Management of Multiple Recession-Type Defects After Orthodontic Therapy: A Clinical Report Based on Scientific Evidence

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Introduction: Treatment of multiple recession-type defects (MRTDs) developed subsequent to orthodontic therapy requires a solid knowledge of the anatomy/characteristics of the defects. Surgical approaches based on the use of subepithelial connective tissue grafts (SCTGs) are considered the "gold standard" for the treatment of MRTDs, but their use may be limited by the availability of donor tissue. The objective of this case report is to present the outcomes of treatment achieved by a SCTG in a patient presenting MRTDs in all four quadrants of the mouth.

Case Presentation: A non-smoking 23-year-old female patient presenting 15 Miller Class I or II gingival recessions (GRs) at anterior and posterior teeth of the maxilla and mandible, developed after orthodontic therapy, was referred for treatment in March 2013. Defects were treated using four SCTG-based procedures using grafts harvested from two donor sites at different time frames. Twenty-four months after treatment, gingival thickness modification led to esthetic and functional results.

Conclusion: The use of SCTGs harvested twice from the same donor site for the treatment of MRTDs led to safe and predictable outcomes (i.e., clinically significant gains in GR depth, attachment level, and esthetics). *Clin Adv Periodontics* 2016;6:70-75.

Key Words: Connective tissue; gingival recession; gingival recession, surgery; gingival recession, therapy; surgical flaps; tooth root, surgery.

Background

Current evidence is clear in demonstrating the detrimental effect of gingival recession (GR) on the esthetics of the smile and on the development of buccal cervical dentinal hypersensitivity.[1-8]

It has been demonstrated that at least four groups of factors can be associated with the development of GR: 1) anatomy-related factors (e.g., lack of attached keratinized tissue [KT], presence of muscular inserts near the free gingival margin, inadequate tooth alignment, reduced thickness of the alveolar bone plate, and root prominences); 2) disease-related factors (e.g., periodontitis); 3) iatrogenic-related factors (e.g., prosthetic/composite restorations with margins invading the biologic space and inadequate orthodontic tooth movement beyond the "alveolar envelope"); and 4) trauma-related factors (e.g., toothbrushing and other mechanical trauma).[1-8]

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It should be noted that the eradication of the etiologic agent of a GR and the patient's knowledge of why it is important to eliminate it are more important than any simple or sophisticated soft tissue root coverage (RC) procedure.[3,6-8] For a single GR caused by orthodontic tooth movement, the interruption/ceasing of therapy is associated with the elimination of the etiologic agent. Moreover, for these cases, a unique RC procedure could be able to cover the exposed root surface. Conversely, for patients presenting multiple sites of defects (or most of the teeth in the oral cavity affected by GR), not only does adequate RC need to be achieved, but improvements in the gingival thickness are mandatory as well.

As demonstrated recently by the American Academy of Periodontology (AAP) Regeneration Workshop literature,[6-8] patients treated with subepithelial connective tissue graft (SCTG) procedures benefited from more stable outcomes and less GR recurrence (i.e., superior long-term stability) because of gingival thickness modification of the GR sites. Thus, the aim of the present 24-month case report is to present the outcomes of treatment of a patient with multiple sites of GR caused by orthodontic therapy, in which an SCTG was used for RC and gingival thickness modification.

Clinical Presentation

A healthy, non-smoking 23-year-old female patient with chief complaints of esthetics and dental hypersensitivity was referred to a private practice (Montevideo, Uruguay) for treatment in March 2013. The patient reported that she had undergone fixed orthodontic therapy (for 4 years) 9 years earlier and that the GRs developed after treatment. Clinical examination showed the presence of several sites of multiple GR-type defects (i.e., 15 teeth presenting Miller Class I or II[9] GRs at anterior and posterior sites of the maxilla and mandible, with GR depths varying from 1 to 6 mm) (Fig. 1). The patient also presented with thin gingiva (i.e., delicate and highly scalloped gingival and osseous architecture, bone dehiscence and/or fenestrations, a gingival margin located over the cemento-enamel junction, little or no KT, and some specific dental characteristics, such as small contact areas and long triangular-shaped teeth) (Fig. 2).[10-12]

Case Management

The potential risks/complications associated with the continuous development of the defects were discussed with the patient, and she subsequently requested correction of the areas. Because of her periodontal characteristics and esthetic expectations for stable, long-term results, a treatment approach using the combination of SCTGs and coronally advanced flaps (CAFs) was proposed. The patient was also informed that it would be necessary to harvest her palatal vault four times (i.e., grafts would need to be removed twice from the same donor site at different time periods). Thus, the time span needed between the first and second harvesting procedures would be at least 6 months. Also, alternative treatment options involving autogenous graft substitutes were considered, but the patient refused RC procedures involving allogenic or xenogenic grafts.

