The advantages of external rhinoplasty approach

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ABSTRACT

Background: The external rhinoplasty approach is one of the methods in nasal surgery. The external approach can be advantageous by offering better exposure to a small surgical field. This approach allows the surgeon to better diagnose the deformity through inspection, to better execute certain maneuvers, and to teach and learn the operation with greater ease. A conspicuous columellar scar is regarded as an inevitable consequence of the external rhinoplasty approach. Purpose: The purpose of this case report was to present the technique and indications for its use. Case: Several nasal deformity cases, such as septal deviation, congenital deformity, tumor and cosmetic reason, which underwent external rhinoplasty approach were discussed in this paper. Case management: External rhinoplasty approach was performed to manage those nasal deformity cases. Conclusion: External rhinoplasty approach could be employed for various cases of nasal deformity.

Key words: external rhinoplasty approach, columellar scar, nasal deformity

ABSTRAK

INTRODUCTION

The ultimate long-term aesthetic and functional results in rhinoplasty are related to the surgical maneuvers performed on the supportive structures of the nose and how healing process and scar contracture affect these structures. Different surgical approaches will provide differing degrees of exposure that may affect the diagnostic capabilities and accuracy of the surgical maneuvers performed. For more than two decades, it has been a continuing debate on external versus endonasal approach rhinoplasty. The forums implied that one approach is superior to the other. Selection of the approach should depend on the severity of the nasal deformity, objective of the surgery and the experience and preference of the surgeon.1,2

The external or open rhinoplasty approach is an old technique. Circa 600 BC, an external nasal surgery was reported being performed in India. The new era of open rhinoplasty began in 1934, when Rethi introduced the transcolumellar incision as an access to the tip. Anderson et al (1981) and Wright and Kriedel (1982) began to use this approach and were increasing the popularity of the approach in United State. Since that time the external rhinoplasty approach has become more popular and is considered as a standard approach to the nasal structures.1,3,4

The external rhinoplasty approach provides maximal exposure of the upper and lower lateral cartilages for the benefit of diagnosis and execution of surgical maneuvers. The usages of this approach include the cases that require extended surgical exposure for diagnostic or technical reasons.1,3,4

The purpose of this paper is to present the technique and indications of external rhinoplasty.
Surgical anatomy of the nose

The external nose could be separated into several anatomic components. Four major parts of the external nose are bony pyramid, cartilaginous pyramid, lobule and soft tissue areas. One third of the external nose is comprised of bony pyramid, cartilaginous pyramid and lobule.6,7

Soft-tissue covering of the nose

Skin

Skin thickness is one of the most important features to be assessed preoperatively in planning rhinoplasty. The skin tends to be thinner and more mobile in the upper half of the nose and thicker and more adherent distally. There are usually more sebaceous glands in the lower half of the nose, causing an oiliness and thickness in the skin that may limit tip definition. This is frequently true in the non-Caucasian nose, which may have a larger subcutaneous dense fibro-fatty layer than the Caucasian nose. The skin is usually thinner along the alar margin and in the columella.8

Subcutaneous layer

The soft tissue intervening between the skin and the osteocartilaginous skeleton is made up of four layers. They are the superficial fatty panniculus, the fibromuscular layer, the deep fatty layer and the periosteum or perichondrium. The fibromuscular layer includes the nasal subcutaneous muscular aponeurotic system (SMAS). The nasal SMAS is a continuation of the superficial muscular aponeurotic system, which covers the entire face, interconnecting the fascial musculature, the galealfrontalis layer and the platysma. Ignorance of the importance of this level or inadvertent surgical or traumatic division of the SMAS will lead to its bilateral retraction. This exposes the deeper skeletal components to possible adherence through scar tissue to the superficial fatty layer, which is directly connected to the dermis. The major superficial blood vessels and motor nerves run within the deep fatty layer. Just beneath it is a good plane of dissection, similar to the areolar layer beneath the galea aponeurotica in the scalp. Preserving these vessels, which provide venous and lymphatic outflow to the nose, will aid in minimizing postoperative nasal tip edema.8
Muscles

Nasal muscles were subdivided into four groups. The elevator muscles, depressor muscles, and compressor muscles. All the muscles are innervated by zygomaticotemporal division of the facial nerve.\(^8\)

Inervation of the nose

The nerve supply of the nasal skin comes from the ophthalmic and maxillary divisions of the trigeminal nerve. Injury to the external nasal nerve could initiate a numbness sensation of the nasal tip. Transection of an external nasal nerve is usually not detected during the surgical procedure. Even though the numbness lasts for only a few months in most cases, it is likely to cause much inconvenience and increase the possibility of neuralgic pain.\(^6,7,9\)

