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Original Scientific Paper

A NOVEL SUTURE TECHNIQUE FOR REDUCTION OF A WIDE COLUMELLAR BASE: OUR EXPERIENCE

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SUMMARY – In this article, we describe a suturing technique for narrowing a wide or asymmetric columellar base. The study included 30 patients. The mean nostril measurements preoperatively were as follows: right nostril diameter 8.9 mm, left nostril diameter 8.0 mm, and columella width 16.7 mm. Immediately after surgery, we observed significant increases in the mean right and left nostril diameters (11.0 mm and 10.9 mm, respectively, $p<0.0001$), and a significant reduction in the mean columella width (11.8 mm, $p<0.0001$). The outcomes were excellent in both functional and cosmetic results.

Key words: *Columella; Surgery; Rhinoplasty*

Introduction

Columella is the soft tissue overlying the paired medial crura of the lower lateral cartilages that separate the nostrils, and it frames the medial aspect of the external nasal valve. It usually makes a smooth transition over the columellar base (CB) and curves laterally to join the nasal sill. The CB consists of medial crural footplates (MCFs) and interposed soft tissue.

Primary deformities in the CB originate from the MCFs or adjacent soft tissue. Secondary CB deformities occur when the CB is distorted, due to irregularities in the caudal septum or nasal spine[1]. The lateral columellar border is bilateral; therefore, symmetry is important because it affects the shape of the nostrils. Asymmetry or impeded airflow during inspiration, due to excessive medial crural volume, is treated either by excising excess soft tissue or by approximating the MCF. We modified and simplified this technique by excising only the skin. By suturing the cut edges of the skin, we could bring the MCFs closer together to widen the cross-sectional area of the external nasal valve. The goal of the study was to show that this modified suture technique would give an equally satisfactory result by being less invasive while preserving the structures of the columellar base.

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Materials and Methods

Patients

This study was approved by the institutional Review Board of the Rijeka University Hospital Center. All patients provided their written informed consent. The present study included 30 patients (17 male and 13 female) aged between 18 and 52 years, mean age 31 years, that underwent operations at the Ear, Nose, and Throat Department, Rijeka University Hospital Center from January 1, 2017 to December 31, 2018. Patients were eligible for the study when they had a wide CB, and they could breathe better after we pinched the columella with forceps. Nasal obstruction had to be present for at least a 6-month period. Patients that did not breathe better after the pinching maneuver were excluded from the study. This maneuver was unsuccessful when the patient had an additional septal deviation, turbinate hypertrophy, or nasal valve collapse.

Surgical technique

Bilateral elliptic skin excisions were performed laterally to the MCFs. The most arched part of anterior incision was at the level of infracartilaginous incision. The posterior incision was at the level of hemitransfixion incision. The anterior edge of this defect was then pulled posteriorly and stitched to the posterior edge of the incision with a 5-0 nylon. Thus, the skin was mobilized, pulled closer over the MCF, which compressed the columella (Fig. 1). The volume of skin to be removed was determined by pinching the skin with forceps, as in a blepharoplasty. The diameter of the defect had to be at least 4 mm.

Diameters of the right and left nostrils and the CB were measured prior to, immediately after and three months after the operation. The measurements were made by the surgeon using a surgical caliper. The defined points of measurement were the widest points of the nasal seal of both nostrils and total width of the columella.

The visual analog scale (VAS) and Nasal Obstruction Symptom Evaluation (NOSE) scale were used to assess quality of life and aesthetic outcome of the surgery. On the VAS, score 0 means that the subject is not pleased with the aesthetic result and 10 means that the subject is very pleased with the aesthetic result. The NOSE scale graded complaints about nasal congestion, trouble sleeping and breathing through the nose, as well as the ability to get enough air through the nose during exercise. Each complaint is graded from 0 to 4 and the sum is then multiplied by 5, so the maximum score is 100.