FIGURE 1 Periodontal characteristics after active orthodontic therapy with fixed orthodontic appliances. Note the thin gingiva and several sites of multiple GR-type defects.

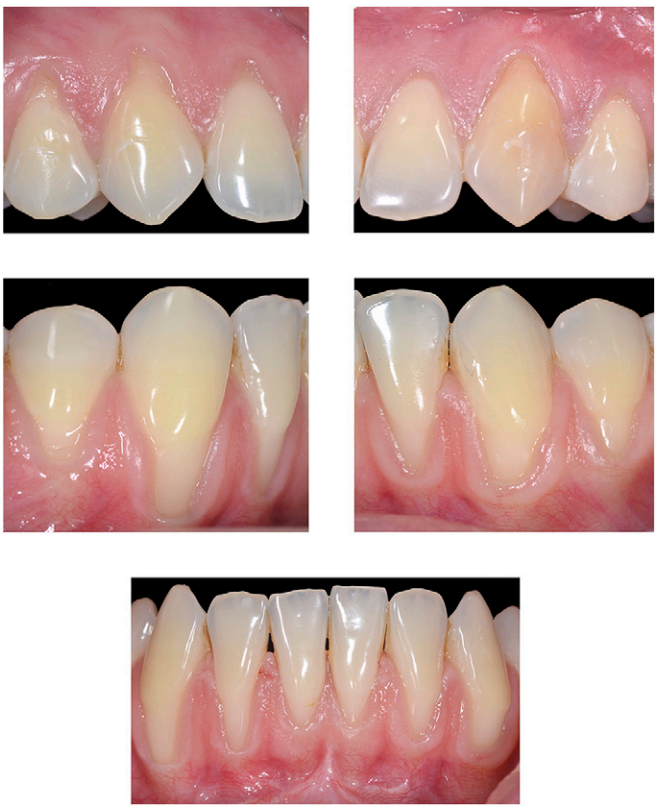

FIGURE 2 Close-up views of the most critical sites of multiple GR-type defects (i.e., deeper defects).

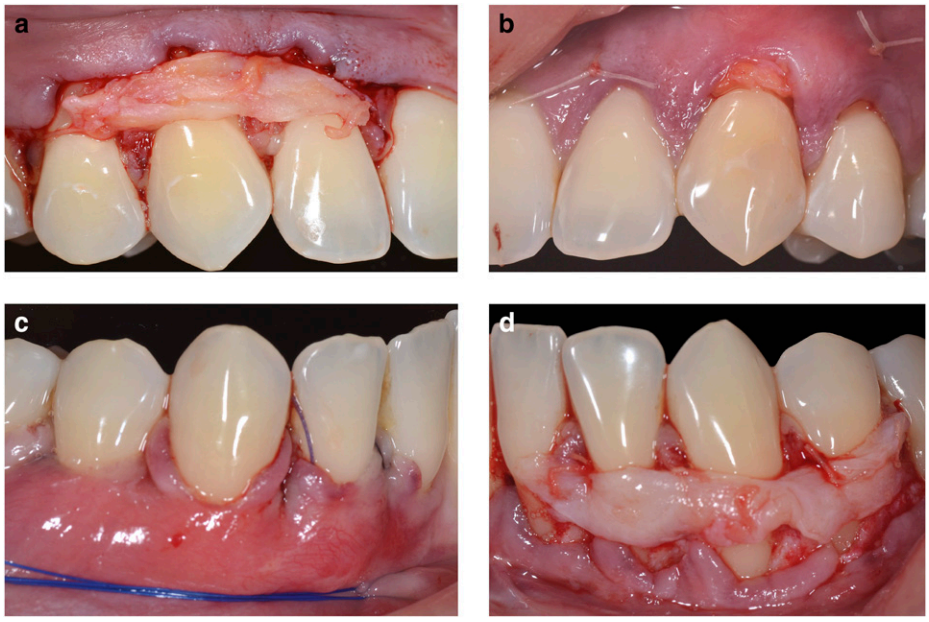

FIGURE 3 SCTGs in position in each quadrant. **3a** Before flap advancement in the right maxilla. **3b** After SCTG suture in the left maxilla. **3c** After flap advancement in the right mandible. **3d** Before flap advancement in the left mandible. Note that, except for in the left side of the maxilla (3b), all grafts were covered completely by CAF without vertical releasing incisions.