Vascular anatomy of the nose

The nasal pyramid receives its blood supply from the facial artery (external carotid system). The major arteries supplying the nasal tip include the lateral nasal, dorsal nasal, and columellar vessels. The lower part of the nasal dorsum is supplied by the internal carotid system through the dorsal nasal artery, a branch of the ophthalmic artery. The dorsal nasal arteries run along the nasal dorsum and feed this vascular arcade from above.\(^6-8\)

Preoperative assessment

A complete history of head and neck examination is taken at the initial consultation, with specific emphasis placed on functional and aesthetic nasal diagnosis. The surgeon has to determine the patient’s wish and try to figure out the approximation of the goals of the surgery. The patient has to be educated regarding realistic expectations. The benefits and the risks of surgery have to be informed with the patient. The possibility of minor postoperative asymmetries is stressed. The position of the external scar has to be informed.\(^6,10\)
Surgical protocol is made and discussed with the patient at the second visit. Medical photographs are taken. Allergy testing is recommended if indicated, so medical and surgical management of nasal function can be addressed.\textsuperscript{5,10}

The patient must be interviewed again and reexamined the day before surgery. Antibiotic treatment could be started a day before surgery, depending on the case. Antibiotics may be used to prevent the infection when osteotomies are performed. A coverage of broad-spectrum antibiotics is indicated when transplant are used in reconstruction.\textsuperscript{6,10}

\textbf{Surgical technique}

\textbf{Incision and exposure}

Before the incision is made, 1\% lidocain with 1:100,000 epinephrin is injected into the nasal tip, columella and along the caudal margin of the lateral crura. The incisions used in external rhinoplasty approach typically include a transcolumnellar incision and bilateral marginal incisions.\textsuperscript{1,3,11}

The shapes of the transcolumnellar incision vary from stairstep or gull-wing to triangular or straight. Celik\textsuperscript{12} used a running W incision for the transcolumnellar incision. Another group of surgeons prefers open rhinoplasty techniques using ‘Z’ and ‘V’ incisions. The most preferred incision by surgeons was the inverted ‘V’ shape for most cases. In patients with bilateral cleft lip nose the incision used is V-Y incision or forked flap incision.\textsuperscript{12,13}

In general, this incision is best located at the narrowest portion of columella, which results in a shorter, less visible scar and less risk of linear contracture. Especially for blacks and Asians who may have short medial crura, care is taken to place the incision above the medial crura or lower third of the columella.\textsuperscript{3,13,14}

\textbf{Figure 2. Transcolumnellar incision.}\textsuperscript{15}

The bilateral marginal incisions are made along the caudal margin of the lateral crura, and not along the nostril rim. It is also called the infracartilaginous incision. The columellar extension of the marginal
An incision is made around the edge of the columella to allow dissection caudal to the caudal margin of the medial crura.\textsuperscript{1,3,11}

\textbf{Figure 3. Marginal incision.}\textsuperscript{15}

After the incisions are made, use converse scissors to dissect caudal to the medial crura without damaging the caudal margin of the lower lateral cartilage. The columellar flap is elevated off the caudal margin of the medial and intermediate crura towards the domes. At this point, special care is taken to identify the submuscular plane just above the lateral crura. The tissue is bluntly dissected toward the cephalic margin of the lateral crura.\textsuperscript{1,3,11}

\textbf{Figure 4. Elevate the thin vestibular skin of the flap.}\textsuperscript{15}

The dissection then is shifted to the midline to release the fibrous connections and to identify the cartilage of the middle nasal vault. Blunt dissection is continued toward the osseocartilaginous junction. The exposure is completed by undermining along the piriform margins and to the upper lateral cartilages as needed. This completes the dissection of the external rhinoplasty approach.\textsuperscript{1,3,11}

Into a precise pocket between the medial crura a columellar strut can be sutured. This graft helps to provide support to counteract the loss of support incurred from execution of the approach itself. The strut should not extend down to the nasal spine. Otherwise, the strut may click on the nasal spine and shift off midline. Symmetric suture placement is critical to preserve a symmetry tip. Then, the surgeon can perform other maneuvers that maybe necessary to maximize the aesthetic and functional
result, such as septoplasty, osteotomies, also modification of nasal tip, alar cartilages and nasal dorsum.\textsuperscript{1,3}

**Closure**

After the surgery is completed, the transcolumnellar incision can be closed with a single midline subcutaneous 6–0 absorbable vicryl suture to approximate the skin edges and take tension off the closure. Special care must be taken when closing the lateral aspect of transcolumnellar incision to avoid lateral notching. The marginal incision can be closed using a single 5–0 chromic suture. It is applied laterally to avoid distortion of the domes.\textsuperscript{1,3,11}

**Postoperative care**

Postoperative medication is directed at minimizing the pain and headache, preventing infection and reducing swelling. If antibiotic has been started pre-operatively, it is to be continued for 3–7 days.\textsuperscript{6}

