



Case report

Vertical coronally advanced flap with periosteal pedicle graft for gingival recession coverage in mandibular anterior region

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ABSTRACT

Mandibular anterior gingival recession is a problem in dentistry due to poor soft tissue characteristics like the presence of thin soft tissue, shallowness of vestibule, and muscle pull. Though several root coverage techniques are available, achieving predictable and stable results in such areas may not always be possible. The periosteal pedicle graft is a type of autogenous vascular graft which provides better blood supply without compromising on having a second surgical donor site.

VCAF with Periosteal Pedicle Graft for Mandibular Recession Coverage

CLINICAL PROBLEM



Gingival recession in the mandibular anterior region causes esthetic concerns, hypersensitivity and root caries.

AIM



To evaluate the clinical outcome of Vertical Coronally Advanced Flap combined with Periosteal Pedicle Graft for root coverage in Miller Class II recession.

SOLUTION



VCAF with Periosteal Pedicle Graft provides predictable root coverage, increased tissue thickness, stable contour and improved esthetics with minimal morbidity.



a) Pre-operative image with Gingival Recession with respect to 31 and 41



b) Pre-operative clinical photograph showing incision outline carried in the mandibular anterior region with slant incision.

(Relative to clinical photograph showing abutment lines, reflecting and measured bone resurfacing in the mandibular anterior region.)



c) Incision placed in the mandibular anterior region



d) Partial thickness flap elevated, exposing the underlying periosteum and recipient site



e) Flap repositioned and secured with sutures following graft placement



f) Placement of periodontal dressing over the surgical site

Conclusion-

VCAF combined with periosteal pedicle graft achieved successful root coverage, improved gingival thickness, stable healing, and reduction of dentinal hypersensitivity in mandibular anterior recession defects.

This paper aims to outline the use of vertical coronally advanced flap along with a periosteal pedicle graft to treat mandibular anterior gingival recession. A 50-year-old healthy individual presented with symptoms of root exposure and dentinal hypersensitivity in the mandibular anterior region. After clinical examination, a localised Miller Class II gingival recession of about 4 mm associated with teeth 31 and 41 was diagnosed. Radiographic examination revealed adequate interdental bone support but no signs of bone loss due to periodontal disease. Under local anaesthesia, root debridement was done. A vertical coronally advanced flap was prepared at the gingival recession area. Periosteal pedicle grafting was then done with care to preserve the apical blood supply to the graft. The harvested graft was then placed onto the root surfaces and stabilised. Next, the flap was coronally advanced to cover the entire graft and sutured to get a tension-free adaptation. One month postoperatively, there was an improvement in the healing status of the soft tissues, a reduction in the depth of gingival recession, an increase in gingival thickness, and the absence of dentinal sensitivity. It is found that the application of periosteal pedicle graft in conjunction with vertical coronally advanced flap gives good results. Better root coverage and thickened gingiva are seen as a result of this procedure. However, further research is necessary to establish the validity of the results.

Keywords: Gingival recession, Coronally advanced flap, Periosteal pedicle graft, Root coverage, Periodontal plastic surgery.

INTRODUCTION

Gingival recession is a frequently encountered periodontal condition in which the gingival margin shifts apically beyond the cemento-enamel junction, exposing the root surface. Root exposure can result in dentinal hypersensitivity, increased susceptibility to root caries, plaque retention, and esthetic concerns, all of which may affect a patient's comfort, oral function, and overall quality of life. The development of gingival recession is influenced by multiple factors, including traumatic brushing habits, periodontal inflammation, tooth malposition, and a thin periodontal phenotype [1,2].

A variety of periodontal plastic surgical techniques have been introduced to correct recession defects and improve soft tissue appearance. Among these procedures, the coronally advanced flap (CAF) has become one of the most commonly used approaches because of its straightforward technique, reliable outcomes, and favorable esthetic results [3,4]. However, obtaining predictable root coverage in the mandibular anterior region remains challenging. Anatomical factors such as thin gingival tissues, limited vestibular depth, and the presence of muscle attachments can restrict flap advancement and influence the long-term stability of the surgical result [5].

To address these limitations, several modifications of the conventional CAF technique have been proposed. One such modification is the vertical coronally advanced flap (VCAF), which incorporates vertical releasing incisions to improve flap flexibility and facilitate passive coronal positioning without tension. This modification can be particularly beneficial in areas where anatomical constraints make flap advancement difficult [6,7].

