

# Maxillofacial Reconstruction with Nasolabial and Facial Artery Musculomucosal Flaps



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## KEYWORDS

- Nasolabial • Facial artery musculomucosal flap • Facial artery • Maxillofacial reconstruction
- Intraoral defect

## KEY POINTS

- The nasolabial flap is a random or axial patterned flap that can be used to reconstruct small to medium-sized perioral and intraoral defects up to 5 × 5 cm.
- The nasolabial flap is excellent for nasal tip reconstruction.
- The facial artery musculomucosal flap is an axial patterned flap used to provide vascularized mucosal tissue to defects of the oral cavity.
- Both flaps provide predictable results, with low morbidity.

## INTRODUCTION

Resection of benign or malignant disease, traumatic injuries, and craniofacial abnormalities commonly result in maxillofacial defects requiring reconstruction. The ideal reconstructive technique should be focused on regaining both form and function. In perioral and intraoral reconstructive surgery, the importance of reestablishing function cannot be underestimated. The chosen technique should maintain or recreate oral competence, speech, deglutination and provide a cosmetic outcome. Ideally, the technique could be applied to multiple areas, have a low morbidity, and easy to incorporate into daily practice.

Local and systemic factors heavily influence the method of reconstruction. Locally, the size and site of the defect largely drive the method of reconstruction. Systemic factors must also be considered, including presence of diabetes, peripheral vascular disease, history of radiation or previous

surgery, and most notably, previous neck dissection.

The nasolabial and facial artery musculomucosal (FAMM) flaps are pedicled flaps that provide versatility when reconstructing perioral and intraoral defects. These flaps provide soft tissue coverage for small to medium sized defects. The benefits of these flaps include the transfer of vascularized soft tissue, low harvest site morbidity, and ease of harvest.

## NASOLABIAL FLAP

The nasolabial flap was first described by an Indian surgeon, Sushruta, in 700 BC.<sup>1</sup> The flap has gone through several modifications since its initial description. Nasolabial flaps have been applied to a variety of anatomic locations, such as the nose (lateral wall, ala and alar rim, tip), upper and lower lip, floor of mouth, tongue, palate, and alveolus.<sup>2-4</sup>

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The nasolabial flap has traditionally been described as an inferiorly based axial patterned flap based on the facial artery.<sup>5</sup> Anatomic studies have shown that in the nasolabial region, the arterial supply runs deep to the mimetic muscles (zygomaticus major and minor, levator anguli oris, nasalis, and quadratus oris). Throughout its course, the artery has vertically oriented perforator vessels, which run through the mimetic muscles to provide a rich blood supply to the subcutaneous tissue. The lower third of the nasolabial region has the most robust blood supply.<sup>6</sup> Only the nasolabial flaps that include the mimetic muscles and underlying artery should be considered true axial patterned flaps. Hynes and Boyd<sup>7,8</sup> showed that the blood supply in the subcutaneous tissue of the nasolabial region has an axial orientation. Based on these studies, the nasolabial flap can be harvested in the subcutaneous plane, but should be considered a random patterned flap.

The venous drainage in the nasolabial area is through the facial vein, which runs along the entire length of the region. It runs deep and lateral to the facial artery.

### **Indications and Contraindications**

The nasolabial flap can be used to reconstruct small to medium-sized defects of the oral and maxillofacial region (**Table 1**). It is an ideal flap to reconstruct defects of the nose, because of its excellent color and texture match.<sup>2</sup> Furthermore, the flap can be used in conjunction with cartilaginous grafts to reconstruct defects of the ala.<sup>9</sup> Less commonly described, the flap has been used as a folded flap to reconstruct full-thickness defects, recreating both the skin and lining of the nose.<sup>2,10</sup> Although nasolabial flaps have been reported in the reconstruction of full nasal tip defects, the paramedian forehead flap is still preferred by most surgeons.<sup>9</sup>

The nasolabial flap is an excellent method to reconstruct defects of the upper lip. Unlike the

Karapanzic and Abbe flaps, this flap does not result in microstomia and still reestablishes oral competence.<sup>3,11,12</sup> Even large full-thickness defects of the upper lip can be successfully reconstructed when the flap includes the underlying muscle. This flap provides an excellent cosmetic result, with significantly less morbidity and cost compared with free tissue transfer.<sup>13</sup>

For intraoral defects, the nasolabial flap can be tunneled through the buccal mucosa and inset in the floor of mouth, buccal mucosa, or palate.<sup>4</sup> This flap does not result in contracture and tissue tethering like other methods of reconstruction, such as skin grafts, especially when used in the floor of the mouth and tongue. Free tissue transfer such as the radial forearm free flap can be used for floor of mouth or tongue reconstruction, but requires longer surgical time and specialized training in microvascular surgery. A major advantage of the nasolabial flap in floor of mouth reconstruction is excellent return to function. Hofstra and colleagues<sup>13</sup> reported minor effects on speech and the ability to wear a prosthesis, and only moderate effects on consumption of solid foods. This flap is best suited for small defect; however, reconstruction of larger defects has also been reported with bilateral nasolabial flaps.

There are few contraindications to the nasolabial flap. Relative contraindications include previous neck dissection, simultaneous free flap surgery using the facial artery, history of radiation, defects greater than 5 cm × 5 cm, and sites distant to the arc of rotation.

### **Surgical Procedure**

#### **Preoperative planning and preparation**

The nasolabial flap requires minimal preoperative planning. The skin laxity in the midface should be evaluated, because increased laxity in this region allows for easy tension-free closure of the harvest site and a more cosmetic result. When designing the flap, it should contain skin outside hair-bearing regions to prevent transfer of hair to intraoral sites. If hair growth does occur at the recipient site, secondary hair removal procedures may be required.

The recipient site should be completely prepared before flap harvesting to ensure that enough tissue can be obtained from unilateral or bilateral nasolabial flaps. Furthermore, the arc of rotation must be evaluated to ensure that the flap can be rotated to the recipient site without significant tension.

Reconstruction of extraoral defects, such as on the nose or lips, can be completed under local anesthesia, intravenous sedation, or general anesthesia. The oral cavity should be kept out of the field to prevent contamination. If planning intraoral defect reconstruction, general anesthesia with nasoendotracheal tube intubation is preferred. A

**Table 1**  
**Indications for nasolabial and FAMM flaps**

<b>Indications for Nasolabial Flap</b>	<b>Indications for FAMM Flap</b>
Superior based flap	Superior based flap
Nose (lateral wall, tip, ala)	Palate
Inferior based flap	Nasal septum
Upper lip	Upper lip
Buccal mucosa	Inferior based flap
Floor of mouth	Floor of mouth
Palate	Lower lip
	Tongue
	Gingival alveolus

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