

OLGU

Mineral trioksit agregat ile trombositten zengin plazma kullanılarak eksternal invaziv kök rezorpsiyonunun cerrahi olarak tedavisi

A surgical repair of external invasive root resorption using mineral trioxide aggregate with platelet-rich plasma: a case report

Ekim Onur Orhan, Murat Maden

SdÜ Diş Hekimliği Fakültesi, Endodonti Anabilim Dalı, Isparta TÜRKİYE

Özet

Bu olgu bildiriminin amacı, eksternal invaziv kök rezorpsiyonunun Mineral Trioksit Agregat (MTA) ve Trombositten Zengin Plazma (TZP) ile birlikte kullanılarak tedavi edilmesidir. 51 yaşında erkek hastanın 23(FDI) numaralı dişine, eksternal kök rezorpsiyonu teşhisi konuldu. Rezorpsiyon boşluğu ile periodontal cep ilişkili olduğu görüldü. Başlangıçta, kök kanal boşluğunun izole edilmesi için flap operasyonu ile rezorpsiyon defektine cerrahi girişim uygulandı. Ardından kök kanalı konvansiyonel olarak genişletilerek, ortograd yolla gutaperka ile dolduruldu. Defekt alanının debridmanından sonra, perforasyon yüzeyine MTA tepildi ve flap kapatılmadan önce yüzeyi TZP ile kaplandı. 6, 12, 24 ve 36 aylık kontrol seanslarında diş klinik ve radyografik olarak asemptomatik olduğu görüldü. Bu eksternal kök rezorpsiyon olgusu, MTA ile TZP birlikte kullanılarak başarılı bir şekilde tedavi edildi.

Anahtar Kelimeler: Eksternal İnvaziv Kök Rezorpsiyonu, Mineral Trioksit Agregat, Trombositten Zengin Plazma.

Summary

The aim of this case report was to present the repair of the external invasive root resorption using combination of Mineral Trioxide Aggregate (MTA) and Platelet-Rich Plasma (PRP). 51 year-old man was diagnosed as an external invasive root resorption of the tooth 23 (FDI). The resorption space was in related with periodontal pocket. Formerly surgical intervention of the resorptive defect was performed by flap operation for isolating the root canal space. Then the root canal was prepared conventionally and obturated with gutta percha in an orthograd way. After the defect area was debrided, MTA was condensed to the perforation surface of the tooth and covered with PRP before the flaps were closed. At 6, 12, 24 and 36 months follow-up visits, the tooth was clinically and radiographically asymptomatic. MTA with PRP successfully repaired the external invasive root resorption.

Keywords: External Invasive Resorption Defect, Mineral Trioxide Aggregate, Platelet-Rich Plasma

Introduction

External invasive resorption is a destructive type of tooth resorption, which affects dental hard tissues¹. This type of tooth resorption is an uncommon form of external root resorption. Traumatic injuries, orthodontic tooth movement, orthognathic and dento-alveolar surgery, periodontal treatment and intracoronal bleaching, e.g. %30 Hydrogen peroxide have been identified as potential predisposing factors for this type of resorption(1-4).

External invasive resorption could be associated with periodontal inflammation; a local periodontal pocket may be detected next to the resorptive defect (4). External resorption occurs immediately below the epithelial attachment of the tooth. As a result, it must be noticed that the location is not always cervical but related to the level of the marginal tissues and the most apical point of the periodontal pocket (4-6). During the resorption process, large irreversible loss of tooth structure may appear intime (7).

Various approaches have been suggested for the treatment of external invasive resorption to provide a clinical guide for debridement and filling of the resorptive defect.

Following the chemo-mechanical debridement of the defect; cements, resins and filling materials such as glass-ionomer, light-cured resin composite, amalgam and mineral trioxide aggregate (MTA) combined with guided tissue regeneration have been recommended for the restoration of the resorptive defects and the treatment of the bony defects (5,6,8). Heithersay further emphasized the importance of using trichloroacetic acid to obtain complete curettage of the defect (5).

Mineral Trioxide Aggregate, or MTA is a new material developed for endodontics. From the results of the procedures performed in bone, it appears that MTA is superior over other materials with its good sealing ability and moisture tolerance (9-12).

This case report describes the surgical treatment of a maxillary canine tooth with an invasive external resorption, and a periodontal lesion directly associated with resorptive defects.

Yazışma Adresi/Corresponding: Ekim Onur ORHAN
Süleyman Demirel Üniversitesi Dişhekimliği Fakültesi, Endodonti Anabilim Dalı,
Doğu Yerleşkesi, Çünür/Isparta, Türkiye

E-mail adresi: ekimorhan@sdu.edu.tr
Telefon: +90 246 211 8784
Fax : +90 246 237 0607
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Case report

A 51 year-old male patient with no history of systemic compromise was referred to the department of endodontics from the department of oral diagnosis for evaluation and management of tooth 23. Extra-oral clinical examination revealed no abnormality. Intraorally, the disto-palatinal surface of the tooth had been restored with composite resin 18 months ago and there was a discoloration when compared to the adjacent teeth. The patient was suffering from gingival bleeding on brushing but there was no pain in the tooth. The evaluation of soft tissues revealed hyperaemia and 5 mm deep periodontal pocket at the palatinal gingival surface of the tooth. While there was slight pain on palpation and horizontal percussion, no mobility existed. A periapical radiograph revealed the presence of a cervical external root resorption associated with a large radiolucency at the cervical third of the root (Figure 1 and Figure 2). Thermal sensitivity tests and electric pulp test confirmed necrosis of the tooth. Our final diagnosis was pulp necrosis with external invasive resorption.

