Using resorbable barriers to make root recession coverage predictable

By Drs David L Hoexter, Nikisha Jodhan and Jon B Suzuki

 Gingival recession is defined as the location or displacement of the marginal gingiva apical to the cementoenamel junction (CEJ). 

Recession is the exposure of root surface, resulting in a tooth that appears to be of longer length.

From a patient’s perspective, recession means an unesthetic appearance and is associated with aging. The gingiva consists of free and attached gingival tissue, as seen macroscopically.

The free marginal gingiva, located coronal to the attached gingiva (AG), surrounds the tooth and is not attached to the root surface. It is the keratinised portion of gingival tissue (KG) that is dense, stippled and firmly bound to the underlying peri-odontium, tooth and bone.

In ideal health, the most coronal portion of the AG is located at the CEJ, where the most apical portion is adjacent to the muco-gingival junction (MGJ). The MGJ represents the junction between the AG (keratinised) and alveolar mucosa (non-keratinised). 

Reasons for recession

There are numerous etiological factors that may result in recession. Generally, the etiology can be categorised as either mechanical or as a function of periodontal disease progression. Recession usually occurs due to tooth malposition 

*`, alveolar bone recession `*`, high muscle attachments and frenal bulge

*`, and iatrogenic factors related to restorative and periodontal treatment procedures. 

The detrimental effects of recession include compromised esthetics, an increase in root sensitivity to temperature and tactile stimuli, and an increase in root caries susceptibility due to cementum exposure. Thus, the main therapeutic goal of recession elimination is gingival root coverage in order to fulfill esthetic demands and prevent root sensitivity.

Miller classifies recession defects into four categories:

- Class I: marginal tissue recession does not extend to the MGJ.
- Class II: marginal tissue recession extends to the MGJ, with no loss of interdental bone.
- Class III: marginal tissue recession extends to or beyond the MGJ, loss of interdental bone is apical to the CEJ but coronal to the apical extent of the marginal tissue recession.
- Class IV: marginal tissue recession extends beyond the MGJ; interdental bone extends apical to the marginal tissue recession.

A possible treatment modality for recession includes restorative/mechanical coverage, such as cervical composite restorations. This kind of treatment may effectively manage root sensitivity and root caries. However, such treatment entails a long-term compromise from an esthetic perspective. Composite restorations stain over time, and any marginal leakage may lead to secondary caries, recurrence of sensitivity and/or local inflammatory changes.

Additionally, color matching can be difficult and such restorations may involve the undesirable removal of vital tooth structure in order to create adequate retention form. Thus, clinicians must determine whether the restorative benefits outweigh the esthetic shortcomings and whether it is possible to employ a treatment modality with few, if any, functional and esthetic disadvantages.

Muco-gingival surgery

Another treatment modality for recession is muco-gingival surgery. Muco-gingival surgery refers to periodontal surgical procedures designed to correct defects in the morphology, position and/or amount and type of gingiva surrounding the teeth. 

In the early development of muco-gingival surgery, clinicians believed that there was a specific minimum apical-coronal dimension of AG that was necessary to maintain periodontal health.

However, subsequent clinical7-11 and experimental studies12 have demonstrated that there is no minimum numerical value necessary.

However, for esthetics, a uniform colour and value of AG is desirable among adjacent teeth. Some of the earliest techniques for correcting recession involved extension of the vestibule. The subsequent healing usually resulted in an increase of AG. However, within six months, as much as a 50 per cent relapse

**Fig. 1:** Pre-op lateral view of anterior teeth: Recession on tooth #6; tooth #7 surrounded by a small adequate zone of keratinised apical tissue.

**Fig. 2:** Flap reflected preserve the interproximal tissue, which preserves the blood supply and prevents black triangles (esthetic interproximal spaces).

**Fig. 3:** The (GTR) membrane was shaped and placed over the root surfaces of teeth #6 and #7.

**Fig. 4:** Gingival tissue was removed repositioned, covering the membranes and the roots of teeth #6 and #7, and sutured in place.

**Fig. 5:** Post-op view: the previously receded roots of teeth #4 and #5 are covered with attached pink, keratinized gingival tissue, with no pocket depth upon probing.

**Fig. 6:** Pre-op lateral view of anterior teeth.
of the soft tissue position was reported.\textsuperscript{18,19} Thus, these techniques did not adequately address recession.

In order to improve esthetics and increase KG for root coverage procedures, current periodontal surgery largely involves the use of gingival grafts. There are a multitude of surgical techniques, which can be distinguished based on the relationship between the donor and recipient sites.

Gingival graft procedures involve either (a) pedicle soft-tissue grafts, which maintain the pedicle blood supply or (b) free autogenous soft tissue grafts. Techniques involving the latter type require the clinician to prepare two surgical sites: one to harvest the tissue and another one to prepare the recipient site.

