

Reconstruction of a Columellar Defect With a Nasolabial Island Flap

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Columellar skin defects may be caused by excision of cutaneous malignancy, trauma, or tissue necrosis associated with surgery. Although columellar skin necrosis rarely occurs following rhinoplasty, this condition might be more common when using an external approach than a closed approach. Columellar skin incision performed with exaggerated tip augmentation may cause columellar necrosis. The nasolabial island flap, used unilaterally to cover columellar skin defects, is used for a single-stage reconstruction procedure and is generally not associated with the need for secondary surgeries. This technique is well suited for repairing columellar skin defects. We experienced a patient with columellar skin necrosis occurring after rhinoplasty which was reconstructed using a unilateral single-stage nasolabial island flap.

Keywords. *Island flap, Columellar defect, Rhinoplasty*

INTRODUCTION

Aesthetically, the columella affects the projection of the nasal tip, defines the nasolabial angle, and influences the connection between the nasal base and alar rims. Isolated destruction of the columella can be caused by rhinoplasty, trauma, infection, or malignancy. The columella is the one of the most difficult nasal subunits to repair. The relative paucity of adjacent tissue available for reconstruction along with the distinctive contour, discrete border, and insufficient blood supply to the columella make this subunit difficult to reconstruct. Surgical reconstruction of nasal defects is influenced by the patient's condition as well as the size and cause of the defect.

There are several methods for reconstructing columellar defects. The nasolabial flap [1] is a regional flap that can be easily used to repair the columellar area. Forehead [2] or subnasal [3] flaps can also be used for columellar reconstruction. However,

the forehead flap is relatively bulky and donor site morbidity is more commonly associated with this type of flap than with the nasolabial flap. Forehead flaps are well suited for reconstructing columellar defects when the defect involves the nasal tip subunit, with or without other adjacent subunits, since the flap will cover these areas as it extends onto the columellar subunit. Subnasal flaps are used for a one-stage procedure that transfers well-match skin to the columella; this technique is relatively simple and donor site morbidity is rarely observed [3]. However, the flap should be an adequate size since too much length predisposes the flap to necrosis and occasionally hair growth can develop in this area [3]. Nasolabial flaps are relatively long enough to cover the entire columellar area and rarely leave scars. A nasolabial island flap is not as bulky as a forehead flap, and the skin color of the nasolabial area is similar to that of the columella. Additionally, hair growth in the nasolabial area is sparse and donor site morbidity is rarely observed. Nasolabial island flaps can therefore represent a good method for reconstructing columellar skin defects.

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CASE REPORT

A 32-year-old man visited our department to receive information about undergoing rhinoplasty. The patient had been involved

in a serious accident. Due to injuries sustained from the accident, his nose was covered with scar tissue. The external portion of his nose was deviated. Furthermore, the nasal tip was rotated in cephalic direction and was lowered.

We planned to perform an augmentation rhinoplasty using rib cartilage harvested from the patient. We obtained rib cartilage for dorsal augmentation and extended the columellar strut to raise the nasal tip. The cartilage was cut and used it for dorsal augmentation and to extend the columellar strut. After surgery, the patient was satisfied with the surgical outcomes but 3 days later, the columellar skin color changes occurred in where incisions had been made. We used alprostadil (Eglandin; Mitsubishi Tanabe Pharma Korea, Korea) and hyperbaric therapy to increase the blood supply to the columellar area. The patient wanted to be discharged and returned home. However, the patient returned 6 days after the operation with total columellar necrosis.

A portion of the grafted costal cartilage used for the columellar strut was exposed (Fig. 1). We planned to cover the defect with a subcutaneous pedicled local flap harvested from the nasolabial fold area. Care was taken to ensure that the suture line was located on the nasolabial fold crease when closing the donor site. While under general anesthesia, the patient was injected with 2% lidocaine mixed with epinephrine (1:200,000) around the defect area. Debridement of necrotic tissue left a defect 1.5×1.0 cm in size. We created an ovoid-shaped skin flap on the right nasolabial fold being careful not to include the hair-bearing regions. The flap was slightly larger than the defect. The subcutaneous pedicle was 1.5 cm in width and 2.5 cm in length; the pivot point was located lateral to alar rim (Fig. 2).

We did not make incise the skin above the subcutaneous pedicle. Instead, we created a subcutaneous tunnel to move the flap to the upper lip. The elliptic-shaped flap was then pulled through the tunnel and onto the columellar defect. After precise trim-

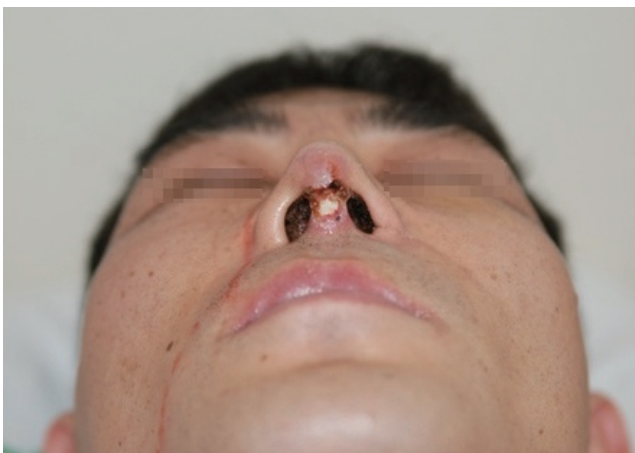


Fig. 1. A skin defect 1.5×1.0 cm in size was located on the columella of the patient. Implanted rib cartilage was exposed.

ming, the flap was set. The lateral cheek was undermined in the subcutaneous plane and the donor site was repaired with simple interrupted suture.