The periosteum has attracted considerable attention in regenerative and periodontal procedures because of its rich vascular supply and abundance of fibroblasts, progenitor cells, and biologically active factors involved in tissue repair. When used as a pedicle graft, the periosteum maintains its vascular connection with

the donor site, ensuring continuous blood supply to the grafted area. In addition, this approach eliminates the need for harvesting tissue from a secondary donor site, thereby reducing patient morbidity and surgical complexity [8-10].

This case report presents the treatment of a localized gingival recession defect in the mandibular anterior region using a vertical coronally advanced flap combined with a periosteal pedicle graft. The report highlights the clinical procedure and the early outcomes achieved with this treatment approach.

Case report

A 50-year-old male with no relevant systemic illness reported to the Department of Periodontology with complaints of sensitivity and visible root exposure in the lower front tooth region. According to the patient, the recession had progressed slowly over time and had become increasingly noticeable during the previous few years. He experienced discomfort, particularly while consuming cold foods and beverages, and was also concerned about the appearance of the affected teeth. Review of his medical and dental history revealed no significant findings. The patient maintained acceptable oral hygiene and had no history of tobacco use or parafunctional habits.

Clinical examination

Clinical assessment revealed a thin periodontal phenotype and localized gingival recession associated with teeth 31 and 41. The gingival margin was positioned apical to the cemento-enamel junction, exposing the root surfaces of both teeth. The recession defect extended up to or beyond the mucogingival junction (Figure 1). The adjacent gingival tissues appeared firm and healthy, with no evidence of swelling, erythema, suppuration, or bleeding on probing.

Radiographic examination showed adequate interdental bone support and no signs of periodontal bone loss. Correlating the clinical and radiographic findings, the defect was classified as localized Miller Class II gingival recession involving teeth 31 and 41. Considering the patient's sensitivity, esthetic concerns, and thin gingival phenotype, surgical root coverage was deemed appropriate.

A treatment plan involving a vertical coronally advanced flap combined with a periosteal pedicle graft was formulated with the objective of achieving root coverage, enhancing soft tissue thickness, and reducing dentinal hypersensitivity.

Figure 1: Preoperative clinical view demonstrating gingival recession associated with teeth 31 and 41



Diagnosis and treatment planning

Based on the comprehensive clinical and radiographic evaluation, a diagnosis of localized Miller Class II gingival recession affecting teeth 31 and 41 was established. The exposed root surfaces were associated with dentinal hypersensitivity and esthetic dissatisfaction. Owing to the limited soft tissue thickness and the anatomical constraints commonly encountered in the mandibular anterior region, a modified root coverage approach was selected.

The planned procedure consisted of a vertical coronally advanced flap in conjunction with a periosteal pedicle graft. This technique was chosen to provide adequate flap mobility, improve tissue volume at the recipient site, and promote favorable healing through the use of a vascularized graft. An additional benefit of the periosteal pedicle graft was the avoidance of a separate donor site, thereby minimizing patient morbidity while maintaining sufficient blood supply to the grafted tissue.

Surgical procedure

After obtaining adequate local anesthesia using 2% lignocaine containing 1:80,000 adrenaline, the surgical area was prepared. Thorough scaling and root planing were carried out, followed by meticulous cleaning of the exposed root surfaces to remove plaque, calculus, and any contaminated root surface deposits.

Figure 2: Preoperative clinical photograph illustrating the planned incision design in the mandibular anterior region



Two vertical releasing incisions were placed on either side of the recession defect adjacent to teeth 31 and 41. A split-thickness flap was carefully reflected and extended beyond the mucogingival junction to obtain sufficient flap mobility and allow passive coronal repositioning without tension.

Figure 3: Intraoperative view showing flap reflection and preparation of the recipient site



A horizontal incision was then made in the periosteum approximately 2–3 mm apical to the recession area. The periosteal layer was gently dissected from the underlying bone while preserving its apical attachment, thereby maintaining the vascular supply and creating a pedicle graft.

Figure 4: Partial-thickness flap elevation with visualization of the exposed periosteum



The periosteal pedicle graft was rotated and adapted over the denuded root surfaces of teeth 31 and 41. After ensuring proper positioning, the graft was stabilized at the recipient site. The previously reflected flap was then advanced coronally to completely cover the grafted area and secured using 4-0 non-resorbable sutures. Care was taken to achieve a passive and tension-free closure. A periodontal dressing was subsequently applied to protect the surgical site during the initial healing period.