Statistics

Measurements were compared before and after surgery with the t-test for independent samples. Statistical analyses were performed with Statistics 64, StatSoft, Inc. 1984-2014.

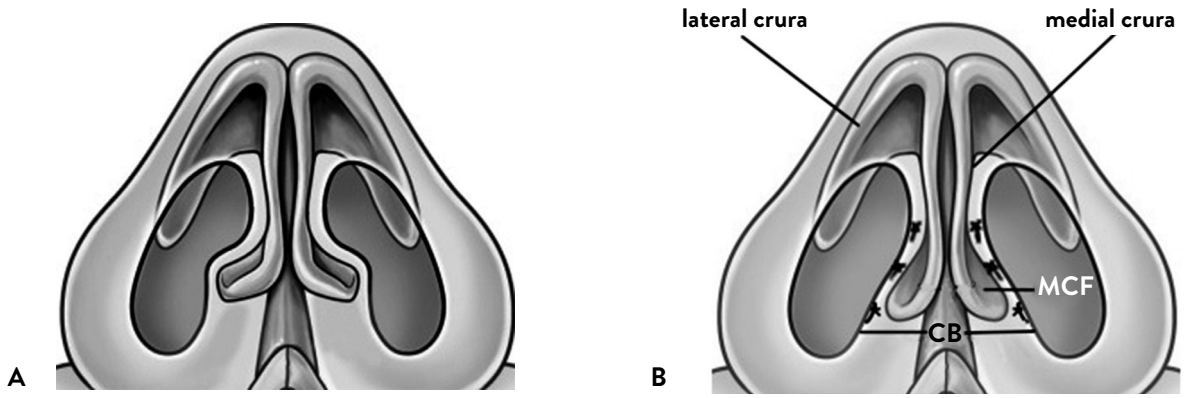

Fig. 1. Schematic illustration of columellar base reduction: (A) before surgery; (B) after surgery.
CB = columellar base; MCF = medial crural footplates

