World Journal of Case Reports and Clinical Images

ISSN: 2835-1568; CODEN: USA

DOI: http://dx.doi.org/10.51521/WJCRCI.2025.e41.404

CASE REPORT

A Case Series of Soft Tissue Augmentation Techniques for Root Coverage

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Received Date: 07-04-2025
Revised Date: 22-05-2025
Accepted Date: 25-05-2025
Published Date: 30-05-2025

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Citation:
Onur Yoldaş, Sema Becerik, Özgün Özçaka Yüksel (2025) A Case Series of Soft Tissue Augmentation Techniques for Root Coverage. World J Case Rep Clin Imag. 2025 April-May; 4(1)1-6.

Abstract

This case series presents clinical outcomes of four soft tissue augmentation techniques for root coverage in patients with gingival recession. Four patients underwent distinct surgical procedures: coronally advanced flap (CAF) with connective tissue graft (CTG), tunnel technique with CTG, vestibular incision subperiosteally tunnel access (VISTA) with CTG, and modified coronally advanced flap (mCAF) with CTG. All patients received non-surgical periodontal therapy before surgery and standardized post-operative care. Results indicated significant root coverage and improved soft tissue thickness in all cases. With the advancement of microsurgical instruments and loupes, microsurgical procedures have become increasingly widespread. In the literature, qualitative success criteria have begun to be presented alongside quantitative success criteria. However, the choice of surgical procedure should not be based solely on selecting the most minimally invasive option. The selection of the appropriate procedure should consider patient-specific factors and clinical conditions.

Keywords: Gingival Recession, Connective Tissue Graft, Root Coverage, soft Tissue Augmentation

Introduction

Due to aesthetic concerns, dentin hypersentivity and also for preventing root caries, several surgical approaches have been proposed for root coverage in last 4 decades. According to the literature, the subepithelial connective tissue graft combined with a coronally advanced flap (CAF) is the most extensively studied and widely accepted gold standard surgical technique in this field [1]. However, the use of less invasive and conservative procedures has increased due to the development of aesthetic considerations and the abandonment of the idea that aesthetics

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should only be considered as root covering [2]. As a qualitative result, the harmony and integrity of tissues, is as important as the amount of root coverage.

Among these procedures the tunnel technique is a conservative, non-invasive procedure utilized for multiple recessions without papilla incisions. The external integrity of the tissues is preserved by the intact interdental papillae and the absence of incisions [3]. Over the years, several researchers have developed its method and success [4,5]. One of the developed method is vestibular incision subperiosteally tunnel access (VISTA). Vertical incision extending beyond the mucogingival line improves the view of surgical field, facilitates placement of connective tissue and preserves the advantages of tunnel surgery [6].

The other surgical procedure is the modified coronally reposed flap developed by Zuchelli and De Sanctis. Multiple gingival recessions can be treated with this procedure, which does not require vertical incisions. In addition, the absence of vertical incisions shortens surgery time, avoids keloid formation and improves the aesthetic demands of the patient [7].

Many different methods for root surface coverage have been published in the literature to date. The clinician must select the most appropriate method based on the patient, the anatomy of the recession, and the clinician's own knowledge and experience. The aim of this case series was to present four patients treated with four different root surface coverage techniques, along with follow-up photographs.

Case 1:

Our first case is 22 years old non-smoker woman who applied to our clinic due to gingival recession and root hypersensitivity in the anterior mandibular region. The patient has received orthodontic treatment for 6 years. Due to orthodontic treatment for angle III malocclusion the teeth were positioned buccally. The patient declined orthodontic retreatment, and the decision was made to perform a coronally advanced flap combined with a connective tissue graft at the site of gingival recession.

