

ALVEOLAR RIDGE AUGMENTATION BY SUBEPITHELIAL CONNECTIVE TISSUE GRAFTING TO IMPROVE AESTHETIC ORAL REHABILITATION

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Abstract: Introduction: Defects in the alveolar bone ridge in edentulous areas may result from extraction procedures or pathological processes, compromising function and aesthetics. Pre-prosthetic surgery for the purpose of ridge augmentation commonly uses soft tissue graft techniques in cases where volume loss occurred in the buccolingual width, and the association of bone grafts when there is loss in height. Objective: To report a clinical case of subepithelial connective tissue grafting to increase the ridge in the anterior maxillary region in a female patient, 21 years old, with aesthetic and functional complaints due to cortical bone resorption resulting from localized periodontitis and tooth loss. Methods: After obtaining free and informed consent from the patient, diagnostic and prognostic considerations of the case were carried out. The initial therapy related to the cause included the creation of a temporary fixed prosthesis, which also served as a post-surgical conditioner. The surgical technique consisted of preparing the graft recipient site, on the edge of the region of the upper right central incisor, with a linear incision located palatal to the defect site, extending in the division of a partial thickness flap parallel to the buccal cortex and exceeding the limit of the mucogingival junction. The graft was obtained from a donor area in the palatal region of the right upper premolars and first molar, with a linear incision 3 mm away from the gingival margin. A wedge of tissue with a conjunctival thickness of 2 to 3 mm was obtained through two internal bevel incisions and transplanted to the recipient site. The synthesis was performed using simple interrupted sutures with an atraumatic needle and nylon monofilament thread in the donor area of the graft and, in the recipient site, the vestibular flap was brought closer to the limits of the palatal inserted mucosa, crossing the thickness of the graft.

The postoperative period included analgesic and anti-inflammatory prescriptions, cleaning with a post-surgical toothbrush and mouthwash with chlorhexidine digluconate for 14 days. Results: Post-operative clinical-radiographic monitoring revealed that the patient's functional and aesthetic discomfort was resolved by the recovery of the planned tissue dimension and by morphological conditioning with the formation of an interdental papilla during the provisional prosthetic phase. Conclusions: An important requirement for the success and predictability of ridge augmentation procedures with subepithelial connective tissue graft is to analyze the degree of loss in buccolingual width and apicocoronal height. The reported case, of precise indication in a moderate defect of a single tooth, achieved reconstruction of the volume of lost tissues with predictability and functional and aesthetic benefits.

Keywords: Alveolar Bone Loss; Dental prosthesis; Oral Surgical Procedures; Tissue Grafting

INTRODUCTION

Defects located in the alveolar ridge of partially edentulous patients may result from tooth extraction with loss or dehiscence of cortical bone, resorption due to periodontal disease, developmental changes, trauma or tumors, compromising aesthetics, phonetics and oral hygiene.¹ Studies analyzing the anatomy of the anterior segment of the arches of partially edentulous patients, they reported the prevalence of deformities in 91% of cases.²

Ridge deformities were classified by Seibert (1983), according to the horizontal and vertical components of the defect, into three types: class I, with loss of tissue contour in buccolingual thickness and normality in apicocoronal height; class II, with loss of apicocoronal height and normal buccolingual contour; class III, with the combination of loss

in buccolingual thickness and apicocoronal height.¹ Regarding their severity, they were classified by Allen et al. (1985) into three types: light, with loss <3 mm; moderate, with loss of 3 to 6 mm; severe, with loss >6 mm.³

Treatment to restore the form, function and aesthetics of ridge deformities may include alveolar ridge reconstructive procedures by guided bone regeneration, bone grafting, onlay soft tissue grafting, subepithelial connective tissue grafting, pedicled, rotated, and roll grafts. or combinations of techniques. Often, soft tissue graft techniques are used in cases where volume loss occurred in the buccolingual width, while its association with mineralized tissue grafts occurs when there is loss in height.^{4,5}

The objective of this work is to report a clinical case of subepithelial connective tissue grafting to increase the ridge in the anterior maxillary region in a young patient with aesthetic and functional complaints due to cortical bone resorption resulting from the loss of a central incisor.