With respect to the surgical procedures, three of them were conducted with SCTG + CAF without releasing incisions[13] and one with SCTG + coronally advanced tunnel flap (CATF)[14,15] (Figs. 3 and 4). All four procedures were conducted under local anesthesia, according to the following sequence: 1) right maxilla (week 0); 2) left maxilla (week 2); 3) right mandible (week 24); and 4) left mandible (week 26). Overall, partial-thickness flaps were raised with sharp dissection, root planing of the exposed roots was performed, and the areas were rinsed with saline solution. In addition, SCTGs harvested from the palate were positioned at recipient sites and sutured with 5-0 nylon sutures. The sutures were removed 14 days after the surgical procedure, and the patient was prescribed 0.12% chlorhexidine gluconate to rinse gently twice daily for 10 days.

Clinical Outcomes

At 6 months after treatment, the patient reported great satisfaction with the esthetic and functional outcomes achieved in the four quadrants of the mouth (Fig. 5). Moreover, 24 months after treatment, gingival thickness modification maintained the esthetic and functional results achieved short term. Although not all GRs have achieved complete RC, the patient expressed great satisfaction with the pleasant smile achieved at medium-term/long-term periods after treatment (Fig. 6). Additionally, dental hypersensitivity was no longer reported.

Discussion

The assumption that SCTGs, allogenic dermal matrix grafts, and xenogenic matrix grafts may be used with confidence to increase gingival thickness was validated recently.[6-8] In this case report, the use of SCTGs for treating GR and improving the thickness and width of the KT promoted long-term stable clinical results.

There is scant evidence on the use of SCTGs removed from the same donor site at different times and on how it could affect both donor and recipient sites.[16] The unique report[16] available describing the outcomes of 60 patients (176 GRs, 91 of them treated by the second graft harvested) demonstrated that defects treated with the first or second graft removed showed similar clinical improvements in GR depth, attachment level, and KT band. Additionally, there were no donor site postoperative complications or adverse effects associated with the second graft harvest in addition to those related to the first.[16]

In this case report, for both donor sites of the SCTGs, the second graft was harvested 24 weeks after the first surgical procedure. This is in line with data presented by Harris et al.,[16] who commented about the need for a minimum time frame of 2 months to permit proper tissue restructuring between the removal of the first and second grafts from the same donor site. The decision to use SCTGs was based on the following: 1) according to the literature, SCTG is described as the gold-standard procedure for soft tissue RC;[1-8] 2) as shown in Figure 4, adequate donor tissue was available for graft removal; and 3) the patient refused RC procedures involving allogenic or xenogenic grafts.

It should be noted that, even with the patient being informed about the need for four harvesting procedures (and their potential adverse effects or complications), she still preferred this procedure. Moreover, both SCTG + CAF and SCTG + CATF have been considered the best options for RC. Indeed, the recent AAP Regeneration Workshop literature[6-8] (i.e., the systematic review, the consensus report, and the practical applications) did not show relevant differences between such procedures. As shown in Figure 2, the defects located at the left quadrant of the maxilla presented shallower GR depths than the other three, so it was opted to perform a less invasive procedure without flap elevation (i.e., CATF).

