The Footplate Suture Technique for External Nasal Valve Surgery

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ABSTRACT

Background and Objectives : To report the preliminary results of the footplate suture technique for narrowing the columellar base to improve nasal respiration and the cosmetic features of the nasal sill. **Materials and Methods** : Patients with nasal obstruction who presented with external nasal valve obstruction were treated with the footplate suture technique. Data on the patient characteristics, operative procedures, and outcomes were gathered from medical records. **Results** : Five patients were included in this study. The footplate suture technique was used in all patients, together with septoplasty, batten graft and inferior turbinoplasty to improve the nasal valve obstruction as needed. In each case, divergent footplate segments of the medial nasal alar crura were identified and tied to medialize and narrow the columellar base. All patients had satisfactory subjective nasal breathing and cosmetic results. **Conclusions** : The footplate suture technique is an adjunctive procedure that improves the nasal obstruction and nasal sill disfiguration caused by external nasal valve obstruction, especially due to the divergent footplate segments of the medial alar crura.

KEYWORDS : Rhinoplasty · Nasal Obstruction · Cartilage · Sutures.

INTRODUCTION

Nasal valve narrowing causes of static or dynamic nasal obstruction. The nasal valve is the narrowest point of the airway and considered the point of maximum airway resistance.[1-3] The external nasal valve is outlined by the membranous nasal septum and fibrofatty tissues of the nasal ala and nasal sill.[1) 4)] A cinching procedure was developed to correct a wide ala base. The footplate segment of the medial crura is often divergent and presents as obtuse blunting and widening of the columellar base. This can contribute to significant external valve narrowing and is sometimes overlooked. Here, we developed a procedure to narrow the columellar base to improve nasal respiration and the cosmetic appearance of the nasal sill.

MATERIALS AND METHODS

Patients with nasal obstruction and nasal sill disfiguration due to a divergent footplate segment of the medial alar crura were treated using the footplate suture technique between December 2009 and July 2012. All of the patients were evaluated using nasal endoscopy and the effectiveness of this procedure was assessed by simple compression of the columellar base with nasal bayonet forceps (Fig. 1). Patients were asked to rate their nasal obstruction using a visual analog scale (VAS) from 0 to 10 pre- and postoperatively. The cosmetic results were evaluated subjectively by the surgeon and patients. Data on the patient characteristics, surgical procedure, and outcome were obtained by reviewing the medical records.

The procedure was performed under general anesthesia with an orotracheal tube. After decongestion with epinephrine-soaked cotton pledgets, the soft tissues were infiltrated with lidocaine and epinephrine. A transfixion incision was made and blunt dissection was performed to identify the footplate segments of the medial crura. At this

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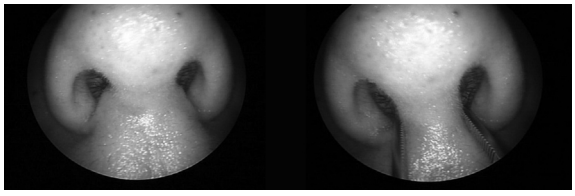


Fig. 1. A telescopic view showing how to grab and assess the columellar base narrowing.

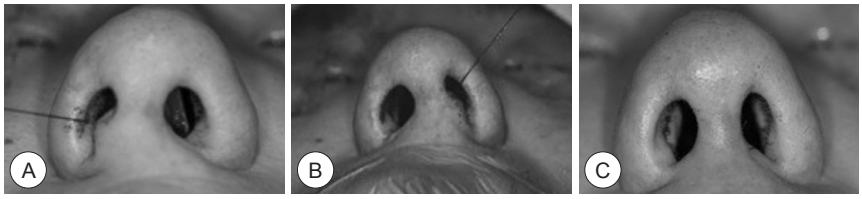


Fig. 2. The footplate suture technique showing a 3-0 nylon suture passed and pulled laterally(A, B) before final tying(C).

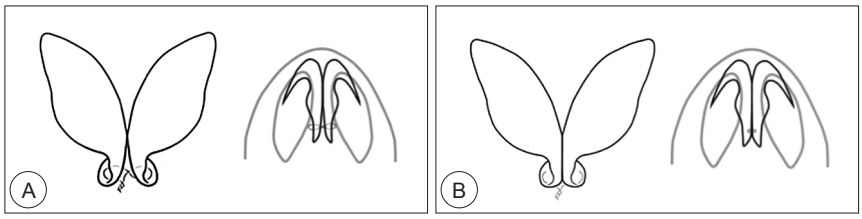
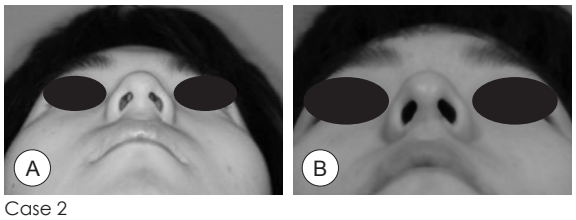
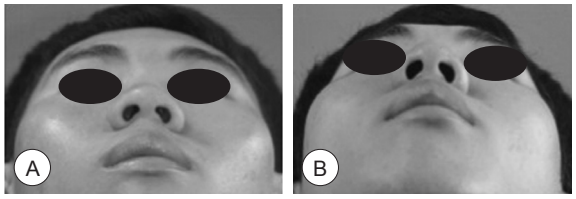


Fig. 3. Illustration of pre-(A) and postoperative(B) footplate suture technique.



Case 2



Case 3

Fig. 4. Pre-(A) and postoperative (B) photographs of case 2 and 3 showing improved columellar base widening and the nasal sill.

