to achieve nasal patency. The technique results in good to excellent functional and aesthetic outcomes with minimal morbidity. An auricular composite graft is a vital tool in the armamentarium of the facial plastic surgeon when presented with a patient with acquired nasal stenosis.

CONCLUSION

Acquired nasal stenosis is a complex clinical entity. Addressing it requires a deep understanding of nasal anatomy. In select patients, an auricular composite graft is invaluable because it contracts minimally, provides critical structural support, and can be harvested in a single-stage procedure. In our case, the use of a free auricular composite graft led to high patient satisfaction and resolution of nasal stenosis.

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