

A Two-Stage Approach Using an Autogenous Masticatory Mucosal Graft and an Autogenous Connective Tissue Graft to Treat Gingival Recession: A Case Report

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Abstract

Various methods have been suggested to cover a denuded root. However, this is especially difficult in the lower molar area when root recession has the additional complication of an inadequate zone of attached gingiva in association with frenal attachment. This case report indicates that a lower molar with Miller Class III gingival recession associated with frenal attachment can be successfully treated by a two-step procedure with an autogenous masticatory mucosal graft and a connective tissue graft.

Key words: Staged approach, gingival recession, frenum, connective tissue, masticatory mucosa, molar

Introduction

Patients looking for a decrease in root sensitivity, esthetic improvement, treatment, or reduction of the risk of root caries, and for restoration of the gingival margin to its normal contour and position, can be treated with root coverage procedures (Harris, 1997). However, this is especially difficult in the lower molar area when there is an inadequate zone of attached gingiva in association with a frenum.

Various techniques have been used to obtain root coverage, and several soft tissue grafting techniques have been used to achieve successful root coverage. Miller described a technique for root coverage using a thick, autogenous masticatory mucosal graft (free gingival graft; FGG) and citric acid treatment (Miller, 1985). Harvey (1970) suggested a two-step procedure consisting of creating attached gingiva by means of a conventional FGG and later coronally positioning the grafted tissue to cover the gingival recession.

In this report, a modification was made to the two-stage approach by using an autogenous connective tissue graft in the second step. The FGG was used to increase both the vestibular depth and the width of keratinized

tissue. The coronally positioned flap with the connective tissue graft was used to cover the exposed root surface and to increase the thickness of the flap.

Case report

A 40-year-old female was referred to the Department of Periodontology at Seoul National Dental Hospital. The patient had a non-contributory medical history. The patient experienced discomfort during tooth brushing and hypersensitivity due to interference of the mucosal lining and the high attachment of a frenulum. The patient did not have any medical conditions and was not taking any medications that were associated with a compromised soft tissue healing response. The clinical and radiographic examination revealed that keratinized tissue was minimal and vestibular depth was shallow in the lower left posterior region (*Figure 1A and 1B*). There was no keratinized tissue on the mesial root of the lower left first molar, and the width of keratinized tissue on the distal root was 1 to 2 mm. The gingival recession was 6 mm on the mesial root and 4 mm on the distal root. The papillar height and the size of the distal papilla were favorable, but the mesial papilla had been lost, probably because of loss of the adjacent tooth and bone loss. The flap on the mesial area was thin, and the periodontal probe was able to obtain readings through the flap (Harris, 1997). There was no probing defect on either the mesial or distal root. The mesial root was classified as a Miller Class III defect, and the

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Figure 1A. Clinical photograph showing minimal keratinized tissue and frenal pull.

distal root as a Miller Class I defect (Miller, 1985). The predictability and the success rate of gingival coverage of the mesial root were expected to be lower than those of the distal root.

The patient was referred to the Department of Prosthodontics and the Department of Orthodontics for evaluation and further treatment planning. The decision was made to apically displace the attachment of the frenulum and augment the gingival zone through the placement of an FGG, and then to cover the exposed root surface with connective tissue. The patient was given a detailed explanation concerning the procedure, and informed consent was obtained.

Immediately before the procedure, the patient rinsed for two minutes with a 0.12% chlorhexidine digluconate solution (Hexamedine, Bukwang, Seoul, Korea). Following an injection of 2% lidocaine with 1:100,000 epinephrine local anesthetic, a releasing incision was made between the mucogingival junction and the marginal tissue. A partial-thickness flap was reflected as close to the periosteum as possible to create the bed preparation. The FGG (length 9 mm x height 6 mm) was obtained from the left palate in the molar area. The graft was trimmed to produce a uniform thickness of approximately 1.0 mm. The palatal donor site was treated with sutures (Ethicon, Johnson and Johnson Medical Inc., Arlington, TX, USA) and a periodontal dressing was applied. The raised partial-thickness flap was positioned apically and secured to the periosteum with sutures. The grafts were placed on the firm periosteal bed with the connective tissue side against the periosteum (Figure 2A). The prepared graft was placed and stabilized with sutures over the graft. The patient was placed on amoxicillin 500 mg 3 times per day for 5 days, mefenamic acid 500 mg initially, then mefenamic acid 250 mg 4 times per day for 5 days, and chlorhexidine digluconate 0.12% 3 times per day for 2 weeks. The patient was asked not to chew on that side or brush the surgical area for the first four weeks postoperatively.



