Obtaining Intraoral Subepithelial Connective Tissue Graft: Dermabrasion Technique

CASE REPORT

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Abstract

Objectives: The present study aims to describe the dermabrasion technique to obtain connective tissue rich in collagen, with satisfactory thickness and anatomy, removing the epithelial layer with diamond drill in high speed handpiece and under refrigeration.

Materials and Methods: A 50-year-old patient was selected for immediate dental implant (element 25) and soft tissue augmentation in the periodontal and peri-implant region. An epithelial connective tissue graft was performed in the area comprising elements 23, 24, 25 and mesial of 26. For the preparation of the donor area of the graft, the dermabrasion technique was used through a spherical diamond drill bit (medium or thick granulation) in high speed and under refrigeration, being able to remove the epithelium without losing part of the subepithelial layer.

Results: The healing process is by second intention and presented a normal evolution with formation of adequate tissues.

Conclusions: The Dermabrasion technique allows to obtain adequate grafts, removing the epithelial layer in a simple way and guarantee the desired thickness.

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Keywords

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Introduction

The aesthetics increasingly is highlighted in the current Dentistry, collaborating, even, for the social well-being of the individual. In this context, periodontology had been showing great advances in plastic surgical techniques through aesthetic soft tissue grafts, with emphasis on the treatment of gingival recession and peri-implant soft tissue deficiencies.

Free gingival graft and subepithelial connective tissue graft are among the most widely used and widely studied gingival augmentation procedures. Both techniques have several applications, including keratinized tissue band augmentation, soft tissue thickness and vestibule depth increase, root coverage, and treatment of the pigmented and pathological oral mucosa. The predictability and long-term stability of the surgical outcome for these procedures were well established [1].

The masticatory mucosa comprises the gingival tissue and the hard palate, and the mucosa of the hard palate is composed of three histological layers: the epithelium, the subepithelial connective tissue with its own lamina and the submucosa. The epithelial portion measures about 300µm in thickness, the subepithelial portion varying substantially from individual to individual and also depends on the area being withdrawn. For example, it may diversify in the area of tuberosity more than 4 mm thickness to an average of 3 mm in the region of second molars and premolars [2, 3].

Several techniques to obtain the graft are described in the literature, such as the trapdoor technique [4], the parallel incision technique [5], Bruno modified technique [6], the single incision technique [7], the technique of the simple parallel incision to the gingival margin [8] and the technique of obtaining a connective tissue graft in fine palates [9]. The most used donor area is the palate region, however, when it comes to the removal of the subepithelial graft in this region, technical and anatomical knowledge of this area is necessary to avoid an increase in morbidity.

The uniformity of the graft is important for the predictability of root coverage and increased ridge. A "gold standard" connective tissue is the one located immediately under the epithelium, because it is relatively dense and highly collagenous, an important clinical condition in the modification of a gingival biotype. One of the greatest challenges of the several techniques proposed in the literature is the removal of the epithelial portion of the graft piece obtained. The widely used techniques remove subepithelial connective tissue from the donor area through a linear incision preserving the epithelial cap. The disadvantages of these methods are the obtaining of a loose, disorganized connective graft, rich in adipose tissue and not uniform.

The dermabrasion technique seeks to obtain a connective tissue rich in collagen, with satisfactory thickness and anatomy, by removing the epithelial layer using a diamond drill on high speed hand-piece and under refrigeration, aiming, therefore, to obtain a graft of excellence and better results. This technique will be described here, with the consent of the patient reported below.

Materials and Methods

For this clinical case, it was selected a 50 years old female patient. She needed a rehabilitation through dental implant (element 25) and soft tissue augmentation in periodontal and peri-implant region. Clinically a thin biotype was observed, besides the complaint of dentin hypersensitivity (elements 23 and 24) and darkening of the gingival margin (element 25) (**Figure 1**).

In view of the clinical picture, it was decided and planned to perform the minimally invasive exodontia of the 2nd left upper premolar with immediate placement of an implant followed by the provisional crown. As a complementary surgical maneuver, an epithelial connective tissue graft was performed in the area comprising elements 23, 24, 25 and mesial of 26.

Figure 1. Patient's initial appearance.

Figure 2. Delimitation of graft boundaries.

Preparation of the receiving area

One hour before the surgical procedure, the patient was medicated with 1g of Amoxicillin and 4g of Dexamethasone. Initially, the recipient area was prepared by performing detachment of the inserted gingiva, preserving the papilla for posterior insertion of the graft by the Tunnel Technique [10].

Then, atraumatic root extraction of element 25 and immediate insertion of the 3.3 x 14mm implant (Straumann, SLActive®, Basel, Switzerland) completed the first surgical step.

Removal of conjunctival graft by the Dermabrasion Technique

Local anesthesia of the donor area was performed only at the anatomical site of the major palatine foramen, avoiding to infiltrate the anesthetic 4% articaine with 1:100.000 epinephrine, along this region, keeping important clinical sign of Dermabrasion, which is the bleeding. Subsequently, through a caliper device, Krekeler caliper (Helmut Zepf, Germany), the required graft length was measured in the recipient area. This measure was transferred to the donor bed and, thus, drawn the limits of the palatal graft. This measurement transfer can also be performed with the periodontal probe or through a template. Subsequently, the vertical and horizontal incisions were made to delimit the graft, the 15C scalpel blade bevel (Swan Morton, Sheffield England) having a thickness of about 1.5 mm (**Figure 2**).

