

Periodontal Health Re-Establishment in Cleft Lip and Palate Patients through Vestibuloplasty Associated with Free Gingival Graft

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This article aims to present the surgical technique of vestibuloplasty with free gingival graft by means of clinical cases. Cleft lip and palate patients frequently present alterations at the anterior maxillary sulcus area. Their shallow vestibule is often associated with labial immobility, lack of keratinized mucosa causing mobility of the gingival margin of teeth adjacent to the cleft and poor hygiene maintenance. Vestibuloplasty is a commonly used technique to decrease these consequences and, when associated with free gingival grafts, it can reestablish the homeostasis of the marginal gingiva.

Key words: vestibuloplasty, gingiva transplantation, cleft lip and palate

INTRODUCTION

The primary objectives of periodontal therapy are to maintain and to obtain health and integrity of the insertion apparatus and to re-establish esthetics by means of the quantitative and qualitative restoration of the gingival margin. Esthetics can be considered essential to the success of any dental procedure. However, in cleft lip and palate patients gingival esthetics do not play a relevant role, since most patients present little gingiva exposure (Mikami, 1990).

The treatment protocol for cleft palate patients is complex and often requires a myriad of surgical and rehabilitative procedures that last until adulthood. In order to rehabilitate these patients and provide them with adequate physical and psychological conditions for a good quality of life, plastic surgery has been taking place since the 19th century, with the development of new techniques. By the age of six months the patients have under-

gone lip repair procedures (Bill, 1956; Jolleys, 1954), followed by palatoplasty at the age of 12-18 months. As a consequence of these surgical interventions, the formation of innumerable scars and fibrous tissue in the anterior region may cause some sequels, such as orofacial growth alterations (Quarta and Koch, 1989; Ozawa, 2001), a shallow vestibule with lack of attached gingiva and gingival margin mobility (Falcone, 1966).

A shallow vestibule in the cleft lip and palate patient is associated with the contraction of the upper lip during healing (Iino et al, 2001), which causes deleterious effects on growth, facial expression, speech, orthodontic and prosthetic treatment problems, diminished keratinized gingiva, bone graft resorption and changes in the upper lip muscle pattern.

The surgical protocol at the Hospital for Rehabilitation of Craniofacial Anomalies (HRCA) in Bauru consists of carrying out primary surgeries (cheiloplasty and palatoplasty) during the first months of

life, followed by a new evaluation at the age of six years to verify the need of secondary surgeries. The incidence of these procedures is 35%, twice as high in complete bilateral cleft patients than in patients with other kinds of clefts, while vestibuloplasty is the third most indicated procedure (Henkel et al, 1998).

In order to establish an anatomy close to normality various authors have presented different surgical techniques for deepening the vestibule. Rumpel (1916) and Kanzanjian (1924) recommended a vestibuloplasty technique in which the surgical site is exposed, achieving healing by second intention. Horton et al (1970) suggested a vestibule construction during primary cheiloplasty. In 1989, a type of polyglactin mesh was indicated to cover the exposed area during surgery (Quarta and Koch).

Watson (1991) classified modern techniques as (i) surgical healing by second intention, (ii) surgical site covering by a pedicle mucosal flap, (iii) surgical site covering by a skin graft or (iv) free gingival graft.

Several authors suggest a vestibuloplasty associated with devices as rubber tubes (Godwin, 1947), surgical stents for flap restraint (Waite, 1962), buccal mucosal grafts (Hillerup, 1982), skin grafts (Hjorting-Harsen et al, 1983), free gingival grafts, palate-cultured mucosal cells grafts (Raghoobar et al, 1995), associated techniques (Froschl and Kerscher, 1997) and other materials (Quarta and Koch, 1989; Iino et al, 2001).

Studies about vestibuloplasty techniques with healing by second intention suggest a 50% of vestibule width loss within 3-5 years (Donoff, 1976). Moreover, submucosal vestibuloplasty pedicle procedures, as proposed by Obwegeser (1964) require adequate quantity of healthy tissue, frequently absent in these patients. Regarding skin graft, discomfort and lip impairment with parakeratosis contraindicates this procedure. As for free gingival grafts, despite the low vestibule gain, it reduces patients' trauma and presents a 70 to 80% success rate (Koomen, 1977).

At the Hospital for Rehabilitation of Craniofacial Anomalies (HRCA), Department of Periodontology, vestibule deepening surgeries comes along with free gingival grafts aiming a wider zone of keratinized mucosa and the establishment of gingival margin, especially in grafted cleft areas (Bergland et al, 1986).

Classic clinical articles at the beginning of the 1960s, written by Bohannon (1962a; 1962b; 1963), stated that vestibule deepening without association with gingival grafts were not successful in long-term evaluations.