MATERIAL AND METHODS

The present case report was approved by the Research Ethics Committee of the ``Universidade Estadual de Feira de Santana`` - UEFS, Bahia, Brazil, as well as the agreement of the patient, who signed the post-information free and informed consent form.

REPORT OF CASE

A 21-year-old female patient was referred to the UEFS dental clinic in Feira de Santana, Bahia, Brazil with the hope of improving the aesthetic appearance of her anterior maxillary fixed partial denture (FPD). The aesthetic and functional patient's complaints were due to localized vestibular cortical bone resorption, resulting from the loss of right maxillary central incisor. Her medical history revealed chronic bronchitis and episodes of

anxiety. The normality of other parameters of his general health, complete blood count, coagulation studies and glucose, was verified. Her dental history revealed the loss of tooth 11 due to localized periodontitis.

Upon intraoral physical examination, the region of tooth 11 was rehabilitated with a FDP with unsatisfactory aesthetics and function, due to space between the tooth 11 pontic and edentulous ridge, which demonstrated Class I deformity with buccolingual tissue loss according to Seibert's classification.¹ Figure 1 shows the initial clinical-radiographic appearance of the case.

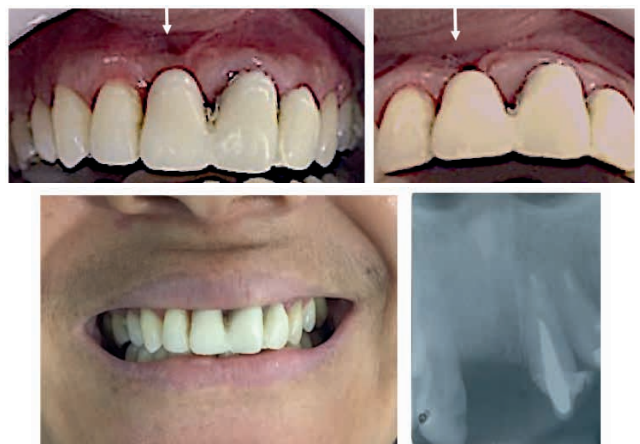


Figure 1. Preoperative clinical-radiographic view of the Seibert Class I alveolar ridge defect (arrow).

In some teeth there were restorations with margin discrepancy, but the occlusion was harmonious. O'Leary's (1972)⁶ plaque index was 53%. The periodontal examination was carried out with Williams and Nabers probes (Trinity, São Paulo, Brazil). Localized clinical attachment loss was found in 20% of the sites, with gingival recession and shallow probing pocket depths. Bleeding on probing was 12%. Radiographs confirmed the clinical findings of interproximal height of alveolar bone and acceptable root canal fillings.

The periodontal diagnosis was localized stage III and grade C periodontitis and, to

control it, the treatment plan included, in its initial phase, cause-related periodontal treatment, which consisted of oral hygiene guidance for self biofilm removal at home using toothbrush and interproximal cleaning aids, professional prophylaxis, supra and subgingival mechanical debridement, elimination of local biofilm retentive factors (inadequate restorative margins), removal of FPD and creation of a provisional fixed prosthesis with adequate shape, contour and emergence profile.

Reevaluation took place 45 days after the end of initial therapy and showed good inflammatory control and stability of clinical attachment levels.

Thus, plastic surgery was carried out with a subepithelial connective tissue graft⁵ to enhance ridge width in the anterior maxillary region, illustrated in figure 2. After removing the provisional fixed prosthesis, an analysis of the shape of the localized defect of the alveolar ridge was carried out, by measuring it in the vertical and horizontal dimension with a periodontal probe (UNC-15, Hu-Friedy, Chicago, USA). When investigating the vertical component, the distance between the deepest point of the ridge defect to a line connecting the tips of the adjacent mesial and distal interdental papillae was analyzed, verifying that there was no loss of ridge height. The horizontal component was analyzed, in an occlusal view, between the deepest point of the buccal aspect of the ridge defect to the tooth arch curvature, which runs through the adjacent gingival zeniths, finding there was moderate loss of ridge in buccolingual width, constituting the indication for soft tissue grafting.

