

Septal Reposition and Correction of a Deviated Nose Using a Nasal Wedge Bone Graft after Osteotomy in Corrective Rhinoplasty

In Sook Kang, Sooyeon Park,
Jin Soo Lim, Ki Taik Han,
Min Cheol Kim

Department of Plastic and Reconstructive Surgery, St. Vincent's Hospital, College of Medicine, The Catholic University of Korea, Suwon, Korea

Background Patients with deviated nose frequently present concomitant nasal bone as well as septal deviation. Many surgical methods have been developed to address such septal deviation, along with various osteotomy techniques to correct bone deviation. The authors performed medial and paramedian osteotomies to treat deviated nose with mild hump, and utilized the acquired wedge shaped bone graft to achieve septal reposition and bony vault correction.

Methods From October 2014 through June 2015, 10 patients with nasal bone deviation that showed sufficient lateral nasal wall angle but deviated dorsum and septum on their preoperative facial computed tomography were included in this study. The authors performed open rhinoplasty to expose the planned osteotomy site, and conducted medial and paramedian osteotomy that resulted in the separation of a wedge-shaped bone fragment. Bony septum deviation was then treated with the swing door maneuver, and the resected 2 to 3 mm portion of the nasal bone was stabilized by inserting the wedge-shaped bone graft acquired from the previous osteotomy procedures. Consecutive clinical examinations were followed on postoperative 1, 3, and 6 months to observe any recurrences.

Results All patients were satisfied with their surgical results, and no recurrent deviations were noted.

Conclusions Precise bone resection and transposition is essential for a successful corrective rhinoplasty. However, medial and lateral osteotomy are not mandatory procedures in all cases, and the nasal wedge bone graft that was utilized to support the treated septal bone may have aided in sustaining the surgical correction.

Keywords Bone transplantation, Osteotomy, Rhinoplasty

No potential conflict of interest relevant to this article was reported.

INTRODUCTION

Nasal deviation is a condition where the axis of the nose deviates from the midline. It can be difficult to correct with rhinoplasty.

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Correspondence: Min Cheol Kim Department of Plastic and Reconstructive Surgery, St. Vincent's Hospital, College of Medicine, The Catholic University of Korea, 93 Jungbu-daero, Paldal-gu, Suwon 16247, Korea.
E-mail: wisethoth@hotmail.com

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Nasal deviation is caused by a defect in either the upper (bony) or lower (cartilaginous) part of the nasal framework, or both (osteocartilaginous) [1]. Surgical management is determined by the part involved. Correction and maintenance of the bony portion require osteotomy and a rigid support structure. To accomplish this, many osteotomy and bone grafting methods have been introduced. The authors investigated a method that yielded satisfactory results. In this method, the septum is supported by moving a wedge-shaped nasal bone that is created by osteotomy and uses it as a graft to supplement the bony defect on the opposite side; this places the bony framework and the septum at the midline in patients with a bony deformity and septal deviation.