Figure 1B. Radiograph taken at the initial visit.

Two weeks after surgery, the periodontal dressing and any remaining sutures were removed, and the grafted area was carefully cleaned with a 0.12% chlorhexidine solution. The patient received oral hygiene instructions and was seen regularly to monitor healing and plaque control. The average increase in the mean amount of keratinized tissue was 4 mm at two months after FGG (Figure 2B).

The root coverage procedure was carried out two months postoperatively. Following local anesthesia, a scalloped, submarginal incision was made on the buccal aspect and connected with the horizontal incisions in the interproximal areas. Vertical incisions were made at the mesial and distal points of the horizontal incisions as necessary for access and subsequent coronal advancement of the facial flap. Following this, a full-thickness facial flap was elevated. An autogenous, connective tissue graft was obtained from the patient's right palate using the single-incision palatal harvest technique (Lorenzana and Allen, 2000). Following harvesting, the connective tissue was trimmed to fit the defect and sutured into place using absorbable sutures (Vicryl, Johnson and Johnson Medical Inc.) (Figure 2C). After graft stabilization, the reflected gingival flap was coronally advanced to cover the graft and defect and sutured using nylon sutures (Ethicon, Johnson and Johnson Medical Inc.) (Figure 2D). The patient was placed on the same medication and given the same care instructions as used previously.

After two weeks, gingival recession measurements on the mesial root and distal root were 2 mm and 1 mm, respectively (Figure 3A). The final evaluation, at three months after surgery, showed that the probing depth was 3 mm. Average recession was 1.5 mm, and the mean increase in keratinized tissue was 3.5 mm (Figure 3B).

Discussion

Attached gingiva is reported to provide increased resistance to the periodontium in cases of external injury,

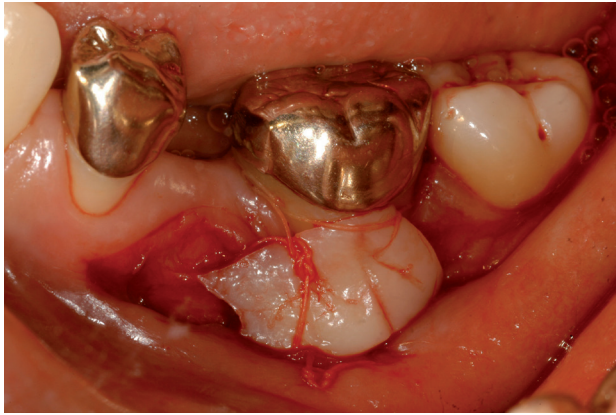


Figure 2A. The FGG (length 9 mm x height 6 mm) was secured to the periosteum by sutures.



Figure 2B. A two-month postoperative buccal view showing increased gingival thickness and greater vestibular depth.

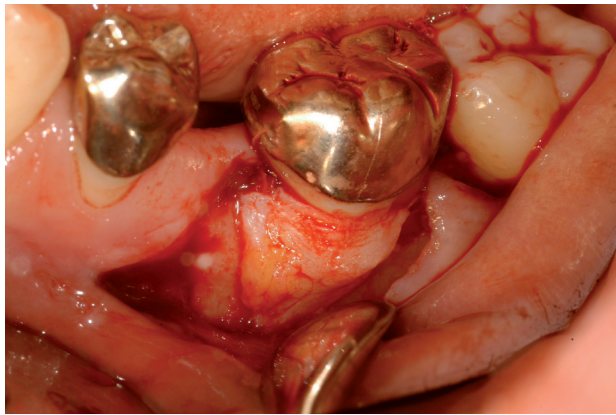


Figure 2C. A full-thickness flap was elevated and autogenous connective tissue was secured with sling suture.