After careful planning and detailed consultation in the literature on how to promote a better result of this graft and the best technique for obtaining them, it was noticed that with a simple intervention it was possible to remove the epithelium without losing part of the subepithelial layer, and thus not to compromise the ideal graft thickness obtained from the chosen donor region.

In the next step is the important observation of this description, called Dermabrasion. Through a spherical (medium or thick granulation) diamond drill (KG Sorensen, country), in high speed hand-piece and under refrigeration, it is possible to remove without difficulty the epithelium of the previously demarcated region. This layer has about 0.3 mm, so the light touch of the drill removes it without any damage or greater connective losses. the reference that the epithelium has been removed is the bleeding itself (**Figure 3A & 3B**).

It follows the vertical and horizontal incisions and removal of the graft by penetrating the scalpel blade to the width of the graft, maintaining a safe distance from the palatine nerve vasculature that presents 12 mm from the cemento-enamel junction in the middle palates.

After the graft removal, if necessary, it is reanatomized, taking it to the receiving site and leaving it as short as possible outside this bed. Meanwhile, the assisting professional presses the donor area with a gauze soaked in saline for proper hemostasis.

Figure 3. Dermabrasion and bleeding after removal of the epithelium.

Figure 4. Graft Thickness.

Through **Figure 4**, it is possible to verify that after the reanatomization of the graft, the desired thickness and quality were reached to achieve the therapeutic objective (Krekeler's caliper, Helmut Zepf, Germany, with a final thickness of about 1.5mm).

At the end, in the donor bed, collagen sponges (Hemospon, Corporación Dental H & T, CA) are applied stabilized with compressive sutures.

Figure 5. Immediate postoperative of the receptor area.

The graft was inserted and stabilized in the receptor area through the Tunneling Technique (**Figure 5**).

Postoperative Care

The patient was guided with the following post-operative care: use of cold compress in the first 3 hours; liquid and pasty food in the first 72 hours; do not floss for a period of 15 days and dental brushing with a Curaprox® surgical brush for 30 days. In addition, the hygiene was complemented by professional prophylaxis with rubber cup and prophylactic paste in the periods of 7, 15, 21 and 30 days

The prescription drug was composed of: mouthwash Chlorhexidine 0.12% 2x daily for 15 days started 24 hours after the procedure; Amoxicillin 500 mg every eight hours for seven days; Dexamethasone 4 mg every 12 hours for two days; Dipirone sodium 500 mg, one tablet every six hours, in the first 24 hours, repeating for another 24 hours in case of pain.

Follow-up

The sequence of **Figure 6A to 6E** shows the follow-up of the case described above, evidencing a process of adequate healing and tissue formation. **Figure 6A** corresponds to the recipient area after 10 days, **Figure 6B** the donor area after 10 days, **Figure 6C** recipient area after 30 days, **Figure 6D** donor area after 30 days, and **Figure 6E** the final patient appearance after 12 months.

Figure 6. Postoperative follow up.

Results and Discussion

The literature is clear in showing that there are associations between adequate keratinized tissue width, higher dental implant survival rates, peri-implant mucosal health, and a better aesthetic result [11], demonstrating the importance of the different treatment options that allow these gains. However, some factors may influence these results. Histomorphometric study in fresh human cadavers has shown that palatal connective tissue grafts collected by different surgical techniques differ in the relative amounts of fibrous tissue and adipose and glandular tissue [12], for example.

The main objective of intraoral autogenous connective tissue collection techniques (such as the Single Incision Technique) is to reduce patient morbidity by alleviating the postoperative course; however, an adequate thickness of the palatal fibromucosa is required to avoid desquamation of the weakened superficial flap due to compromised vascularization [13], therefore even aiming for primary intention healing of the donor site, such techniques may also offer some disadvantages.

In this context, other procedures for the collection of these tissues, such as the one demonstrated in this study, where the healing of the donor area is by second intention, may also offer advantages such as the ease of obtaining a high-quality graft and thus guarantee more predictable results at the site of the graft.

It is important to note that an anesthesia should not be infiltrated near the donor area to perform the technique described in this study, because this action would mask bleeding of the region when dermabrasion is performed, therefore, it is advised that anesthesia should be at a distance through a trunk anesthesia.

In addition, previous work [1] evaluated that long-term procedures in periodontal surgery were strongly related to increased postoperative pain. This fact highlights the importance of the technique descri-

bed here because it is the same of rapid accomplishment in comparison with other techniques in use, without requiring a degree of experience more than that already necessary for execution of the main techniques present in the literature.

Besides that, as it was observed in the description, dermabrasion does not increase the cost of the surgical procedure nor does it require specific instruments or material to perform it, which makes it a technique that is applicable and predictable in the professional's daily life.

Conclusion

The Dermabrasion technique allows to obtain adequate grafts, removing the epithelial layer in a simple way and guarantee the desired thickness. The advantages of this technique are:

1. Good visibility of the donor site;
2. Assorted sizes of grafts can be obtained;
3. The technique is applicable to different anatomical situations of the palatine vault;
4. Graft obtained with favorable thickness and quality;
5. Reduced surgical time.

Conflict of Interest

All authors declare no conflicts of interest related to the present study.

Ethical approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the Helsinki Declaration of 1964 and its subsequent amendments or comparable ethical standards.

Informed consent

Informed consent was obtained from the study participant.

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