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Surgical Root Coverage of Miller's Class III Using Free Gingival Autograft (A Case Report)

Mulyati, K. Agung, and P. Yunita

ABSTRACT

***Background*: Gingival recession is a condition where the root surface of the tooth is exposed due to migration of the gingival margin and junctional epithelium in an apical direction. The problem that patients often complain about due to gingival recession is an aesthetic problem, especially if the recession occurs in the upper anterior teeth. In addition, gingival recession can also cause dentine hypersensitivity due to the exposure of the root surface that was previously covered by the gingiva. One of the treatment options for patients with gingival recession is free gingival autograft surgery.**

***Purpose*: The goal of this article is to explain how to manage gingival recession therapy with free gingival autograft surgery in patients with Miller Class III recession.**

***Case*: A 29-year-old female patient came to RSGM Airlangga University with complaints of hypersensitivity in the front teeth at the lower jaw. The last scaling took place about 6 months ago. The patient does not have a history of systemic diseases, such as hypertension and diabetes, and the patient does not have allergies to either drugs or food.**

***Case Management*: Based on the examination that has been carried out, the treatment option for Miller's class III gingival recession in the tooth region 41 is agreed to be a free gingival autograft.**

***Conclusion*: One of the root coverage treatment options is free gingival autograft, where this procedure can also increase the width of the attached gingiva.**

Keywords: Free Gingival Autograft, Gingival Recession, Surgical Root Coverage.

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I. Introduction

Gingival recession is a condition in which the root surface of the tooth is exposed due to apical migration of the gingival edge and junctional epithelium. Patients who have gingival recession typically comment that their teeth appear longer. This occurs as a result of the marginal gingiva's distance from the cemento-enamel junction (CEJ), which causes the previously closed root surface to become exposed [1]. Patients frequently express aesthetic concerns as a result of gingival recession, particularly when it affects the higher anterior teeth. In addition, gingival recession can lead to dentine hypersensitivity since the previously concealed root surface is now exposed. The exposed root surface also promotes cementum and dentin degradation and abrasion caused by the oral environment and tooth brushing activities. When this condition is stimulated, especially by temperature fluctuations, it frequently results in pain and pains. Additionally, cervical caries is more likely to affect the teeth because of the exposed root surface [1]. Both in the upper and lower jaws, this gingival recession condition can affect a single tooth or a group of teeth. Men and women are equally at risk, and incidence rises with age [2].

Gingival recession can be caused by a number of variables, including anatomy, physiology, and disease [1]. Fenestration and dehiscence in the alveolar bone, the placement of teeth outside the normal arch, and conspicuous root morphology are anatomical conditions that can result in gingival recession. Gingival recession is facilitated by all of these disorders since they all result in the alveolar bone and the gingiva that covers it being thinner. Gingival recession is additionally frequently brought on by the frenulum's attachment, a frenulum that is too coronal, the attached gingiva's narrowness, and hereditary characteristics, such as the gingival epithelium's fragility and susceptibility to damage. Physiological gingival recession can occur as a result of orthodontic tooth movement, both lingually and labially, which causes dehiscence. Aging is another factor that contributes to physiological gingival recession. Pathological gingival recession, on the other hand, can be brought on by a variety of causes, including hormonal variables, unsatisfactory marginal restorations, smoking, drinking alcohol, occlusion trauma, toothbrush trauma, periodontal surgery treatments, and pathological gingival

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inflammation [1].

Although there are a number of hypotheses for how to categorize gingival recession, Miller's hypothesis is the one that is most frequently applied. Miller categorizes gingival recession into four grades. Class I: There has been no bone or soft tissue loss in the interdental spaces, and gingival recession has not reached the mucogingival junction. Class II: The mucogingival junction has been reached by gingival recession, but there has been no bone or soft tissue loss in the interdental region. Class III: Malpositioned teeth may or may not be present along with gingival recession that has reached the mucogingival junction and is characterized by bone and soft tissue loss in the interdental region. Class IV: Extensive malposition of the teeth, severe bone loss in the interdental spaces, and/or gingival recession that has reached the mucogingival junction [3].

