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Nasolabial Flap Reconstruction of Oral Cavity Defects: A Report of 18 Cases

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Purpose: This article describes the successful use of pedicled nasolabial flaps in the reconstruction of various oral cavity defects with or without adjunctive microvascular free tissue transfer.

Patients and Methods: Twenty-eight flaps were performed in 18 patients, for a variety of oral cavity defects.

Results: All flaps healed without evidence of necrosis, infection, or dehiscence. Patient satisfaction with this procedure was high. The use of the nasolabial flap appears to provide an improvement in overall functional outcome.

Conclusions: The inferiorly based nasolabial flap provides reliable coverage of intermediate-sized oral cavity defects when used alone. It can improve mastication and speech when used in conjunction with microvascular free tissue transfer for the reconstruction of large combined defects of the tongue and floor of mouth.

With the increasingly widespread application of reliable microvascular free tissue transfer techniques for oral cavity reconstruction, the routine need for a variety of local and regional flaps has decreased. However, a number of such flaps remain quite useful and should be included in the modern armamentarium of the reconstructive surgeon. Often, a combination of local and distant flaps is required to optimize the functional outcome after oral reconstruction. In this article, the focus is on the utility of the pedicled nasolabial flap to achieve this goal.

The subcutaneous pedicled nasolabial flap appears to have been originally described in the works of Sushruta in 600 BC.[1] For centuries thereafter it was used primarily in external nasal reconstruction. Thiersch[2] was the first to use a transbuccal transfer of this flap for closure of an oral cavity defect. Subsequently, Esser[3] reported use of a cutaneous nasolabial flap transferred in 2 stages to increase its reliability. Wallace[4] and Rose[5] later reported modifications of the basic flap, allowing for single-stage transfer. Several authors have reported favorable outcomes when this flap was used to cover various oral cavity defects.[6-9] However, none has reported its adjunctive role with simultaneous free tissue transfer for oral cavity reconstruction.

In this article, an overview of a favorable experience with the use of the nasolabial flap for closure of oral cavity defects is presented. When these flaps should be transferred as a single stage, under what circumstances a second stage will be required, and the adjunctive role of these flaps in microvascular oromandibular reconstruction is also discussed.

Technique

For oral cavity reconstruction, the use of an inferiorly based nasolabial flap is preferred. The medial incision line precisely follows the nasofacial fold in its superior two thirds (Fig 1) and is located 3 to 4 mm medial to the nasolabial fold in its inferior third (Fig 2). This will cause less distortion after flap transfer and allow for an improved arc of rotation. The base of the flap should be 1.5 to 2.5 cm in width (Fig 3). Flaps of greater width are difficult to effectively rotate into position, whereas flaps with a narrower base may have a compromised blood supply and will provide only a limited amount of tissue for transfer. The medial and lateral limbs of the incision taper together superiorly approximately 0.5 to 0.75 cm anterior to the medial canthus.

The inferior limit of the flap is at the level of the oral commissure. When coverage for lateral oral cavity defects (lateral one third of the palate, alveolus, floor of mouth, and retromolar trigone) is required, a

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FIGURE 1. Initial presurgical planning with proposed incision line precisely following the nasolabial fold.

single-stage nasolabial flap can be used. The inferior 2 to 2.5 cm of the flap is deepithelialized with a no. 15 scalpel blade (Fig 4). For defects of the palate, upper alveolus, and retromolar trigone, a transbuccal tunnel is fashioned with Metzenbaum scissors at the posterior aspect of the upper gingivobuccal sulcus. To accomplish a single-stage closure of defects of the lateral one third of the floor of mouth and lower alveolus, the transbuccal tunnel is made at the posterior aspect of the lower gingivobuccal sulcus.

If the defect is in the central one third of the oral cavity (central palate, floor of mouth, upper and lower alveolus) or anterior tongue, a 2-stage nasolabial flap will be required, and the necessity for bilateral flap harvest is significantly increased. Hence, only the inferior 1 to 1.5 cm of the flap is deepithelialized. A transbuccal tunnel is fashioned at the level of the posterior bite margin to facilitate transfer.

With the planning completed, the flap is raised from superior to inferior in a supramuscular plane by using dissecting scissors. The angular branch of the facial artery often needs to be tied off in the superior aspect of the dissection. The transbuccal tunnel is made next according to the site of the defect in the oral cavity as described previously. The tunnel should be large enough to easily accommodate 1 or 2 fingers (1.5 to 2.0 cm). The flap is then transferred into the oral cavity in a tension-free manner and inset with a series of interrupted 3-0 absorbable sutures.

Generous undermining of the donor site is performed in the subcutaneous plane as for a "skin-lift" rhytidectomy. Layered closure of the donor defect is then performed (Fig 5). An attempt is made to evert the skin along the nasofacial portion of the incision to achieve a flat scar once healing is completed. However, along the nasolabial fold, a slightly depressed scar (hence, minimal eversion at the time of closure) results in a more natural appearance.

