

CASE REPORT

MANAGEMENT OF MILLER'S CLASS III GINGIVAL RECESSION USING FREE CONNECTIVE TISSUE GRAFTS - THE USE OF TWO DIFFERENT TECHNIQUES

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ABSTRACT:

Background: In recent years, dentistry not only demands functional restoration of teeth but also esthetic rehabilitation. A very common issue faced is the presence of gingival recession, which not only is unesthetic but also practically problematic as it is associated with difficulty in oral hygiene maintenance, root caries and hypersensitivity. Restoring lost gingiva can be challenging and is highly dependent on other factors such as the quality of the surrounding hard and soft tissues. While recession coverage in class I and II defects can be treated with greater predictability, the management of Miller's class III defects is more demanding. Here two case reports are presented where root coverage was attempted in Miller's class III gingival recession defects using two different techniques which employed free connective tissue grafts. **Results:** Two years post-surgery both cases had an appreciable increase in keratinized gingiva and root coverage. Creeping attachment occurred labially and unique interdental creeping attachment was seen which resulted in a remarkable increase in papillary height. **Conclusion:** These cases demonstrate that favorable outcomes can be anticipated even in Miller's class III recession defects. Creeping attachment can be expected to occur.

Keywords: Interdental creeping attachment, Miller's class III defects, Connective tissue grafts.

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INTRODUCTION:

Gingival recession is the exposure of root surfaces that has occurred as a result of displacement of the soft tissue margin apical to the cemento-enamel junction (CEJ). It is a frequently encountered condition often associated with hypersensitivity, increased incidence of root caries and an unesthetic appearance. Many patients also associate gingival recession with the fear of tooth loss, all of which prompts the patient to receive appropriate treatment for the same.

Gingival recession has been reported in populations practicing excellent oral hygiene¹ as well as in those with poor oral hygiene.¹ Etiological factors associated with gingival recession include tooth malposition, alveolar bone dehiscence, prominent root contours, aberrant frenal attachments, occlusal discrepancies, plaque and calculus accumulation, periodontal disease, some dental procedures and self-inflicted trauma from oral habits such as vigorous tooth brushing, usage of hard toothbrushes, improper flossing, foreign object doodling and tobacco chewing.^{2,3}

In 1985, Miller⁴ presented a classification system for gingival recession which took into consideration the

possible root coverage attainable. The classification was described as:

Class I: marginal tissue recession that does not extend to the mucogingival junction with no loss of hard or soft tissue interdentally. Complete root coverage can be attained.

Class II: marginal tissue retention that extends to or beyond the mucogingival junction with no loss of hard or soft tissue interdentally. Complete root coverage can be attained.

Class III: marginal tissue recession that extends to or beyond the mucogingival junction. Interdental hard or soft tissue loss is apical to the CEJ, but coronal to the apical extent of the marginal tissue recession. Only partial root coverage may be anticipated.

Class IV: marginal tissue recession that extends beyond the mucogingival junction. Interdental hard tissue loss extends apical to the marginal tissue recession. These are not amendable to root coverage procedures.

Over the years various procedures have been used in the treatment of root exposure defects such as free autogenous grafts, pedicle grafts, guided tissue regeneration, and combinations of these techniques with or without

biomaterials. According to recent the systematic review⁵and consensus report, ⁶ the subepithelium connective tissue graft resulted in the most desirable root coverage outcomes.

In this article we present two cases treated with the use of the free connective tissue graft, also known as the subepithelium connective tissue graft, for the treatment of Millers class III recession defects. The first case demonstrates the techniques as described by Levine⁷wherein the free connective tissue graft is sutured at the prepared recipient site without an overlying flap. The envelope technique as described by Raetzke⁸was employed in the second case.

CASE 1:

A 19 year old male patient reported with the chief complaint of receding gums since the last 3-4 years. He was distressed as he felt that tooth loss would follow. The patient had no history of tobacco chewing or smoking, nor any deleterious oral habits. His past medical history was noncontributory. The patient would brush his teeth twice daily, using a medium bristled toothbrush and the horizontal scrub brush technique. He experienced mild tooth hypersensitivity when eating cold desserts or drinking cold beverages but did not find it bothersome.