Free gingival grafts are performed in order to create a wide attached gingival zone and to keep periodontal homeostasis (Kennedy et al, 1985). Björn (1963) was the first to report a free gingival graft for enhancing vestibule height, eliminating frenum and creating attached keratinized gingiva. This sort of graft is commonly used in periodontal plastic surgeries, characterized by palatal tissue transplantation to alveolar mucosa areas, with high previsibility and success rates (Langer and Calagna, 1982). Since then, gingival grafts were performed to gain keratinized gingiva around teeth (Prato et al, 1995; Miller, 1985), to deep shallow vestibules and to release frenum and/or muscle tension (Bernimoulin et al, 1975; Bousquet et al, 1997; Han et al, 1995).

However, many authors have contraindicated free grafts due to their unesthetic results. A different color and texture of the tissue are normally the results of this procedure, but in cleft palate patients this aspect is not relevant, once their lip lines are low.

OBJECTIVES

The aim of this work was to describe a vestibuloplasty technique associated with free gingival graft by means of three case reports from the HRCA Department of Periodontology.

CASE REPORTS

Case report 1

A 16-year-old male patient with a surgically repaired cleft lip, alveolus and palate was referred to the Department of Periodontology at HRCA with a shallow vestibule and lack of keratinized gingiva at the right upper lateral incisor (Fig 1 and 2). These circumstances impaired oral hygiene and orthodontic treatment. The recipient site was prepared with a partial thickness flap - ie connective tissue and periosteum covered the alveolar bone providing vascular supply to the graft (Fig 3). The graft was harvested from the right side of the palate

CASE 1



Figs 1, 2 Lateral incisor with a shallow vestibule and inadequate zone of keratinized gingiva.

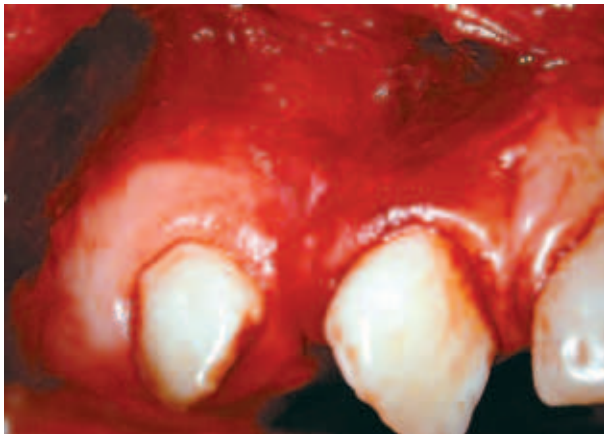


Fig 3 Recipient site preparation: vestibule deepening with a partial thickness flap, preserving the periosteum.



Fig 4 The vestibule was deepened and free gingival graft was sutured.

and was placed at the cleft and central incisor area (Fig 4). The recipient area was trimmed for removing the excesses of connective tissue and the graft was sutured with absorbable suture. Four months postoperatively, the achieved keratinized mucosa and vestibule depth was maintained, providing conditions to perform proper oral hygiene (Fig 5).

Case report 2

A 23-year-old female patient with a shallow vestibule due to several corrective plastic surgery interventions presented with lack of attachment at the upper central incisors area (Fig 6). A vestibule-deepening surgical procedure with a partial thick-



Fig 5 View of the patient of Fig 4, four months postoperatively.

CASE 2



Fig 6 Shallow vestibule at the upper central incisors area.



Fig 7 Vestibule deepened and free gingival graft sutured.



Fig 8 View of the patient of Fig 7 at two months post-operatively.

ness flap and free gingival graft was performed (Fig 7). After 15 days the patient returned for post-operative control and reported better lip mobility and better hygiene (Fig 8).

Case report 3

A 13-year-old male patient with a cleft lip, alveolus and palate cleft was referred to the Department of Periodontology with insufficient keratinized mucosa and vestibule depth at the upper right canine region (Fig 9). A vestibule-deepening procedure was performed with a free gingival graft (Fig 10). Six months postoperatively an adequate zone of keratinized mucosa and vestibule depth was achieved to proceed with orthodontic treatment (Fig 11).

DISCUSSION

The treatment of cleft lip and palate patients aims to enhance anatomical and functional conditions of the area and to re-establish better physical and psychological conditions. In the early months of life cleft palate patients undergo primary plastic surgery interventions (cheiloplasty and palatoplasty). Later, these patients experience bone graft, usually from the ilium, to repair the osseous cleft. Postoperative scars alter the orofacial growth pattern and promote a shallow vestibule and lack of mobility at the gingival margin of adjacent teeth (Falcone, 1966, Horton et al, 1970).

