

Pre-expanded Bipedicled Supratrochlear Perforator Flap for Simultaneous Reconstruction of the Nasal and Upper Lip Defects

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KEYWORDS

- Supratrochlear perforator forehead flap • Nasal reconstruction • Upper lip reconstruction
- Tissue expansion

KEY POINTS

- The supratrochlear perforator vessels come in pairs in the forehead, which permit 2 flaps to be harvested at the same time.
- The forehead is an excellent source of skin and soft tissue for most nasal reconstruction. Because the upper lip is adjacent to the nose, the forehead should be a possible donor site for upper lip reconstruction.
- The pre-expanded, bipedicled supratrochlear perforator flap technique allows the reconstruction of the nose and the upper lip, 2 independent units, with 2 flaps from 1 donor site.
- The pre-expansion technique can provide abundant tissue so that the donor site can be closed directly after the 2 flaps are harvested. Meanwhile, the pre-expansion is a flap delay procedure that can enhance the blood perfusion of the flaps, especially in their distal parts.

INTRODUCTION

The nose and upper lip are 2 adjacent units in the middle of the face that have prominent aesthetic status for humans. Defects in these 2 units are extremely conspicuous. The nose and upper lip are 2 projecting structures in the face, hence are prone to be damaged in trauma, or flame or chemical burns and also can be violated by tumor and infections. On the other hand, they tend to be

destroyed together because of their adjacent positions. Simultaneous reconstruction of the 2 central facial units is a complex and challenging issue for plastic surgeons.

The principles of replacing “like with like” and achieving a unit or subunit reconstruction is well established. In 1956, Gonzalez-Ulloa¹ described the regional aesthetic “units” of the face, based on skin thickness, to emphasize the need for restoring facial skin units in complete regions as

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opposed to patch work. Burget and Menick² developed the facial “units” principle and also divided the nose into “subunits” based on skin quality, border outline, and 3-dimensional contour. They looked at facial surfaces as convex and concave regions that allow for different light reflection. Burget and Menick² emphasized that if a graft or a suture line is matched to the shape of a subunit, the natural appearance of facial light and shadows can be restored. Indeed, following the “units” and “subunits” concept, an optimal reconstructive result can be achieved because the scars are hidden within the joints between units or subunits and perceived as normal facial topography. More importantly, myofibroblasts lie in the recipient site under the transferred flap. They will contract, causing the transposed skin flap to rise above the level of adjacent skin. The flap will appear as a distracting patch if the defect is filled without regard to the subunit outline. When an entire subunit is resurfaced, the pincushioned flap shrinkwraps could augment, rather than distort, the contour of a subunit. The authors summarize these concepts and put forward the concept of the double “S” principle (similarity and subunit) for the facial reconstruction. The first “S” stands for the “*similarity*” of the donor site to the defect area and the second “S” means the reconstruction should be based on the different “*subunits*” of the face. Performing facial reconstruction according to this principle can dramatically improve the final appearance of facial scars and surgical outcomes.³

Many techniques have been described in the literature for the reconstruction of nose and upper lip defects. The easiest approach to resurfacing facial soft tissue defects is skin grafting. However, this method should generally be avoided because of the hyperpigmentation, secondary contracture, and poor texture. Free flaps can act as workhorse flaps in reconstruction for acute wounds and defects after trauma or tumor resection,⁴⁻⁶ but their poor color and texture matching are the main reasons and patients very often need a second or third or even more revisions to improve cosmetic outcome. Most of the reports are focused on the forehead flap for the reconstruction of nose and local flaps for the reconstruction of the upper lip.^{7,8} However, multiple donor sites are required and local flaps can resurface only small defects. Moreover, patients with composite nasal tissue losses often have facial injuries around the defect, reducing the availability of the donor site. Thus, it may be difficult to find an appropriate local flap for upper lip reconstruction. Yoshihiro and colleagues⁹ reported their technique of using the split-scalping forehead flap for the reconstruction

of defects of the nose and upper lip. This technique reduced the number of donor sites but the cosmetic of hemi-forehead donor site was unpleasant and required skin grafting. Because the forehead area is an excellent source of skin and soft tissue for most nasal reconstructions in clinical practice,¹⁰ and it also has the superior color and texture match to the facial skin, the forehead area should be a possible donor site for both nose and upper lip reconstruction. Based on the work of pioneers and the anatomic features of the facial vessels, which come in pairs, we present our experience with the pre-expanded, bipediced supratrochlear perforator flaps for simultaneous nasal and upper lip resurfacing. This novel approach allows the reconstruction of multiple facial subunits with tissue of similar color and texture to the recipient site from a single donor site.

TREATMENT GOALS AND PLANNED OUTCOMES

To improve the final appearance of facial scars and surgical outcomes, we put forward a concept of double “S” principle (similarity and subunit) for the facial reconstruction. The first “S” stands for the “*similarity*” of the donor site to the defect area and it is a selection criteria of the best donor site in reconstructive surgery. The forehead region should be the optimal choice owing to the neighborhood relationship and similar color and texture to the nose and upper lip. The second “S” means the reconstruction should be based on the different “*subunits*” of the face so as to restore facial skin unit or subunit with the same tissue and hide the scars within the joints between units or subunits. The nose and upper lip should be restored separately because they belong to different units of the face.

Based on the double “S” principle and with the help of tissue expansion technique, we applied the pre-expanded bipediced supratrochlear perforator flap for simultaneous reconstruction of the nasal and upper lip defects from a single donor site. With the experience of more than 30 cases, we think that this technique is simple and safe in achieving excellent aesthetic results in nasal and upper lip reconstruction. When properly planned and performed, this operation can also obtain a low complication rate and minimal donor site morbidity.

PREOPERATIVE PLANNING AND PREPARATION

Patients with burn scar contractures of the nose and upper lip were operated on with the pre-expanded, bipediced supratrochlear flap in our

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