

Pathological external resorption caused by impacted tooth

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ABSTRACT

Tooth resorption can be associated with physiological or pathological loss of dental hard tissues. The process of resorption is usually asymptomatic and may lead to substantial tooth damage. We presented a case of pathological

resorption of a molar tooth due to pressure from an impacted tooth. A considerable loss of hard tissues and impossibility to perform conservative treatment caused the loss of two molars. **Key words:** external resorption, impacted tooth

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INTRODUCTION

Resorption is the process associated with physiological or pathological loss of dental hard tissues. Apart from physiological resorption in milk teeth there is also a pathological process observed both in primary and permanent dentition [1]. Resorption can be external and internal, depending on whether the pathological process begins on the surface of the root cement or at the tooth cavity [2, 3].

There is no universal division of external resorptions. Fuss et al. have divided resorptions according to the causative factor, including pulpitis, periodontitis, orthodontic treatment, trauma, pressure and ankyloses [4]. Lindskog and Heithersay have distinguished three groups of causes: damage, infections and hyperplastic resorptions [5]. Ne et al., taking into account clinical radiological and histopathological manifestations, have presented four types of external resorption: external surface resorption, external inflammatory root resorption, replacement resorption and ankyloses [2]. Malmgren et al. have established a four-grade radiology-based classification of resorption: grade I – irregular root contour, grade II - less than 2 mm of the assessed original root length, grade III - between 2 mm and one third of the assessed original root length, grade IV - exceeding one third of the assessed original root length [6].

The most common type of external resorption is inflammatory root resorption, caused by external pressure exerted on the tooth by the force of the orthodontic movement, coexistence of tumors, cysts and impacted teeth [2].

The process of external resorption due to pressure begins from the cementum. Damage that follows involves cementoblasts and cementoid (paracement), covering cell cement which becomes vulnerable to the action of osteoclasts. The balance between the apposition of cementoblasts and resorption of osteoclasts is impaired [3]. The external root resorption can be transitory or progressing. The former state is observed during orthodontic treatment or abnormal eruption path of the tooth pressing on the adjacent teeth. In such cases, elimination of the pressure inhibits the process of resorption [2].

However, further stimulation of phagocytes promotes resorption. According to Trope, a chronic pressure and infection seem to maintain the process [7].

External tooth resorption due to pressure induced by another tooth is relatively rare. Cases of resorption caused by an impacted tooth [8-10] or supernumerary tooth [11] have been reported. The process of resorption is usually asymptomatic, causing tissue damage and in consequence tooth loss. We describe a case of molar tooth loss as a

result of pathological resorption caused by an impacted tooth.

Case report

A male patient, 37, presented himself at the Department of Oral Surgery, Medical University of Białystok due to temporary pain of tooth 47. The patient complained of aches of 12 months duration. Ten years earlier the tooth had been treated for caries. The medical history of systemic diseases and drug history were unremarkable. The patient had no history of orthodontic and periodontal treatment or bleaching. No facial injury was noted. The extraoral examination did not reveal any abnormalities. In the intraoral examination single upper and lower teeth were missing. The tooth 47 showed extensive filling and considerable pathological mobility (I° in Entin scale). A panoramic radiograph revealed totally impacted tooth 48, located horizontally, class C2 according to Pell and Gregory [12]. The impacted tooth caused resorption of the adjacent tooth 47 root. Damage involved hard tissues of the distal root and fragments of the mesial root (Figure 1 and 2).



Figure 1. Panoramic radiograph of the patient - resorption of tooth 47 roots



Figure 2. The extracted tooth 47

The patient was referred to endodontic consultation. However, the consultant disqualified tooth 47 from endodontic treatment due to a

considerable degree of resorption. A decision was made to extract the teeth 47 and 48. The patient gave written informed consent for the suggested treatment. The procedure was scheduled and performed in local anesthesia. Both the surgery and the postsurgical treatment were uneventful.

