

CASE REPORT

External Root Resorption – Try to Save or Extract: A Case Report

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Abstract

Text

Root resorption is the loss of dentine and cementum because of the activity of osteoclastic cells. There are many classifications and terms for different types of root resorption. Sometimes root resorption can lead to tooth extraction. A new generation of bioceramic compounds has shown many advantages for the surgical repair of root defects. This clinical case report demonstrates the use of bioceramic formulations for the surgical repair and 1-year follow – up of an extensive external root resorption defect in a lower right canine.

Keywords: Bioceramics, external root resorption, papilla preservation flap.

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Introduction

Root resorption is the loss of dentine and cementum because of the activity of osteoclastic cells [1]. Root resorption is a complication that can lead to the extraction of the tooth. Etiology of root resorption requires two phases: mechanical or chemical injury to the tissues and stimulation by infection. Prolongation of the active resorption process is dependent on stimulation of the osteoclastic cells, either infection or pressure. The origin is different for each type of root resorption [1,2]. It is important to select the right treatment plan, according to the stimulation factor for each type of resorption [3]. Various different materials are used for the treatment of resorption, although the best clinical outcomes are achieved using bioceramic materials [3,4]. The first bioceramic compound introduced, MTA (DENTSPLY Tulsa), was derived from Portland cement and has proven to be a valuable root repair material [4-6]. More recently, new formulations of medically pure bioceramic substances were fabricated. Due to their nano-particulate size and viscosity, these materials can be used for repair of root defects and also as a sealer and/or filler for root canal obturation [7,8].

Materials Used

TotalFill® BC RRM™ is a pre-mixed bioceramic obturation material, which is used as putty when doing root repair and retrograde fillings [9].

Case Report

A healthy 58-year-old female presented to the Hospital of Lithuanian University of Health Sciences (LSMU) Department of Dental and Oral Pathology with discomfort in her mandibular right canine. A sinus tract was seen clinically on the attached gingiva in the lingual aspect of the lower right canine. A composite resin restoration was present on the tooth #43. The tooth had no pathological mobility. Intra-oral periapical radiographs were taken and showed the presence of an irregular enlargement of the root dentin at the coronal-middle third root level and pure previous endodontic treatment with periapical lesion [Fig. 1]. Dentin lesion looked close to the canal. The patient declined the recommendation for cone-beam computed tomography (CBCT) for the more precise diagnosis of the tooth regarding financial reasons.

Periodontal examination of the tooth #43 showed the presence of 5mm periodontal pocket in the mesiolingual and lingual aspects with bleeding on probing (BOP). During the

periodontal examination, the patient was found periodontally healthy and perfect individual oral hygiene was observed.

The treatment plan consisted of endodontic retreatment and open flap surgery with an area of resorption cleaning and use of root repair material, a crown build-up with hermetic restoration and follow-up after 10 days, 1, 3, 6 and 12 months.

Endodontic Retreatment Phase

The tooth was isolated using rubber-dam and disinfected, the root canal was accessed using the dental microscope. All the three Protaper Universal system retreatment rotary instruments (D1, D2, D3) were used in the crown down technique sequentially for old gutta-percha material removal. Working length was determined with a K-file (22mm) and apex locator (Root ZX II, J. Morita) and verify with digital periapical radiography. The canal was cleaning and shaping using Protaper Gold rotary instrument system till F4 and irrigated with NaOCl 2.5% solution. There was no internal canal wall defect detected during the examination and it was presumed that the external root resorption did not reach the root canal. The canal was dried with paper points and medicated with calcium hydroxide and the cavity was sealed with a temporary filling IRM (Dentsply) for 2 weeks. After 2 weeks calcium hydroxide was removed and after full disinfection protocol, the canal was obturated using gutta-percha and AH-plus sealer (Dentsply, Maillefer) with warm vertical condensation technique using Calamus Dual system (Dentsply). The cavity was sealed with IRM (Dentsply). A postoperative radiograph was done [Fig. 2]. The patient was ready for the resorption repair using the open flap technique 2 weeks later.

Surgical Phase

The patient arrived after the endodontic retreatment and clinical reevaluation still showed PD of 5mm in mesiolingual and lingual aspects of tooth #43. A sinus tract was still observed in the lingual aspect. After administering of local anesthesia (Articaine hydrochloride with epinephrine 40mg+5mcg/ml; 1,5ml), using a papilla preservation technique, a full thickness mucoperiosteal flap was reflected at the lingual

aspect of tooth #43, #44, #42, following intracrevicular incisions using a periosteal elevator. After reflection of the flap thorough degranulation and debridement at the defect area, scaling and root planning on the exposed root surface were done. After instrumentation surfaces were washed with saline solution to remove any remaining detached fragments from the defect. After that, the tooth defect was filled with a TotalFill® BC RRM™ material and the excess of the material was removed [Fig. 3]. Primary soft tissue closure of the flap was done with resorbable polyglycolic acid [6-0] suture (Assucryl, Assut Medical Sarl, Switzerland) using interrupted suturing technique [Fig. 4]. Radiograph after this procedure was done [Fig. 5]. The patient was advised proper plaque control and prescribed 0.12% chlorhexidine mouthwash for rinsing twice daily, for a week. The sutures were removed 10 days after surgery. Recall appointments were scheduled 10 days after surgical treatment and then after 3, 6 and 12 months. At every recall appointment, the oral hygiene of the patient was checked and reinforced.

