

The Inferiorly Based Nasolabial Flap for Lower Lip Reconstruction in Children

RAOUF M. GOMMA, M.D.; NASSER A. GHOZLAN, M.D. and ABDEL MOHSEN K. ABOUELDAHAB, M.D.

The Department of Plastic and Reconstructive Surgery Unit, Faculty of Medicine, Alexandria University.

ABSTRACT

Reconstruction of large defects of the lower lip is difficult. The ultimate appearance should resemble the normal lip, and function should be reestablished so that oral competence is achieved. Various lip reconstruction techniques have been described. The number and variety of concepts suggest that no single technique is ideal. In this study, our aim was to define the role of the inferiorly based nasolabial flap for lower lip reconstruction in children. The study included seven patients in the pediatric age group suffering from perioral scarring and lower lip defects due to a variety of causes. Patients were operated upon in the period from January 2001 to May 2003 and followed-up for 2-3 years. The surgeries were carried out in the Plastic & Reconstructive Surgery Department of the Alexandria Main University Hospital and Students Hospital.

In all patients, the lower lip was reconstructed with a unilateral subcutaneous nasolabial flap. The postoperative course was uneventful and all flaps survived completely. We achieved lip reconstruction with good lip seal and at least good function in eating and speaking. There was no entropion of the lip and all the reconstructed lips preserved their height. Lip sensation recovered within a six month period. Upper lip sensation and motion were entirely preserved. The donor site scar was inconspicuous within the nasolabial crease.

The subcutaneous nasolabial flap provides colour- and texture-matched tissue to the lip. Its accessibility, ease of dissection, excellent blood supply, and minimal donor site morbidity reinforce this flap as a useful adjunct in lip reconstruction.

INTRODUCTION

Large defects of the lower lip represent a challenge to the reconstructive surgeon. The reconstructed lip should be sensate, retain muscle function, allow sufficient mouth opening, and have an acceptable aesthetic appearance. Various lip reconstruction techniques had been described. The number and variety of concepts suggest that no single technique is ideal [1].

A review of the literature suggests that musculocutaneous transfers are commonly advocated to recreate the anatomical composition of the resected lip, adhering to the questionable belief that muscle

must be transferred into the defect to maintain oral competence [2].

Functional reconstructions are best accomplished with innervated myocutaneous flaps of the orbicularis oris [3], or depressor anguli oris [2,4]. These are innervated, composite, musculocutaneous flaps that carry perioral muscles of facial expression along with the overlying skin and underlying mucosa and preserve the motor and sensory innervation. Thus, they have the potential for fully reconstructing lip loss by restoring all missing elements with a flap that retains sensation and restores oral sphincter motor function [4].

In smaller lip defects, innervated muscle reconstruction is attainable. However, in large defects, there is literally not enough muscle. For this reason, a simple technique that provides effective reconstruction with minimal donor morbidity is more appealing [5].

In this study, our aim was to define the role of the inferiorly based nasolabial flap for lower lip reconstruction in the pediatric age group.

PATIENTS AND METHODS

The study included seven patients in the pediatric age group (mean age 5 years with a range from 2.5-8 years), suffering from perioral scarring and lower lip defects due to a variety of causes. Five patients had post-electric perioral scarring, in one patient the microstomia resulted as a complication of laser therapy to a haemangioma of the lower lip, while one patient suffered from a severe form of neonatal oral infection (cancrum oris).

Patients were operated upon in the period from January 2001 to May 2003 and followed-up for 2-3 years. The surgeries were carried out in the Plastic & Reconstructive Surgery Department of the Alexandria Main University Hospital and Students Hospital.

Operative procedure:

After excision of all scar tissue causing microstomia, the resultant defect was measured regarding the length and width. A banner-shaped, inferiorly-based, flap was designed within the nasolabial fold immediately superior and lateral to the nasolabial crease. To minimize the creation of dog-ears at the oral commissure, the flap was based immediately superior and lateral to the defect, and discrepancies between medial and lateral flap length were kept to a minimum. Placing the flap base superior and lateral to the commissure effectively “suspends” the reconstructed lip and prevents any downward traction.

