Treatment of a Complicated Iatrogenic Furcation Perforation in a Mandibular Molar with Bicuspidization Technique: A Case Report

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ÖZET

Alt çene büyük azı dişinde komplike bir iatrojenik furkasyon perforasyonunun biküspidizasyon tekniği ile tedavisi: vaka raporu

İatrojenik furkasyon perforasyonu, endodontik tedavi esnasında dişin prognozunu oldukça azaltan önemli hatalardan biridir. Günümüzde, çoğu pratisyen hekim kompleks tedavi prosedürlerinden kaçınmak için bu gibi perfore dişlerin çekimini ve bunun yerine sabit protez ya da dental implantların yerleştirilmesini tercih etmektedir. Bunlar farklı birer tedavi alternatifi olarak düşünülse de, bu gibi etkilenmiş dişlerin çekim yerine tedavi edilmeleri gelişmekte olan diş hekimliğinin birinci amacı olmalıdır. Bu vaka raporunda, endodontik hataya bağlı alt çene büyük azı dişinde gelişen komplike bir furkasyon perforasyonunun biküspidizasyon tekniği ile tedavisi ve sonraki dönemde çevreleyen periodontal dokuların iyileşmesi sunulmaktadır.
Anahtar sözcükler: Furkasyon, perforasyon, biküspidizasyon

ABSTRACT

Treatment of a complicated iatrogenic furcation perforation in a mandibular molar with bicuspidization technique: a case report

Iatrogenic furcation perforation is one of the important failures during endodontic treatment and significantly reduces the tooth prognosis. Today, many of the practitioners prefer extracting the involved tooth and replacing it with fixed prostheses or dental implants to avoid the complexity of the treatment procedures. Although these may be thought as other treatment alternatives, treating instead of extracting the involved teeth must be the primary scope of developing dentistry. This case report presents the treatment of a complicated mandibular molar furcation perforation depending on endodontic failure with bicuspidization technique, and subsequent healing of the surrounding periodontium.
Key words: Furcation, perforation, bicuspidization

INTRODUCTION

Iatrogenic furcation perforations can occur during root canal treatment or preparing a canal for a post (1,2). Furcal-floor may also be perforated accidentally when seeking the root canal entrances (3). Perforations of the furcal-floor mostly cause inflammation in the furcation region and reduce the prognosis of the involved tooth (2). If the furcation region is not invaded with any filling or root sealant material, the perforation may be repaired using a hermetic and biocompatible sealant (4). However, if the furcation region is also irritated with root sealant or other filling materials, surgical access will be required in order to remove the irritants under the fornix.

Furcations are the limited regions for adequate access and for removing the irritants from the area with non-surgical procedures (5). Therefore, the preferred treatment procedure is often the surgical flap operation (6). Resective surgery procedures such as root amputation, hemisection, bisection/bicuspidization (bisectioning) and radisection techniques are the various surgical treatment alternatives of furcation involvements, and attempt the excision and removal of any segment of the tooth or a root with or without its crown portion (7).

Bisection/bicuspidization technique is the separation of mesial and distal roots of mandibular molars along with its crown portion, where both segments are then retained individually (8). It is usually performed in Grade II or III furcation defects of mandibular molars, and preferred to remove the irritants under the fornix and to obtain two single-rooted teeth for crowning as premolar (9).

CASE REPORT

A 29-year-old female patient was admitted to our clinic in July 2009 with a complaint of an increasingly painful swelling over her mandibular left first permanent molar. Dental history stated that the tooth had been treated by a general dental practitioner with root canal therapy and completed with amalgam restoration five days ago. The following day she had noticed an acute pain and intraoral swelling that progressed over the week to become apparent extraorally. There was submandibular swelling over the left side of her mandible on extraoral examination. On intraoral clinical examination, the tooth was sensitive to percussion and the buccal gingival region was edematous and red. On probing there was 8 millimeter probing depth midfacially, and the tooth was revealed as Grade II furcation involvement and Grade I mobility. Baseline scores of plaque index (PI) (10) and gingival index (GI) (11) were measured at the involved tooth using a Williams type periodontal probe.

Radiographic examination showed that there were gutta-percha cones, root canal sealant and base-cement in the furcation area (Figure 1). The interradicular alveolar bone was destroyed under furcation fornix depending on inflammation. However, there was no periapical lesion related with mesial and distal roots.

