

ENAMEL MATRIX PROTEIN IN THE TREATMENT OF RECESSION DEFECTS

CLIVE WATERMAN

Recession has been an esthetic and functional problem recognized for many years. These defects are relatively common, and studies have shown up to 20% of people aged 20 years have recession on at least one tooth¹⁻². These levels increase with age and may lead to problems for both the patient as well as for the dentist.

Problems can be divided into either esthetic or functional categories. The esthetic aspect usually involves the upper anterior teeth, but, depending on the patient, several other areas can also be involved. Visually, discrepancies on the vertical plane are more noticeable than those on the horizontal one. Thus recession defects are more visually unattractive than a shift in center line. From the patient's point of view, the main functional aspect is that of root sensitivity. This can be to any hot, cold or sweet substance, or to touching the area while brushing. From the dentist's viewpoint, the functional aspects can include effective treatment of sensitivity, possible root caries or restorative problems. These restorative problems can range from difficulties in placing satisfactory restorations without causing irritation to possible exposure of cornu of the pulp chamber while preparing an adequate esthetic shoulder further down on the root surface. The best way to address these problems is to reduce or eliminate the recession defect to ease or eliminate the problem.

Before considering the ways to repair the recession, it is essential to appreciate the underlying cause and what any repair should aim to achieve. For recession to happen, there must be loss of attachment with an apical migration of the epithelial attachment. When buccal bone is present on the root surface to the correct height, there can be no apical movement of the epithelium resulting in recession. For this bone to be absent, there must be an absence at the time of eruption due to the position of the tooth, usually to buccal. The other cause

is loss as a result of inflammation with the formation of a periodontal pocket. In both instances, initially the gingiva will be in the correct position relative to the cemento-enamel junction. Trauma, either directly or resulting from inflammation, will result in a loss of this unsupported gingival tissue. When considering the nature of any repair, the ideal repair will result in the reformation of all aspects of this support apparatus, new bone, periodontium and cementum. The end result of the formation of this will be a repositioning of the overlying gingiva.

The classification of recession defects was proposed by Miller³ (Table 1) and it can be used for assessing the projected outcome of any repair attempt. Class I and II defects with intact interdental papillae have the potential of complete regeneration of the buccal soft (and possibly) hard tissues. Class III defects with some loss of papilla height will never regain full coverage. With the flat Class IV defect, there is no possibility of gaining any recoverage without some form of papilla reconstruction.

The earlier methods for repairing recession involved the use of grafts, either epithelial (or just connective tissue⁴⁻⁶). These techniques produced very good and predictable results, which caused the connective tissue grafts to be called the "gold standard" for recession repairs. This gold standard was taken as the benchmark to compare all other techniques against. Since those days, there have been many modifications to the grafting procedures and later the use of Guided Tissue Regeneration (GTR) procedures. These were introduced to eliminate the uncomfortable second surgical site for the donation of the graft, usually on the palate. These techniques also better addressed the regeneration of a complete attachment apparatus, compared to the grafting of just soft tissue. Initially, non-resorbable membranes⁷ often with titanium supports were used⁸. Later, bio-absorbable membranes were used⁹⁻¹¹ as they had the advantage of only involving a single surgical procedure without the need to remove the membrane after 6 to 8 weeks. The results and degree of predictability achieved using membranes have been extremely good, reaching the levels achieved with connective

*Clive Waterman BDS, MSc, DGDRC RCS (UK), Specialist in Periodontics,
Private Specialist Practice
4 Elm Grove Road, Barnes, London SW13 0BT, Great Britain
Tel: +44 20 8878 8986, Fax: +44 20 8878 9755
Email: clive@c4gum.co.uk*



Figure 1: Initial view of tooth 41.



Figure 2: PrefGel® applied.



Figure 3: PrefGel® washed off, Emdogain® immediately placed.



Figure 4: Initial suture. Through flap papilla, papilla and a vertical mattress lingually.



Figure 5: Remaining Emdogain® placed under flap via relieving incision.



Figure 6: Remaining Emdogain® placed under flap via relieving incision.

tissue grafts. Reentry studies have shown that there is the potential to regenerate in the region of 2mm of new buccal bone if the conditions are right¹⁰.

