Interdisciplinary Treatment of Gingival Recession

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Gingival recession may be localized or generalized, but always involves at least one tooth surface. It occurs more often in the mandibular arch than in the maxillary arch. Gingival displacement can become a critical complication, leading to esthetic complaints, root sensitivity, loss of periodontal attachment, difficulty in performing oral hygiene, and increased risk of root caries. Exposed root surfaces are also more prone to abrasion from brushing.

It is difficult to determine a specific etiology for gingival recession. Predisposing primary factors may include traumatic toothbrushing, localized plaque-induced periodontal inflammation, and generalized forms of destructive periodontal disease. Among possible secondary factors are anatomical causes (such as frenal pull), smoking and other stimulants, and orthodontic treatment.

The likelihood of dehiscence of alveolar bone during orthodontic tooth movement depends on a number of elements, including the magnitude and direction of applied forces, gingival biotype, and volume and anatomy of the bone. The risk becomes particularly high if teeth are moved to positions outside the alveolar process. In the presence of fixed orthodontic appliances, inadequate oral hygiene may negatively affect the periodontium by transforming gingivitis into periodontitis with extensive alveolar bone loss. A poorly designed bonded retainer or a retainer that maintains unfavorable tooth positions may also cause marginal gingival recession. Such circumstances clearly predispose the patient to apical displacement of the marginal gingiva and exposure of the root surface. Pronounced labial recession, extending almost to the apical level, is not only an esthetic problem, but may also increase the risk of tooth loss in a young patient.

This article describes two fixed-appliance patients who developed gingival recession in the mandibular anterior dentition.
Case 1

A 31-year-old female with no notable medical history, no reported use of medications or tobacco, and fair oral hygiene was referred to a specialist unit with the chief complaint of a severe gingival recession at the lower right central incisor (Fig. 1). She had become aware of the apical displacement of the gingival margin shortly after finishing 12 months of orthodontic treatment, at age 15. A lingual 3-3 retainer had been bonded immediately after the completion of treatment. The recession had gradually increased in size, but had caused no discomfort or symptoms apart from a fear of losing the tooth.

The patient displayed a Class I malocclusion with an adequate molar relationship, good arch-forms, normal overjet and overbite, and no midline discrepancies. The mandibular arch had minor crowding, and the lower right central incisor exhibited severe labial root torque and labial recession, with pronounced gingival inflammation. The gingival defect measured 6mm vertically and 3mm horizontally at the level of the cementoenamel junction. It was defined as Miller Class II: a marginal recession extending to or beyond the muco-gingival junction, with no loss of interdental bone or soft tissue. Radiographs showed no intraosseous or periapical pathology.

The goals of retreatment were to improve the patient’s oral hygiene and to correct the mandibular anterior crowding and the labial root torque of the lower right central incisor. Once the roots of the lower incisors had been aligned, the patient would be referred to a periodontist for a gingival grafting procedure.

A conventional .022” edgewise appliance was placed in the mandibular arch, and a light initial force was applied with an .014” nickel titanium wire. The dimensions of rectangular wires and the lingual root torque on the lower right central incisor were progressively increased. After 10 months of treatment, the torque had been corrected; the clinical condition had improved; the gingival inflammation had diminished; and the gingival color, form, and consistency appeared healthy (Fig. 2). The mandibular appliance was debonded, a lingual retainer was bonded, and the patient was referred for gingival grafting.
The denuded root surface of the lower right central incisor was carefully debrided with curettes. Through an undermining partial-thickness incision, a labial envelope was created without releasing incisions. Two incisions were made 1-2mm apart in the palate, close to the gingival margin of the upper left second premolar and first molar, in an anteroposterior direction. A connective-tissue graft was harvested (Fig. 3A), placed in the previously created envelope so that it completely covered the exposed root surface, and secured with non-absorbable sutures13,14 (Fig. 3B). The wound edges at the donor site were adapted and stabilized with non-absorbable sutures.

All sutures were removed 10 days later. At that time, the gingiva showed healthy clinical conditions, with coverage of the labial recession as far as the cementoenamel junction. The red color of the labial gingiva indicated a good blood supply and active wound healing. Two months later, the patient showed optimal healing and complete root coverage of the recession. Three years after treatment, the gingival situation had remained stable, with a wide, robust zone of keratinized gingiva; full root coverage; and no probable pockets around the lower right central incisor (Fig. 4).

**Case 2**

A 17-year-old female presented with no notable medical history, no reported use of medications or tobacco, and good oral hygiene. Her chief complaint was a severe gingival recession at the lower right central incisor. She had previously completed nine months of orthodontic treatment for a mild Class III malocclusion with minor crowding of the upper and lower anterior teeth, using conventional .018” edgewise appliances in both arches. During treatment, the lower incisors were derotated and protruded 2mm with light forces. At the time of appliance removal, the lower central incisors displayed excessive crown height, but a lower 3-3 lingual retainer was bonded.

