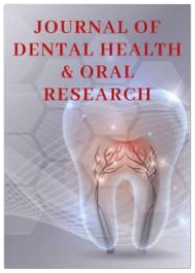

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Case Report

Free Gingival Graft for Mandibular Anterior Teeth: A Clinical Case Report

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Abstract

Free Gingival Graft (FGG) is a well-established surgical technique in mucogingival surgery, primarily used to increase the amount of Keratinized Tissue (KT) in deficient areas. This procedure has proven effective for the coverage of gingival recessions, especially in cases with insufficient attached gingiva. However, its application in deep recessions or for complete root coverage presents aesthetic and functional limitations. Recently, modifications to the traditional FGG technique have been proposed to improve its outcomes. A study introduced a modified FGG technique, which demonstrated greater recession coverage and a significant increase in KT height compared to the conventional FGG. This modification also resulted in higher patient satisfaction in terms of aesthetics. In addition, recent research has evaluated the use of mucoadhesive agents containing hyaluronic acid at the palatal donor site.

Clinical Case: A 51-year-old female patient with a medical history of breast cancer, successfully treated five years ago with no signs of recurrence to date, presented for consultation seeking to improve periodontal esthetics and functionality through root coverage in the lower anterior region. Clinical examination revealed gingival recessions on teeth #31 and #41, classified as RT1 according to Cairo's classification of recession types. Aberrant frenula were also noted, inserting at the mucogingival junction and causing excessive muscular traction on the gingival margin. The width of KT in the affected area was minimal-approximately 2 mm-compromising periodontal stability and complicating oral hygiene. The therapeutic approach involved performing a Free Gingival Graft (FGG) to increase the amount of KT and improve the periodontal environment in preparation for a potential future root coverage procedure. Additionally, muscle traction was addressed through the disinsertion of muscle fibers and removal of the aberrant frenula. The graft was harvested from the palate and adapted to the previously prepared recipient site. Postoperative evaluations revealed a significant gain in KT height and thickness, along with satisfactory integration of the graft in terms of color and texture, achieving esthetic harmony with the adjacent tissues. Despite the absence of mucoadhesive agents or dressings at the donor site, palatal healing was adequate and uneventful, with the patient reporting manageable pain levels.

Conclusion: The free gingival graft remains a reliable and effective therapeutic option for increasing keratinized tissue in areas where it is minimal or absent. In this case, the technique not only improved the periodontal and esthetic conditions of the treated region but also established favorable conditions for possible future root coverage. The surgical intervention successfully modified the insertion of soft tissues, eliminating muscular tension that compromised gingival stability and improving the long-term prognosis of the involved teeth.

Keywords: Free Gingival Graft; Keratinized Tissue; Gingival Recessions; Gingival Augmentation

Introduction

Mucogingival deformities affecting the natural dentition, such as gingival recession and keratinized tissue (KT) deficiency, represent an ongoing clinical challenge in periodontics, particularly in contexts demanding high esthetic standards and long-term soft tissue stability [1]. Currently, autologous grafts such as the Free Gingival Graft (FGG) and connective tissue graft are considered the most evidence-based therapeutic options for correcting soft tissue defects, preserving alveolar ridges and reconstructing peri-implant papillae [2]. Since the late 1960s, the FGG has been employed as an effective technique for increasing KT and deepening the vestibule in cases of insufficient attached gingiva [3]. Originally described within the field of mucogingival surgery-a term introduced by Friedman, -it was later incorporated into the concept of periodontal plastic surgery by Miller, who defined it as a set of surgical techniques aimed at correcting anatomical, traumatic or pathological defects of the gingiva, alveolar mucosa or bone [4,5]. FGG involves harvesting an epithelialized graft from the palate, which is used to increase the width of KT in deficient areas [1]. It has been established that a minimum of approximately 2 mm of KT is required; a lack of it is considered a significant risk factor for biofilm accumulation, inflammation and even marginal bone loss [5]. Golmayo B, demonstrated that sites with less than 2 mm of keratinized gingiva have up to 3.5 times greater risk of marginal bone loss [6]. Although FGG offers predictable outcomes for KT augmentation, it presents disadvantages, such as donor site morbidity, which heals by secondary intention and requires dressing protection for approximately 14 days [7]. Among the most notable complications is intraoperative bleeding, usually due to injury to the greater palatine artery; this risk can be minimized with proper anesthetic technique using a vasoconstrictor, which improves hemostatic control and surgical visibility [2]. The hard palate is the preferred donor site, healing by secondary intention and often requiring an acrylic stent or dressing to reduce patient discomfort GGs are not recommended for treating recession defects in patients with high esthetic demands due to poor esthetic outcomes and low predictability of root coverage [4]. The aim of this article is to evaluate and compare the gain in keratinized tissue achieved with free gingival graft procedures around the mandibular anterior teeth and to assess tissue stability six months postoperatively.

