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Case report

Free Gingival Graft: A Viable Surgical Option for Treating Mandibular Anterior Thin Gingival Phenotype and Gingival Recession

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***Abstract*— Thin gingival phenotype and thin labial plate bone morphotype predispose lower anterior teeth to gingival recession. Free gingival graft has become one of the periodontal plastic surgeries of choice in dealing with aesthetic demand, impaired hygiene care, and dentin hypersensitivity secondary to the gingival recession. The prognosis of free gingival graft as a single augmentation procedure for root coverage is usually good and predictable with proper post-surgery care and maintenance. In this case report, a 28-year-old female patient having gingival recession that was associated with interproximal attachment loss less than to the buccal site, limited keratinised tissues, and thin gingival phenotype in relation to teeth 31 and 41 that was treated using autogenous graft which harvested from hard palate mucosa with satisfactory postoperative results.**

Keywords— Free gingival graft, gingival recession, periodontal plastic surgery, root coverage

I. INTRODUCTION

Periodontal tissue phenotype is divided into gingival phenotype (gingival thickness and keratinised tissue width) and bone morphotype (facial/buccal bone plate) [1]. The ideal features of thick keratinised tissue (>4mm) are crucial in maintaining gingival health and preventing gingival recession [2]. However, thin keratinised tissue (⩽2mm) could lead to a greater risk of further gingival recession, and it can be modified by environmental factors, mechanical force such as improper tooth brushing technique, and iatrogenic factors like overhanging restorations and orthodontics intervention [3]. Generally, gingival recession refers to an apical movement away from the cementoenamel junction [4]. Thin gingival phenotype and bone morphotype over anterior teeth may lead to gingival recession and are routinely encountered in clinical practice due to esthetic demand, hypersensitivity, and root caries affecting a patient's behaviour and confidence [5].

Three types of gingival recession (RT) were described by Cairo et al. (2011), namely, class RT1 recession included gingival recession with no loss of interproximal attachment; class RT2 recession was associated with interproximal attachment loss less than or equal to the buccal site and class RT3 recession showed higher interproximal attachment loss than the buccal site [6]. The free gingival graft (FGG) is the most widely used surgical technique for increasing the width of attached gingiva, and this technique was introduced by Cohen (1989) in which it involved preparation for the recipient site, harvesting of the graft from the donor site, the placement of the graft and suture placement [7].

FGG has been shown to be less technique-sensitive compared to the harvest connective tissue graft (CTG) technique. Nonetheless, FGG could undergo a significant shrinkage average of 30% from the initial placement during the healing process; thus, a graft wider than the recipient site needed to be harvested [8]. Additionally, the healing of FGG depends on the survival of the connective tissue and thorough postoperative care [4]. This case report aims to highlight the management of localised gingival recession with RT3 classification using autogenous FGG technique.

II. CASE

A 28-year-old female patient was referred to the Department of Periodontic, Specialist Dental Clinic, Alor Setar, for management of gingival recession. Initially, she complained of root surface exposure and prominent roots appearance in the lower anterior tooth region, which was occasionally sensitive to cold and hot food/drinks (Figure 1).

Figure 1. Pre-operative gingival phenotype

She was healthy and had no known drug allergies. Apart from that, she was a regular dental attendee and brushed her teeth three times daily with a medium-bristled toothbrush and fluoridated toothpaste. She does not smoke and has no parafunctional habit. She was motivated and keen for dental treatment to improve her oral health. Clinically, she was presented with gingival recession of about 2mm on teeth 31 and 41 with class RT2 gingival recession based on Cairo classification (2011). After a thorough clinical examination, a detailed treatment plan was explained to the patient, and presurgical therapy that included patient education and motivation, as well as scaling with plaque control instructions, was done. Reassessment was done after one month of non-surgical periodontal therapy, and her oral hygiene improved (Figure 2).

Figure 2. Gingival recession was presented on teeth 31 and 41 with a 2mm recession.

Surgical intervention with an autogenous FGG technique was planned. The patient was informed of the surgical procedure, and consent was taken. She was asked to rinse 0.12% chlorhexidine mouthwash for about 30 seconds. The infiltration of local anaesthesia and 2% lignocaine with epinephrine (1:200 000) at the planned recipient and donor sites were administered on the buccal area of teeth 31 and 41.

A) Preparation of Recipient Site

The recipient site was prepared with an initial incision at the existing mucogingival junction using a #15c blade, and a mucosal (partial thickness) flap was elevated. The template of the recipient site was measured by using the University of North Carolina 15 (UNC 15) probe for harvesting FGG at the donor site.

B) Harvesting the Free Gingival Graft

The partial thickness graft consisted of epithelium and a thin layer of underlying connective tissue was harvested from the left first molar–premolar area of the palate. The incision was carried out with the incision 2-3 mm from the palatal gingival margin to avoid recession on these teeth. Haemostasis (blood clot) was achieved by applying compression with sterile gauze and sutures.

C) Fixation of the Graft

The gingival graft was well adapted to the recipient bed and sutured to the periosteum to secure its position. The graft edge was placed to overlap the area where a bevel incision (de-epithelisation) was made on the recipient site. Root surface conditioning and absolute immobilisation of the graft are the key factors for the success of this procedure (Figure 3). The labial flap was sutured by means of interrupted sutures to the periosteum apically. The graft was covered by periodontal dressing for four days.