On clinical examination, mild lower anterior crowding was present. The lower left central incisor (tooth number 31) was found to have gingival recession of 5 mm in depth and 3 mm in width, extending beyond the mucogingival junction. Loss of papillary height of 1.5 mm was noted in relation to the papilla in-between the lower central incisors and 0.5 mm in relation to the papilla between the left central and lateral incisors. Mesially the tip of the papilla was just apical to the level of the CEJ interproximally and coronal to the level of the CEJ mid buccally (Class II papilla according to the classification described by Nordland and Tarnow⁹in 1998). Radiographically the distance from the contact point to the crest of the interdental bone was 6mm. The recession defect was diagnosed as a Miller's Class III defect due to the associated interproximal tissue loss. It was also associated with an aberrant frenal attachment. Retraction of the lower lip produced visible blanching of the marginal gingiva. Attached gingiva was lacking. It was also noted that the distal portion of the involved tooth was labially positioned with increased root prominence.

The patient has no previous history of attempted treatment. As part of initial therapy, scaling and root planning was performed and the patient was instructed in performing non traumatic oral hygiene measures. After successfully correcting his brushing habits, he was scheduled for periodontal plastic surgery. The treatment planned for the patient included the usage of a free connective tissue graft as described by Levine⁷following a frenotomy to achieve the dual benefit of root coverage while simultaneously increasing the width of attached gingiva.

After the administration of anesthesia, two divergent vertical incisions were made on either side tooth 31. A partial thickness flap was raised to prepare the recipient bed. The frenotomy was performed by sharp dissection of the muscle fibers. The flap was then placed apically and sutured to the periosteum with 3-0 black silk sutures. The labial prominence of the root surface was reduced using curettes. A foil template was used to estimate the amount of graft to be harvested. The connective tissue graft was harvested from the palatal tissues in relation to teeth 14 and 15 using the "trap door" approach. It was then transferred to the recipient site and sutured using 3-0 absorbable Vicryl sutures (polyglactin 910, by Ethicon). Sterile aluminum foil was placed over the grafted site followed by the placement of periodontal dressing (CoePak).The donor site was also sutured and a previously prepared stent was positioned intraorally for the protection of the donor site and for the comfort of the patient. The patient was prescribed amoxicillin, 500 mg, to be taken every 8 hours for the next 5 days and ibuprofen, 400 mg, to be taken every 8 hours for the next three days and thereafter as and when required. He was advised to abstain from brushing the surgical area and also asked to rinse with 0.2% chlorhexidine gluconate mouthwashes, twice daily, for the next 4 weeks. He was scheduled for recall once every week for the first month. During this time it was noted that the portion of the graft overlying the denuded root had survival issues. Defect coverage appeared minimum as the only noticeable difference was reduction in the width of the defect. But there appeared to be an increase in the width of keratinized gingiva apical to the defect. There was no change then in the papillary height mesial and distal to the involved tooth. The patient was scheduled for regular follow ups but could not always come due to academic commitments. However his motivation for the best post-surgical results persuaded him to meticulously maintain excellent oral hygiene as taught to him. The patient was seen again after 2 years. It was then noticed that 2 mm of "creeping attachment" had occurred labially and also in relation to the previous papillary loss.



Figure 1: Preoperative view. Note the loss of papillary height.



Figure 2: Partial thickness flap apically repositioned and sutured.



Figure 3: Connective tissue graft being harvested.



Figure 4: Graft sutured in place.



Figure 5: One month post-surgery.

The embrasure space was occupied entirely by healthy interdental papilla. 1.5mm of creeping attachment was seen mesially and 0.5 mm distally. The tissues appeared healthy and firmly attached to the tooth, pockets were absent and no bleeding on probing was present. The patient was informed that a second stage surgery could be performed to correct the residual labial gingival recession that was

present. However he declined further surgical treatment as he was content with the results that had been achieved.



