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Case Report

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An Alternative Approach for Enhancing Gingival Phenotype and Root Coverage Using Free Gingival Graft: A Case Report with A 3-Year Follow-Up

Running Title: Enhancing gingival phenotype and root coverage

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Abstract

Background: *Mucogingival surgical procedures are performed to achieve root coverage in cases of gingival recession, increase the width of attached gingiva, enhance a thin gingival phenotype, deepen a shallow vestibule, and correct aberrant frenulum attachments. In addition to their aesthetic applications, these procedures can facilitate the maintenance of adequate oral hygiene. This case report aimed to present a patient with combined mucogingival problems and describe the successful management of these conditions.*

Case Report: *A 26-year-old female patient presented to the periodontology clinic with plaque accumulation, moderate dentin hypersensitivity, gingival bleeding, and recession in the mandibular anterior region. Intraoral examination revealed gingival recession in the lower anterior region associated with frenal pull, along with a thin gingival phenotype and shallow vestibule. These conditions may contribute to plaque accumulation in the lower anterior region and increase the likelihood of further gingival recession. The treatment included oral hygiene instructions, mechanical periodontal debridement, and surgical periodontal therapy.*

Results: *Following the surgical procedure, complete root coverage was achieved, accompanied by increased vestibular depth, a thickened gingival phenotype, and an increased width of keratinized gingiva.*

Conclusion: *This case report demonstrates that gingival recession can be treated while maintaining periodontal health in patients presenting with destructive mucogingival problems. The free gingival graft (FGG) was used to provide the dual benefits of increasing vestibular depth and achieving a thicker gingival phenotype. Patient compliance, together with regular dental follow-up, may contribute to maintaining periodontal stability in these patients.*

Keywords: Gingival Recession, Inadequate Vestibular Depth, Aberrant Frenulum, Gingival Phenotype, Frenotomy, Vestibuloplasty, Free Gingival Graft, Gingival Augmentation

1. Introduction

Mucogingival problems i.e., gingival recession, thin gingival phenotype, narrow attached gingiva, shallow vestibule, and aberrant frenulum encompass anatomical and morphological variations or deformities involving adjacent periodontal tissues [1-6]. Effective management of problems plays a crucial role in enhancing the overall quality of life for patients. The mucogingival surgical procedures involve the treatment of these problems. It,

apart from being used as an aesthetic procedure, is also used for improving the maintenance of regular oral hygiene.

According to the 2017 World Workshop on the Classification of Periodontal and Peri-Implant Diseases and Conditions, the clinical assessment of gingival recession should consider recession depth, interdental clinical attachment level, gingival phenotype, keratinized tissue width, tooth position, root-surface characteristics, and aberrant frenal attachment [2,3]. The thin gingival phenotype has been associated with a higher prevalence and severity of gingival recession compared with a thicker phenotype [5,6]. An aberrant high frenal attachment may transmit tension generated by lip movement to the marginal gingiva, pulling the gingival margin away from the tooth and potentially contributing to the progression of gingival recession [7]. When combined with reduced vestibular depth and an unfavorable gingival phenotype, such anatomical conditions may complicate plaque control and compromise the local mucogingival environment. Among these problems, a strong correlation was found between the severity and extent of gingival recession to others.

Soft tissue autografts have been routinely used in soft tissue augmentation procedures to increase vestibular depth and the width of attached gingiva, enhance the gingival phenotype, and cover exposed root surfaces resulting from gingival recession when associated with functional or aesthetic concerns. Free gingival graft (FGG) is one of the techniques used for soft tissue augmentation [8-13]. FGGs have been used to increase the amount of keratinized tissue and achieve root coverage. These outcomes are considered important for improving the marginal adaptation of soft tissue to root surfaces and preventing further apically directed loss of soft tissue and bone [8-10].

This case report aimed to present the combined mucogingival problems and describe their successful management using a single-stage FGG procedure.The case report was prepared and presented in accordance with the CaReL guidelines [14].

2. Case Report

An 26-year-old systemically healthy female patient presented to the Department of Periodontology with complaints of gingival bleeding during toothbrushing, localized dentin hypersensitivity to cold stimuli, and an esthetic concern involving the mandibular anterior region. The patient reported no history of systemic disease, regular medication use, or smoking.

Clinical examination revealed gingival recession at teeth #31 and #41, associated with an aberrant frenulum, shallow vestibule, thin gingival phenotype, and less than 1mm of keratinized tissue (**Figure 1A**). Localized plaque accumulation, marginal erythema, and bleeding on probing were also present. Radiographic examination showed no significant interdental bone loss (**Figure 1B**). Based on the absence of interproximal attachment loss, the recession defects were classified as Cairo Recession Type 1 (RT1).



Figure 1: Clinical views of the case.

A. Preoperative view
B. Panoramic radiograph view
C. The view of incision and reflection
D. Free gingival graft sutured in place. The roots are covered to the level of the CEJ.
E. Clinical view at 15 days post-surgery.
F. Follow-up view at 3 years

Initial periodontal therapy consisted of oral hygiene instruction, full-mouth scaling, root planing, and polishing. The patient was instructed in a non-traumatic modified Bass brushing technique using a soft-bristled toothbrush to improve plaque control and minimize mechanical trauma. At the 2-week re-evaluation, gingival inflammation had resolved and patient compliance was satisfactory, allowing progression to surgical treatment.