Nasal packing is removed in the morning after surgery. Nasal tape and columnellar sutures are removed five days after surgery. The sutures at the tranverse columnellar-vertical marinal incision junction are removed at day 7. After the sutures are removed, the columnellar incision is taped to support the incision for three weeks after surgery. Patients are advised to avoid active exercise for 3 weeks and contact sports for 6 weeks.\textsuperscript{1,3}

After the procedure using external rhinoplasty approach, nasal tip edema more than in endonasal approach. This edema will decrease over the time, leaving a more defined nasal tip. If it is persistent, it can be treated with subdermal triamcinolone acetonide (10 mg/ml) injections.\textsuperscript{1,3}

**Complication**

The complications associated with the external rhinoplasty approach are related to improper plane dissection of the skin soft tissue envelope or irregular closure of the transcolumnellar incision. Dissection out of the submuscular plane and into the muscle layer may result in excessive operative bleeding, postoperative edema, scarring and irregularity of the skin soft tissue envelope.\textsuperscript{1}

Irregularity of the transcolumnellar incision can be avoided by not beveling the incision and by performing a tension-
free closure with precise eversion of the skin edges.\(^1\)

One of the common deformities is lateral notching of transcolumnellar incision. To prevent it, the two sutures placed just off the midline can be angled from medial on the lower flap to lateral on the upper flap. This closure will recruit the upper flap medially to avoid excess lateral flap that could result in lateral notching of the incision.\(^1\)

Other complication is damage of the caudal margin of the medial crura. It is due to negligence of the surgeon in identifying the caudal margin of the lower lateral cartilage and in following it to the dome.\(^1\)

Advantages and disadvantages

The main advantage of external rhinoplasty approach is better surgical exposure. Sutures can be placed, grafts exactly trimmed, and asymmetries corrected without distortion of surrounding tissues. Scar tissue and redundant subcutaneous tissue are more easily excised. The valve region can be well protected, and the absence of incisions in the intercartilaginous region helps prevent later obstructive problems by avoiding interruption of one of the tip support mechanisms or scarring. The other advantage of external rhinoplasty approach is that it is an excellent mode for training purposes.\(^1,3\)

One potential disadvantage of the open approach is that surgeons may often tend to elevate more soft tissues off the underlying framework than is necessary. Extensive skeletonization that does not have direct positive impact on other technique only adds to soft tissue trauma which will lead to nasal tip edema and subsequent scarring. Other disadvantages of this technique include transcolumnellar scar, columellar flap necrosis and postoperative numbness. Compared to the endonasal rhinoplasty approach, the surgery time is longer.\(^1,4\)

Indication

The primary indications for external rhinoplasty approach are the cases that require extended surgical exposure for both diagnostic and technical reasons. Patients who have asymmetry of nasal tip cartilage or middle nasal vault, inadequate tip projection or structural deficiency are the ideal candidates for this approach. Other cases with specific nasal deformity that may be need external rhinoplasty approach include
crooked nose deformity, secondary and revision rhinoplasty, cleft-lip nasal deformity, saddle nose deformity and benign nasal tumors.  

**CASES REPORT**

**Case 1**

A 28 years old female presented with fractured nose and septal deviation. Septorhinoplasty, reduction and placement of spreader graft via external approach was planned. V-inverted incision on columella was performed followed by bilateral marginal incision. Nasal tip and nasal dorsum were undermined. Once the septum was exposed, the procedures continued to tunneling and the septum was corrected. This procedure followed by nasal reduction, continued with the placement of spreader graft. Incision was sutured. Anterior nasal packing was inserted. Antibiotic and corticosteroid were administered.

**Case 2**

A 17 years old girl presented with unilateral cleft lip-nose deformity. An external rhinoplasty approach was planned to correct the shape of nostril and the asymmetrical domes followed by septoplasty. Correction of the flared and sagged alae was done by rim incision plus wedge resection while trying to imitate the contour of the normal nostril. Columella strut was placed and shield graft was positioned, followed by suturing of the incision.

**Case 3**

A 21 years old male presented with a wide and bulbous nose. External rhinoplasty approach was planned to correct the nasal pyramid, the tip and the ala. Once the tip was exposed, fibrous tissue on the tip was identified and removed. Bilateral marginal incision was continued with alar base excision. Then lateral and paramedian osteotomy was performed. An L shape silicon rubber then placed into the nasal dorsum. Incision was sutured.

