Necrosis of Gingiva and Alveolar Bone Caused by Acid Etching and its Treatment with Subepithelial Connective Tissue Graft

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Abstract

The misuse of various chemicals in dentistry may cause damage to gingiva and alveolar bone. In this case report, we describe necrosis of the gingiva and alveolar bone caused by acid etching. A patient whose caries on the cervical third of the root of his mandibular right first molar were treated 2 days earlier presented to our clinic with severe pain and discomfort in the treated area. Intraoral examination revealed a spreading gingival ulceration and exposed alveolar bone. The patient was followed and a week later, when the gingival inflammation had decreased, periodontal surgery was performed. A full-thickness flap was raised and necrotic gingiva and bone were removed. As a result, only a narrow band of keratinized gingiva remained. To treat the gingival recession and protect the underlying bone, a subepithelial connective tissue graft was placed during the same session. After the operation, the patient's complaints resolved. Subepithelial connective tissue graft can be an important treatment approach in cases of necrosis and gingival recession caused by the misuse of various chemicals.

MeSH Key Words: *acid etching, dental; dental bonding/adverse effects; ulcer/chemically induced*

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In adhesive dentistry, chemical agents used in the oral cavity should not come into contact with the gingiva or other oral mucosa. Unfortunately, unintentional spillage may occur.[1,2]

Dental adhesives have been shown to be toxic to the gingival fibroblasts in vitro.[1,2] In particular, residual monomers may cause gingival irritation and inflammation.[2,3]

Phosphoric acid, which is widely used as an etching material in adhesive dentistry and as a root surface modifier in periodontology, has necrotizing effects on periodontal soft tissues.[4] Only a few reports of damage to periodontal tissues caused by dental etching materials appear in the literature.[5]

In this case report, we describe necrosis of the gingiva and alveolar bone caused by acid etching and introduce a treatment approach.

Case Report

A 56-year-old man with a noncontributory medical history requested routine dental treatment at the faculty of dentistry, Hacettepe University, and was referred to the department of conservative dentistry for treatment of his several root caries.

His mandibular right first molar was restored with composite resin in the undergraduate clinic. Four days later, he was back at the clinic for another scheduled appointment. A white lesion was observed on the gingiva of the mandibular right first molar and the patient reported that he had experienced pain in that area since the first appointment. Clorhexidine gluconate (0.12%) was prescribed and the patient was called the next day. Because the lesion did not heal, the patient was referred to the department of periodontology.

Figure 1: *White lesion around the gingiva of the mandibular right first molar and exposed alveolar bone.*

Figure 2: *After initial treatment, the extent of the lesion decreased, the lesion became red and there was gingival recession.*

Figure 3: *The width of the keratinized gingiva increased from 1 to 6 mm after the surgery.*

Figure 4: *Twelve months after the surgery, the gingiva was healthy and there was sufficient keratinized gingiva.*

Intraoral examination revealed a spreading white lesion around the gingiva of the mandibular right first molar and exposed alveolar bone (**Fig. 1**). The lesion extended from the mid-buccal third of the mesial aspect of the tooth to the distal edentulous area almost to the base of the buccal sulcus. The patient reported serious discomfort and spontaneous severe pain, for which analgesics were inadequate. The day after starting treatment with the chlorhexidine mouth rinse (prescribed at his second appointment), the patient's mouth became more sensitive. Because of the possibility of sensitivity and allergic reactions to chlorhexidine, we advised him to stop using chlorhexidine gluconate. An antibiotic (1 g amoxicillin-clavulanic acid, twice a day) was prescribed as the alveolar bone was exposed. During the following week, he was seen every other day and the area was rinsed with saline solution. The extent of the lesion decreased, gingival recession was seen and the lesion became red (**Fig. 2**). After 1 week, the gingival inflammation decreased clinically. As the remaining keratinized gingiva was not adequate and both the furcation area and the alveolar bone were exposed, we decided to perform a subepithelial connective tissue graft.