The latest technique, using Enamel Matrix Protein Emdogain® (Straumann AG, Basel, Switzerland) has the advantage of an equally good result as the bioabsorbable membranes, but is technically easier to perform¹². It has been shown to give better long-term results when supplementing a coronally advanced flap¹³⁻¹⁴. The biological basis for its use is the presence of Enamel Matrix Protein in the developing tooth

germ prior to and at the initiation of the differentiation of cells into the components of the periodontium, mimicking the normal development of these tissues¹⁵⁻¹⁷.

The surgical technique (Figure 3) starts with an incision with a trapezoid flap outline, avoiding the papillae by finishing the relieving incisions at the same level below the papilla crest as the depth of recession. A full thickness flap is then gently raised to a level of 4 to 5mm beyond the muco-gingival-junction. At this point, the epithelial surface of the papillae is removed without reducing the height. This is to allow coronal

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Table 1.

Class I	- Intact papillae, recession within attached gingiva.
Class II	- Intact papillae, recession extending into alveolar mucosa.
Class III	- Loss of papilla height.
Class IV	- No papilla, flat gingiva.

repositioning of the flap without too much bulk of the papillae. The root surface is planed up to the cemento-enamel junction to reduce convexity, using curettes*. At this point, the flap is placed in the intended position to cover the exposed root surface. It is then checked to see if there is a passive coverage, even when the lips and cheeks are moved. This is an essential



Figure 7: Results after 2 years on tooth 13, despite patient still not taking good care of cleaning.



Figure 8



Figure 9: Results after 9 months on tooth 34, note rebound on adjacent tooth 33.

feature for success¹⁸, and if not, a periosteal fenestration across the whole width of the flap is required to give the required free movement to allow this passive placement at the correct level.

The placement of Emdogain® is next. The root conditioned using PrefGel® (Straumann AG, Basel, Switzerland) for 2 minutes without any burnishing. Following the removal of the PrefGel® with saline solution for at least 15 seconds, some Emdogain® is immediately placed on the root surface.

Suturing is carried out with the flap in its coronally placed position using resorbable Vicryl suture, preferably 5 or 6/0 with a small double-curved needle. The first sutures pass through the papilla tip of the flap and the papilla. On the lingual/palatal aspect, the double curve is used to give additional flap stability and tightness by a vertical mattress approach and is then passed through the interdental space to be tied off on the buccal aspect. Prior to any further suture placement, the remainder of the Emdogain® is placed below the flap via the relieving incision. The relieving incisions are sutured with angulated sutures to help maintain the coronal repositioning.

Post surgically, there are a variety of suggested regimes, but for continuity with an ongoing long-term longitudinal study, my regime is that the patient is advised to not brush the area for a period of 6 weeks and to use a chlorhexidine mouthwash twice daily for this period. As a precaution, oxytetracycline is prescribed at 250 mg qds for 2 weeks. The sutures are removed after 3 to 4 weeks, and brushing with a very soft brush can start at 6 weeks. However, many authors advocate suture removal at 10 to 12 days, and brushing to start at 3 weeks.

The results achieved with this technique (Figures 4–7) are in a similar order to those achieved with either grafts or other GTR techniques. A recent study showed 88.6% root coverage, which agrees with a long-term study of 125 cases recorded by myself, as well as the results achieved with soft tissue grafting. A further very important added bonus is that there is no second surgical site or follow-up surgical procedure. Additionally, while using a 0.3ml syringe for a single site, there is the possibility of treating several adjacent defects at the same time using a single 0.7ml syringe of material rather than having to use several individual membranes, one for each defect. This is a great financial saving to both the dentist and patient. Although it is only an impression, many users report that there are far better healing characteristics, and that healing appears swifter and there appears to be less inflammation. All this results in better patient acceptance of the procedure, as it is equally effective, less traumatic or painful, heals more quickly and can be more financially advantageous.

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Figure 10



Figure 11: Multiple defects on teeth 43-45, 3 years after treatment.



Figure 12



Figure 13: Balanced look of lower teeth 4 years after treating tooth 42.

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