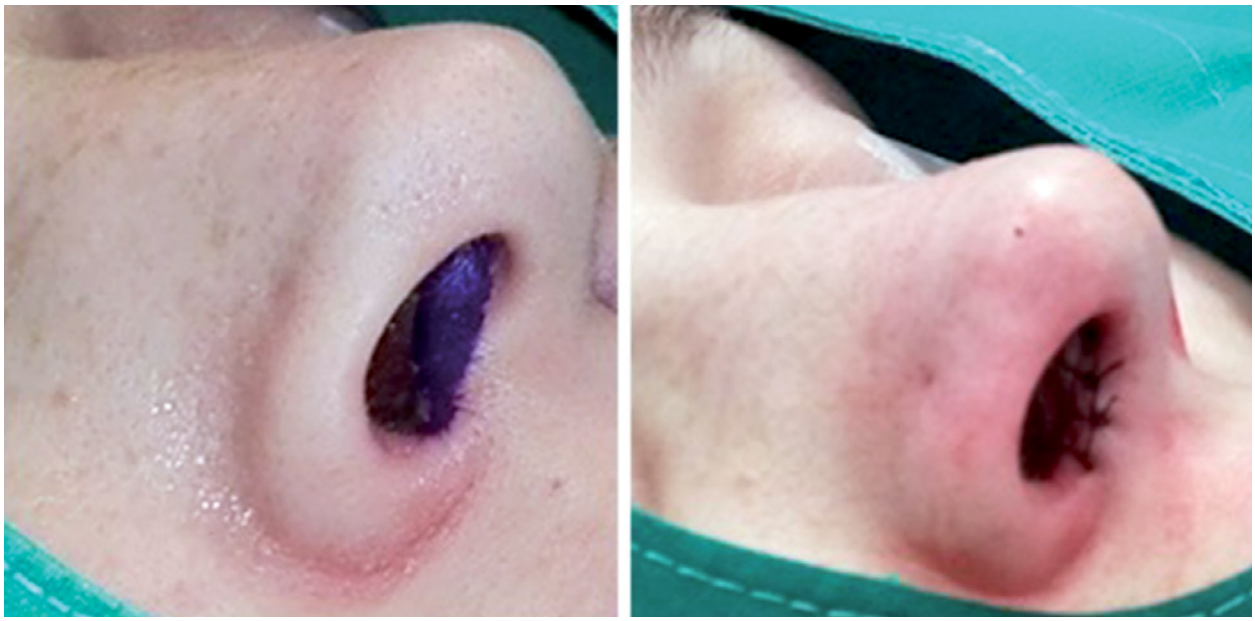

Fig. 2. Photographs of columellar base reduction: preoperative nostril (left); postoperative nostril with sutures (right).

Results

With the surgical technique described above, we successfully improved nasal breathing in 30 patients by increasing the cross-sectional area of the nostrils (Fig. 2). Before the operation, the mean nostril measurements were as follows: right nostril diameter 8.9 mm, left nostril diameter 8.0 mm, and columella width 16.7 mm. Immediately after the surgery, we observed significant increases in the mean right and left nostril diameters (11.0 mm and 10.9 mm, respectively, $p<0.0001$), and a significant reduction in the mean columella width (11.8 mm, $p<0.0001$). Subsequent measurements of the nostrils and columella were obtained 3 months after the surgery. Results showed nonsignificant reductions in the right nostril widths (mean 10.9 mm, $p>0.05$) and nonsignificant increases in the columella widths (mean 12.1 mm, $p>0.05$); however, the mean left nostril width increased by 0.1 mm (to 11.0 mm). At 3 months after the surgery, the mean columella widths were reduced by 5.1 mm in males and 4.4 mm in females. Compared to pre-surgery (i.e., baseline) measurements, we observed mean diameter increases by 26.1% in the right nostril and 39.2% in the left nostril. Compared to baseline measurements, the columella width decreased after the surgery by 29% in males and 27.5% in females.

The average follow-up length was 12 months, while the longest follow-up was 18 months, and no complication was reported. The patients were given VAS and NOSE scale for evaluation of the results. The NOSE scale had a mean value of 60 preoperatively and 15 at 3 months postoperatively. Our patients had a mean value of 5/10 on the VAS preoperatively and 8/10 at 3 months postoperatively.

Discussion

Ideally, nostrils are pear shaped, symmetrical, and slightly wider than the columella[2]. The columellar width should equal one fifth of the entire nasal base distance. The sides of the columella should be fairly straight, down to the point where the medial crura starts to flare. When the MCFs flare too soon, the harmony of the nasal base and the function of the external nasal valve are compromised. A wide columella extending from a short medial crura will narrow the nostril opening and can cause static and dynamic obstruction[3].

There are a few approaches and techniques used to address a wide CB. One approach is to remove the soft tissue between the footplates in the MCFs and reduce the MCF flare by incising the cartilage where they start to flare, and suturing the footplates together[1]. In some cases, there is excess MCF, and it is necessary to excise part of the MCF to achieve the best results. Scoring and shaving the cartilage reduces its strength and could result in either loss of tip support or unpredictable scarring[4].

Cachay-Velasquez *et al.* described a technique which started with a transfixion incision; then they excised a rhomboidal portion that included the depressor muscle of the nasal septum and the orbicular muscle of the mouth. That technique was primarily used to achieve tip projection and to widen the nasolabial angle, but interalar distance reduction was also accomplished[5]. Based on that technique, Lawson *et al.* developed another technique, called reduction columelloplasty. They recommended excising a diamond-shaped area of skin and soft tissue from the lower columella and suturing the MCFs together. This diamond-shaped tissue was located between the medial crura; it had a superior apex situated between the MCFs and an inferior apex that extended slightly onto the philtrum. Although this technique was reliable, its principal disadvantage was the visible scar left by the skin excision[6]. On the other hand, Ahmed *et al.* described MCF approximation with sutures and a minimal mucosa excision (1-2 mm). The soft tissue mass at the base of the columella was not excised, but captured with a horizontal mattress suture. The advantage of that percutaneous technique over previous techniques was that it did not require extensive degloving of the columellar base. Consequently, protracted edema occurred infrequently[1].