The flap was elevated in the subcutaneous plane, immediately superficial to the facial musculature. The distal flap was tapered to provide for simple closure without distortion of the lower eyelid. After transposition of the flap into the defect, the donor site was closed primarily with modest lateral cheek undermining as required. Finally careful inseting of the flap was performed avoiding any undue tension or kink. The inner mucosal lining was advanced to reconstruct the vermilion border and there was no need for any mucosal grafts in our patients.

RESULTS

In the present study all patients suffered from microstomia except the one following neonatal infection who presented with complete occlusion of the left buccal sulcus with gingivobuccal adhesion and synchinesis between the upper and lower lips. In this particular patient the flap was used to reconstruct the missing part of the lip as well as to serve as a lining to the sulcus (Fig. 1). In the other six patients the flap was used for subtotal or total lip reconstruction (Figs. 2,3).

In all patients, the lower lip was reconstructed with a unilateral subcutaneous nasolabial flap. The postoperative course was uneventful. All flaps survived completely and the patients were discharged after one week.

We achieved lip reconstruction with good lip seal and at least good function in eating and speaking. There was no entropion of the lip and all the reconstructed lips preserved their height. Lip sensation recovered within a six month period. Upper lip sensation and motion were entirely preserved. The donor site scar was inconspicuous within the nasolabial crease. Secondary minor touch-up procedures in the form of flap debulking or commissure refinements were needed in some patients.



Fig. (1-A): 3-years old child with complete occlusion of the left buccal sulcus, ginjivobuccal adhesion, and synchinesis between the upper and lower lips.



Fig. (1-B): An inferiorly based nasolabial flap was used to reconstruct the defect.



Fig. (1-C): Early post-operative view.



Fig. (1-D): Late post-operative view after flap debulking and commissure refinement.



Fig. (2-A): 7-years old child with post laser therapy microstomia, perioral scarring, and deficient lower lip.

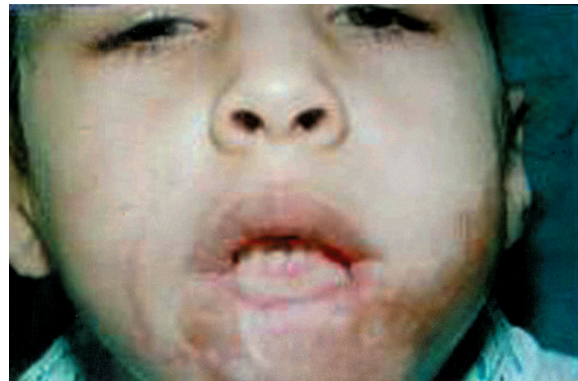


Fig. (3-A): 8-years old child post electric burn loss of the lower lip.



Fig. (2-B): Reconstruction with an inferiorly based nasolabial flap.



Fig. (3-B): Whole lower lip reconstruction with a single flap.

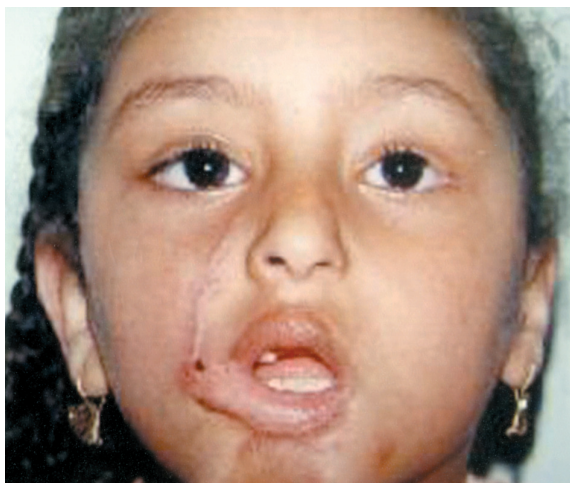


Fig. (2-C): Post-operative view.



