화상으로 손실된 비익에 대한 전두피판을 이용한 재건

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Reconstruction of Postburn Nasal Alar Defect by Paramedian Forehead Flap

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In the face, the nose plays an important role in both function and appearance. Among the subunits on the nose, the alar is a critical nasal structure of high aesthetic value. Previously, many surgeons have insisted that structural support should be added to the reconstruction of alar and particularly so in the case of a full-thickness defect. In a 58-year-old male patient who had a third-degree burn injury and full-thickness defect in most of the left nasal alar, forehead flap surgery alone was successfully performed without structural support. (**J Korean Burn Soc 2021;24:60-63**)

Key Words: Nose, Nasal cartilages, Surgical flaps, Forehead, Alar

INTRODUCTION

For proper reconstruction of the nose, it is important to understand and pay close attention to, the three-dimensional structure. For nasal reconstruction, the aesthetic facial subunit principle, which is considered the gold standard for nasal reconstruction surgery [1] must be considered throughout. The subunit principle was described in 1985 by Burget and Menick. It's about reconstructing the entire subunit rather than cover the defect when a large portion of a subunit has been removed [2]. The nose consists of a total of eight subunits. When defects occur in more than 50% of the subunit area, rebuilding the entire subunit shows better results in reducing scarring and deformation than when reconstructing only the defective area [3]. In the case of small defects, there has recently been the objection that it is not

optimal to reconstruct the entire subunit by expanding the defect too much. In addition, skin characteristics differ depending on race as well as individual differences, and therefore procedures can be modified and applied according to each situation.

In this case, a 58-year-old male patient had more than 90% of the Lt. alar subunit missing due to a contact burn injury approximately seven months ago. The surgeon planned the operation, judging that reconstructing the entire subunit would cause less scarring and deformation afterward. As a result of touching the patient's forehead skin and performing a pinch test, the author judged that the patient's skin was thick enough and planned the surgery using only the forehead flap without a cartilage graft. We obtained written informed consent for the publication and use of his images. The study was approved by the Institutional Review Board and performed in accordance with the principles of the Declaration of Helsinki.

CASE REPORT

A 58-year-old man visited the plastic surgery department with a full-thickness defect of the left alar measur-

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Fig. 1. Preoperative photographs showing lip and nose deformations due to skin defects in the left alar area and contracted scar. (A) Frontal view. (B) Lateral view. (C) Worm's eye view.

Fig. 2. Postoperative photographs. (A) Immediately after first-stage surgery. (B) Ten days after the first surgery. The flap is not necrotic and is well inset in the missing alar area. (C) Four weeks were allowed for the flap to vascularize at the recipient site. (D) Pedicle division was performed and the donor site was covered with artificial dermal graft (Terudermis®; Olympus Terumo).

ing 12×15 mm and a deformed upper lip. The surgeons had several meetings and decided to proceed with two-stage reconstruction surgery using a paramedian forehead flap without structural support and to perform the flap lining with an oral mucosa graft. The flap was designed using a Doppler probe to precisely locate the supra-trochlear artery. The pedicle was designated on the contralateral side of the primary nasal alar defect (Fig. 1). The flap was elevated from the subgaleal plane. Dissection proceeded to the subperiosteal plane near the origin of the supra-trochlear artery. The flap width was to be 2 cm and the length was designed to be 10 cm long, enough to prevent tension, without excessive torque on the pedicle or deformation of the nose. The raised flap was rotated and the distal portion was inset into the alar defect and secured with sutures. Before suturing, the subcuta-

neous fat layer was removed to match the skin and thickness of the nose. At this time, symmetry with the opposite alar was the most important goal, and defatting with a little fat left in consideration of the contracture. The donor part was sufficiently undermined from side to side and then sutured. The area that could not be sutured due to tension was covered by an artificial dermal graft (Terudermis®; Olympus Terumo). An oral mucosa graft was performed for nasal lining while releasing scars on the lips. In addition, after scar release on the left lip, an artificial dermal graft was performed to correct the deformation (Fig. 2A). In the initial surgical plan, it was decided to perform a skin graft after an artificial dermal graft. However, after 1st stage surgery, the patient did not want the other donor site to be sacrificed. Although it was informed that there may be deformation due to con-

Fig. 3. The reconstructed site after discharge was cosmetically harmonized with the rest of the nose.

tracture in the future, it was rejected and treated with secondary intent. After the first stage of surgery, daily dressing changes with vaseline gauze were performed for the pedicle and the suture line. Sutures were removed one week postoperatively, and vaseline gauze dressing changes to the pedicle continued until the second-stage procedure. Four weeks were allowed for the flap to vascularize at the recipient site (Fig. 2B). At the second stage, the flap was divided. (Fig. 2C, D). After the second stage, the patient was discharged and subsequently visited the outpatient clinic a week later to check the state of the surgical site (Fig. 3).