An unpleasant condition is the gingival recession. Additional significant aspects that contribute to patient pain include the main patient complaints about aesthetics, tooth hypersensitivity, decreased tolerance to pathogenic stimuli such cariogenic bacteria, and involvement with plaque treatment [4]. There are two categories of treatment for gingival recession: non-surgical treatment and surgical treatment. Making artificial gingiva is a non-surgical therapeutic option, while periodontal flaps (coronally, apically, or laterally positioned flaps) with or without gingival grafts are a surgical option. Patients are not always eager to undertake invasive surgical treatment, because gingival augmentation is an excellent, safe, and effective strategy for relieving pain and stopping further development [4,5]. The purpose of this paper is to describe how to treat Miller Class III recession in patients with free gingival autograft surgery.

II. Case

A female patient, 29, arrived at RSGM Unair to complete her dental treatment. The patient stated that the lower front teeth's gums were sagging, blushing red, and painful both when she ate and drank and when she was exposed to air. Tartar was last removed from a patient about six months ago. The patient brushes his teeth twice a day. The patient has no family history of systemic illnesses like diabetes or hypertension, and he or she has no drug or food sensitivities.

On intraoral clinical examination, there was plaque on all tooth surfaces; there were pockets in tooth regions 15 (mesial: 4) and 13 (distal: 4); there was gingival hyperplasia in tooth regions 15 and 13; there was gingival recession in tooth region 41 mm and in tooth region 35.3 mm. Based on the examination that has been carried out, the diagnosis determined is local periodontitis, stage 1, grade A, active condition. The deformity is in the form of mucogingival deformities around the teeth (recession in the tooth region 41), with a fair prognosis.

The treatment plan includes dental health education and scaling root planing as non-surgical therapy. Surgical therapy as phase II therapy in the form of free gingival graft in tooth region 41 and coronally advanced flap in tooth region 45. Phase III in the form of continuing orthodontic therapy and Phase IV in the form of maintenance phase.

Fig. 1. (Left) Pre-Op clinical condition. Recession in facial tooth region 41 9mm with Miller class III classification. (Right) Periapical radiographic examination of tooth 41. There appears to be widening of the periodontal ligament space and resorption of the alveolar bone.

III. Case Management

The surgical technique starts with the application of providone iodine to the patient's skin, followed by local infiltration anesthetic using septocaine on the donor site of the palatal region 24 and 26 as well as the mucobuccal recipient site of teeth 41, 42, 31, and 32. A sulcular incision in region 41 with extensions to region 42 and region 31 was used to prepare the recipient site. This was followed by a full-thickness flap and irrigation with sterile saline. The donor site is then prepared by applying an aluminum foil marker that has been previously modified to the required size, and a keratinized tissue donor with dimensions of 12x10mm and 2mm thick is then taken. Suturing is performed using blue nylon at the donor site, followed by the administration of a periodontal pack. After being extracted, donor tissue is scraped to eliminate any fatty tissue before being immersed in sterile saline. The donor tissue is then applied to the recipient site, after which it is fixed by being sutured with blue nylon using the sling suture technique.

Amoxicillin 500 mg was administered to patients three times daily for five days, along with mefenamic acid 500 mg three times daily and as needed, and chlorhexidine gluconate 0.2% gargled twice daily. Patients were given postoperative instructions to refrain from consuming hot and spicy meals or hot beverages for three days following surgery. Following surgery, patients were given instructions on how to control their discomfort for three, seven, fourteen, and twenty-one days.

Fig. 2. Preparation of the recipient site in tooth region 41 with a sulcular incision in region 41 extending to regions 42 and 31.

Fig. 3. Stages of donor site preparation in the palatal region 24 and 26, keratinized tissue excision was performed with a size of 12×10 mm and a thickness of 2 mm

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Fig. 4. Stages of application of keratinized tissue to recipient site region 41 and fixation of donor tissue using sling suture technique

Fig. 5. Results of Free Gingival Autograft Treatment.
(a) Pre-op photo with recession on teeth 41 9 mm;
(b) Post Op photo H+14 has a reduction in the length of the recession to 6 mm; (c) Post Op photo H+21 has a reduction in the length of the recession to 6 mm.

IV. Discussion

Aesthetics are now an essential consideration in periodontal treatment. Patients and dentists frequently focus on aesthetics when receiving periodontal therapy. The maxillary anterior region's gingival tissue look has a big impact on the patient. Gingival recession, hypertrophy, hyperpigmentation, and the "gummy smile" are a few clinical disorders of the gingival tissue that affect appearance [6].