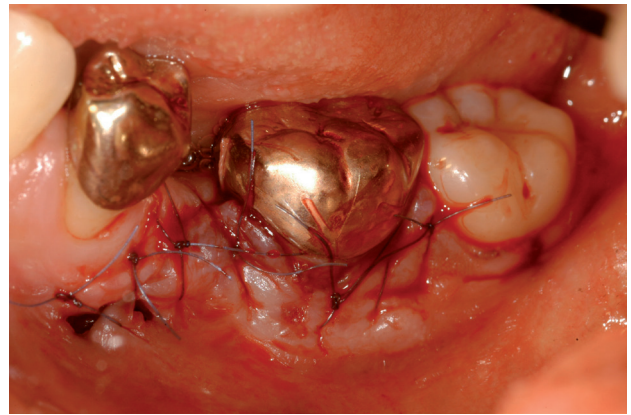


Figure 2D. The overlying flap was coronally positioned to fully cover the autogenous connective tissue graft.



Figure 3A. Clinical view two weeks after the root coverage procedure showing the esthetically covered root.



Figure 3B. Facial view three months after root coverage, showing a well maintained result. The orthodontic treatment was initiated recently to upright the tilted molar.

contribute to the stabilization of the gingival margin position and aid in the dissipation of physiological forces that are exerted by the muscular fibers of the alveolar mucosa on the gingival tissues (Hassell, 1993).

Marginal tissue thickness was suggested to be a more critical determinant of future recession than the width of keratinized gingiva (Henderson *et al.*, 2001), and injuries from inflammatory reactions or traumatic tooth brushing may easily produce gingival recession in the presence of thin marginal tissues (Paolantonio *et al.*, 2002).

The use of the free gingival graft for root coverage involving a two-step procedure was introduced by Harvey (1970) and described in detail by Bernimoulin *et al.* (1975). Maynard (1977) modified the technique by using a split-thickness flap, and Laney *et al.* (1992) changed the method by doing the second surgery after one month of healing.

In this case, the flap on the mesial root was thin, and the periodontal probe was able to obtain readings through it before the first surgery. The dimension apical to the mucogingival junction seemed to be increased after the FGG procedure, but the probe still could be read at the gingival margin (Harris, 1997). It has been reported that a combination approach using a coronally positioned flap with a subepithelial connective tissue graft gives the additional advantage of increased keratinized tissue width and gingival/mucosal thickness (da Silva *et al.*, 2004). With this connection, a coronally positioned flap was performed in conjunction with a subgingival connective tissue graft at the second surgery.

It was suggested that the apical portion of periodontal flaps should be of full thickness when possible to minimize circulatory alterations (Mormann and Ciano, 1977), and thick gingiva at the recipient site seems to be advantageous because, in theory, it harbors more patent vessels and eases surgical manipulation (Hwang and Wang, 2006). In the second surgery, a full-thickness flap was raised and no periosteal scoring was done to minimize any impairment of the blood supply.

The healing of free soft tissue grafts placed entirely on a connective tissue recipient bed has been studied in monkeys by several authors (Oliver *et al.*, 1968; Nobuto *et al.*, 1988). According to these authors, they recorded the tissue maturation phase from 11 to 42 days. In light of this background, the second procedure was delayed up to two months in the current case report.

The shrinkage of FGG is a well-known clinical phenomenon of which the operator must be aware (Hatipoglu *et al.*, 2007). Egli *et al.* (1975) reported that the vestibular depth, which had been increased by the operation, showed a 25% reduction within one month. Longer follow-up was done, and mean graft shrinkage of 24.8% was seen at six months (Hatipoglu *et al.*, 2007). Forty-three percent of contractions were noticed at

12 months (Orsini *et al.*, 2004). In this report, 0.5 mm (12.5%) of shrinkage was seen during a three-month follow-up period.

This case report indicates that lower molars with Miller Class III gingival recession associated with frenal attachment can be successfully treated by a two-step procedure with an autogenous masticatory mucosal graft and a connective tissue graft. However, longitudinal randomized controlled clinical trials are needed to support this approach.

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