Fig. (3-C): Late post operative view.

DISCUSSION

The goal of reconstruction of the acquired lip defect or deformity is to restore function and appearance as close to preinjury status as possible. Specific goals, in priority order, are: 1- Prevent drooling, 2- Allow a water tight seal of the mouth to prevent food or liquid expulsion during chewing, 3- Allow oral access for dentures, eating utensils, dental work, airway access, 4- Preserve or recreate symmetrical appearance at rest, 5- Provide accurate manipulation for labiodental speech sounds, 6- Preserve voluntary and involuntary expression of emotion, 7- Permit pursing of the lips for sucking or whistling and 8- Preserve lip sensation for preview of hot, cold, or sharp objects [6].

Large defects of the lower lip have been reconstructed with a variety of techniques. In principle, the lower lip can be reconstructed using "either" (1) Cheek advancement flaps (Modified Bernard's procedures) [7,8], (2) rotation flaps using the residual lip (Karapandzic) [3,9], (3) Double cross-lip flaps [10,11], or (4) Composite nasolabial or "gate" flaps [12,13]. Free tissue transfer techniques may also be used but are best reserved for the most extensive defects, such as those including the mental area [14,15].

The Karapandzic flap can provide a sensate lip with near-normal function; however, but if the defect is large, it inevitably results in microstomia and commissural distortion. Secondary commissuroplasty will almost surely denervate the muscle so carefully preserved in the initial reconstruction. After many procedures, the final result is often a patient with an immobile and insensate lower lip and significant perioral scarring [5,16].

Modified Bernard procedures can produce excellent results but sacrifice extremely large amounts of skin and subcutaneous tissue at the labiomental and nasolabial folds. The invariably results in a tight lower lip and significant perioral scarring and contour deformity. The extent of mobilization required restricts the use of the technique to patients with substantial cheek laxity [5,12].

Musculocutaneous nasolabial flaps have been used to reconstruct the lip in a single stage without the development of microstomia. However, this technique denervates the upper lip and destroys the orbicularis muscle at the commissure. Often, unsightly bulging is created at the pivot point as a consequence of the unnecessary thickness of the pedicle [16,17].

A fan flap, first described by Gilles [18] and popularized by Millard, is another option. This flap has a superiorly based pedicle that provides additional tissue to the lip so that microstomia is avoided. Because of the reorientation of the orbicularis oris muscle, a lack of motor function and minimal return of sensation results in this portion of the flap [16].

Many lip repairs that utilize muscle from the adjacent cheek produce a muscle malalignment. The sphincteric action of the lip and thus its power are reduced. Movements of the lip with emotion are somewhat distorted. Reconstructive techniques that use full-thickness nasolabial tissue may also denervate the upper lip muscle to a great degree [17,19].

Although muscular reconstruction is conceptually attractive, objective evidence of muscular function in reconstructed lips is only seldom described [20,21]. Rudkin et al. [5] stated that in their experience with musculocutaneous flaps, muscular function is either limited or absent and the flap served merely as a static sling. In smaller defects, innervated muscle reconstruction is attainable. However, in large defects, there is literally not enough muscle. They therefore stated that a simple reconstructive technique that provides effective reconstruction with minimal donor morbidity is more appealing.

In our series of seven patients, no complications were encountered. Patients were hospitalized just for few days to ensure adequate fluid intake. We have not encountered difficulties in maintaining oral competence or with drooling in any patient despite the fact that muscle was not included in the reconstruction. Patients were provided with a generous and functional oral aperture that allows oral hygiene, and oral feedings without anatomical constriction. Upper lip sensation and motion were entirely preserved. All patients had aesthetically acceptable results.

The subcutaneous nasolabial flap provides colour- and texture-matched tissue to the lip. Its accessibility, ease of dissection, excellent blood supply, and minimal donor site morbidity reinforce this flap as a useful adjunct in lip reconstruction.

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