Open rhinoplasty – Should it be the procedure of choice?

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BR Neu. Open rhinoplasty – Should it be the procedure of choice? Can J Plast Surg 1994;1(4):166-176. Open rhinoplasty is currently recognized for its usefulness in treating complex nasal deformities. This study examines and supports the routine use of the open approach for all cosmetic nasal operations. Forty consecutive open rhinoplasties were carried out. Included were primary, secondary and post-traumatic deformities. The surgical technique is described and the results are reviewed. Precision is enhanced with the open exposure. Alar cartilages are repositioned and contoured into shape with sutures. Tip rotation and elevation are more easily controlled. Cartilage grafts are used less often and, when required, are accurately sutured into place. A learning period is needed to understand the new perspective of the exposed cartilages and the effect on the external appearance. Asymmetries are easily created, and overcorrections must be avoided. The procedure takes longer. Nasal tip hypoesthesia and edema are more pronounced. The columellar scar is well accepted. The improved results with open rhinoplasty justify it becoming the procedure of choice in the author's practice. Minor modifications of the nasal dorsum or tip are still carried out through the endonasal approach.

Key Words: Nasal deformities – primary, secondary, Open rhinoplasty, Post-traumatic, Rhinoplasty, Septoplasty

Rhinoplastie ouverte – Serait-ce l'intervention de choix?

RÉSUMÉ : La rhinoplastie ouverte est actuellement reconnue pour son utilité dans le traitement des malformations nasales complexes. Cet essai étudie et appuie l'emploi courant de l'approche ouverte pour toutes les chirurgies esthétiques du nez. Quarante rhinoplasties ouvertes consécutives ont été effectuées. Elles incluaient notamment des malformations primaires, secondaires et post-traumatiques. La technique chirurgicale est décrite et les résultats sont passés en revue. La précision est plus grande avec l'exposition ouverte. Les cartilages alaires sont replacés et fixés en place à l'aide de sutures. La rotation et l'élévation de la pointe sont mieux contrôlées. Les greffes de cartilage sont utilisées moins souvent et, si nécessaires, elles sont suturées avec précision en place. Une période d'apprentissage est nécessaire pour comprendre la nouvelle perspective des cartilages dénudés et l'effet de leur façonnement sur l'apparence extérieure. Il est facile de créer des asymétries et il faut aussi éviter les corrections exagérées. L'intervention prend plus de temps, l'hypoesthésie du bout du nez et l'oedème sont plus prononcés. La cicatrice de la columelle est bien acceptée. Les résultats meilleurs qui accompagnent la rhinoplastie ouverte justifient qu'elle devienne l'intervention de choix pour l'auteur. Les modifications mineures de l'arête et du bout du nez s'effectuent encore par l'approche endonasale.

The modified Joseph (1) technique is the traditional and standard approach used in rhinoplasty. Rethi, in 1939 (2) was the first to describe an open procedure, exposing the nasal tip through a transcolumellar incision. Subsequent articles on open rhinoplasty were published by Sercer in 1958 (3), Padovan in 1966 (4) and Goodman in 1973 (5).

The open technique soon became recognized for its usefulness in correcting complex nasal deformities. The excellent exposure permitted a direct repair of anomalies in the cartilage and bone. There was, and still is, however, a reluctance to apply the open concept to the routine rhinoplasty, largely out of concerns about the columellar scar.

The open rhinoplasty deserves closer scrutiny. The improved exposure enhances precision. The ability to reposition and contour cartilages provides a degree of aesthetic control which otherwise would not be possible. Changes in nasal profile are more predictable. In the author's experience the results are better.

To evaluate the effectiveness of the technique in all clinical situations, a series of 40 consecutive open rhinoplasties was carried out. The surgical technique and results are reviewed. In total the author has performed 90 open rhinoplasties.

MATERIALS AND METHODS

The 40 consecutive open rhinoplasties were performed over a 10 month period, from July 1991 to April 1992. One female patient was excluded because she had concerns about a columellar scar. Her surgery was done by the standard endonasal approach.

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Figure 1) 'V' and stairstep columellar incisions can be used. The stairstep closure is more precise and results in better scars

There were 31 females and nine males. Follow-up ranged from 10 to 18 months.