One of the trickiest techniques in periodontal mucogingival surgery is the surgical root covering used to treat gingival recession. The cause of the gingival recession, the assessment of the interproximal bone level, and the area to be treated are some of the variables that affect the surgical root coverage procedure's success [7]. Various surgical options have been developed to achieve the above goals and include the use of free gingival grafts, laterally sliding flaps, coronally advanced flaps, double papilla flaps, guided tissue regeneration, and acellular dermal matrix allograft [7].

Mucogingival surgery is a procedure that can be used to repair gingival recession; this surgery focuses mostly on improving the appearance and functionality of the patient's mouth. In addition to increasing the zone of attached gingiva, maintaining the normal shape of the soft tissue, and providing enough gingival thickness with normal color, mucogingival surgery can cover exposed root surfaces up to the CEJ [8], [9]. There are four basic techniques for root coverage therapy: (1) pedicle grafts, (2) free gingival grafts, (3) connective tissue grafts, and (4) membrane barrier-guided tissue regeneration. All of these methods are often used and have their respective advantages and difficulties, also depending on the experience of the operator [10], [11].

Gingival recession has been treated using a variety of mucogingival surgical methods. One of the most often used root covering therapy procedures is the tunneling or supraperiosteal envelope technique proposed by Allen [12]. An internal bevel incision is used during the tunneling procedure from above the gingival margin in the recession-prone area. The interdental papillae were then affected by extending a supraperiosteal partial thickness flap with strong dissection 3-5 mm laterally and apically to the recession area [8]. The gingival profile makes it challenging to regulate mechanical instrumentation throughout the tunneling technique and to appropriately detach the junctional epithelium from its attachment to the root surface. The success rate of mucogingival surgery is poor when a gingival margin defect occurs. Gingival fiber is crucial to root coverage therapy. The gingival margin is securely held to the tooth by gingival fiber, which strengthens and stabilizes it [8], [13]. Tunneling through the gingival sulcus, specifically in circular and semicircular gingival fiber incisions, can affect the integrity of the gingival fiber, and trauma to these gingival fibers results in unsatisfactory repair [8].

A free gingival graft is an old periodontal surgical procedure in which the graft is derived from the palatal or maxillary tubercle. The maxillary tuberosity area is a more beneficial location to harvest tissue grafts because it has a smaller operating space and faster and easier tissue healing than the palate region. Due to the potential of injuring the palatal arteries when palatal grafts are used, it's crucial to evaluate the palatal tissues' size and perform a thorough preoperative evaluation [14].

The method for free gingival grafts entails extracting soft tissue from the palatal mucosa, maxillary tuberosity, or edentulous ridge and placing it over the defect. This method differs from pedicle grafts in a number of ways, including the need for two surgical sites, the absence of graft blood supply, and reliance on vascularization at the recipient site. The recipient site's soft tissue must adequately overlap the free gingival graft tissue for the procedure to be successful. Immobilization of the graft at the recipient site is a crucial element as well. The thickness of the acquired graft tissue determines whether this method is successful. Therefore, when choosing the best therapeutic strategy and estimating prognosis, consideration should be given to the thickness and amount of tissue to be transplanted from the donor site [15]. Epithelialized free gingival grafts and subepithelial connective tissue grafts that are implanted using a pedicle flap, envelope technique, or tunneling technique are examples of frequently used free gingival graft techniques [15].

Free gingival grafts can be used in a one-stage operation, when the graft is placed directly over the root surface, or in a two-stage technique when the gingival biotype at the recipient location is thin. In this instance, the pedicle flap was positioned and moved further coronally to cover the exposed root surface after the graft had been implanted apically in the recessed area and had healed. Free gingival grafts as a root covering therapy have a poorer success rate compared to other surgical techniques, according to Wennstrom [16]. According to research, total root coverage varies between 9 and 72%, while the average root coverage from an epitheliazed free gingival graft ranges from 9 to 87%. The effectiveness of the treatment has been found to depend on a number of variables, including the patient's smoking habit (more than 10 cigarettes per day), an adequate blood supply, the graft's size, border characteristics, thickness, and immobilization. The gingival graft technique also has a number of benefits, including being a straightforward

surgical approach that can be employed for surgeries aimed at enlarging the attached gingiva. This procedure also has several disadvantages, such as poor color matching between the donor and recipient, increased discomfort, and the potential for postoperative bleeding. surgery from the donor site due to a large wound that healed by secondary intention [15].