In cases in which a second stage is required, division and inset of the flap is generally performed 3 weeks after the initial procedure. Most patients are able to tolerate a soft diet during this period. During flap division, it is important to remove all of the transbuccal component of the flap rather than to

FIGURE 2. Placing the inferior one third to one half of the nasolabial portion of the incision medial to the fold will allow for an improved arc of rotation and aesthetic result.

FIGURE 3. Presurgical markings completed. The base of the flap is 2 cm wide in this patient.

simply divide it flush with the cheek tissue on the oral cavity side. Failure to do so will invariably result in the presence of a visible long-term fullness at the level of the lateral commissure.

Results

A total of 28 flaps were performed in 18 patients by the senior author (Y.D.). One patient underwent a repeated bilateral nasolabial flap harvest. The most common defect site in the oral cavity was the anterolateral tongue (Tables 1, 2). Three patients underwent secondary reconstruction to release tongues that were functionally tethered anteriorly. All of this subset of patients had significant improvement in speech clarity and masticatory capacity, and there was a reversal of chronic aspiration in 1 case. Five patients with complex combined defects of the oral cavity (9 nasolabial flaps) underwent simultaneous microvascular free tissue transfer (3 radial forearm fasciocutaneous flaps, 2 fibula osteomusculocutaneous flaps). In each case, the nasolabial flaps were used to provide independent reconstruction for the anterolateral tongue, with the microvascular flap providing for reconstruction of other areas of the oral cavity. In this subset of oromandibular reconstructions, all were able to maintain their weight with a soft diet. This is remarkable in that each of these patients had large combined defects of the oral cavity. All flaps healed without any evidence of necrosis.

Discussion

Even relatively small defects of the oral cavity often require reconstruction to avoid anatomic distortion and subsequent limitation of function. This is especially important in reconstruction of combined defects of the anterolateral tongue and floor of mouth. We believe that, although simple to perform, split-thickness graft reconstruction of these defects or the use of a single cutaneous paddle from a microvascular free tissue transfer, frequently will not provide optimal functional restoration after oncologic resection. In fact, in this series, 3 patients underwent reversal of tethering of the tongue by incision, release, and interposition of pedicled nasolabial flaps. All of them had

FIGURE 4. Flap raised in a supramuscular plane of dissection and the inferior 2 cm deepithelialized in preparation for single-stage transfer.

FIGURE 5. View of the donor site closure.

previously undergone single modality reconstruction of the tongue and floor of mouth, and they now showed significant improvement in mastication, clarity of speech, and tongue mobility postoperatively. Performing primary nasolabial flap reconstruction of anterolateral tongue defects in conjunction with microvascular reconstruction of large floor of mouth and mandible defects appears to be safe, does not add significantly to the length of the procedure, and is associated with a significant improvement in functional outcome.

The decision as to whether unilateral or bilateral flaps are required, or whether they may be safely and effectively transferred in 1 or 2 stages, should be based primarily on the size and location of the defect, as previously discussed. Generally, defects up to 4 × 5 cm can be satisfactorily closed by using this technique.

Table 1. DEFECT SITES

Anterior Tongue	Lateral FOM	Midline FOM	Lateral Palate	Midline Palate	Retromolar Trigone
12	4	6	3	1	2

Abbreviation: FOM, floor of mouth.

Table 2. CAUSE OF ORAL CAVITY DEFECTS

Squamous Cell Carcinoma	Osteo-radionecrosis	Wound Breakdown	Tethered Tongue From Previous Surgery
11	2	2	3

There has been some controversy over the nature of the blood supply to the inferiorly based nasolabial flap.[10,11] Some authors have even advocated performing nasolabial flaps on the side contralateral to a radical neck dissection to avoid basing the flap on a potentially compromised facial artery. We believe that the inferiorly based nasolabial flap can be raised as a random pattern flap, as evidenced by its viability in the face of transected ipsilateral facial arteries and the ability to raise a second (bilateral) set of nasolabial flaps in a single patient. We have performed 4 radical neck dissections ipsilateral to a nasolabial flap harvest at the same setting and have encountered no adverse effects.

The nasolabial flap is generally outside of the radiation therapy portals used in combined modality therapy for oral cavity squamous cell carcinomas. Thus, its vascularity is generally not compromised in this patient population. The administration of planned postoperative external beam radiation therapy may, in fact, be beneficial, especially in males, because it limits subsequent hair growth along the flap and, thus, obviates the need for epilation.

The nasolabial flap is a simple, effective, and safe flap with a low complication rate. Although not encountered in this series of patients, other authors have reported complications (infection, minor or major flap necrosis, wound dehiscence) occurring in a small minority of their patients.[12] Donor site morbidity is negligible in cases in which bilateral flaps have been raised. Asymmetry at the level of the nasolabial fold is noted in unilateral cases. The degree of asymmetry is lessened by broad undermining at the donor site.

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