Surgery

After local anesthesia, sulcular incisions were made, a full-thickness flap was raised and the necrotic tissues were removed. Vertical incisions were made on the mesial and distal sides of the tooth to maintain the flexibility of the flap. A subepithelial connective tissue graft was harvested from the edentulous maxillary left canine–premolar region. The graft was placed so that its apical, mesial and distal borders were over the remaining alveolar bone to maintain good nutrition of the grafted tissue. The coronal border was a few millimetres apical to the cementoenamel junction to achieve sufficient root coverage. The graft was sutured in place with 5-0 Vicryl sutures (Ethicon Inc., Piscataway, N.J.) and stabilized to prevent movement during the critical wound-healing phase. The flap was then positioned coronally to cover the connective tissue graft and sutured to

the surrounding gingiva. Periodontal dressing was applied to both the graft and donor areas.

The healing phase was uneventful and the sutures were removed 10 days after the surgery. Healing in the donor site was perfect and the patient's discomfort had almost disappeared.

The grafted area was still slightly hyperemic and edematous. Periodontal dressing was placed in the area for 1 more week. The patient was recalled 7 days later and the dressing was removed. The gingiva was free of inflammation and the exposed furcation area was almost completely covered with gingiva. However, the patient still had slight root sensitivity. He was referred back to the department of conservative dentistry, where the composite restoration was renewed.

Three weeks after the surgery, periodontal examination revealed perfectly healthy gingiva around the mandibular right first molar with pocket depth less than 2 mm. The width of the keratinized gingiva had increased 5 mm since the surgery, from 1 to 6 mm (**Fig. 3**). The patient was fully satisfied with the outcome. At 12 months after the surgery, the gingiva was healthy, keratinized gingiva remained (**Fig. 4**) and the patient was happy with the results of the treatment.

Discussion

Acid-etching materials and dental adhesives are known to be toxic to the periodontal tissues, and trauma to these tissues is seen very rarely. In the case we have described, trauma may have been caused by the rapid removal of the cotton wool used to isolate the restored tooth during treatment when the traumatized gingiva was more prone to chemical injury from the acid etchant or the adhesive materials. Inadequate rinsing of the etching material or material left under the cotton roll that was in contact with the gingiva and gingival sulcus for a prolonged period could also have caused the problem.

In the present case, severe damage to the gingiva and alveolar bone was treated with a subepithelial connective tissue graft. The treatment outcome was very satisfactory. There was an important gain in width of keratinized gingiva, which is vital for protecting the underlying bone and furcation area. Further risk of root caries was also prevented. Subepithelial connective tissue graft seems to be an appropriate treatment choice in acute chemical injuries to the gingiva.

In the literature, few reports focus on necrosis of both the gingiva and alveolar bone after a composite restoration. To our knowledge, this is the first report of such a case treated by subepithelial connective tissue graft.

In conclusion, the dental practitioner has a responsibility to know the possible damage to the tooth and the surrounding tissues when using various chemicals and to prevent such damage by protective methods and tissue management. ➧

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References

1. Huang TH, Tsai CY, Chen SL, Kao CT. An evaluation of the cytotoxic effects of orthodontic bonding adhesives upon a primary human oral gingival fibroblast culture and a permanent human oral cancer cell-line. *J Biomed Mater Res* 2002; 63(6):814–21.

2. Szep S, Kunlel A, Ronge K, Heidemann D. Cytotoxicity of modern dentin adhesives – in vitro testing on gingival fibroblasts. *J Biomed Mater Res* 2002; 63(1):53–60.

3. Schmalz G. The biocompatibility of non-amalgam dental filling materials. *Eur J Oral Sci* 1998; 106(2 Pt 2):696–706.

4. Blomlof J, Lindskog S. Periodontal tissue-vitality after different etching modalities. *J Clin Periodontol* 1995; 22(6):464–8.

5. Gutteridge DL. Iatrogenic oral ulceration following restorative treatment with an acid-etch material. *Br Dent J* 1984; 156(11):403–4.