Eight months after the original treatment, the patient and her general dentist became aware of a gingival recession at the lower right central incisor.

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**Fig. 3 Case 1.** A. Connective-tissue graft harvested from palate. B. Graft sutured into labial envelope around lower right central incisor.

**Fig. 4 Case 1.** Three years after completion of treatment, showing wide zone of keratinized gingiva and full root coverage.
Seven months later, she was referred to a specialist clinic for examination and root coverage. The labial gingival recession, defined as a Miller Class II defect, had a thin band of keratinized gingiva extending to the level of the mucogingival junction (Fig. 5). There were no clinical or radiographic signs of any interdental loss of attachment. Because of a potential fiber pull from the labial frenum, a frenectomy was performed. The patient was given oral-hygiene instructions.

![Fig. 5 Case 2. 17-year-old female patient with Class II gingival recession and frenal pull of lower right central incisor.](image1)

About five months later, a similar connective-tissue graft surgery as described in Case 1 was performed. The palatal-tissue graft was harvested from the region of the upper left first and second premolars, placed in a previously created envelope around the lower right central incisor (Fig. 6), adapted, and secured with non-absorbable sutures. The wound edges at the donor site were adapted and stabilized with non-absorbable sutures.

Fourteen days later, when the sutures were removed, the gingiva was at the level of the cementoenamel junction, showing adequate blood supply and a well-integrated graft. Six years later, the patient displayed a well-keratinized, healthy gingiva up to the cementoenamel junction of the lower right central incisor, with no probable pockets (Fig. 7).

**Discussion**

It is debatable whether orthodontic treatment alone can cause gingival recession. Studies have shown that patients receiving treatment had a significantly higher frequency of gingival recession compared with untreated controls. In a study of 600 untreated children age 9-11, only 7.5% exhibited gingival recessions. Normal growth and de-
velopment can lead to a leveling of the dental arches and spontaneous healing of a recession in a young patient, as long as oral hygiene is well maintained. Unfavorable long-term effects of bonded retainers have also been reported, although one study found only a minor difference in gingival health between patients who had worn bonded retainers for as long as 10 years and those who had worn them for three to six months.

In the two cases presented here, a combination of orthodontic tooth movement, bonded mandibular lingual retainers, and inadequate oral hygiene likely contributed to the development of gingival recessions. In Case 1, the severe labial root torque of the lower right central incisor may have predisposed the patient to apical displacement of the gingival margin. The influence of lower-incisor proclination as a risk factor, however, is uncertain. Several studies have associated proclination with gingival recession, whereas others have demonstrated no such effect. Defects of the alveolar bone are quite common and the loss of cortical bone is most frequently encountered on the labial aspect of the mandibular anterior dentition. Therefore, caution is advised when changing the axial inclination of incisors, especially in patients with anatomical risk factors.

To avoid the development of dehiscences, the morphology of the alveolar bone should be evaluated prior to orthodontic treatment. Cone-beam computed tomography is well suited for this purpose. Evangelista and colleagues found dehiscence or lack of alveolar bone to be 35% more prevalent in Class I patients than in Class II, division 1 patients. Another important finding, from Allais and Melsen, is that 93% of those who developed recession had a gingival thickness of less than .5mm. In each of the cases shown in this article, a thin gingival biotype probably contributed to the apical displacement of the marginal gingiva.

Gingival recession can be successfully treated with oral-hygiene instruction and orthodontic treatment, with or without mucogingival surgery. Non-intervention may actually be the best option in certain cases. If mucogingival surgery is needed, it should not be performed until growth is complete. In a patient with labial gingival recession and irregular lower incisors, surgery should be attempted only after orthodontic correction of the tooth positions. Lingual root torquing of the incisors can improve the chances that the bone and labial gingiva will thicken. A recently published case report illustrated spontaneous improvement of a gingival recession after orthodontic correction.

Complete root coverage can be achieved only if there is no interdental attachment loss. A stable long-term outcome requires control of the two main causes of gingival recession: traumatic toothbrushing and plaque-induced periodontal inflammation. Adequate plaque control is also essential to avoid any subsequent failure of root coverage.

Conclusion

This article shows successful clinical outcomes in two cases with gingival recession associated with orthodontic treatment. A connective-tissue graft alone or following correction of the tooth position, as in Case 1, can provide a stable long-term result. We hope these findings may encourage a more active approach to the treatment of gingival recession, particularly in young patients.

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REFERENCES

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