A shallow or absent vestibule impairs upper lip muscle mobility and, since lip and premaxilla are attached, it interferes with facial expression as well as promoting food retention, causing difficulties in bilabial phoneme production, impairing orthodontic treatment, prosthetic rehabilitation and periodontal care - leading to gingival margin mobility- and possibly enhancing bone graft resorption due to buccal flap tension.

Besides being shallow, the vestibule in cleft palate patients normally presents minimal or even no keratinized gingiva. The need for an adequate width of keratinized gingiva (qualitatively and quantitatively) at the marginal area is supported by observations that suggest that this tissue influences the maintenance of periodontal health, clinical attachment level, the depth and width of gingival sulcus, gingival margin mobility, relative marginal tissue impermeability and resistance and capacity of masti-

CASE 3



Fig 9 Ischemic area after upper lip traction.



Fig 10 Vestibule deepened and free gingival graft sutures.

catory forces dissipation (Ariau and Tyrrell, 1957; Lang and Löe, 1972; Egli et al, 1975). Lang and Löe (1972) showed that for young adults a minimum of 2 mm of keratinized gingiva would be necessary to maintain gingival health. The authors showed that less than 2 mm allows gingival margin mobility, facilitating microorganism penetration in the sulcus. This results in subgingival plaque formation that is difficult to detect clinically and prevents access for home care hygiene procedures. Subsequently, other articles question these data, revealing that adequate hygiene maintenance alone is sufficient to reach gingival and periodontium health. Those studies question the need for surgical management in order to augment the keratinized tissue around teeth (Dorfman et al, 1980; Wennström and Lindhe, 1983).

Gingival alterations may occur in the absence of an adequate zone of attached soft tissue. Therefore, it is necessary to surgically correct these areas. However, the lack/insufficiency of the latter is not supposed to be measured in size but observing other factors, such as patient age, hygiene maintenance conditions, need for restorations, prosthesis and orthodontic treatment, dental history, the presence of recessions and as a preparatory phase prior to other surgical interventions (regenerative techniques and/or periodontal plastic surgeries). Only after checking these features is it possible to indicate keratinized tissue augmentation (Prato et al, 1995; Miller, 1985).

The free gingival graft has numerous contraindications, such as unpleasant outcome in the anterior re-

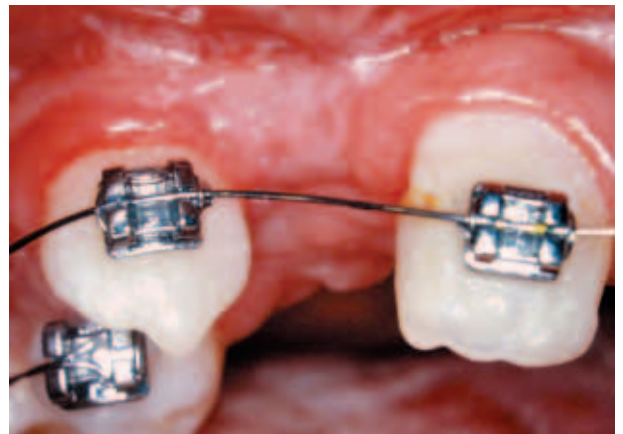


Fig 11 Three months postoperatively with orthodontic appliance installation.

gion where esthetic appearance is important (Prato et al, 1995; Miller, 1985). In 1970, Horton et al related that the attachment of the lip to the premaxilla results in deleterious effects, and the persistence of this abnormal adherence at the central lip area limits vertical lip growth. This impairment results in lip asymmetry when compared to the opposing non-affected side. Since cleft lip and palate patients normally present a low lip line profile there is no esthetic contraindication of free gingival grafts described by other authors.

At the HRAC Department of Periodontology, vestibuloplasty with an epithelium/connective tissue free gingival graft to create or augment the zone of keratinized tissue and diminish the relapse rates, observed when there is no association with

gingival grafts, is performed habitually with favorable outcomes.

All patients were referred to the HRAC Department of Periodontology presenting a shallow vestibule and lack of keratinized soft tissue. After vestibuloplasty with the association of a free gingival graft, favorable results were achieved with vestibule deepening and a minimum of 2 mm of keratinized tissue, reestablishing homeostasis at the cleft region.

CONCLUSIONS

The treatment of cleft lip and palate patients enhances physical and psychological conditions, promoting a better quality of life these patients. Therefore, the proposed therapy was effective in the three cases presented:

- Patients mentioned better lip mobility;
- All cases presented a deeper vestibule and a wider zone of keratinized gingiva;
- Oral hygiene was enhanced after therapy;
- All patients were satisfied with treatment outcomes.

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