Incision

Both a stair step and V-columellar incision are used in this series, with the former now being preferred (Figure 1). The 90° angles of the stair step incision provide more accurate markers for precision closure. Creating a break in the incision also avoids a linear scar. Any potential scar thickening or depression is distributed over a wide plane, making it less visible on lateral view.

The initial cut transects the narrow mid portion of the columella, and is best carried out with a #11 blade. It is extended vertically with a #15 blade, just inside the columellar rim. Care is taken to preserve the delicate nostril web. The incision then slopes laterally, hugging the caudal edge of the lower lateral cartilage. This edge is palpated with the back of the scalpel blade, and is usually adjacent to the upper extent of the vibrissae.

While stabilizing the skin flap with a double hook, scalpel and fine scissor dissection are used to elevate the skin. The alar cartilages are fragile and can easily be damaged or torn. They are particularly vulnerable at the juncture of the medial and lateral crura. Beyond this point, the skin is readily elevated in a standard fashion over the upper lateral cartilages and nasal bones. Exposure of the entire dorsum is obtained with an Aufricht retractor, while a Senn is adequate for tip work.

Dorsum

In an open rhinoplasty, surgery to the nasal dorsum varies little from the endonasal approach. There is much better vision, however, and hump removal is carried out in a controlled fashion with a rasp and #15 blade. Bleeding vessels

Figure 2) Suturing the medial crura increases nasal tip support and projection

Figure 3 Crural-septal sutures control tip rotation and projection. Suture passes from left crus (above, right), to septum (below, left) and back to opposite right crus (below, right)

Figure 4 Apical sutures (left) narrow the angle of the lateral crus. Bigger bites of cartilage have a greater leverage force. Cross hatching of thick cartilage may be necessary. Interdome sutures (right) correct the bifid tip

are cauterized for hemostasis. Small irregularities are palpated without interposed skin.

When there is a limited dorsal resection, the nasal mucosa is generally not damaged, and does not have to be freed. With a more generous hump removal mucosa is at risk and a submucosal dissection is carried out. This dissection is simpler and has fewer tears using the open approach. The viewing angle is better, and one can feel the blades of the dissecting scissors beneath the juncture of the septum and upper lateral cartilages.

When the supratip region is still wide after osteotomies,

the upper lateral cartilages and septum are sutured together to reduce the lateral fullness.

Medial crura

The medial crura are frequently splayed. Securing the two together significantly strengthens the vertical support, raising the tip (Figure 2). Asymmetrical crura may project unevenly and cause a columellar tilt. These cartilages have to be mobilized and correctly positioned before suturing. The 5-0 nylon sutures are placed posterior to the edge of the crura to preserve the natural separation of the anterior margins.

Figure 5) *Peck type (left) and Sheen type (right) onlay tip grafts are precisely sutured into position*

Any residual unevenness of the anterior edge of the crura is shaved down. The columellar-lobular angle is carefully preserved.

Nasal tip ptosis is managed well with the open technique. Sutures from the medial crura to the septum can rotate and elevate the tip in a precise graduated fashion. Two sutures are generally used. The 4-0 nylons are passed from one medial crus, to the septum, and then back to the opposite crus (Figure 3). The lower of the two sutures requires exposure of the caudal septum through a transfixion incision, while the upper suture is usually secured to the supratip region of the dorsal septum. Tightening these sutures dramatically alters the nasal tip profile. Cephalic rotation is adjusted by the degree of tension on the upper suture. Tip projection is controlled by the lower suture. When this suture is angled higher on the septum than the crura, it draws the tip upward. When the angle of the suture is reversed, an overprojecting tip is reduced. A minor degree of overcorrection is cautiously carried out.

Lateral crura and domes

Excessive fibrofatty tissue is removed from the lateral crura to make the tip less bulky and to facilitate suture

placement. The sutures narrow and modify the shape of the lateral ala. Displaced cartilages are repositioned.

In each dome, the apex is identified. A 5-0 nylon suture is passed through this apical angle, with a bite of 3 to 4 mm of cartilage (Figure 4, left). The tension on this suture determines the bend of the cartilage. Kinks are avoided as they are visible externally. Including more cartilage in the suture increases the leverage, and the potential for narrowing, but also adds to the risk of catching nasal mucosa. Exposed sutures may cause infections.