The gingival margin must be at the level of the CEJ in order for the complete root covering treatment, which has been used for a while, to be successful. The total root coverage criterion has been used in several systematic reviews, case reports, and clinical trials to gauge the effectiveness of the treatment. These studies have found that this criterion is the best predictor of success. However, after extensive research, the literature has numerous definitional contradictions. Complete root coverage is not formally defined in the American Academy of Periodontology's Glossary of Periodontal Terms. In the soft tissue autograft procedure, complete root coverage was originally defined as being achieved when the soft tissue margins were in the CEJ, associated with clinical attachment to the root and a shallow sulcus (2 mm) without bleeding on probing. Aesthetics is the final outcome that is considered, and some researchers say that complete root coverage can be achieved when the final margin of the gingiva slightly covers or lies on the CEJ [17].

Important factors that must be considered for the success of mucogingival surgical treatment with the use of tissue grafts include immobilization, stabilization, and vascularization. Immobilization aims to eliminate the tensile forces acting on tissue that is already positioned to close in recession. Immobilization can be achieved by deepening the vestibule to widen the attached gingiva. Stabilization aims to ensure that the tissue that has been positioned can hold well on the recessed root surface. Stabilization can be obtained by means of adequate sutures so that the tissue can hold on to its new position without shifting. Vascularization aims to make the gingiva in its new position survive. Optimal vascularization can be achieved by minimizing the incision so that the blood supply to the gingival area covering the recession is adequate. In addition, the needle used should be an atraumatic needle to minimize tissue laceration [1]. The three conditions above are a single unit that needs attention because failure often occurs due to disruption of the three processes [1].

In this case report, it can be said that the management of free gingival autografts is not optimal because there is no keratinized tissue where the presence of keratinized tissue is expected to bridge and receive blood circulation from the donor site. However, the results obtained reduced the original recession length from 9mm to 6mm, whereas there was an increase in keratinized gingiva, which was absent, to 3mm. The factor that was not optimally fulfilled in this case report was the immobilization factor, namely the lack of keratinized gingiva. so that the low position of the vestibule and the pull of the muscles on the vestibule affect the healing process and the formation of keratinized gingiva.

Successful root coverage is an important part of periodontal therapy. Many surgical procedures are performed to achieve good root coverage results. However, unsatisfactory results can also occur. The causes can be due to improper case selection, inappropriate choice of surgical technique, inadequate root preparation, insufficient interdental bone and soft tissue height, inadequate surgical procedure, and inadequate blood supply from the surrounding tissue due to inadequate preparation of the recipient site and penetration of the flap [10], [18].

In a case report, Srinivas [19] described how the use of a free gingival graft with a fibrin fibronectin sealing system to treat gingival recession resulted in a significant reduction in recession depth, recession width, and probing depth at baseline up to 1 year, as well as a noticeable increase in the width of keratinized gingiva and clinical attachment loss in the subsequent year. To assess the clinical efficacy of the fibrin-fibronectine sealing system with free gingival grafts in the treatment of gingival recession, further research is still needed [19].

Free Gingival Graft to Increase Keratinized Mucosa after Placing of Mandibular Fixed Implant-Supported Prosthesis, published by Marin [20] in the journal case report, explains that patients complain of discomfort, disruptions in oral hygiene, and plaque buildup after 30 days of using a prosthesis due to a lack of keratinized mucosa, necessitating a free gingival graft. After the final prosthesis is put in place, free gingival grafts are done to preserve the recipient bed, assure a healthy graft, and restore physiological function so that the patient can keep wearing the prosthesis. The use of a free gingival graft was considered an adequate and satisfactory therapeutic choice with good results during the follow-up period of 6 to 12 months, taking into consideration the patient's age and health [20].

A free gingival graft is a procedure with high predictability when used alone or in combination with other techniques. The therapeutic goal in any form of corrective surgery must be clearly defined and assessed on the basis of the results obtainable by other procedures.

V. Conclusion

Surgical treatment of patients with gingival recession, besides aiming to cover the recession area, also serves as an aesthetic correction, stops the possibility of a more severe recession and eliminates dentine hypersensitivity. One of the root coverage treatment options is a free gingival autograft, where this procedure can also increase the width of the attached gingiva. Using autograft free soft tissue grafts for root coverage requires a much more complicated technique. The existence of things that are neglected or less than optimal when handled incorrectly can result in sub-optimal root coverage so that good cooperation is needed between the operator and the patient to get optimal treatment results.

Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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