Figure 5: Coronal repositioning and stabilization of the flap after placement of the periosteal pedicle graft



Figure 6: Periodontal dressing placed over the surgical area following completion of the procedure



Postoperative care and follow-up

Following the surgical procedure, the patient was prescribed analgesic medication for a period of three days to control postoperative discomfort. In addition, he was instructed to use a 0.12% chlorhexidine mouth rinse twice daily for two weeks. Brushing in the treated area was temporarily discontinued during the initial healing phase to prevent disruption of the surgical site, while routine oral hygiene was maintained in the remaining areas using a soft-bristled toothbrush. The patient was also advised to avoid any mechanical trauma to the operated region and to adhere to a soft diet during the early postoperative period.

The healing response was assessed one week after surgery, and the sutures were removed between 10 and 14 days postoperatively. At the one-month review appointment, the treated area demonstrated uneventful healing with no evidence of infection, flap dehiscence, or other complications. Clinical examination revealed a noticeable reduction in gingival recession, improved soft tissue thickness, and satisfactory coverage of the previously exposed root surfaces associated with teeth 31 and 41. The patient reported complete relief from dentinal hypersensitivity and expressed satisfaction with the esthetic improvement achieved following treatment. Oral hygiene measures were reinforced, and the patient was advised to continue with regular periodontal maintenance visits.

Figure 7: Postoperative clinical photograph demonstrating satisfactory healing and root coverage at the treated site



DISCUSSION

Management of gingival recession in the mandibular anterior region is often considered challenging because of the unique anatomical characteristics of this area. Limited vestibular depth, thin gingival tissues, and the presence of muscle attachments can interfere with flap advancement and may compromise the stability of the surgical outcome over time. Therefore, selecting a technique that allows adequate flap mobility while maintaining a favourable blood supply is essential for successful root coverage procedures [5].

Among the various mucogingival surgical approaches available, the coronally advanced flap has consistently demonstrated predictable outcomes and satisfactory esthetic results in the treatment of gingival recession defects [3,4]. However, in anatomically demanding regions such as the mandibular anterior segment, modifications of the conventional technique may be required to improve surgical access and flap repositioning. In the present case, a vertical coronally advanced flap was utilized in conjunction with a periosteal pedicle graft. The addition of vertical releasing incisions enabled greater flap flexibility and facilitated passive coronal advancement, whereas the periosteal graft provided supplementary tissue support over the exposed root surfaces.

The periosteum possesses considerable regenerative potential due to its abundant vascular supply and cellular composition. It contains fibroblasts, progenitor cells, and biologically active factors that contribute to tissue repair and wound healing. When employed as a pedicle graft, the periosteum remains attached to its original blood supply, which may improve graft viability and enhance healing at the recipient site. Another important advantage of this technique is the elimination of a secondary donor site, thereby reducing surgical morbidity, patient discomfort, and overall treatment time [6-10].

The clinical outcome observed in this case was encouraging. At the one-month evaluation, the treated sites exhibited satisfactory healing, improved soft tissue thickness, and appreciable root coverage. Complete resolution of dentinal hypersensitivity was also reported by the patient, together with improved esthetics and comfort. Similar findings have been documented in previous studies by Mahajan and Gupta et al., who reported favorable results following the use of periosteal pedicle grafts for the treatment of gingival recession defects [9,10]. The present findings further support the potential usefulness of this biologically based approach in situations where additional soft tissue support is desirable.

Nevertheless, the observations reported in this case should be interpreted within the context of certain limitations. The report represents the outcome of a single clinical case, and the follow-up period was relatively short. Furthermore, detailed quantitative

measurements of clinical parameters were not available, which limits objective comparison with other treatment modalities. Consequently, the results should be viewed as preliminary clinical observations rather than conclusive evidence regarding the effectiveness of the procedure.

Despite these limitations, the combination of a vertical coronally advanced flap and a periosteal pedicle graft appeared to provide a favorable clinical response in the management of localized mandibular anterior gingival recession. Additional well-designed clinical studies involving larger patient populations and extended follow-up periods are required to determine the long-term predictability, stability, and clinical benefits of this treatment approach.

CONCLUSION

The present case highlights the successful use of a vertical coronally advanced flap combined with a periosteal pedicle graft for the treatment of localized gingival recession in the mandibular anterior region. The procedure resulted in favorable early clinical outcomes, including improved root coverage, enhanced gingival thickness, and complete relief from dentinal hypersensitivity. An important advantage of this technique is the utilization of a vascularized graft while avoiding the need for a second surgical donor site, thereby reducing patient morbidity. Although the short-term results were promising, additional clinical studies involving larger patient populations and extended follow-up periods are necessary to establish the long-term effectiveness, predictability, and stability of this treatment modality.

Patient consent

Written informed consent was obtained from the patient for publication of clinical photographs and treatment details.

Conflict of interest

The authors declare no conflict of interest related to this case report.

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