The apical sutures are placed in the cephalic half of the crus, thereby tightening foremost the posterior segment of each dome. This maintains the natural splay of the tip, and its double light reflex. Placing sutures more anteriorly causes an artificial and shapeless pinched look.

The bifid tip, or dome separation, is corrected by suturing the domes together posteriorly (Figure 4, right). Additional contouring of the splayed crus is achieved by more lateral sutures, sometimes spanning the two alae.

When alar cartilage is very thick, cross-hatching lightly with a blade softens it, and makes it more malleable. Occasionally, however, sutures are not enough to bend and con-

Figure 6 Primary rhinoplasty – Case 1. Preoperative views (above). Postoperative views (below)

tour the cartilage into the desired shape. It may be necessary to resect a 3 to 4 mm segment of offending lateral crus, usually between the medial and central thirds. The free cartilage ends are then sewn back together. This procedure was carried out in two of the 40 patients of this series.

Cephalic resections of lateral alar cartilages are not routinely done. With concave cartilages, there is no indication for it, and instead underlay or onlay grafts may be required. Soft alae should also not be trimmed. The cartilage needs to be preserved to maintain the limited structural support, and thereby tip projection. Cephalic resections are carried out to sculpture the tip and to advance caudally high tip defining points.

Osteotomies

Medial osteotomies are seldom done. They are required when the nasal bones are wide and low in dorsal profile.

Additional nasal narrowing may be needed, and this can be achieved by removing thin channels of bone centrally with a nasal saw before in-fracturing. The latter was carried out in one case within the series.

Lateral osteotomies are performed through piriform incisions in a standard fashion. The curved osteotome is directed low on the nasal bones inferiorly and angled towards the radix superiorly.

Septoplasty

The open approach septoplasty is helpful in crooked noses, and this technique was used in four patients. With the dorsal septum widely exposed, the effectiveness of manoeuvres to straighten it can be readily assessed. A complete sectioning of the septum may be required, and can then be repaired directly with sutures to avoid dorsal collapse. To facilitate exposure, the alar cartilages are retracted anteriorly or spread

Figure 7) Case 1 (continued). Preoperative and postoperative basal views (**left**). Extensive removal of fat from lateral alae (**centre**). Splayed lateral alae narrowed with sutures (**right**)

apart. Where the nasal-septal obstruction and deformity are close to the vomerine crest, standard endonasal techniques are simpler and preferable.

Grafts

The steps described provide an impressive degree of support and projection to the nasal tip. The increase in tip strength is palpable and visible. If desired, 4 to 5 mm of extra tip height can be obtained. For this reason, cartilage grafts are needed much less often, particularly in primary rhinoplasties.

When tip projection is very poor a columellar strut graft is helpful. It sits on the nasal spine, between the medial crura, and is sutured to the crura, under tension. This creates an upward force to the tip. Further elevation and rotation can then be achieved with crural septal sutures.

Secondary and post-traumatic nasal deformities usually require grafts. They are carved into shape, appropriately positioned and then sutured with 6-0 nylon or polypropylene.

Tip defining points are altered and accentuated with Peck (6) or Sheen (7) type grafts (Figure 5). Structural asymmetries sometimes require upper lateral or alar spreader grafts. A variety of local onlay or underlay support grafts are used for contour irregularities.

RESULTS

Primary rhinoplasty (Case 1 – Figures 6,7,8)

This 27-year-old girl had thick skin and wide alar cartilages with nasal tip ptosis. Surgery comprised of:

- (1) Minor dorsal reduction;
- (2) Radix two-tier on-lay graft (alar cartilage);
- (3) Extensive removal of fibrofatty tissue from lateral crura;
- (4) Medial crural sutures;
- (5) Crural septal sutures to correct nasal tip ptosis;
- (6) Dome cross-hatching and dome sutures to narrow cartilages;
- (7) Interdome sutures;
- (8) Lateral osteotomies.

Postoperative photographs were taken at 14 months.