Clinical and radiographic outcome

Healing was found to be adequate. There was no history of pain or discomfort. Since the follow up had to last for a year and because of the financial reasons the tooth was re-built with composite resin and glass fiber post. The clinical appearance of the tooth had improved considerably at the time of evaluation 3 and 12months following treatment [Fig. 6, Fig. 7]. Although the patient supposed to come for the recall after 6 months, she delayed the visit. The patient came for the recall after 12 months post-surgically. The periodontal probing pocket depth was found to reduce to 3 mm. Radiographic examination showed a significant bony fill in the defect. No gingival inflammation or sinus tract was apparent. At 12months follow-up, the radiograph showed complete bone fill similar to adjacent normal teeth and the periapical lesion was healed [Fig. 7]. A year post-surgery the periodontal health continued to remain stable with no probing depths and the tooth remained firm. A periapical radiograph taken revealed no periapical lesion and interdental bone remained at a healthy point [Fig. 7].

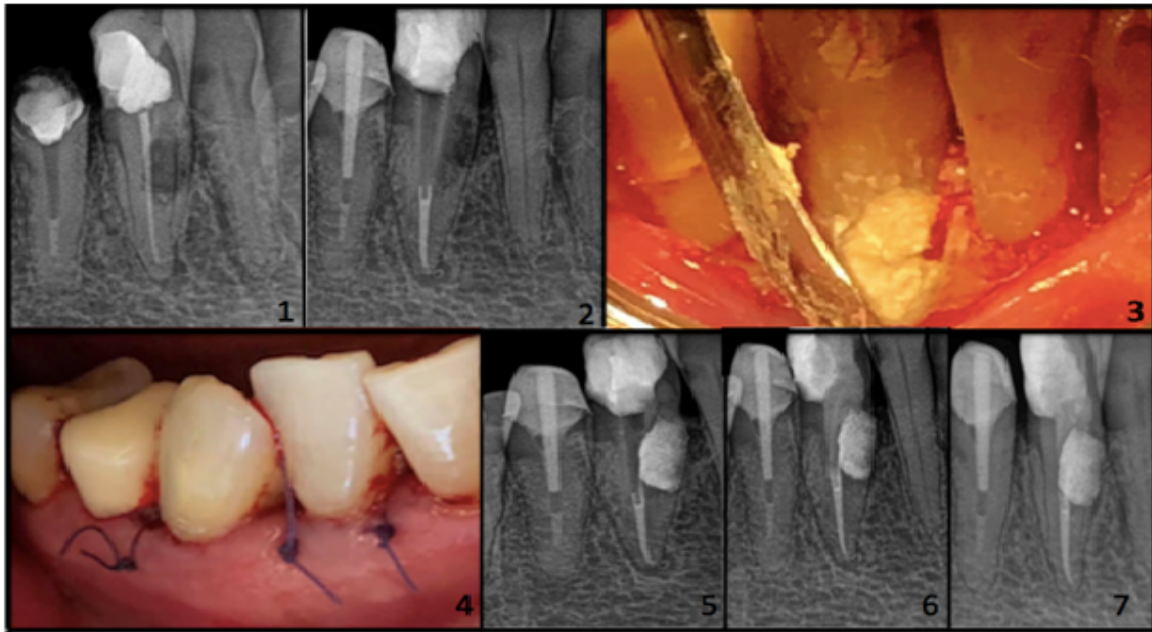


Figure 1: Preoperative Radiograph, 2: Post endodontic retreatment radiograph, 3: resorption cavity restoration, 4: suture placement, 5: post operative radiograph, 6: 3months follow up radiograph (grass fiber post and composite resin restoration), 7: 12 month follow-up radiograph.

Discussion

Root resorption is defined as progressive or transitory loss of dentine and cementum, which is a physiological process of deciduous teeth. However, root resorption in permanent teeth is largely pathological and can result in tooth loss. Extensive external root resorption and other aggressive forms of cervical root resorption are challenging when they cause significant root damage [1,2]. Computed tomography test would help to determine the exact localization and size of root resorption. However, in cases where direct surgical access and good visualization can be achieved, the use of modern bioceramic formulations may be an excellent clinical choice [10]. While MTA was the benchmark in bioceramic materials, material advances have constantly tried to overcome disadvantages and improve its properties. Materials used for the filling should be easy to apply to the site and have demonstrated excellent biocompatibility, bioactivity, radio-opacity, bonding, hydrophilic qualities and they must remain dimensionally stable. Their ability to provide a perfectly impermeable seal, in order to counter bacteria and fluid leakage that might cause inflammation, is also of the utmost importance. It has been demonstrated by a host of studies

that TotalFill range repair materials meet all of these conditions [11-14]. In this clinical case, the use of a pre-mixed bioceramic obturation material TotalFill BC RRM was demonstrated. Although the treatment of resorption defects in anterior teeth area is always a challenge, the ease of clinical handling during surgery and a lack of dentin staining were noted. Kohli et al; compared TotalFill BC RRM Fast Set Putty with other commonly used root repair materials and it demonstrates that TotalFill BC RRM Fast Set Putty does not cause any clinically visible color variation and it was quite a big problem with using MTA [15]. Furthermore, thanks to the papilla preservation technique and its ease of manipulation the adequate blood circulation, lack of gingival recession and sound healing was achieved.

Conclusion

Within the limitations of the study, it can be concluded that the TotalFill BC RRM repair material is a correct choice for root repair because it is highly biocompatible, osteogenic and resistant to washout. Early diagnosis, proper treatment, and appropriate restorative material are essential for long-term retention of the tooth with quite a big root resorption. Further, follow – up is required.

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Ethical Permission: Obtained

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