2.1. Surgical Procedure

Under local anesthesia, a horizontal incision was made at the mucogingival junction using a #15C blade. A split-thickness flap was reflected, the aberrant frenal and muscle attachments were released apically, and vestibuloplasty was performed to create a stable periosteal recipient bed (**Figure 1C**). The exposed root surfaces were mechanically debrided with Gracey curettes. An approximately 1.5-mm-thick epithelialized free gingival graft was harvested from the premolar-molar palatal region and adapted to the recipient site (**Figure 1D**). The graft was stabilized over the periosteal bed using 4-0 non-resorbable monoprolylene interrupted and periosteal compression sutures. A periodontal dressing was applied, and postoperative care included systemic analgesics, and chlorhexidine rinses twice daily, and avoidance of brushing or trauma at the surgical site for 15 days. Healing was uneventful, and the sutures were removed at 15 days (**Figure 1E**).

At 3 years postoperatively, complete root coverage was achieved, with a marked increase in vestibular depth and keratinized tissue width. The gingival phenotype changed from thin to thick, dentin hypersensitivity resolved, and the patient reported high satisfaction with esthetics and oral hygiene (Figure 1F).

The present case report was conducted in accordance with the principles of the Declaration of Helsinki. Written informed consent was obtained from the patient for the publication of the findings and images.

3. Discussion

The present case illustrates the management of combined mucogingival problems occurring simultaneously in the mandibular anterior region. The combination of gingival recession, a thin gingival phenotype, shallow vestibular depth, and aberrant frenal attachment required a treatment approach directed not only toward the recession defect but also toward improvement of the surrounding soft-tissue anatomy. The inadequate width of keratinized tissue frequently correlates to thin periodontal biotype, high frenal attachment and shallow vestibule [2]. The use of autogenous FGG is the preferred clinical benchmark for attaining adequate keratinized tissue width, as observed in this patient.

Gingival recession may be associated with several factors, including periodontal disease, mechanical trauma, improper occlusal relationships, a thin periodontal phenotype, and tooth position [1-6]. The 2017 World Workshop emphasized that gingival recession should be evaluated within the broader context of the periodontal phenotype and associated anatomical characteristics [2,3]. In particular, a thin gingival phenotype is clinically relevant because available evidence indicates that thin and narrow gingiva is associated with a greater prevalence and severity of gingival recession [2-4]. In the current case, thin gingival phenotype and combined problems such as high frenal attachment and shallow vestibular depth were observed.

The primary objectives of mucogingival surgery include predictable root coverage and the provision of sufficient attached keratinized tissue to support long-term stability. In recent years, soft tissue grafting techniques have been increasingly used to enhance soft tissue volume, establish an adequate width of keratinized tissue, and cover exposed root surfaces, among other purposes [1–5]. FGG has also been widely used in periodontal surgery and has contributed substantially to the improvement of periodontal health.

Since its initial description by Björn in 1963 [8] and its subsequent designation as the free gingival graft (FGG) by Nabers in 1966 [9], this procedure has been used to increase the amount of keratinized tissue and achieve root coverage. FGG has demonstrated a high degree of predictability in the management of various mucogingival defects, including gingival recession, aberrant frenulum, and shallow vestibule. Its most common application is considered to be the augmentation of keratinized tissue [1–5]. When used for tissue augmentation, FGG has shown a high degree of predictability. Its adaptability is also reflected in its widespread application for root coverage procedures [8–13]. In the present case, FGG provided a favorable option for obtaining an adequate amount of keratinized tissue.

The primary indications for root coverage procedures include esthetic and/or cosmetic concerns, followed by the treatment of root hypersensitivity, shallow root caries lesions, cervical abrasions, and the enhancement of gingival health and stability. Covering denuded root surfaces remains one of the most challenging procedures in periodontal mucogingival surgery. When root coverage is the sole therapeutic objective, FGG should not be regarded as the most predictable contemporary technique. Reported outcomes for FGG in the literature vary considerably, with root coverage percentages ranging from 11% to 100% [1,2,4]. Such variation may be related to differences in gingival recession severity and surgical techniques, including the use of root conditioning agents and the thickness of the grafted tissue. In RT1 and RT2 gingival recessions, successful root coverage rates ranging from 90% to 100% have been reported with FGG [12,13], as demonstrated in the present case.

The rationale for selecting FGG in the present case was primarily based on the coexistence of limited keratinized tissue, a thin gingival phenotype, reduced vestibular depth, and aberrant frenal attachment rather than on recession coverage alone. The favorable clinical outcome observed in this patient suggests that a single-stage procedure may simultaneously improve several components of a combined mucogingival defect. Nevertheless, the results of an individual case cannot establish the superiority or predictability of

a surgical technique. Long-term stability also depends on effective plaque control, atraumatic oral hygiene, patient compliance, and regular periodontal maintenance.

4. Conclusion

This case report demonstrates that gingival recession can be treated while maintaining periodontal health in patients presenting with destructive mucogingival problems. The free gingival graft (FGG) was used to provide the dual benefits of increasing vestibular depth and achieving a thicker gingival phenotype. Patient compliance, together with regular dental follow-up, may contribute to maintaining periodontal stability in these patients.

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