DISCUSSION

Resorption is a complex pathology resulting in a loss of mineralized dental tissues. The root surface deprived of the protective layer of cementoblasts attracts clastic cells which demineralize cement and then remove organic matrix via phagocytosis [3,13]. The clinical course of resorption is usually asymptomatic and is thus detected accidentally during clinical or radiological examination. One of the first visible symptoms is increased tooth mobility or pink discoloration of its crown. The process of resorption due to pressure may lead to considerable tooth damage, but even then the pulp remains vital for a long time and pathologically unchanged. Only when blood supply to the pulp is disrupted pain appears. External resorption can be confirmed by a radiographic image. The periodontal crevice becomes wider, osseous lamella of the alveolus and tooth structure are discontinued, leading to irregular, "worn away" course of the mesial and distal wall of the root [2, 14].

Resorption can show a varying dynamics, being most rapid after luxation and replantation of immature teeth [7]. After dental injuries in children and adolescents, replacement resorption usually takes place. In this process hard dental tissues are replaced by the alveolar process bone, which is unfavorable and leads to ankylosis [15]. Also inflammatory resorption can have a dramatic course. Bacteria and their toxins located in the canal pulp and in dental canaliculi induce osteoclast formation. The root surface becomes sinuately dissolved and its complete resorption occurs within a few months [16].

External resorption is a side effect of bleaching procedures. This refers mainly to pulpless teeth bleached from the side of the pulp chamber using hydrogen peroxide, sodium perborate and urea peroxide. Causes of this complication are not well known and may be associated with the type of the bleaching material [17]. Moreover, both periodontitis and periodontal procedures may activate the process of resorption through damage to the layer of cementoblasts [3].

In the current clinical case, the patient presented himself due to temporary pain and increased mobility of the tooth. Radiological diagnosis showed the presence of a horizontally located impacted tooth, whose crown was in a close contact with tooth 47 roots. Hard tissues of tooth 47 were considerably damaged. Resorption defect

was classified as Malmgren class IV, being the highest advancement grade assessed by radiology [6]. Severe tissue damage might have caused looseness of the tooth and pulp necrosis, which was painful. The patient had never had facial trauma, orthodontic or periodontal treatment or bleaching. Tooth 47 had never undergone endodontic treatment. The clinical and radiological examinations suggested that resorption was caused by chronic pressure exerted by the impacted tooth.

The pressure exerted by impacted teeth, supernumerary teeth, cysts or tumors can be the cause of external resorption. Pressure-induced resorption is frequently observed when upper canines are impacted, causing atrophy of hard tissues of the incisors [8, 9, 14]. Improperly situated supernumerary tooth may lead to damage and loss of molar [11]. Tooth resorption caused by growing tumors are characteristic of lesions of low growth dynamics, such as enameloblastomas or giant-cell granulomas. Odontogenous tumors may cause resorption in the form of sharply cut off or having rough edges root apex. The irregular rough root surface defect may indicate aggressive nature of tumor [18].

Low-grade resorptions can be treated conservatively with calcium hydroxide preparations showing a bactericidal effect and affecting the site of resorption through dentine canaliculi. High pH of calcium hydroxide neutralizes lactic acid produced by osteoclasts, which prevents dissolution of the root organic components. Moreover, the alkaline environment inactivates collagenase and acid phosphatase, and causes an increase in the activity of alkaline phosphatase, which plays a major role in the formation and repair of hard tissues [2, 19, 20].

In more extensive resorption lesions, endosurgical treatment should be applied, in which granular lesions are surgically removed, and resection, hemisection or radectomy are performed, with a simultaneous filling of bone defects with synthetic substitutes [2, 20].

Elimination of the pathological factor is the most effective treatment of pressure-induced resorption. In the presented clinical case, conservative treatment had to be excluded due to marked injury of hard tissues of the lower molar. For the same reason, the decision was made to extract both the impacted tooth and tooth 47.

CONCLUSIONS

Pathological resorption of teeth shows complex etiology. In most cases, the pathology is clinically asymptomatic, and thus difficult to predict and eliminate in everyday clinical practice. In the presented case, a long-term asymptomatic course of resorption caused a loss of two molar teeth. This indicates that regular radiological diagnostic procedures are necessary for early

detection of resorption lesions and for institution of appropriate treatment.

Conflicts of interest

The authors declare no conflicts of interest.

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