Figure 6: Two years post-surgery. Labial and interdental creeping attachment seen. Healthy papilla fills the embrasure spaces.

CASE 2:

A 26 year old male patient reported with the chief complaint of increasing tooth sensitivity since the past 4-5 years and receding gingiva since the past 6-7 years. On enquiring about the history of the issue, the patient explained that during his early teenage years he unfortunately fell into the vice of tobacco chewing. He would place tobacco in the mandibular labial vestibule. He tried to keep it a secret from his family but soon noticed that his lower front teeth were getting visibly stained. The patient experimented with various colloquial methods of stain removal, some of which included vigorous scrubbing of his teeth with toothpowders, ash, lemon, twine and coconut husk, and picking on stained areas with sharp objects. He finally found that he would get the best results by scrubbing his teeth with a needle or pin dipped in battery acid. For several years the patient would carry out this procedure in secret, once in every 4 or 5 months, to get rid of stains that had accumulated from tobacco chewing. He only discontinued acid cleaning of his teeth when he approached adulthood and once his family knew about the habit. During this period, the patient noticed that his gingiva, in relation to the lower left central incisor, was gradually receding. He started experiencing mild tooth sensitivity 4-5 years back but found that it was increasing in intensity in the recent past. In his early twenties he decided to quit the habit and had reduced the use of chewing tobacco. Also he no longer placed it in the mandibular labial vestibule fearing that his tooth would only get worse. At the time when he reported for dental treatment, he used to chew tobacco only occasionally (once in two to three weeks) and was willing to quit the habit completely.

On clinical examination, generalized plaque, calculus, stains and attrition were present. The lower left central incisor (tooth number 31) was found to have gingival recession of 8 mm that extended beyond the mucogingival junction. Attached gingiva was absent. Soft tissue loss was present interproximally which was apical to the CEJ but coronal to the apical extent of the marginal tissue recession.

Radiographic examination revealed interdental bone loss which measured 8 mm from the contact point to the crest of the interdental bone. It was diagnosed as a Miller's class III recession defect. The tooth had slight labial prominence. After recording the clinical parameters, scaling and root planning was done. Polishing of the tooth surfaces was performed with a rotary polishing brush and fine grit polishing paste. On completion of stain removal, fine ditches and irregular grooves due to erosion from the deleterious habit were clearly visible on the labial surfaces of the lower front teeth. The patient was educated about these ill effects produced by the previous acid cleaning on teeth surfaces. He was then taught correct oral hygiene techniques. The patient was also counselled for tobacco cessation which he eagerly participated in. He was put on a follow up regimen, cooperated well and expressed his desire to have the root exposure repaired. After re-evaluating the tissues, treatment with a free connective tissue graft and the envelope technique was deemed most suitable for this case.

Following the administration of anesthesia, the recipient bed was prepared. The sulcular epithelium was eliminated by an internal beveled incision. The sulcular incision was then extended laterally and apically as split incisions to form the "envelope" while simultaneously being careful not to perforate the flap or the interdental papilla. A foil template was used to determine the dimensions of the graft. The free connective tissue graft was harvested from the palatal tissues in relation to the upper left premolars and the donor site was sutured. The graft was transferred to the recipient site and gently eased into the "envelope". Gentle finger pressure was applied to facilitate close approximation and hemostasis. The graft was secured in place by 3-0 absorbable Vicryl sutures (polyglactin 910, by Ethicon). Sterile aluminum foil was placed over the recipient site followed by a periodontal dressing (Coe Pak). Postoperative medications and instructions were similar to those described in the previous case. He was gently reminded that tobacco chewing, if resumed, would hinder healing. Over the course of the first post-operative month, both the donor and the recipient sites were found to be healing well. The graft appeared to have taken up well and good colour matching and graft adaptation to the surrounding tissues was observed.



Figure 7: Preoperative view.



Figure 8: "Envelope" prepared.