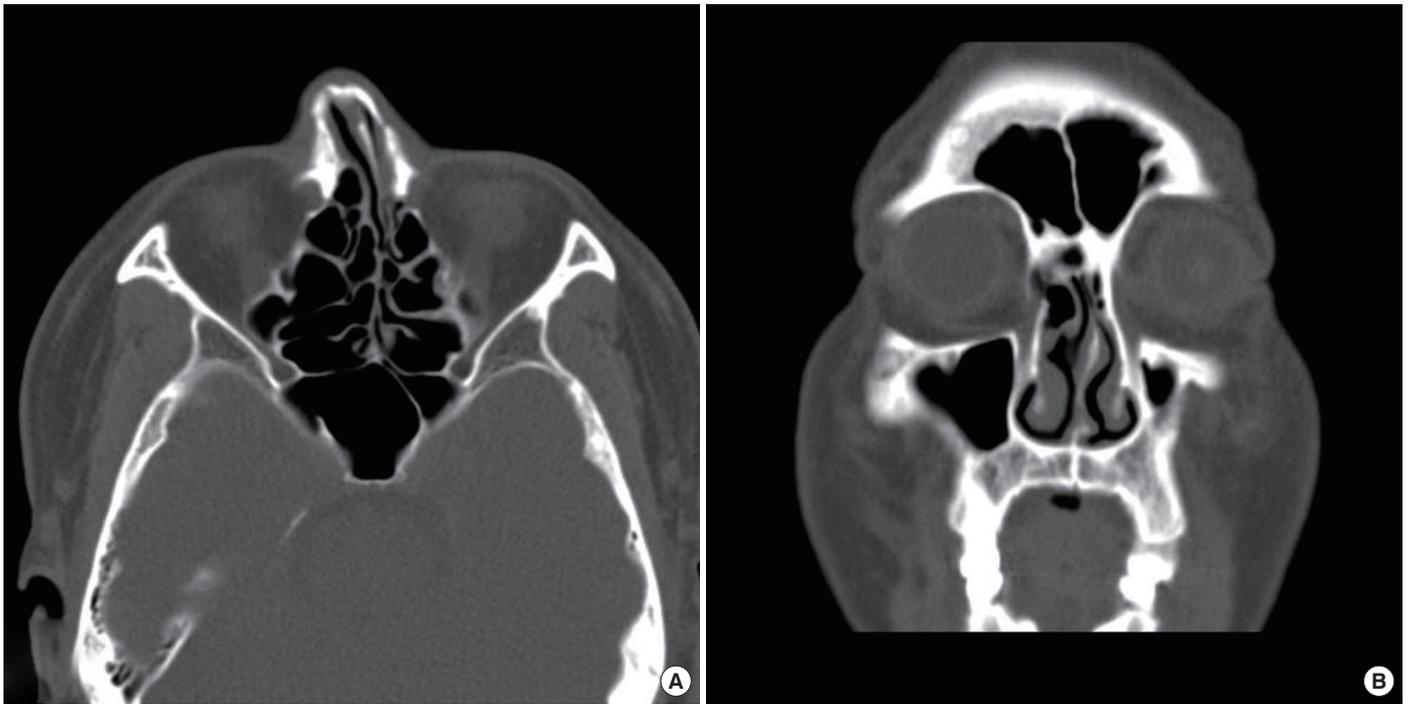


Fig. 1. Computed tomography [CT] findings; the deviation of the septum and bony nasal vault is visible (Patient No. 4). (A) Axial view. (B) Coronal view.

METHODS

Among patients who underwent corrective rhinoplasty from October 2014 to June 2015, ten were selected for medial and paramedian osteotomy because their septums and bony junctions had deviated from the midline, although the computed tomography (CT) results indicated that lateral osteotomy was unnecessary because both the lateral walls were relatively symmetric (Fig. 1). All the patients were males, and the average age was 31.9 years. We confirmed the correction of a deviation with pre- and postoperative photographs, and scored patient satisfaction and colleagues' evaluations of the surgical results using a 5-point Likert scale.

Surgical procedure

Under general anesthesia, patients underwent wide exposure up to the bony framework using an open rhinoplasty technique. After infiltration of 2% lidocaine mixed with 1:100,000 epinephrine, a transcolumellar incision and two marginal incisions were made. Septal dissection was performed to separate both the medial crura, and subsequently the bony portion was exposed. The mucoperiosteal flap was sufficiently undermined to prevent nasal synechia. After separating the upper lateral cartilage and septum, we performed a medial osteotomy and bilateral paramedian osteotomy via a reciprocating saw and an osteotome on the bony deviation that was confirmed on preoperative CT. Thus, a wedge-shaped bone was separated at the side where the medial and paramedian

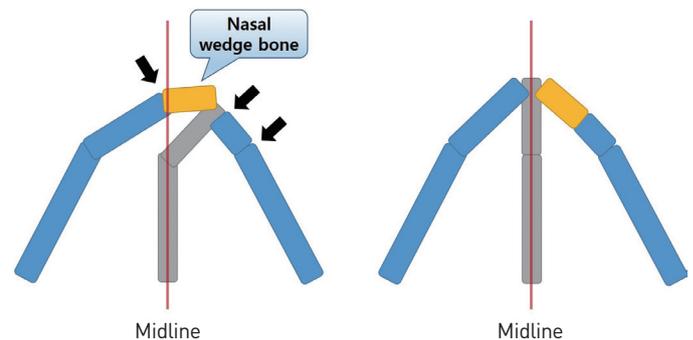


Fig. 2. The method of the operation. Medial and paramedian osteotomy was conducted, and the deviation of the septum was corrected by using a swing door maneuver. Then, we inserted the separated, wedge shaped bone graft at the resected 2–3 mm portion of the nasal bone (black arrow: osteotomy site).

osteotomies were performed. The average width of the bone graft was 3 mm. We placed the nasal septum in the midline using the swinging door maneuver and supported the bony framework by inserting the excised wedge-shaped bone graft in the bony defect area (Fig. 2). When the patient requested correction of the nasal tip, we also performed a tip plasty with a columellar strut, tip only graft, or shield graft. The patients were all discharged three days after surgery.

RESULTS

Surgery was performed with this method on 10 patients, and the average follow-up period after surgery was 5.4 months (1 to 10 months). Photographs were taken, and physical examinations were performed before surgery, and 1, 3, and 6 months after surgery. Patient satisfaction and colleagues' evaluations of the surgical results were measured using a 5-point Likert scale (*very satisfied, satisfied, neutral, dissatisfied, or very dissatisfied*).