**Case 4**

A 38 years old female presented with siliconeoma, and also wanted her nose to be augmented. Removal of the siliconeoma and augmentation rhinoplasty using a carved silicone rubber was performed via external rhinoplasty approach.
Case 5

A 30 years old female presented with acquired nose deformity with retracted nostril and collapsed allae, due to variolla infection. An external rhinoplasty approach was planned to correct the shape of nostril, combined with nasolabial flap for the inner lining. Nasal frame was reconstructed with graft from bilateral auricle conchae. The graft was placed as collumellar strut, onlay graft, shield graft and tip graft. Incision was sutured. Antibiotic and analgetic were administered.

Case 6

A 12 years old girl presented with fibroma of nasal tip. Extirpation of the tumor using external rhinoplasty approach was executed. The histopathologic examination revealed the mass to be a neurofibroma.

DISCUSSION

The external rhinoplasty technique has various benefits in both reconstructive and cosmetic surgery as mention by many authors. In this paper the technique was used for septal deviation (case 1), cleft lip nasal deformity (case 2), cosmetic reason, ie bulbous nose (case 3), tumor removal on tip nasal (case 4 and 6), and other acquired nasal deformity (case 5). This is in accordance with the indications of external rhinoplasty as found in literature.\(^1,3,4,11\)

The 1\(^{st}\) case showed that with external approach rhinoplasty, concomitant septolasty could also be done. The open rhinoplasty approach is required for this patient especially for placing the spreader graft.

For cleft lip nose case, as seen in the 2\(^{nd}\) case, open rhinoplasty is obligatory to correct the deformity. The general characteristics for unilateral cleft are deviation of the nose to the non-cleft side and asymmetry of the nasal tip. While the pattern of the deformity for bilateral cleft are a very short columella with downward tip rotation and lack of nose projection. In this 2\(^{nd}\) case, it was a unilateral cleft lip nose. Procedure was addressed to correct the shape of nostril and to make the domes symmetry. The key to correcting tip asymmetry is a stable and symmetrical base formed by the collumella strut. The alar cartilage of the cleft side must be dissected free, after which it can be repositioned and
sutured to the columella strut. Then, a shield graft was positioned, which further increase tip projection, enhance tip definition and camouflages minor tip asymmetries.

The 3rd case is a patient with wide, bulbous nose and hanging alae. Broad nasal tip has strong and broad lower lateral cartilage. A bulbous nasal tip appearance results when lower lateral cartilages have strong bidomal configuration. A weak cartilaginous structured and thickened nasal tip skin creates a broad nasal tip with poor definition in some patients. It is common in Asian or African nose. A single technique maybe employed with a slight bulbous nose. But, a number of technique might be necessary with a more dramatic bulbous shape. For this patient, a single technique was used to correct the bulbous tip that is the resection of the fibrofatty tissue overlying the cartilages. Osteotomies were carried out to correct the wide nasal bone. To correct the hanging alae in this patient, alar base resection was performed. The external rhinoplasty approach facilitated all this maneuvers, so the surgeon could see and addressed the problem area directly.16

External rhinoplasty approach for the 4th case was indicated for siliconoma removal from dorsum nasi. With this technique, siliconoma could be identified clearly. The patient wanted her nose to be augmented, so the next procedure is rhinoplasty augmentation using a carved silicone rubber. With the open approach, the surgeon could place the augmentation material precisely.

Open approach rhinoplasty was required to correct and make the nostril wider, as shown in the 5th case. Through the open structure approach, nose reconstruction by graft placement can be carried out. In this case, external rhinoplasty was combined with nasolabial flap to line the inner side of nostrils.

The 6th case was neurofibroma on nasal tip, which was a benign tumor. With external approach, the mass was easy to be removed as a whole, due to wider area of operation than endonasal approach. This is in accord with what has been referred to in some literature that one of the indications of external rhinoplasty is benign nasal tumor.1,3,4,11

One thing that we have to pay careful attention in this technique is the incision. Various kind of incision have
been discussed. Which form chosen has to suit the objective of the operation? The incision used for all cases are v-inverted trans columellar incision. The incision was placed on the lower third of columella. For Asians, this is the right location for trans columellar incision, because the scar will be formed below the tip shadow, so it will be less visible.

When open rhinoplasty is applied in esthetic rhinoplasty procedures, a visible trans-columellar scar is one of the concerns for both the patient and surgeon. But, if the incision is performed in the appropriate way and closed meticulously with adequate suture material, there will be no conspicuous scar. The first skin suture is always placed in the midline at the tip of the inverted V. Closure is continued with angled off-midline sutures, starting medially from the inferior flap and extending laterally to the superior flap. Open rhinoplasty enables the surgeon to correct deformities with bimanual manipulation and direct suturing the graft materials.\(^4,11\)

Selection of the approach to be used in rhinoplasty should depend on the nasal deformity present. In complex nasal deformities, the wide exposure provided by the open approach allows for more precise evaluation of deformities and enhance the control over the corrective maneuvers employed.

REFERENCES