Figure 1: The diagnostic radiograph was taken with standard vertical and horizontal angulations

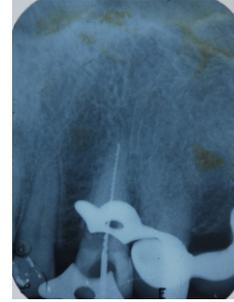


Figure 2: The diagnostic radiograph was taken with mesial horizontal angulations



In the first appointment, restoration was removed and an adequate endodontic access cavity was performed with diamond and carbide burs (MANI Inc., Utsunomiya, Japan). Isolation was obtained by a rubber dam. Initial canal working length was established by using the electronic apex locator (Root ZX, J. Morita Co., Irvine, CA, USA) and a #25 stainless-steel file (MANI Inc., Utsunomiya, Japan). Working length was confirmed by using radiograph (Figure 3). After establishing optimal working length, the canal was disinfected with 5,25% NaOCl (NiClor 5 OGNA®, Milan, Italy) and then, canal was dried with absorbent paper points (DiaDent®, DiaDent Group International, Seoul, South Korea).

Figure 3: This radiograph appears the working length.



As the canal could not be dried completely, it was concluded that the resorption was associated with the pulp and the periodontal tissues. Therefore, we decided to treat the tooth with a surgical intention besides endodontic treatment. Calcium hydroxide paste (Calasept®, Nordisk Dental, Sweden) was placed as a medicament inside the canal. After two days, at the next appointment, local anaesthesia (Lidocaine 2% with epinephrine 1:80 000) was applied and full thickness flaps were reflected surgically. Following the debridement of granulation tissues, localization of the resorptive defect was determined with a probe. Beginning from the perforation orifice at the periodontal side, the area was prepared with a slow-speed hand piece and a carbide bur under the saline irrigation. Root canal preparation was performed hand stainless-steel files with conventional step-back technique. Root canal therapy was completed with 2% tapered gutta percha points (DiaDent®, DiaDent Group International, Seoul, South Korea) and root canal sealer (AH Plus®, De Trey; Dentsply™, Switzerland). Following the root canal obturation, MTA (Pro Root MTA®, Dentsply™, Tulsa Dental Company, USA) and saline was mixed with the proportion of “3:1” and a thick layer of a mixture was placed into the resorptive defect cavity from the both sites. After the placement, MTA was condensed by cement condensing hand instrument. The platelet-rich plasma (PRP collection kit, Curasan Dental, Germany) was placed on MTA and adjacent bone before closing the flap and suturing the soft tissues (Figure 4).

Figure 4: The Radiograph of ending treatment



Seven days after this operation, sutures were removed and tooth was restored with composite resin. At 6, 12, 24 and 36 months follow-up visits the tooth was clinically asymptomatic. Probing depths were less than 3 mm, no sign of any visible acute or chronic inflammatory reactions surrounding soft tissues was observed.

No abnormalities were detected with follow-up radiographs (Figure 5, Figure 6, Figure 7 and Figure 8).

Figure 5: 6-month follow up radiograph



Figure 6: 12-month follow up radiograph



Figure 7: 24-month follow up radiograph



Figure 8: 36-month follow up radiograph.



Discussion

The main objective of treating external invasive resorption is removing the resorptive tissue, which is caused by an invasive resorptive process, and sealing or restoring the defect area. The pulp can survive until the resorptive process reach to the pulp. This report describes a case of external invasive resorption with a tooth presenting late signs of pulp infection and therefore, requiring root canal treatment.

In previous reports and studies, it was reported that successful results in supraosseous defects (3) or in class III invasive cervical resorption (6) can be obtained by approaching the defect through the access cavity. The presented case which can be classified as class III invasive cervical resorption, did not reach to the defect area via coronal access in an orthograd way. Consequently the surgical intervention of resorption defect was decided to perform as Heithersay's suggestion (6). Heithersay (6) stated that root canal treatment and management of the resorption should be performed treatment in order to prevent secondary infection. In this case root canal therapy and sealing of the defect area were performed in the second-visit. The defect area was debrided with hand pieces and carbide bur under the sterile saline irrigation as suggested by Heithersay (13).

MTA was chosen as the filling material for its biocompatibility (14). In experimental studies in which teeth with root perforations were created at the root surface and due to this perforations a communication between the pulp canal space and the periodontal tissue was obtained; MTA was found to be a successful repair material (15). Similar results were obtained in human studies in teeth with necrotic pulps and open apices (16). The grey MTA did not cause any aesthetical compromises in the appearance of the tooth even the defect cavity was large. Neither discoloration of the tooth nor soft tissue tattoo was observed in the follow-up periods.

Using platelet-rich plasma (PRP) is a way to accelerate and enhance the body's natural wound-healing mechanisms (17). This autologous PRP is a rich source of growth factors, and its application has been reported as an effective way to induce tissue repair and regeneration (18). PRP was selected for expecting to attach of the periodontal tissues on the MTA surface as periodontal regeneration (19). PRP was covered on the MTA in order to accelerate hard tissue regeneration in large defect surface.

In generally, predisposing factors of the cervical tooth resorption could be a traumatic injury, bleaching applications or a periodontal infection (6). The patient had never been through an orthodontic treatment, any oral surgical procedure or intracoronal bleaching procedure. The aetiology of the resorption may have been related to the periodontal infection which was measured 5 mm depth of the periodontal pocket of the tooth.

In this case report, the invasive cervical root resorption with pulp necrosis was presented. After 3 years follow-up, the treated tooth combined with MTA and PRP was observed to gain a reattachment on the root surface and the patient was asymptomatic both clinically and radiologically.

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