The patient experienced congestion 2 days after surgery. A leech was applied for 3 days and $10 \mu\text{g}$ of alprostadil (Eglandin) was administered to the patient every day for 8 days. The flap survived completely with minimal volume loss. No major complications occurred except mild hypoesthesia on the right upper lip. Two years after surgery, the flap was still intact and there was no visible donor site scarring (Fig. 3).

DISCUSSION

Creation of nasolabial island flap relies on the subcutaneous and dermal vascular system augmented by these vessels in the base of the flap [4-6]. Ducic and Burye [7] described the successful use of pedicle nasolabial flaps for reconstructing various oral cavity defects. Nasolabial flaps have long been used for the reconstruction of oral cavity defects [7-9]. Nasolabial flaps have also

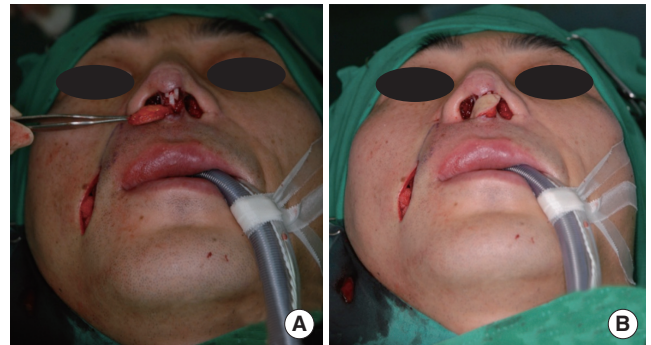


Fig. 2. A nasolabial island flap was created (A) and extended to the columellar skin defect (B) through a subcutaneous tunnel.



Fig. 3. The flap successfully covered the defect with minimal volume loss. The height of the columella was well preserved. Additionally, the skin tones of the flap and nose matched. There was no visible donor site scarring 2 years after the operation.

been utilized by several authors as the preferred method for reconstructing isolated columellar defects [10-12]. Compare to the myocutaneous nasolabial flap, the subcutaneous nasolabial flap is relatively thin and can be applied to skin and subcutaneous defects. It is important assess the extent and depth of the defect as well as the remaining tissue that surrounds the defects before performing reconstruction. In this respect, nasolabial island flaps are ideal for reconstructing the columella because these flaps are composed of skin lacking hair, skin that is of a similar color, and are associated with less visible donor site scarring than other types of regional flaps. With larger than 2 cm defects of the nasal dorsum, lateral wall, and columella, it is often necessary to use tissue from area adjacent to the nose for reconstruction [13]. The subcutaneous nasolabial flap is probably the most widely used flap for this purpose. The most widely described method for reconstruction of nasal skin defects greater than 2.5 cm in diameter is the use of a forehead flap [14].

The present case involved a superficial columellar defect affecting only the skin and subcutaneous tissue. A musculocutaneous nasolabial flap was too thick to reconstruct this defect. Additionally, we did not use this flap in order to avoid the development of muscle weakness or facial nerve damage following surgery. Musculocutaneous flaps are similar to subcutaneous nasolabial flaps except that underlying muscle is included. Although incorporating underlying mimetic muscle enhances the reliability and durability of the flap, allowing it to be transposed along greater distances, musculocutaneous flaps have a bulky pedicle and limited arc of rotation [15]. Although the nasolabial flap is excellent for reconstructing the columella, a columella reconstructed with a nasolabial flap occasionally deviates to the side of the pedicle as a result of flap contracture during the healing phase. One way to avoid this problem is to create a flap 10%–20% longer than what is actually needed to avoid exerting tension on the pedicle. The present columellar defect was caused by raising the nasal tip too high. Therefore, we recommend that the nasal tip be raised properly, and, if possible, to use the endonasal approach instead of the transcolumellar approach to do so. If the early signs of columellar skin necrosis (e.g., skin color change) occur, smoking should be stopped, hyperbaric therapy should be administered, and medications for blood supply should be given. In addition, excessive handling of the columellar incision site should be avoided to prevent this drastic complication. In conclusion, our results demonstrated that a nasolabial island flap can be used to effectively reconstruct the nasal columella. The flap produces acceptable results in terms of aesthetics and function.

CONFLICT OF INTEREST

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

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