Case Report

A 51-year-old female patient presented to the Graduate Periodontics Program at the School of Dentistry, Universidad Juárez del Estado de Durango. Regarding her family medical history, she reported maternal diabetes mellitus and cancer in her siblings. As for her personal medical history, she had been diagnosed with breast cancer, which was successfully treated five years prior with no signs of recurrence to date (Fig. 1). Given her medical background, she was classified as ASA II according to the American Society of Anesthesiologists. Intraoral photographs (Fig. 2) revealed a thin and scalloped gingival phenotype with a narrow band of KT in the mandibular anterior region. Aberrant frenula inserting below the Mucogingival Junction (MGJ) were observed, along with gingival recessions on teeth #31 and #41, classified as RT1 according to the Cairo classification of 2011 [8]. Radiographic analysis revealed generalized horizontal bone loss in the anterior region, with normal trabecular pattern and diffuse lamina dura resulting from the resorption (Fig. 2). Periodontal probing showed 3 mm pocket depths, with 2 mm KT width on tooth #31 and 3 mm on tooth #41 in the area of interest. Plaque control scores were below 12.5%, considered acceptable based on O'Leary's plaque index [9]. Before the surgical procedure, the patient underwent full-mouth scaling and polishing.

Figure 1: Initial photographs: A well-defined mucogingival junction is observed, with frenula inserted below this line. A wide band of keratinized gingiva is visible in the upper and posterior-lower areas, whereas it narrows in the anterior-lower region, where crowding is also evident.

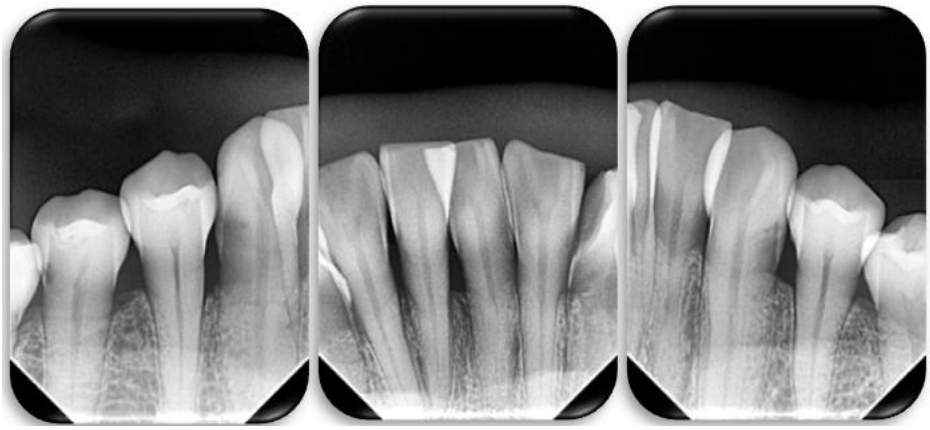

Figure 2: Radiographs of the anterior-lower region show horizontal bone loss and the apparent absence of a lamina dura.

Surgical Procedure

On the day of surgery, aseptic techniques were implemented by disinfecting the surgical area with povidone-iodine, followed by a one-minute rinse with 0.12% chlorhexidine. Local anesthesia was administered via infiltration in the mental nerve region using 2% lidocaine with epinephrine at a 1:100,000 concentration. Horizontal incisions were made at the base of the papillae in the area of interest, complemented by two slightly divergent releasing incisions extending beyond the Mucogingival Junction (MGJ). These incisions were performed with a #15c scalpel blade (Fig. 3). A partial-thickness flap was then elevated, detaching periosteal fibers and aberrant frenulum insertions located at the MGJ. The remaining epithelial tissue was carefully removed with soft tissue scissors (Goldman Fox, Hu-Friedy®) (Fig. 3). To harvest the graft, local anesthesia was administered in the palatal area. The graft was obtained using four incisions with a #15c blade, beginning with three incisions to facilitate tissue separation and prevent tearing and concluding with a final incision that preserved blood supply to the graft. Adipose tissue was removed using tissue scissors (Fig. 3). The graft was transferred to the recipient site and stabilized with suspensory and simple sutures placed at the release incision sites, ensuring proper adaptation. Careful attention during suturing is critical, as overly tight closure may lead to early necrosis of the Free Gingival Graft (FGG). The palatal wound was covered with a collagen sponge (Zimmer CollaTape®) and sutured using 5-0 nylon (ETHILON®) (Fig. 3). Postoperative instructions included avoiding brushing in the treated area and rinsing with 0.12% chlorhexidine (Bexident®, ISDIN) for 10 days. A soft diet, free from irritating or greasy foods, was recommended for at least 15 days. An acrylic stent was placed to protect the palatal wound. Medications prescribed included 500 mg amoxicillin tablets and 30 mg sublingual ketorolac for severe pain [10].