The average score of the patients was 4.6, and all the patients were either very satisfied or satisfied (Table 1). Most of the nasal deviations showed improvement and an overall reduction in size or dorsal depression did not occur on photographic review (Fig.

3-5). The mean score of our colleagues' ratings was 4.2 points. After surgery, some patients complained of hypesthesia, but there were no significant complications.

DISCUSSION

Nasal deviation is deviation of the nasal pyramid from the facial midline [2]. Osteotomy (medial, lateral, intermediate, double, percutaneous, and/or continuous) plays an important role in correcting an irregular bony framework [3]. Nevertheless, deviation may recur after surgery because of the "memory" retained by the nasal pyramid relative to the surrounding original soft nasal tissue, and this problem may be the most difficult part of corrective rhinoplas-

Table 1. Patient results

Patient number	Sex/age	Additional procedure	Follow-up period (month)	Complications	Satisfaction (5-point Likert scale)
1	Male/18	Shield and tip onlay graft, columellar strut	1	Tip hypesthesia	Satisfied
2	Male/19	Tip onlay graft, columellar strut	10	None	Very satisfied
3	Male/41	-	7	None	Very satisfied
4	Male/52	-	3	Epiphora	Very satisfied
5	Male/45	Tip onlay graft, columellar strut	3	None	Very satisfied
6	Male/23	-	6	Tip hypesthesia	Satisfied
7	Male/26	Tip onlay graft, columellar strut	6	Dorsum hypesthesia	Satisfied
8	Male/49	Tip onlay graft, columellar strut	6	None	Very satisfied
9	Male/20	Tip onlay graft, columellar strut	6	None	Very satisfied
10	Male/26	-	6	Nasal stuffiness	Satisfied



Fig. 3. (A) A 41-year-old man with nasal reverse C-shaped deviation (Patient No. 3). (B) Postoperative appearance at 3 months. (C) Postoperative appearance at 6 months.



Fig. 4. (A) A 52-year-old man with nasal C-shaped deviation (Patient No. 4). (B) Postoperative appearance at a month. (C) Postoperative appearance at 3 months.



Fig. 5. (A) A 26-year-old man with reverse C-shaped deviation of the septum (Patient No. 7). (B) Postoperative appearance at 3 months. (C) Postoperative appearance at 6 months.

ty. In other words, the soft tissue attachment (e.g., the nasal skin, mucous membrane, and periosteum) has a tendency to revert to the original deviation. This can be induced by postoperative contraction and other factors [2]. To reduce the recurrence of deviation, surgeons have developed new techniques, such as septocolumellar suturing [4] and have performed more delicate bone work using microperforating osteotomy techniques [5]. A new osteotomy method including beveled bone resection has also been introduced [6].

In rhinoplasty, bone grafting was first performed in 1975 by Sheen [7]; this procedure reconstructed the nasal tip using bone from the nasal radix. Since then, various methods including transplantation of a rib graft into the alar collapse region [8], septum reconstruction with a radial bone [9], and spreader grafting with an ethmoid perpendicular plate [10] have been introduced and are widely performed.

Our method, other than using autologous tissue, does not require another donor site to achieve a rigid bone graft and has the benefit of using resected bone for correction. Very small bone grafts are reportedly resorbed, but this mainly seems to have occurred when the graft was transplanted into the tip region [11]; we performed transplantation at the dorsum, which moves less than the tip and has good blood flow, reducing the likelihood of resorption. Although the authors were trying to record a follow-up CT to prove this, every patient rejected taking a CT as a matter of cost and radiation. It was confirmed that the location of the graft was maintained in a physical examination and photographic review after surgery.

Because this method does not include lateral osteotomy, both the lateral walls solidly support the bony framework; however, because the method corrects midline deviation at the bony septal junction by only using paramedian osteotomy, it is important to pre-select a candidate who meets the criteria for surgery. A thorough preoperative physical examination, photography, and CT enabled us to select patients who had severe midline deviations as candidates for surgery, even though both lateral walls were relatively symmetric.

We performed taping and splinting after surgery to prevent migration and malpositioning of the graft. We are considering suture fixation using a drill to solidly attach the graft. Although the small

number of cases is a limitation, this method shows promise as an effective technique in the correction of nasal deviation because it is simple, effective, and long-lasting, when properly performed.

CONCLUSION

In corrective rhinoplasty, proper osteotomy and repositioning of the bony portion are very important. However, medial and lateral osteotomy are not required in all cases; depending on the patient's condition, by performing only medial and paramedian osteotomy and transplanting a wedge-shaped nasal bone graft onto the opposite side, we effectively corrected and supported the bony framework and confirmed maintenance of the position.

This method proved successful in providing satisfactory results; we expect to improve the technique by performing more cases in the future.

PATIENT CONSENT

Patients provided written consent for the use of their images.

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