Secondary rhinoplasty (Case 2 – Figure 9)

This 26-year-old woman had had two previous rhinoplasties. Examination revealed a significant left upper lateral cartilage collapse, a supratip excess, partial collapse of the left lateral crus with nasal obstruction, and distortion of the columella. Surgery comprised:

- (1) Left upper lateral cartilage spreader graft (septal cartilage) sutured into place;

Figure 8) Case 1 (continued). Radix onlay grafts (left). Tip projection and rotation controlled with crural-septal and dome sutures; before (above, centre and right), after (below, centre and right)

- (2) Supratip reduction;
- (3) No osteotomies;
- (4) Repositioning of medial crura with suture fixation, and contour trim;
- (5) Left lateral crus underlay graft (septal cartilage) sutured into place;
- (6) Repositioning right lateral crus with suture fixation;
- (7) Sheen type on-lay graft (conchal cartilage) for enhancement of tip defining points, sutured into place.

Postoperative photographs were taken at six months.

Post-traumatic rhinoplasty (Case 3 – Figures 10,11)

This 46-year-old man presented with a significant deformity to his nose from an injury sustained in his late teens. There

was right alar loss and collapse, supratip depression and a marked septal deviation with right nasal obstruction. Surgery comprised:

- (1) Minor dorsal hump reduction;
- (2) Repositioning of medial crura with suture fixation;
- (3) Complete right lateral crus reconstruction with graft (conchal cartilage);
- (4) Left lateral crus cephalic resection, dome cross-hatching, and dome sutures;
- (5) Medial and lateral osteotomies;
- (6) Extensive septoplasty;
- (7) Supratip two-tier on-lay graft (conchal and septal cartilage), sutured into place.

Postoperative photographs were taken at nine months.

Figure 9 Secondary rhinoplasty – Case 2. Preoperative views (**above, left and centre**), postoperative views (**below, left and centre**). Left upper lateral cartilage spreader graft sutured into position (**above, right**). Left lateral alar underlay graft, and Sheen type tip onlay graft sutured into position (**below, right**)

DISCUSSION

Plastic surgeons in Canada have been trained almost exclusively with the endonasal (closed, internal) approach to rhinoplasty. A few otolaryngologists have expressed preferences for the open technique (7-11). In its initial phases, the open method provided wide exposure, made surgery easier and was an excellent teaching aid for residents. At that time, the actual procedures carried out through the open approach were almost identical to those of the standard rhinoplasty (11). This is now changing, and open rhinoplasty is becoming more complex and extensive in its scope (13-29).

As our understanding of nasal anatomy and dynamics improve, the importance of cartilage support becomes a key

concept. Rather than remove segments of cartilage, we wish to rearrange, support or augment them. These changing attitudes have become increasingly difficult to implement from inside the nose.

With the traditional endonasal approach, nasal tip shape and projection may appear to be good intraoperatively, but may be less than satisfactory six months later. It has been the tendency to remove segments of alar cartilage with the hope and expectation that scar contracture will narrow the tip and elevate it to the desired level. While the concept has some validity, it lacks precision and predictability. Supporting ligaments of the nasal tip are damaged and scar pulls down the projection which was achieved during surgery. Cartilage

Figure 10 Post-traumatic rhinoplasty – Case 3. Preoperative views (above). Postoperative views (below)

grafts are used to help offset this problem, but are difficult to assess through edematous skin, and sometimes shift post-operatively.

With these problems in mind, the author has examined the open rhinoplasty more critically and analytically. Primary, secondary and post-traumatic deformities have all been approached in the same fashion. Repairs of cleft lip-nose deformities were not a part of this series, but have been described by other authors (30-33).

As with all new procedures there is a learning curve which takes time. It is wisest to use the open approach first in post-traumatic deformities, as these patients are more accepting of results that are less than perfect. Gruber (20) suggests doing a standard endonasal rhinoplasty, then opening the tip at the end of the procedure to develop a visual concept of what should be the norm. A standard rhinoplasty relies heav-

ily on tactile feedback. When the cartilages are openly displayed, visual feedback dominates.

A caution to the novice surgeon - be conservative in all parameters. It is surprising what a significant change in appearance can be made with a few crural-septal and dome sutures. Altering the position of one wing of a crura affects the other. For example, stitching the medial crura together changes the arch of the lateral crura. This concept is used to an advantage when there is alar retraction.