Figure 3: A) Intrasulcular incisions at the base of the papillae, complemented with two slightly divergent releasing incisions extending beyond the mucogingival junction. B) Elevation of a partial-thickness flap; residual epithelium is carefully removed using Goldman-Fox scissors (Hu-Friedy®). C) Harvesting of the free gingival graft through four incisions in the hard palate. D) Resection of underlying adipose tissue with Goldman-Fox scissors (Hu-Friedy®). E) Graft adaptation at the recipient site and fixation using sling and simple sutures to enhance stability and compression. F) Placement of a collagen sponge over the palate (Zimmer CollaTape®) and cross suturing to protect the donor site.

Follow-Up Appointments

The patient was evaluated at 3 days, 1 week and 15 days postoperatively, when sutures were removed. Postoperative care and follow-up visits are crucial during the initial weeks, as they greatly influence the integration of the graft (Fig. 4).

Figure 4: A) Three-day postoperative review; B) Seven-day follow-up showing better graft adaptation; C) Fifteen-day image after suture removal.

Results

Fifteen days after surgery and suture removal, the patient was recalled at one month to assess graft adaptation and complete soft tissue healing. A significant improvement in both the thickness and width of the newly formed keratinized tissue was observed. The use of the acrylic stent over the hard palate contributed to excellent healing, with the patient reporting minimal postoperative pain. At the three-month follow-up, clinical results remained favorable, with stable graft integration and progressive improvement in clinical parameters. A slight change in graft coloration was noted; however, since the area is not esthetically critical, this was not considered clinically significant (Fig. 5).

Figure 5: Postoperative A) Photograph taken one month after the procedure showing proper adaptation of the free gingival graft, with no signs of complications B) The patient continued follow-up during the first postoperative month and later attended a periodontal maintenance visit at three months, where favorable clinical results persisted.

Discussion

The need for a sufficient amount of attached gingiva around teeth has been a matter of debate. Some authors recommend a minimum thickness of attached gingiva to maintain periodontal health Friedman and Levine, Lang and Löe [10,11]. A graft rich in dense connective tissue is firmer, more stable and easier to manipulate than one containing fatty or glandular tissue. De-epithelialized gingival grafts have been associated with greater average root coverage (91.7%) [12]. The free gingival graft is a valid option for root coverage procedures. However, it is mainly indicated in the lower arch. Results may vary, especially in the anterior-lower region, although some cases do report successful root coverage [13]. These findings are consistent with reports by Agudio, et al., who demonstrated that FGG can provide stable long-term keratinized tissue gain, even though complete root coverage is not always achieved, especially in anatomically challenging areas [14]. In this case, the anterior-lower region presented specific challenges, such as high frenulum insertion, muscle tension and limited flap mobility, all of which may compromise graft revascularization and stability during healing [15,16]. Nevertheless, the gain in keratinized tissue and gingival thickness offers significant clinical benefits, such as increased resistance to mechanical trauma from brushing and improved long-term periodontal stability, reducing recession progression [17]. This outcome supports the use of FGG not only as a root coverage technique but also as an effective tool to modify gingival biotype in challenging areas. Dimensional changes in the graft may occur during healing. Soft tissue contraction ranging from 12% to 48% has been reported [18]. Carcuac, et al., introduced a modified FGG technique that resulted in greater root coverage and a significant increase in keratinized tissue height compared

to conventional FGG [18]. This modification also led to higher patient esthetic satisfaction. Moreover, recent studies have evaluated the use of mucoadhesive patches containing hyaluronic acid at the donor site [18]. However, in the present case, the use of acrylic stents remains a preferred method for postoperative care, with patients reporting comfort and minimal palatal pain.

Conclusion

The free gingival graft is a highly reliable technique for increasing keratinized tissue in areas where it is nearly absent. The patient plays a fundamental role in the success of such procedures by adhering to postoperative instructions and care. Although root coverage was not achieved, the procedure succeeded in modifying the periodontal environment, which could facilitate future interventions or prevent the need for retreatment. In this context, FGG remains a valid technique for enhancing the anterior-lower region, especially when the goal is to increase keratinized tissue rather than achieve esthetic improvement. Future studies may evaluate the effectiveness of combined techniques or the use of acellular dermal substitutes in this specific area, where achieving complete root coverage with isolated FGG remains a clinical challenge.

Conflict of Interest

There are no potential conflicts of interest to declare in this systematic review.

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Author Contributions

All authors contributed equally for this paper.

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