



# Nasolabial and forehead flap reconstruction of contiguous alar–upper lip defects

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## KEYWORDS

Nasal reconstruction;  
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**Summary** *Background:* Defects of the nasal ala and upper lip aesthetic subunits can be challenging to reconstruct when they occur in isolation. When defects incorporate both the subunits, the challenge is compounded as subunit boundaries also require reconstruction, and local soft tissue reservoirs alone may provide inadequate coverage. In such cases, we used nasolabial flaps for upper lip reconstruction and a forehead flap for alar reconstruction.

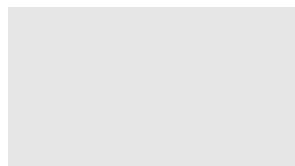
*Methods:* Three men and three women aged 21–79 years (average, 55 years) were treated for defects of the nasal ala and upper lip that resulted from cancer ( $n = 4$ ) and trauma ( $n = 2$ ). Unaffected contralateral subunits dictated the flap design. The upper lip subunit was excised and replaced with a nasolabial flap. The flap, depending on the contralateral reference, determined accurate alar base position. A forehead flap resurfaced or replaced the nasal ala. Autologous cartilage was used in every case to fortify the forehead flap reconstruction.

*Results:* Patients were followed for 25.6 months (range, 1–4 years). All the flaps survived, and there were no complications. Satisfactory aesthetic results were achieved in every case. With the exception of a small vertical cheek scar and a vertical forehead scar, all incisions were concealed within the subunit borders.

*Conclusion:* From preliminary experience, we advocate combining nasolabial flap reconstruction of the upper lip with a forehead flap reconstruction of the ala to preserve normal

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facial appearance. This combination addresses an important void in the algorithmic approach to central facial reconstruction.

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## Introduction

The nasal aesthetic subunit, as introduced by Burget and Menick, is one of the nine distinct territories of the nose that should be entirely replaced when a majority of it is deficient. Subunits of the lip include the upper lip, philtrum, and vermilion. Subunit boundaries are points of inflection or concavities amenable to favorable scarring and should be preserved or recreated.<sup>1,2</sup> Facial defects spanning more than one aesthetic subunit are commonly encountered following tumor extirpation and trauma. Such defects pose reconstructive challenges that may not be addressed by conventional local flap designs. Although reconstructive algorithms and flap designs specific to the defects of the upper lip or nasal alar subunits have been described, little attention has been given to defects that span both.

In 2012, Burget and Hsiao described a novel design for extended nasolabial flap coverage of large superficial defects of the upper lateral lip.<sup>3</sup> This design generates aesthetically favorable results but does not address defects that traverse subunit boundaries. Specifically, the extended nasolabial flap does not provide adequate tissue to resurface the lip and ala without undue tension and subsequent distortion. In one case of an isolated upper lip defect that did not extend to the ala, Hsiao and Burget noted alar notching that necessitated secondary reconstruction with a forehead flap.<sup>3</sup> In the present study, we considered soft tissue losses extending from the upper lateral lip to the nasal ala. We offer a novel strategy for the reconstruction of contiguous alar–upper lip defects. Indications for this approach, description of the technique, and results of reconstruction are presented in a small series of patients.

## Patients and methods

Three men and three women aged 21–79 years (average, 55 years) presented with large superficial defects of the upper lip and nasal ala following trauma or cancer (Table 1). Patients were of Taiwanese ethnicity. Labial defects occupied >50% of the upper lip subunit, and five of six labial lesions involved the cutaneous and subcutaneous layers only. One patient with a full-thickness lip defect resulting from squamous cell carcinoma had a prior free-flap reconstruction that was revised for debulking and cosmetic improvement. Three patients were treated by the dermatologists for basal cell carcinoma at the alar base. Two patients had alar defects resulting from trauma; one involved both nasal alae. Nasal alar defects were partial or full thickness in nature, but all approached or exceeded 50% or more of the alar subunit.

## Indications

It may be necessary to combine nasolabial and forehead flaps for the reconstruction of contiguous defects that involve the majority of the upper lip and alar subunits. Patients included in this series had (1) partial-thickness defects of >50% of the upper lip subunit, (2) composite defects of the nasal ala, and (3) high aesthetic expectations.

## Surgical technique

The upper lip was reconstructed before the nasal ala in every case (Figure 1). Skin cancers were excised to clear margins. The remainder of the upper lip subunit was then excised as previously described.<sup>3</sup> Subunit boundaries were the philtral column, nostril sill and alar base, and nasolabial fold. Nasolabial flaps were based laterally. The lateral border of the nasolabial flap was positioned at the nasolabial fold after inset. The upper lip flap was modeled after the contralateral subunit to assure accurate alar base positioning.

The alar subunit was then excised to the subunit boundaries in preparation for staged forehead flap reconstruction.<sup>4</sup> Nasal subunits and the defect were recreated on a foil template. Forehead flap design was based on the unaffected contralateral nose or a gender-, age-, and ethnicity-appropriate prototype. The supratrochlear artery was identified by Doppler examination. The foil template was marked on the forehead along the vascular axis and then expanded 1 mm circumferentially to account for anticipated scar contraction. If necessary, the alar cartilages were reinforced using autologous cartilage.

The forehead flap was inset in such a way that it and the nasolabial flap were precisely opposed along the nostril sill and alar base. In cases with a full-thickness defect with missing nasal lining, the forehead flap was folded over as previously described to simultaneously restore the lining and skin (Figure 2).<sup>5</sup> In subsequent stages, the forehead flap was elevated to create, reinforce, or refine the framework, and conservative flap thinning was performed. In the final stage of reconstruction, the pedicle was divided. Additional refinements were performed several months later to create nasal grooves, enhance definition, and open the airway as desired (Figure 3).

## Results

All patients had three-stage forehead flap reconstruction combined with unilateral ( $n = 5$ ) or bilateral ( $n = 1$ ) nasolabial flaps. Autologous cartilage was required in every

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