In the technique described here, only the skin was sutured; thus, the underlying soft tissue was preserved. There was little edema, and we avoided reaction to the sutures. An additional benefit was removal of vibrissae; when thick, these might present aesthetic problems in some patients. To achieve symmetry with CB reduction, the surgeon must consider how much skin to remove. Excising too much skin will introduce tension that will prolong wound healing. Moreover, an excessively narrow columella could disturb the harmony of the nasal base.

This technique can be performed as an isolated procedure, in patients undergoing routine rhinoplasty, or it can be used as an adjunct to conventional septoplasty. In some cases that involve anterior subluxation of the nasal septum, after the caudal margin of the septum is resected or repositioned, there is often excessive mucosa[7]. In those cases, excising the skin and mucosa can produce enough tension to align the caudal septum to the midline.

Conclusion

In this article, we describe a simple suturing technique for narrowing a wide or asymmetric CB. This technique was effective and simple to perform. The patients themselves rated the results using VAS and NOSE scale, which were satisfactory. In our experience, the functional and cosmetic results were excellent and predictable over long term. However, considering that this study was made on a small group of patients and that the mean follow-up was 12 months, it is still possible that late complications (such as columella retraction) and patient dissatisfaction may occur, therefore further prospective studies are needed.

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References

1. Ahmad J, Rohrich RJ, Lee MR. The aesthetics and management of the nasal base. In: Rohrich RJ, Adams WP, Ahmad J, editors. Dallas Rhinoplasty: Nasal Surgery by Masters, 3rd ed. St. Louis: Quality Medical Publishing, Inc.; 2014.
2. Farkas LG, Hreczko TA, Deutsch CK. Objective assessment of standard nostril types: a morphometric study. Ann Plast Surg. 1983;11(5):381-9.
3. Hamilton GS 3rd. The external nasal valve. Facial Plast Surg Clin North Am. 2017;25(2):179-94. DOI: 10.1016/j.fsc.2016.12.010
4. Pastorek NS, Becker DG. Treating the caudal septal dislocation. Arch Facial Plastic Surg. 2000;2:217-20. DOI: 10.1001/archfaci.2.3.217

5. Cachay-Velasquez H, Laguinge RE. Aesthetic treatment of the columella. Am Plast Surg. 1989;22:370-9. DOI: 10.1097/00000637-198905000-00001
6. Lawson W, Reino AJ. Reduction columelloplasty. A new method in the management of the nasal base. Arch Otolaryngol Head Neck Surg. 1995;121(10):1086-8. DOI: 10.1001/archotol.1995.01890100006001
7. Kenyon GS, Kalan A, Jones NS. Columelloplasty: a new suture technique to correct caudal septal cartilage dislocation. Clin Otolaryngol. 2002;27:188-91. DOI: 10.1046/j.1365-2273.2002.00562.x

Sažetak

INOVATIVNA KIRURŠKA TEHNIKA ZA REDUKCIJU BAZE KOLUMELE: NAŠE ISKUSTVO

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U ovoj studiji provedenoj na 30 bolesnika izveli smo kiruršku tehniku sužavanja široke ili asimetrične baze kolumele. Prosječne prijeoperacijske mjere bile su: desna nosnica promjera 8,9 mm, lijeva nosnica 8,0 mm i širina kolumele 16,7 mm. Rani poslijeoperacijski rezultat bio je značajno proširenje promjera desne i lijeve nosnice (11,0 mm i 10,9 mm, p<0,0001). Ishod zahvata bili su odlični funkcionalni i estetski rezultati.

Ključne riječi: *Kolumela; Kirurgija; Rinoplastika*