DISCUSSION

The nose is one of the principal areas that can be easily damaged by an accident or physical force [4]. The nose plays an important role in the overall harmony and function of the face [5]. Therefore, surgeons should understand the concept of aesthetic facial subunit discussed in the introduction, when planning a reconstruction of the nose. In addition, surgeons should select a reconstructive method that minimizes the deformation and scarring of the nose by reviewing which part of the nose anatomically corresponds to the patient's defect and what percentage of the defect area is occupied [6].

Since the skin and nasal characteristics are different for

each race, these factors also should be considered when performing a nasal reconstruction. Asian skin has a thicker and denser dermis structure than other races [7]. In addition, Asians have alar that is more rounded than Caucasians, because the shape of the nasal cartilage of Asians does not directly reflect the shape of the nose [8]. For these reasons, some believe that it is not necessary to graft the cartilage together at the time of nasal reconstruction in full-thickness, especially at the time of alar reconstruction [9].

Nasal reconstruction surgery using a forehead flap is known to be the most preferred because the skin color, tone, and characteristics are similar to those of the nose [10,11]. There are two methods for nasal reconstruction as follows: 1) a two-stage reconstruction; the first lift (1st stage), and then the flap is cut three weeks after reconstruction of the nose by elevating the flap (2nd stage), and 2) a three-stage reconstruction; the first lift (1st stage), a thinning procedure that corrects the contour and thickness of the flap and corrects the shape of the cartilage after one month without cutting the flap diameter (2nd stage), and a final cutting of the flap a month later (3rd stage) [12].

The patient, in this case, had a left alar skin defect and deformed lips due to a burn injury seven months prior. This patient had continued treatment at a local clinic and came to our hospital for reconstruction. As almost all of the left alar subunit was lost, the entire structure had to be reconstructed. A three-stage forehead flap surgery with cartilage graft was indicated. However, the patient's forehead skin was thick and hard enough to support a new alar structure, and as well, this individual could not be hospitalized or treated for a long period. Therefore the surgery proceeded using a two-stage forehead flap without cartilage graft.

In previous reports, few have demonstrated the possibility of avoiding a cartilage graft in entire full-thickness nasal alar reconstructions in Asians [9]. The conventional alar repair using a forehead flap with structural support tissue is still useful. However, we present a surgical procedure that saves time and effort and avoids potential morbidity at the donor site for the cartilage graft. The patient's reconstructed area was cosmetically in harmony with the rest of the nose and both the patient and the

surgeons were satisfied with the result. When the patient revisited the outpatient clinic, the state of the surgical site was good and had maintained the normal contours of the alar rim. The author explained to the patient that he might need some minor revisions, but after that day he was lost to follow-up. One month after the operation, we could contact the patient on the phone and explained that it was necessary to evaluate the condition of surgical site. However, he was very satisfied with his current condition and said that he did not need additional surgery due to deformation or other problems in the surgical site, and did not want to visit the hospital again. We were unable therefore to directly confirm the patient's condition and whether depression or contracture occurred after surgery. The patient was satisfied with the result of the operation, and it can only be inferred that there will be no major deformation or side effects in the surgical site. It was disappointing that we could not directly confirm the long-term results of the surgery.

Several papers have been published suggesting that the surgery we performed in this case, can be applied to Asians with thick skin. However, the number of these cases is small, and few were published in Korea. The author has always had doubts about the effectiveness of this kind of reconstructive surgery. At the preoperative evaluation, the "skin pinch test" was used to assess the thickness of the forehead skin. The thickness of the skin can be predicted by grasping the forehead skin with the thumb and index finger: thin (<1 cm) and thick (≥ 1 cm) [13]. To accurately measure the skin thickness, a biopsy or ultrasonography has been used to evaluate the thickness of the skin, but pinch test is a simple and reliable way to determine skin thickness. The pinch test result was 1.3 cm, which could be judged to be sufficiently thick. The patient also wanted a simple operation that did not require an additional donor site. Therefore, surgery was attempted without structural support, and the treatment period was relatively short.

CONFLICT OF INTEREST STATEMENT

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

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