Figure 9: Connective tissue graft being harvested.



Figure 10: Graft secured in place.



Figure 11: Two weeks post-surgery

At 2 weeks, 6mm of defect coverage was noted which reduced to 5mm at one month. It remained stable thereafter. The patient was scheduled for regular monthly recalls. 2 years after surgery the defect coverage obtained was found to have remained constant at 5mm. Creeping attachment labially was negligible but 0.5 mm of

interdental creeping attachment was observed mesially and distally.



Figure 12: One month post-surgery.



Figure 13: Two years post-surgery. Negligible creeping attachment labially, 0.5mm interdental creeping attachment.

DISCUSSION:

Edel, in 1974,¹⁰ originally described the connective tissue graft for increasing the width of attached gingiva. Later Langer¹¹ demonstrated its use in root coverage procedures. According to a systematic review by Chambrone and Tatakis⁵ optimum results were obtained when connective tissue graft procedures were used for root coverage. The connective tissue graft has several useful advantages for both the recipient as well as the donor sites. The donor site heals by primary intention since the graft is obtained from beneath the palatal flap which is repositioned and sutured. This less invasive palatal wound offers the patient reduced post-operative discomfort. It also boasts of superior esthetics because of better colour matching obtained of the grafted tissues and the adjacent tissues.

In the first case presented, gingival recession was associated with aberrant frenal attachment and lack of adequate attached gingiva. The lack of suitable donor tissues from the adjacent sites precluded the use of a pedicle flap. The frenal muscle attachments further complicated the treatment plan. Hence the technique as described by Levine was chosen as this would allow repositioning of the frenal attachment while simultaneously increasing the width of attached gingiva and providing root coverage.

In the second case root coverage was obtained by using the envelope technique which was introduced by Raetzke.⁸ Here a large portion of the graft lies sandwiched between

the recipient bed and the overlying envelope flap thus maintaining intimate contact. Also vertical releasing incisions which could interrupt the vascular plexus are not used. Both of these factors play a role in improving graft survival.

According to Miller,¹² complete root coverage could be considered if the soft tissue margin was at the CEJ with clinical attachment to the root, with sulcus depth no deeper than 2 mm and no bleeding on probing. As rightly predicted by Miller, partial root coverage was obtained in these two class III defects. The greater defect coverage demonstrated in the second case can be attributed to the technique used which provided the graft with better nutrient supply during the early post-operative period.

Another finding that is appreciable, is the creeping attachment seen at two years post-surgery not only labially but also interdentally. To the best of our knowledge very little information is available on interdental creeping attachment. In the first case, the interdental creeping attachment resulted in complete fill of the embrasure space with healthy papilla even though no treatment was done to increase the papillary height. This noteworthy finding improved esthetics and improved oral hygiene maintenance. Goldman and Cohen¹³ described the phenomenon of creeping attachment particularly in the mandibular anterior region, as the postoperative coronal migration of gingival marginal tissues over previously exposed root surfaces with firm attachment to the root surface and no increase in sulcular depth. Matter and Cimasoni¹⁴ listed a few factors which seemed to influence creeping attachment such as graft position, width of the recession, presence of interdental bone, tooth position and oral hygiene of the patient with the best results in the youngest patients. According to Tarnow,¹⁵ the distance from the contact point to the crest of the interdental bone is an important deciding factor with regards to the presence of the interdental papilla. In the first case, this distance was 6 mm and 8 mm in the second case which could explain the greater interdental creeping attachment seen in the first case. Other factors such as alteration of the labial tooth prominence, excellent oral hygiene maintained by the patient and the patient's age could also have played a substantial role.

CONCLUSION:

Root coverage of Miller's class III defects is not predictable and neither always complete. However these cases demonstrate that creeping attachment can be expected to occur, thus improving the outcome. When interdental creeping attachment occurs, it will greatly improve esthetics, especially in Miller's class III defects which are characterized by interdental hard and soft tissue loss. It appears that favorable results would depend on the presence of anatomic and environmental factors conducive to it.

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