J INDIAN SOC PEDOD PREV DENT

Vol. 26	March 2008	No. 1

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ISSN 0970 - 4388

Disappeared roots: A case report

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Abstract

Tooth resorption is a perplexing problem for all dental practitioners. The etiologic factors are vague, the diagnoses are educated guesses and, often, the chosen treatment does not prevent the rapid disappearance of the calcified dental tissues. This becomes all the more confusing if the tooth in question is a pulpally involved young permanent tooth. Presented in this report is the case of an upper first young permanent molar that underwent complete root resorption following root canal therapy and obturation.

Keywords: First permanent molar, post-root canal treatment complication, root resorption

Introduction

Tooth resorption is a perplexing problem for all dental practitioners. The etiologic factors are vague, the diagnoses are educated guesses and, often, the chosen treatment does not prevent the rapid disappearance of the calcified dental tissues.

The most common stimulating factor for root resorption is pulpal infection. Following injury to the predentin, infected dentinal tubules may stimulate an inflammatory process, with the consequent osteoclastic activity in the pulpal or periradicular tissues initiating internal or external root resorption.[1]

Resorbing cells are attracted to the area and act as scavengers, removing tissue debris and foreign bodies.[2,3] Phagocytosis is carried out by the mononuclear phagocyte system consisting of neutrophils, macrophages, and osteoclasts.

These resorbing cells require continuous stimulation for phagocytosis.[4] So when the irritating factor or source of infection is removed, phagocytosis is automatically reduced or stopped. When the trauma or irritation is severe, more pronounced inflammatory changes lead to resorption of the cementum. When the cementum layer is broken, the exposed dentin resorbs at a faster rate,[5] resulting in complete resorption of the roots.

Presented in this report is a case of an upper first permanent molar that underwent complete root resorption.

Case Report

A healthy girl, aged 12 years, reported to the Department of Pedodontics and Preventive Dentistry, Manipal College of Dental Sciences, Mangalore, with a complaint of tooth mobility in relation to the upper right first permanent molar. She gave a history of root canal treatment done on the same tooth 3 years back.

On examination a stainless steel crown was in place, with gingival recession exposing the cervical portion of the tooth; the tooth showed mild mobility [Figure 1].

IOPA revealed complete resorption of the roots. The guttapercha obturation material was embedded in the bone [Figure 2]. Some of the gutta-percha cones were broken and were detached from the master cone. No radiographic changes in the bone could be seen around any of the gutta-percha points. Normal bone deposition was seen in the areas of root resorption (replacement resorption).

The radiographs that had been taken 3 years back after the completion of root canal therapy were obtained. It is interesting to note that the tooth was then immature and the root canal therapy, followed by obturation with gutta-percha,

Figure 1: Tooth with stainless steel crown and gingival recession exposing cervical tooth portion

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Figure 2: IOPA radiograph showing complete resorption of roots with gutta-percha embedded in bone

Figure 5: Completely resorbed roots of the extracted tooth with the gutta-percha cones projecting out

Figure 3: IOPA radiograph tooth 3 years back, when it was obturated with gutta-percha without obtaining an adequate apical seal

Figure 6: IOPA radiograph of the upper right posterior region after the extraction of the first permanent molar

Figure 4: Shallow extraction socket due to replacement resorption

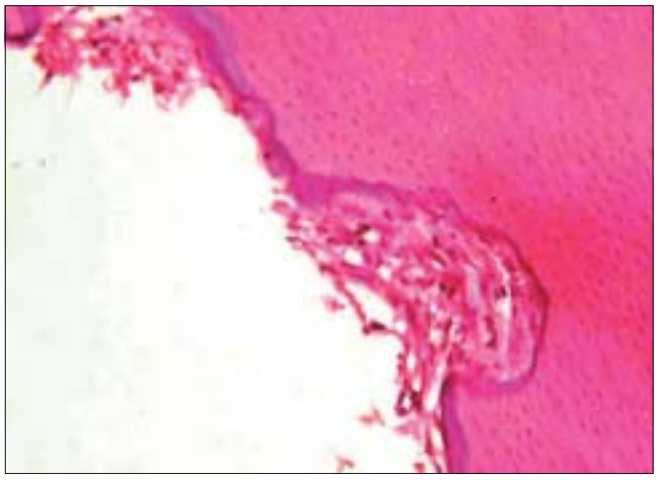

Figure 7: Histological picture shows areas of resorption on the root surface (Hematoxilin and Eosin stain)