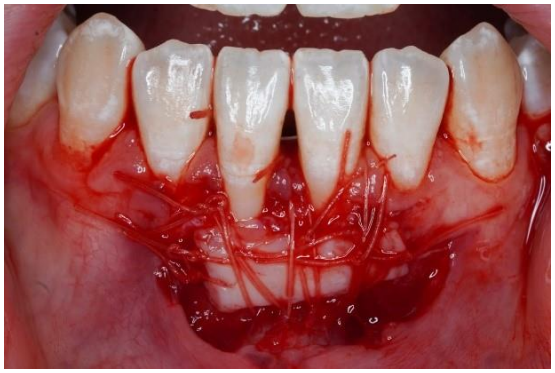

Figure 3. The FGG was sutured directly at each edge of the recipient site with resorbable suture.

D) Protection of the Donor Site

Meanwhile, the donor site was compressed and protected by the acrylic stent, which was prepared on the pre-operative dental cast. Post-operative instructions and care were given to the patient. The patient was instructed not to brush on the surgical site and to rinse with 10 ml of chlorhexidine 0.12% mouthwash. The surgical site was irrigated with chlorhexidine solution and saline during the first few days. At seven days postoperatively, the healing of the palatal wound was satisfactory. Sutures at the recipient site were then removed two weeks after the surgery with no signs and symptoms (Figure 4). After three months postoperatively, better healing of the recipient site was noted (Figure 5). Finally, six months postoperatively, the new band of keratinised tissues and thick gingival tissue were evident (Figure 6).

Figure 4: Recipient site healing after 2 weeks postoperatively.

Figure 5: Gingival phenotype with thick and adequate keratinised tissue width after 3 months postoperatively.

Figure 6: Gingival phenotype with full coverage of gingival recession after 6 months postoperatively.

III. DISCUSSION

The main objective of periodontal plastic surgery is the establishment of a homogenous, pink, healthy gingiva by reconstruction of the gingival margin [9]. Prior to any root coverage procedure, root planning and conditioning should be achieved. Root conditioning is often performed with chemical agents such as citric and phosphoric acids, ethylenediaminetetraacetic acid, and tetracycline hydrochloride. The procedure involved soaking in a chemical solution and applying it to the exposed root surfaces for 2 to 5 minutes. This process aims to detoxify, decontaminate, and demineralise the root surface so that the smear layer is removed, exposing the collagenous matrix that covers the dentin and cementum [4].

FGG consists of epithelium and underlying connective tissue without fatty and glandular tissue. The advantages of the FGG technique include increased keratinised tissue width and gingival thickness, graft predictability, technique simplicity, and minimal post-operative pain. Meanwhile, the disadvantages of this procedure include the secondary intention healing of the palate, post-operative discomfort, and risks for complications, including haemorrhage at the donor site, palatal sensory dysfunction, infection, and/or increased surgical time, high post-operative pain and swelling [10, 11]. The discomfort can be reduced by protecting the harvested area with a stent or a periodontal dressing [11]. The FGG is contraindicated in patients with esthetic demands as the outcome may have the risk of white scar appearance of grafted tissue with adjacent soft tissues. Deep and wide recession defects and the presence of deep facial probing pockets associated with gingival recession also might limit the use of FGG as a treatment of choice [7]. Lack of good adaptation between the graft and underlying vascular and avascular portion of the recipient site or its borders may result in necrosis of the grafted tissue [12].

Adequate graft dimension is necessary for the longevity of the graft placement. It must be sufficiently thin to enable adequate nutrition from the recipient site during the re-epithelisation process. However, thinner FGG leads to incomplete root coverage and lack of desired thick gingival phenotype [13]. In contrast, a thicker graft will impair adequate nutrition. Additionally, the harvested gingival graft should be 15–25% larger than the desired final size. This is to overcome primary (immediate) and secondary (during healing) contraction [14]. During the first part of healing and the creation of the vascular network, a thick blood clot would delay

the fluid circulation and increase the risk of necrosis. Thus, in order to avoid the creation of hematoma between the grafted and the recipient site, it is advisable to maintain pressure over the grafted site for approximately 5 minutes with wet gauze to prevent dead space under the graft following suturing [15].

The healing of the graft depends on the survival of the connective tissue. Sloughing of the epithelium is expected, but the fibrous 76evascular iz of the interface between the graft and the recipient bed occurs within 2 to several days. The graft is nourished by the process of the diffusion of fluid from the host bed, adjacent gingiva, and the alveolar mucosa. On the first day, the connective tissue becomes edematous and 76evascular iz and undergoes degeneration and lysis of some of its elements. On the second or third day, the graft 76evascularizat with the proliferation of the capillaries from the recipient bed [16]. These networks of capillaries anastomose with the pre-existing vessels. The central section of the surface is the last to 76evasculari, but this is complete by the 10th day. The critical healing period is the first 48 hours, of which there was no 76evascularizati of the grafts. The graft initially (first few days) was nourished by the blood supply from the recipient bed via plasmatic circulation (red blood cells, leukocytes, and plasma cells). The exudate formed a fibrin net at the interface and established the early attachment (2-3 days) [17]. Between 4 – 7 days, firm adhesion of the graft to the bed was observed, and 76evascularization occurs initially by anastomoses between vessels of the graft bed and pre-existing vessels in the graft and later by capillary budding, which penetrated the graft [18]. There will be increasing vascular density for up to 7 days, followed by a gradual reduction and a return to a normal vascular pattern after 14 days [18]. On the 14th day onwards, a complete junctional embodiment of graft to the recipient site is formed [17]. An average of ~20% shrinkage is expected during healing [14]. A thin graft will have less primary contraction but more secondary contraction. Meanwhile, a thick gingival graft will have more primary contraction and less secondary contraction [19].

Iv. CONCLUSIONS

FGG technique was considered a viable treatment option in the less-demand aesthetic area and was effective for treating thin gingival phenotype with satisfactory results.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Written informed consent was obtained from the patient for the anonymised information to be published in this article. This case report was registered with the National Medical Research Register (NMRR ID-22-02907-SKD) and approved by the Ministry of Health, Malaysia.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this paper.

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