Figure 1: *Pre-op photograph of recession site*

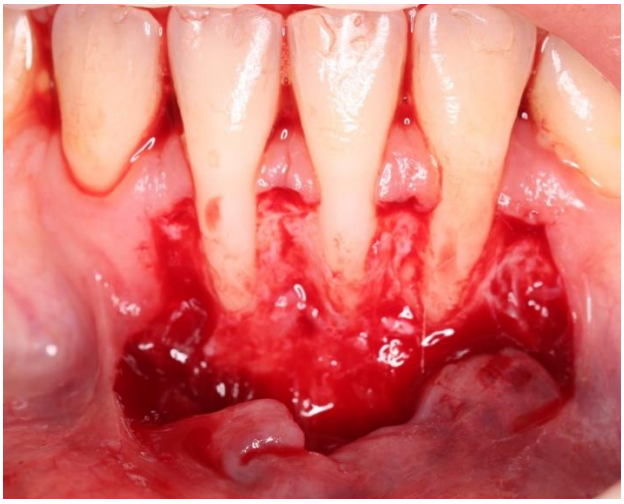

Figure 2: *Intra-op photograph of flap design*

Due to the buccal position of the teeth and the resulting thinness of the buccal tissue, full thickness flap was raised at keratinized tissue. Incisions were made by using 15C scalpel blade. Beyond the mucogingival line, releasing incisions were made for flap mobility and eliminating muscle tension. Afterwards papilla's were de-epithelialized and the root surfaces were mechanically treated with the use of curets. Subsequently free gingival graft was harvested from the palatal mucosa and de-epithelialized extra orally. The graft was placed and sutured by using 6-0 polypropylene sutures. Afterwards sling sutures were made and flap was placed coronally. Then vertical incisions were sutured using interrupted suture.

Figure 3: *Post-op 1. Month*

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Figure 4: *Post-op 8. Month*

Case 2:

Figure 4: *Pre-op photograph of recession site*

Second case is 44 years old non-smoker woman who applied to our clinic due to gingival recession and root hypersensitivity in mandibular region. The patient was determined to have a hard brushing habit. Non-surgical periodontal therapy, including tooth surface cleaning and proper oral hygiene instructions, was provided.

Figure 5: *Intra-op photograph of connective tissue graft*

Following the intrasulcular incisions by using 15C scalpel blade, recipient site was prepared by using tunnel instruments. The root surfaces were mechanically treated and planned with the use of curets. Then free gingival graft was harvested from the palatal mucosa and de-epithelialized extra orally. The graft was placed and sutured by using 6-0 polypropylene sutures and flap was placed coronally by using sling sutures.

Figure 6: *Post-op 3. month*

Case 3:

Third case is 27 years old non-smoker man who applied to our clinic due to gingival recession and root hypersensitivity. The etiology was determined as dental calculus and non-surgical periodontal treatment was performed. After 2 weeks of healing process VISTA operation was planned for the patient.

Figure 7: *Pre-op photograph of recession site*

After a vertical incision was made in the frenulum area, the frenulum was dissected and removed. Intrasulcular incisions were performed on mesial and buccal thirds of teeth 32 and 41 and on mesial, distal and buccal side of tooth 31 using a 15C scalpel blade. The recipient site and the tunnel were prepared using tunnel instruments through the vertical incision without causing damage to the gingival margin. The root surfaces were

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mechanically treated with the use of curets. Then free gingival graft was harvested from the palatal mucosa and de-epithelialized extra orally. The graft was placed and sutured by using 6-0 polypropylene sutures and flap was placed coronally by using sling sutures.

Figure 8: *Post-op 1. month*

Case 4:

Fourth case is 30 years old non-smoker man who applied to our clinic due to gingival recession and root hypersentivity in maxillar region. The patient was determined to have a hard brushing habit and the proper oral hygiene instruction was provided.

Figure 9: *Pre-op photograph of recession site*

The envelope type of CAF proposed by Zuchelli and De Sanctis was performed. Horizontal and intrasulcular were made by using 15C scalpel blade and split-full-split flap was raised. Papilla's were de-epithelialized and the root surfaces were mechanically treated with the use of curets. Subsequently free gingival graft was harvested from the palatal mucosa and de-epithelialized extra orally. The graft was placed and sutured by using 6-0 polypropylene sutures. Afterwards sling sutures were made and flap was placed coronally.