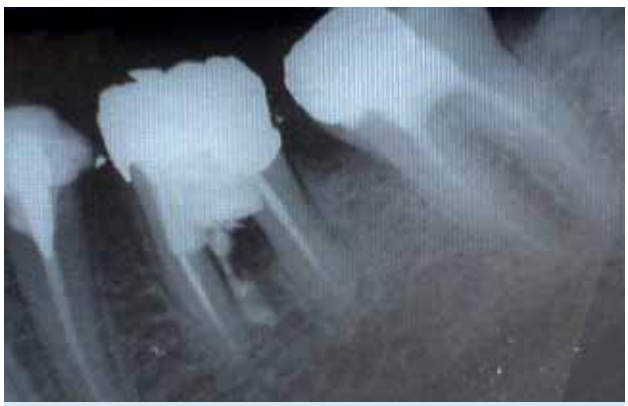

Figure 1: Radiographic image of the involved tooth before treatment.

Treatment Plan

In the first treatment phase, the furcation region was instrumented slightly with a thin type ultrasonic insert (Instrument PS, Electro Medical Systems, Nyon, Switzerland) and was irrigated through the furcation entrance under local anesthesia. Then the patient was prescribed amoxicillin clavulanic acid, 625 mg in order to eliminate the acute inflammation and recalled after ten days.

Figure 2: Dissected portions were prepared for porcelain restorations and each dissected parts of the tooth was crowned as a premolar tooth.

Figure 3: Radiographic image of the treated tooth 24 months after surgery.

Surgical procedure was planned with bicuspidization technique. A full thickness flap was reflected with the crevicular incision extending from the distal surface of the mandibular 2nd premolar to the midfacial surface of the mandibular 2nd molar. After the flap elevation, the tooth was dissected and the gutta-percha cones and other restorative surplus were removed from the furcation. All faces of the mesial and distal roots were instrumented and the spurs were smoothened with aerator. After the irrigation with saline solution, the flap was repositioned and sutured with 3/0 silk sutures.

Six weeks after surgery the dissected portions were prepared for porcelain restorations and each dissected parts of the tooth was crowned as a premolar tooth (Figure 2). The patient was followed at 3, 6, 12 and 24 months after surgery, and clinical measurements and radiographies were recorded (Table 1). Figure 3 shows the radiographic image 24 months after surgery.

Table 1: The clinical periodontal scores at baseline and following measurements.

	Baseline	3 months	6 months	12 months	24 months
Plaque index	3	1	1	1	1
Gingival index	3	1	1	1	1
Probing depth (mm)					
Mesial	5	3	3	3	3
Midfacial	8	6	5	5	5
Distal	6	5	4	4	4
Mobility	1	0	0	0	0

DISCUSSION

Accidental furcation perforations are significant complications of endodontic treatment, and they usually impact the long-term prognosis of the tooth (12-14). Treatment technique may be performed with coronal approaches which aim to repair the perforation using biocompatible, completely resorbable and easily sterilizable materials (15). However, if the furcation area is invaded with endodontic files and non-biocompatible filling materials, the prognosis of the tooth will significantly reduce, and coronal approaches without surgical access will be insufficient (16). Due to the fact that the anatomy of the furcation impedes accessibility for professional debridement (17,18), management of furcal defect is one of the complex challenges in periodontal treatment (19,20). Perforation of the furcation areas of multi-rooted teeth is usually critical (21,22), and especially troublesome as the inflammatory process may cause rapid and extensive periodontal tissue destruction (23). Nevertheless, a good healing can be attained in the treatment of such lesions (24).

Root amputation, hemisectioning and bicuspidization (bisectioning) fall within the scope of endodontic and periodontal surgery, and aim to manage and retain the teeth in the dental arch (16,24). Bicuspidization technique is indicated in Class II and III furcation involvements, and preferred when there is irretrievable material or a non-repairable perforation in the furcation (25). The clinician splits the mandibular molar vertically through the furcation, without removing either half, leaving two separate roots that are then treated as bicuspids (26,27). This technique should be performed if the roots are adequate for length and healthy periapically (9). Farshchian and Kaiser (28) stated that the success of bicuspidization depends on three factors: (i) stability of, and adequate bone support for, the individual tooth sections; (ii) absence of severe root fluting of the distal aspect of the mesial root or mesial aspect of the distal root; (iii) adequate separation of the mesial and distal roots, to enable the creation of an acceptable embrasure for effective oral hygiene. However, bicuspidization should be avoided when the furcation is deep and the roots are very close or fused together (29).

In this case, the roots of the involved tooth were adequate in length and periapically healthy, and therefore bicuspidization technique was preferred. Clinical periodontal scores and radiographies were recorded at 3, 6, 12 and 24 months after surgery, and the treatment procedure was found to be successful. Today, many of the practitioners prefer extracting the involved tooth and replacing it with fixed prostheses or dental implants to avoid the complexity of the treatment procedures (25). Although dental implants demonstrate a very high success rate, additional cost for the patient is still required. Therefore, tooth extraction must be the last treatment alternative with the recent developments in periodontics, endodontics and restorative dentistry. Although there are few case reports about bicuspidization in the literature, this technique is a successful alternative on such furcal defects which are nonrepairable with coronal approaches.

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