was done on a tooth with an open apex, without obtaining an adequate apical seal [Figure 3]. The patient had been asymptomatic for the last 3 years.

The tooth was extracted under local anesthesia. The extraction socket was shallow due to the bone deposition that had occurred simultaneously with the root resorption [Figure 4]. There were problems while trying to retrieve the gutta-percha cones that were embedded in the bone; barbed broach was used to retrieve the gutta-percha cones.

The roots of the extracted tooth were completely resorbed, with the gutta-percha cones projecting out [Figure 5]. The extraction site healed uneventfully [Figure 6].

Granulation tissue from the extraction site, which also included a piece of calcified tissue that was embedded in the soft tissue, was sent for histopathologic examination. Histologic pictures revealed that the calcified tissue was a root piece that had probably broken off during the resorption process. The resorption was visible as a scooped-out area on the root surface. No odontoclasts were seen in the granulation tissue [Figure 7].

Discussion

Tooth resorption is a physiologic or pathologic interactive process, involving inflammatory cells, resorbing cells, and hard tissue structures which is similar to bone resorption.

Regardless of its cause, it is ultimately the result of osteoclastic activity on the root surface of the involved tooth. Microscopically, it varies from small areas of cementum resorption replaced by connective tissue or repaired by new cementum, to large areas of resorption replaced by osseous tissue, or “scooped-out” areas of resorption replaced by inflammatory or neoplastic tissues.[6]

Andreasen has shown that when the resorptive process penetrates the cementum and reaches the dentinal tubules of a tooth with a necrotic pulp, toxic elements from the pulp tissue diffuse into the resorptive cavity, thereby further stimulating inflammatory resorption.[7]

Even after endodontic therapy, residual bacteria that are trapped in accessory canals and dentinal tubules may stimulate the resorptive process. Ford, in a study with beagle dogs, found that 60% of roots with filled, but contaminated canals exhibited root resorption.[8]

Treatment decisions for a pulpally involved young permanent tooth requires careful assessment. There are many options available for the management of such teeth; one of which is obtaining an apical stop by favoring apical closure or apexification is the treatment of choice. The aim of this is to stimulate and preserve the formative activity of the cells in the apical part so as to enhance the formation of calcified callus in the wide apical opening.[9]

Obtaining a apical stop can also be achieved with materials like dentinal chips, tricalcium phosphate, freeze-dried cortical bone, freeze-dried dentin, dentinal shavings, etc., all of which would enable immediate filling of the root canals.[10,11]

The potential for rapid and destructive inflammatory root resorption is very high in an endodontically treated young permanent tooth and, therefore, periodic recall evaluation is imperative. It is recommended that the patient be seen every 3 months, followed by re-evaluation over the next 5 years.

In the present case, the resorption was probably triggered by persisting inflammation or may have resulted because of seepage at the apex due to incomplete obturation. Persistent infection had led to continual root resorption, to the extent that there was complete loss of the root and replacement by osseous tissue.

Conclusion

The importance of a vital decision for a nonvital permanent tooth with an open apex cannot be overstressed. The root at the growing end is so thin and fragile that it breaks during obturation maneuvers, resulting in micro-gaps and leakage. Hence, to prevent the chance of root resorption and the loss of a permanent tooth at an early stage in life, the procedure should be chosen that provides an apical stop—either through multivisit or single visit apexification procedures; additionally, the patient should be scheduled for recall evaluation every 3 months over the next 5 years.

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