Figure 10: *Post-op 1. Month*

Post-Operative Care and Patient Instructions

All patients were advised postoperatively to avoid pulling their cheek or lip excessively to prevent increasing tension on the sutured flap. Additionally, they were instructed to refrain from consuming very hot, cold, or hard foods to avoid thermal or mechanical damage to the surgical site. To prevent bleeding at the donor site on the palate, they were also advised to avoid vigorous rinsing or spitting movements. Ibuprofen (200mg x 2/day for 4 days) and amoxicillin (1000gr x 2/day for 5 days) were prescribed following surgery. Patients were instructed to avoid tooth brushing during the first 15 days and %0.2 chlorhexidine spray was prescribed three times per day for 15 days. Fifteen days after the surgery, sutures were removed, professional supragingival scaling was performed and patients were instructed to start using a modified Bass technique. The patients were recalled for a follow-up appointment at 1 month, during which the percentage of root coverage and the harmony of the tissues were evaluated.

Discussion

Probably the most important outcome of the root coverage surgeries is a stable gingival margin positioned coronal to the cemento-enamel junction. This can be determined by measuring the coronal movement of the gingival margin with a periodontal probe or by measuring the surface area of the root surface covarage using intraoral scanners before and after the surgery. However, success is not determined just by quantity. The qualitative outcome is the tissues' harmony, integrity and thickness which are just as much as the quantity of root covering.

The techniques that we shared in our case series are well known and they have been studied many times in literature and their success rates have been demonstrated. Especially CAF with connective tissue graft is considered the gold standard for root coverage surgery. However, with the development of the microsurgical instruments, the minimal invasive techniques are also successful, especially considering the qualitative results. To decide between these methods, amount of keratinized gingiva, its localization, soft tissue thickness, depth of vestibule, clinical attachment level, defect localization and patient expectations should be taken into consideration. The success of the surgery depends on deciding the appropriate technique by considering factors described above and patient's systemic conditions, oral

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and smoking habits, age, preparation of the wound bed, flap tension, tissue trauma, graft volume and operator's skills.

Three separate sources provide the blood supply to the periodontal tissues: the vessels of the periodontal ligament, the intra-alveolar vessels, and the supraperiosteal vessels [8]. Vessels originating from the periodontal ligament play a compensatory role when the supraperiosteal vessels are interrupted [9]. The effect of flap perfusion, which mostly consists of supraperiostal vessels, to surgical success has been proven many times in the literature [10,11]. The effect of tissue thickness on success of the procedure is actually based on the increase in the number of blood vessels and the resulting increase in flap blood supply. In the light of these informations, the integrity of periodontal tissues may affect the survival rate of connective tissue and increase the surgical success rate. In a study by Tavelli et al., the application of connective tissue around the implant with CAF and tunnel techniques was compared. In the study conducted using Doppler ultrasonography, it was found that the blood supply in the interproximal region was higher in the tunnel technique. The blood supply of the connective tissue graft also has a reducing effect on the shrinkage of the graft. This positively affected the root coverage rate and tissue thickness in the first year of the study in favor of the tunnel technique [12]. Considering that the periodontal ligament is not present around the implant and the compensatory effect mentioned above is absent, minimally invasive techniques gain importance in periodontal plastic surgeries performed in the peri-implant region.

In addition to the positive effects of minimally invasive techniques, keloid formation and unfavorable tissue harmony and integrity due to vertical incisions also affect the qualitative outcomes of the surgery. However, this does not mean that CAF is outdated. Keeping the flap design minimal does not always increase the likelihood of success. In cases of deep recessions, it may be necessary to extend the incision lines to reduce flap tension and prevent the collapse of microvasculature within the flap. At the same time, the key to success is not solely blood supply; the degree of coronal advancement of the flap and flap tension are also highly significant factors. This approach allows the flap to be positioned coronally to the desired extent, thereby increasing the chances of success. Especially, in our first case, due to the rate of gingival recession and the tissue thickness, using vertical insicions and raising a full thickness flap were mandatory. Therefore, as explained above, considering the pros and cons of these approaches and choosing the appropriate technique for the case are among the most important factors for achieving a successful root coverage rate.

Conflict of interest: None

Ethical Consideration: None

Acknowledgements: None

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