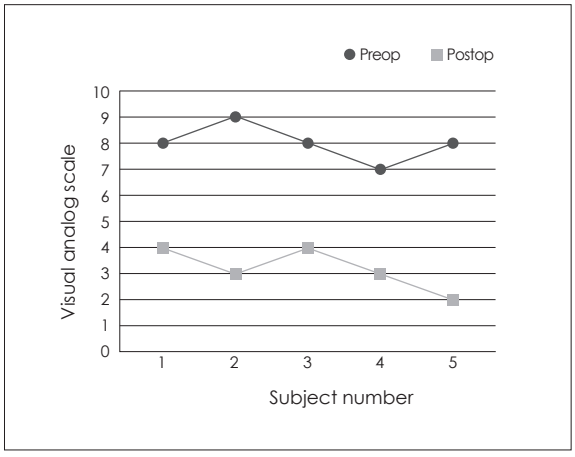


Fig. 5. The visual analog scale of nasal obstruction shows improvement postoperatively, with the mean score falling from 8 to 3.2.

point, it is not necessary to expose the perichondrium or cartilage proper. Grasping the distal point of one footplate with fine tooth forceps, a 3-0 nylon suture was passed through it. The suture was pulled laterally to set the proper tension and confirm the exact position of the suture (Fig. 2, 3). The other footplate was sutured in the same manner and the suture knot was carefully tied deeply, so that it was not palpable at the skin. After completing of the procedure, the skin was closed with 4-0 chromic catgut suture. Nasal packing is not routinely required and was not in this case series.

RESULTS

Five patients (3 males, 2 females ; 19~41 years old) underwent the procedure. Additional procedures to improve the nasal obstruction were four septoplasties, two batten grafts, and three inferior turbinoplasties. The footplate suture technique required an additional 15~20 min. All patients underwent the procedure without any complications or any additional skin incision or scar. All patients had satisfactory cosmetic results regarding the nasal sill (Fig. 4). Using the VAS, the patients rated the degree of nasal obstruction as 8.0 preoperatively and 3.2 postoperatively (Fig. 5).

DISCUSSION

The nasal valve is the narrowest point of the airway and is considered the point of maximum airway resistance. It regulates the airflow so that it does not exceed the capacity of the nose to humidify and warm the inspired air. The internal nasal valve is located just anterior to the face of the inferior turbinate. The external nasal valve is delimited by the membranous nasal septum, medial and lateral crura of the lower lateral cartilage, and the fibrofatty tissues of the nasal ala and nasal sill.[1-3] The footplate segment of the medial crura is often divergent and is seen as obtuse blunt-

ing and widening of the columellar base.

To diagnosis of the nasal valve obstruction, inspection without a nasal speculum is important, because it could distort the nasal valve itself. The Cottle and modified Cottle maneuvers are used routinely, but the surgeon should be aware of false-negative and false-positive results.[1) 5)] In this series, we performed a simple preoperative maneuver to check for obstruction by simply compressing of the columellar base with nasal bayonet forceps. It is important for the surgeon to compress the bulging area gently, and not pull on the columella, which can lead to false-positive results.

A variety of methods have been described to correct the nasal valve region, such as batten grafts, spreader grafts, butterfly grafts, flare sutures, and radiofrequency induced thermotherapy.[2) 5-8)] Han *et al*.[9)] introduced a footplate incision technique to improve the width and length of the columella. The columella can also be advanced caudally to elongate the nostril. However, this procedure involves an additional skin incision and often produces a scar. The footplate suture technique uses a transfixion incision, which is very familiar to what is used by most head and neck surgeons and leaves no external scar. It is important for the surgeon to pass the needle through the cartilage proper carefully because it can weaken the integrity of the cartilage, leading to loosening of the fixation and poor long-term results. Assessing postoperative improvement with the procedure is important, especially when additional procedures are performed and obstructions cannot be assessed objectively using tools such as acoustic rhinometry. Proper preoperative assessment is mandatory so that a proper adjunct procedure can be chosen, if necessary.

There are several limitations to this study. First, the number of subjects was small and thus further procedures and follow-up with more subjects are required. Second, we scored nasal obstruction subjectively, although objective tools such as acoustic rhinometry should be used for the nasal cavity proper beyond the external nasal valve area, which this study focused on. Tools need to developed to objectively measure the dimensions and degree of obstruction in this area. The preoperative columellar compression test might help predict the usefulness of the procedure. Finally, all patients underwent primary procedures such as septoplasty, turbinoplasty, and batten grafts, so the effectiveness of our procedure along might be limited. The preoperative columellar compression test might give additional information on whether the procedure is helpful. All of the patients felt more comfortable when we compressed the columellar base, and we used a positive answer as an indication for this procedure. In conclusion, this procedure gave the patients additional relief of nasal obstruction beyond a conventional septoturbinoplasty or batten graft alone. Careful preoperative analysis of the nasal valve area and additional procedures are recommended for patients with nasal obstruction.

저자역할(Author Contributions)
조재현, 한상윤 , 김태환, 김동은, 안병훈은 본 연구에서 모든 자료에 접근할 수 있으며, 자료의 완전성과 자료 분석의 정확성에 책임을 지고 있습니다. **연구기획** : 조재현, 한상윤, 김태환, 김동은, 안병훈. **자료 해석 및 분석** : 조재현, 한상윤, 김태환, 김동은, 안병훈. **논문 초안** : 조재현. **연구 총괄** : 안병훈

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