Overall, the use of SCTGs or enamel matrix derivatives in conjunction with the coronal advancement of the gingival margin over the exposed root surface can provide the most stable outcomes.[6-8] In contrast, CAF alone could not be considered an alternative choice because it does not promote gingival thickness modification and because it was described as a procedure associated with significantly more soft tissue loss in the long term (i.e., GR recurrence). Furthermore, the identification and elimination of the causative agent of the GR (e.g., traumatic toothbrushing, periodontal disease) and compliance with regular periodontal maintenance seem directly associated with long-term

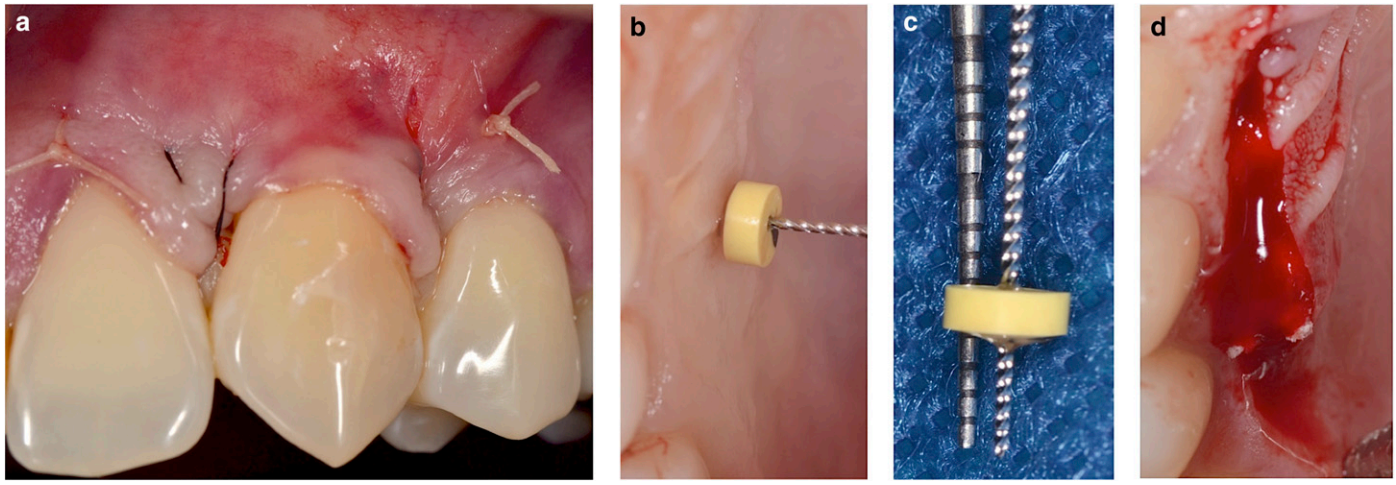

FIGURE 4a CATF completely covering the graft on the left side of the maxilla. **4b** through **4d** Dimensions of the donor sites.

FIGURE 5 Six-month outcomes.

FIGURE 6 Clinical conditions before periodontal maintenance at the 24-month follow-up.

stability of results achieved with surgical therapy.[6-8] Additionally, the recent AAP literature[6,7] also observed that ≥70% of GR reduction can be expected ≥2 years after treating the defects; the number of GRs showing complete RC can vary considerably (up to 67.5% of variation) depending on the type of surgical procedure and the follow-up period; and SCTGs provided the most stable outcomes in the long term because of the improvements of KT thickness and width.

It has also been shown that both maxillary and mandibular sites may be equally benefited by treatment of their associated GRs.[1-8] However, the use of SCTG + CAF in the mandibular arch may not reach the same extent of success as when it is applied to the maxillary arch (as shown in the right side of the mandible).[6] These results can be attributable to conditions associated with the depth of the vestibular fornix, flap tensions, and flap thickness found in the maxilla and mandible.[1-8]

In conclusion, the selection of treatment based on the best evidence available favored the achievement of satisfactory results. The gains in the KT width and thickness promoted by the proposed RC therapy seem to be key factors for the stability of the results. ■

Summary

Why is this case new information?	■ This case demonstrated an evidence-based approach for the management of several sites of multiple GRs after orthodontic therapy. ■ Gingival thickness modification led to esthetic and functional long-term results. ■ This case demonstrated the clinical benefits of using grafts removed from the same donor site in different time frames.
What are the keys to successful management of this case?	■ Solid knowledge of periodontal anatomy ■ Identification of the key characteristics of GRs caused by orthodontic therapy ■ SCTG harvesting ■ The use of tension-free flaps ■ Gingival thickness increase to promote superior and more stable long-term outcomes
What are the primary limitations to success in this case?	■ The need to harvest from both sides of the palatal vault twice ■ The anatomic characteristics of the GRs and the thin gingival thickness (can limit the extension of the flap) ■ Clinician's expertise

Acknowledgment

The authors report no conflicts of interest related to this case report.

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