The surgical technique consisted of preparing the graft recipient site, under local anesthesia, by a horizontal crestal incision with a n° 15 scalpel blade, extending from the mesial aspect of right lateral incisor to the

mesial aspect of left central incisor over the deformity. Following, a partial-thickness flap was raised, up to the mucogingival junction (Fig. 2A).

The donor site for the connective tissue graft was the right lateral half of the hard palate in the second premolar and the first molar region. To obtain the free connective tissue graft, a sterile cardboard template was cut to the size of the inside of the tissue pouch created in the recipient site, plus 3mm in width and height to compensate for the primary contraction that occurs at the time of excision of the wedge of tissue obtained from the donor area (Fig. 2B). The graft was obtained from the palatal area from the distal line angle of the canine to the mesial line angle of the palatal root of the first molar by a linear incision with a n° 15 scalpel blade 3 mm away from the gingival margin. Following, the 2-3 mm thick connective tissue graft was obtained through two internal bevel incisions parallel to each other (Fig. 2C). The wedge of tissue had the macroscopic submucosal structures of adipose and glandular tissue removed with the scalpel blade, as well as the layer of keratinized epithelium (Fig. 2D). The graft was transferred to the recipient site, inserted into the pouch and sutured using 5-0 nylon sutures going through the graft (Figs. 2E-G).

The provisional prosthesis was cemented with temporary zinc oxide-based cement. The prosthesis was made with a convex and ovoid shape, so that its cantilevered pontic exerted the function of conditioning, in the healing phase, the remodeling of the shape of the fibromucosa through its slight superficial compression, allowing thus the formation of interdental papillae occluding the spaces of the prosthesis's embrasures.

Post-surgical treatment included analgesic and anti-inflammatory prescriptions, soft toothbrush hygiene (CS Surgical Mega Soft, Curaprox, Bern, Switzerland) and

mouthwashes with chlorhexidine digluconate for 2 weeks. No post surgical complications were revealed and the sutures were removed after one week, when apparently complete epithelialization of the wound in the donor area of the palate was observed, without considerable edema or redness, and the patient reported no relevant discomfort (Fig. 3A, B).

The patient was called after an interval of 2 weeks for the next 3 months. Postoperative follow-up included the routine of removing the prosthesis and adding an increment of acrylic resin to the cervical of the oval pontic, making it progressively more convex for the superficial conditioning of the fibromucosa by light compression and induction of formation of the mesial and distal interdental papillae. After 3 months, the surgery sites were well healed with a firm uninflamed fibromucosa. The labial contour of the alveolar ridge showed augmented width, which was harmonious with the prosthesis design and with good oral hygiene (Fig. 3C). The patient was scheduled for 3 additional months of periodical clinical recall appointments, when maturation of connective tissue remodeling will be achieved. The definitive ceramic prosthesis will then be made 6 months post-operatively, when there is greater tissue stability and shape predictability. The planning also includes subsequent annual clinical maintenance and biannual radiographic control through periapical radiography of the graft recipient area and the abutment tooth of the prosthesis by the paralleling technique.