It is very easy to create asymmetries. When the sutures between the domes are not precisely level, one side of the nasal tip will be higher than the other. Asymmetric bites in the medial crura will result in uneven projection, and a tilt to the columella. At regular intervals, one must check the symmetry from all three views: frontal, profile and basal.

Cartilage grafts are needed much less frequently than in

Figure 11 Case 3 (continued). Preoperative and postoperative basal views (left). Original defect (above, centre), and after medial alar correction sutures (below, centre). Conchal cartilage graft to reconstruct right ala (above, right) and supratip graft sutured into position (below, right)

the endonasal approach. In fact, care has to be taken not to overproject the tip. With the endonasal approach, 40% of the author's primary rhinoplasties required cartilage tip graft support. In this series, only 10% were grafted.

When cartilage grafts are needed for the nasal tip or dorsum they can be precisely sewn into place. The skin is redraped after each step, and the profile checked. When the position is not correct, the sutures are simply released and the graft repositioned.

Structural anomalies to cartilages, especially in secondary and post-traumatic cases, are generally much worse than suspected preoperatively. This is especially so in terms of cartilage loss and collapse. Reconstruction in these cases

requires finesse, and a trial and error approach to decide upon underlay, overlay, or interposition grafts. The literature suggests that repairs of septal perforations are more successful through the open approach (33-35).

Operating time is longer with the open rhinoplasty. An endonasal septorhinoplasty usually takes the author 2h; the open approach averages 3h. This is not due to the columellar dissection. It only takes a few minutes. Instead, it is due to the additional procedures which are carried out with the open technique. The wide exposure also allows more critical examination of minor irregularities, which in turn take added time to correct.

The columellar scar is a concern in open rhinoplasty. No

patient in this clinical series of 40 cases (total of 90 to-date) expressed any dissatisfaction with it. Other studies confirm this (36-38). After six to nine months, the scar is fine and usually difficult to detect. The author had one recent case in which a stitch separated, just inside the columellar roll, and this resulted in a small notch depression. It was inconspicuous and the patient did not wish a repair.

Patients do have nasal tip hypoesthesia, lasting up to six months. Surprisingly, prolonged nasal tip edema, has been minimal. There have been no problems with nylon or polypropylene stitch extrusion, and sutures have never been visible through the skin or mucosa.

A contraindication to the open approach is a scarred nasal tip or columella. A case which requires excessive grafting and tension on the columellar incision should also be avoided.

It must be emphasized that open rhinoplasty, in its present context, is not an 'easier' operation. It could be logically argued that the potential for harm, with an inexperienced

surgeon, is greater with this technique than with the internal approach. There is no guarantee of better results. All operations of the nose require a clear concept of the deformity and an organized logical approach to the problem. In the author's experience, the latter is more readily accomplished with the open technique.

CONCLUSION

At a time when endoscopy and small incisions are becoming the popular trend in surgery, one hesitates advocating a more open procedure. Rhinoplasty, however, is a challenging operation. Expectations for perfection are high. The enhanced exposure through the open technique allows for greater perfection of standard procedures, and provides options not available through the endonasal approach. In the author's practice it has provided better results and has become the procedure of choice. Minor modifications to the dorsum and tip are still carried out through the internal approach.