In this case, the autogenous soft tissue graft has a separate blood supply to the recipient site. Combinations of (a) and (b) have also been reported.\textsuperscript{20-22}

**Soft-tissue grafts**

The pedicle soft-tissue graft was first described by Grupe and Warren in 1956.\textsuperscript{6} This involved raising a full thickness flap and laterally positioning and then suturing donor tissue into place from an adjacent area while maintaining a pedicle blood supply. This technique and others that followed were designed to increase the zone of KG.

The function of the membrane is to maintain space during the healing period for tissue regeneration to occur. From a patient’s perspective, biodegradable membranes with GTR might be preferable in order to avoid a second-stage surgery for membrane removal.

The goal is to restore gingival health, colour and esthetics by covering the exposed root predictably with healthy gingival tissue and, in doing so, decrease sensitivity. Using GTR and coronal repositioning techniques, we achieve predictably cementum.

**Other procedures**

Variations in muco-gingival procedures have been developed to include root surface bio-modifications by treating the root surfaces with a variety of materials. These measures enhance the regeneration process of a new connective tissue attachment. In order to increase root coverage, a new clinical attachment is necessary.

Root surface bio-modification involves treating the root surfaces with citric acid, tetracycline or EDTA in order to remove the smear layer and expose dentinal tubules and thus facilitate a new fibrous attachment. An enamel matrix derivative claimed to support the action of enamel matrix proteins by inducing acellular cementum, periodontal ligament and alveolar bone formation is also available in the range of root surface bio-modification materials.

The following case report considers predictable esthetic root coverage by comparing a GTR technique to a non-GTR technique in a split-mouth procedure involving the same patient.

**Case report**

A young, adult male patient presented with recession bilaterally in his maxilla. The upper right maxillary had extensive recession on teeth #6 and #7 (Fig. 1). The upper left maxillary had similar recession on teeth #11 and #12. Additionally, tooth #11 had a cervical groove, which was stained and hard but not decalcified.

After local anesthesia using lidocaine, the desired flap design was completed. There was an adequate zone of KG present before treatment, which was preserved and repositioned coronally. Upon reflection of the tissue, the full extent of the underlying recession was evident (Fig 2). The area and recession were uncovered following removal of debridement and granulomatous tissue.

The resorbable membrane material was shaped and placed on the exposed roots. The membrane was first placed on tooth #6 and thus the tooth appeared darker as it absorbed blood. The membrane was placed on tooth #5 second and thus the tooth had not absorbed the blood at the time of the photograph, which accounts for the colour difference at this time.

The coronally repositioned flap was sutured in place with the flap covering the now submerged membranes and previous recession (Figs 5, 6). Periodontal dressing (Coe-Pak, GC) was utilised as a bandage and placed over the surgical area. It was removed a week later at the same time as the sutures. The patient then lavaged and returned to the usual oral hygiene routine, initially lightly and gradually more vigorously.

Once healed and oral health was maintained, the recession was covered and health regenerated. Upon periodontal probing, no pockets were present (Fig 5). The final view presents a visual symmetry of health and colour that is maintainable.

Recession was also present at the maxillary left side (teeth #11 and #12; Fig 6). After local anesthesia of the areas involved, a full thickness muco-periosteal flap was completed. This exposed the extent of the recession defect (Fig 7). Tooth #11 was treated, as was the other side of the mouth, by utilising the GTR technique using an acellular connective tissue membrane to preserve the space for regeneration.

Tooth #12 was treated the same way, except that no membrane barrier, resorbable or non-resorbable, was used (Figs 9). Thus, there was no use of a GTR technique on tooth #12. Both teeth had the flap manipulated with the coronally repositioned graft, covering the recessed root and suturing to the CEJ level.

Both sides were covered with periodontal dressing. Antibiotics (tetracycline) and an analgesic (Tylexone-Godona) were prescribed for the first week after the operation.

One week after the surgical phase, the dressing and sutures were removed and the mouth lavaged. Oral Hygiene was restored to good, maintainable habits following the healing phase of over two months. Upon observation, tooth #11, for which the GTR membrane had been employed, had reattached healthy gingiva that was not probable.

The recessed root and the stained cervical groove were covered. In contrast, tooth #12, for which no GTR membrane had been utilised, displayed recession as prior to the surgery (Fig 10).

In summary, this split-mouth technique demonstrated that using an acellular resorbable barrier membrane is more predictable for achieving root recession coverage than coverage of a recessed root without such a membrane.

---

**The goal is to restore gingival health, colour and esthetics by covering the exposed root predictably with healthy gingival tissue and, in doing so, decrease sensitivity**

---

**About the author**

Dr. Dharma V. Komar, 654 Madison Avenue, New York, NY. To get in touch, you can call him on +1 212 355 0800 or email dharma@dent.com.