DISCUSSION

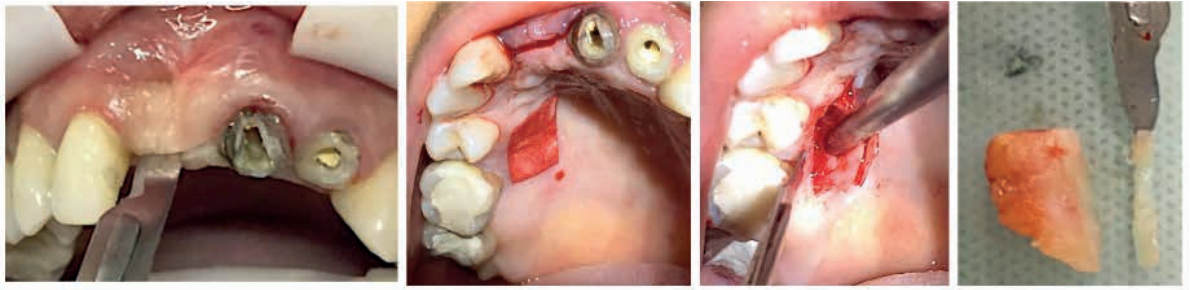
A variety of techniques and procedures have been reported in the literature for treatment aimed at restoring the form, function and aesthetics of ridge deformities.^{1,4} The subepithelial connective tissue graft technique described by Langer and Calagna (1980)⁵ for

root coverage and ridge augmentation was chosen for the present clinical case, since, especially in the maxilla, its success and predictability are attributed to the double blood supply to the recipient site from the base of the underlying connective tissue and the overlying recipient flap. In addition to better repair, the tissue phenotype resulting from healing maintains excellent aesthetics and natural color and surface texture. The donor area can be occluded with the suture, which produces less postoperative discomfort.

The advantages stand out when compared with the free epithelial-connective graft previously proposed by Bjorn (1963)⁷ and Nabers (1966)⁸, which presents, in turn, a greater risk and rate of graft necrosis, is less aesthetic due to the greater risk of unevenness in the interface between the graft and the recipient site, discrepancy in color, surface texture and degree of keratinization and, in the donor area, postoperative exposure of connective, periosteal and/or bone tissue, with healing by secondary intention, and often incurs greater discomfort, postoperative pain and risk of hemorrhage.

While techniques using mineralized tissue grafting and biomaterials may face relative unpredictability of ridge volume gain due to the possible healing resorption, replacement resorption, and ankylosis processes, autogenous connective tissue graft may, in the long term, undergo secondary contraction and remodeling. The patient must be made aware that wound healing is a prolonged biological process and can be influenced by individual reparative factors.

Once the gain in soft tissue volume has been achieved in the treatment with a graft on the defective ridge, the prosthetic rehabilitation phase must be strategically conducted so that the relationship between the fibromucosa of the ridge and the pontics of the FPD favors aesthetics, function and hygiene. In

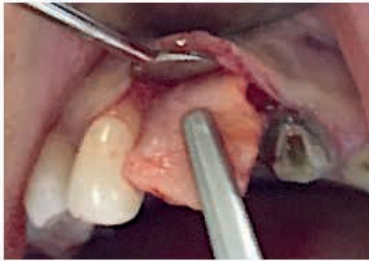


A

B

C

D



E



F



G

Figure 2. Surgery steps.



A



B



C

Figure 3. A,B. Clinical appearance 14 days post-operatively. C. Clinical appearance 90 days post-operatively.

the healing phase, the oval-shaped pontic of the provisional FPD used in the present clinical case was repeatedly remodeled by adding acrylic resin with the aim of making it progressively more convex to condition the shape and obtain a concave soft tissue contour on the edentulous crest, with the formation of adjacent papillae that imitate the emergence profile of natural teeth.

Finally, so that the results achieved can be monitored and maintained, all prosthetic rehabilitation must include regular periodic

follow-up recalls, with the aim of guaranteeing and preserving physiological biomechanics, biofilm control and overall health.

CONCLUSION

The present case report illustrates the aesthetic reconstruction of a Seibert Class I ridge ridge deformity using subepithelial connective tissue grafting to return a functional and aesthetic contour to the planned FPD. An important requirement for the success of the procedure is to classify the degree of loss in

buccolingual width and apicocoronal height. The case reported, of a procedure with precise indication for its classification, achieved reconstruction of the volume of lost tissues with aesthetic and functional benefits.

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