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REFERENCES

- Joseph J. Die Korrektur der Schiefnase. Deutsche Medizinische Wochenschrift 1907;33:2035-40.
- Rethi A. Über die korrektiven Operationen der Nasendeformitäten. I Die Hockerabtragung. Der Chirurg 1929;1:1103.
- Sercer A. Dekortication der Nase. Chir Maxillofac Plast 1958;1:149.
- Padovan IV. External approach in rhinoplasty (decortication). In: Conley J, Dickinson JT, eds. Plastic and reconstructive surgery of the face and neck vol 1. New York: Grune and Stratton, 1970:143-6.
- Goodman WS. External approach to rhinoplasty. J Otolaryngol 1973;2:3207-10.
- Peck GC. Basic primary rhinoplasty. Clin Plast Surg 1988;15:15-28.
- Sheen JH. Secondary rhinoplasty. Plast Reconstr Surg 1975;56:137-45.
- Goodman WS, Charles DA. Technique of external rhinoplasty. J Otolaryngol 1978;7:13-7.
- Snell GED. History of external rhinoplasty. J Otolaryngol 1978;7:9-12.
- Briant TDR. Management of the nasal tip in the external approach rhinoplasty. J Otolaryngol 1978;7:18-23.
- Conrad K. Correction of crooked noses by external rhinoplasty. J Otolaryngol 1978;7:32-42.
- Goodman WS. Septorhinoplasty: surgery of the nasal tip by external rhinoplasty. J Laryngol Oto 1980;94:485-94.
- Goodman WS, Gilbert RW. The anatomy of external rhinoplasty. Otolaryngol Clin North Am 1987;4:277-83.
- Adamson PA. Open rhinoplasty. Otolaryngol Clin North Am 1987;20:837-52.
- Stone JW. External rhinoplasty. Laryngoscope 1980;90:1626-29.
- Wright WK, Kridel RWH. External septorhinoplasty: a tool for teaching and for improved results. Laryngoscope 1981;91:945-50.
- Daniel RK, Lessard ML. Rhinoplasty: an aesthetic anatomical approach. Ann Plast Surg 1984;13:436.
- Gunter JP, Rohrich R. External approach for secondary rhinoplasty. Plast Reconstr Surg 1987;80:163-7.
- Juri J, Juri C. Secondary rhinoplasty. Ann Plast Surg 1987;18:336.
- Gruber RP. Open rhinoplasty. Clin Plast Surg 1988;15:95-114.
- Friedman Gd, Gruber RP. A fresh look at the open rhinoplasty technique. Plast Reconstr Surg 1988;82:981-2.
- Stubbs RH. External septorhinoplasty: exposure for the difficult nose. Ann Plast Surg 1989;22:283-8.
- Anderson JA. The external approach to rhinoplasty. In: Berman WE, ed. Rhinoplasty Surgery. St Louis: CV Mosby 1989:170-8.
- Teichgraeber JF, Russo RC, Riley WR. External rhinoplasty technique. Ann Plast Surg 1990;25:388-92.
- Guerrerosantos J. Open rhinoplasty without skin-columella incision. Plast Reconstr Surg 1990;85:955-60.
- Teichgraeber JF, Riley WB, Russo RC. External rhinoplasties: indications for use. Br J Plast Surg 1992;45:47-54.
- Smith O, Goodman W. Open rhinoplasty: its past and future. J Otolaryngol 1993;22:21-5.
- Hugo NE, Mattson-Gates G, Sultan MR. Unhooking the hook: sculpting the nasal tip by replanting the medial crura. Plast Reconstr Surg 1993;91:1344-8.
- Gruber RP. Primary open rhinoplasty. In: Gruber RP, Peck CP, ed. Rhinoplasty State of the Art. St Louis: CV Mosby, 1993:255-76.
- Gorney M. Rehabilitation for the post-cleft nasolabial stigma. Clin Plast Surg 1988;15:73-9.
- Nishimura Y, Kumoi T. External septorhinoplasty in the cleft lip nose. Ann Plast Surg 1991;26:526-40.
- Chen KT, Noordhoff MS. Open tip rhinoplasty. Ann Plast Surg 1992;28:119-30.
- Black PW. Cleft lip-type nasal deformity. In: Gruber RP, Peck CP, ed. Rhinoplasty State of the Art. St Louis: CV Mosby, 1993:255-76.
- Arnstein DP, Berke GS. Surgical considerations in the open rhinoplasty approach to closure of septal perforations. Arch Otolaryngol Head Neck Surg 1989;115:435-8.
- Teichgraeber JF, Russo RC. The management of septal perforations. Plast Reconstr Surg 1993;91(2):229-35.
- Vogt T. Tip rhinoplastic operations using a transverse columellar incision. Aesthetic Plast Surg 1983;7:13-9.
- Adamson PA, Smith OD, Tropper GJ. Incision and scar analysis in open (external) rhinoplasty. Arch Otolaryngol Head Neck Surg 1990;116:671-5.
- Padovan IF, Jugo SB. The complications of external rhinoplasty. Ear Nose Throat 1991;70(7):454-6.