

Surgical Exposure of Impacted Mandibular Second Premolar

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Abstract

Tooth impaction occurs when a tooth fails to erupt normally at its ideal place in the arch. Second premolars of the mandible are the third most prevalent teeth detected with impaction. A case report of a 13-year-old patient reported with an impacted right second premolar of the mandible is described. A brief review of the international literature is also presented regarding the proper diagnosis of impaction and the surgical technique of choice. In conclusion, a combined use of orthopantomography and cone beam computerized tomography establishes the level of a tooth impaction, while the surgical exposure of the crown of the impacted tooth constitutes a safe and predictable procedure.

Keywords: impacted premolar, tooth eruption, tooth impaction, surgical exposure

Introduction

Tooth impaction occurs as a result of the tooth incapacity of rising in the arch, during the normal period of eruption with closed apexes [1]. As regards mandibular second premolars, they constitute the third most frequent impacted teeth following third molars and maxillary canines [2]. The frequency of their impaction is reported to be 0,2-0,3%, with an increased prevalence in women [2,3].

Etiological factors may be divided to local and systematic. Local factors comprise lack of space in the arch, prolonged stay of a primary tooth, redundant teeth, anchorage, trauma, root dysplasia and presence of a cyst [3]. Systematic causes are consisted of lack of vitamin D and calcium, endocrinopathies, developmental abnormalities as well as dwarfism [3].

The level of impaction varies from case to case and regarding mandibular second premolars, it is defined as the distance between the cementum-enamel junction of distal tooth and the most coronal point of the crown of the impacted tooth [2]. Moreover, a tooth may have been erupted merely from the bone and not from the gum tissues. In this case the tooth is characterised as soft tissues impacted tooth [4].

The mineralization of premolars occurs from the age of 18-30 months and their eruption is between 10 and 13 years of life [5]. Premolars erupt following the first molar and canine of mandible, whereas the ideal position of their dental sperm is located between the roots of the second primary molar [4]. Therefore, the pathway of the premolar eruption follows mainly the absorption of the roots of the primary molar [4]. In case

of lack of space, one of the premolars, usually the second one, cannot erupt and may stay impacted [4].

Case Report

A 13-year-old male patient was referred to our private practice by an orthodontist, due to the intraoral absence of the lower second right premolar. The orthopantomography revealed the impaction of the premolar, which was surrounded by an eruption cyst. The patient was prescribed a cone beam computerized tomography in order to reevaluate the case in cooperation with the orthodontist (Figure 1). The patient's medical history revealed that he was systematically healthy. Following the evaluation of all the clinical and radiographic information, it was decided to proceed to the surgical exposure of the impacted premolar and the placement of an orthodontic bracket with metallic chain, aiming to help the tooth eruption via the orthodontic treatment.

At the day of the operation, anesthesia of the inferior alveolar nerve block was conducted at the fourth quadrant, combined to supra-periosteal local infiltration at the buccal mucosa of the premolars (Figure 2); lidocaine 1:80000 was the anesthetic of choice. An intra-crevicular incision was conducted at the distal side of the canine and at the first premolar, then an incision at the top of the alveolar crest, combined to a vertical releasing incision at the proximal side of the first molar. A full-thickness flap was elevated allowing adequate access of the surgical site. The operator drilled the buccal bone plate until the crown of the impacted premolar was revealed (Figure 3). The eruption cyst

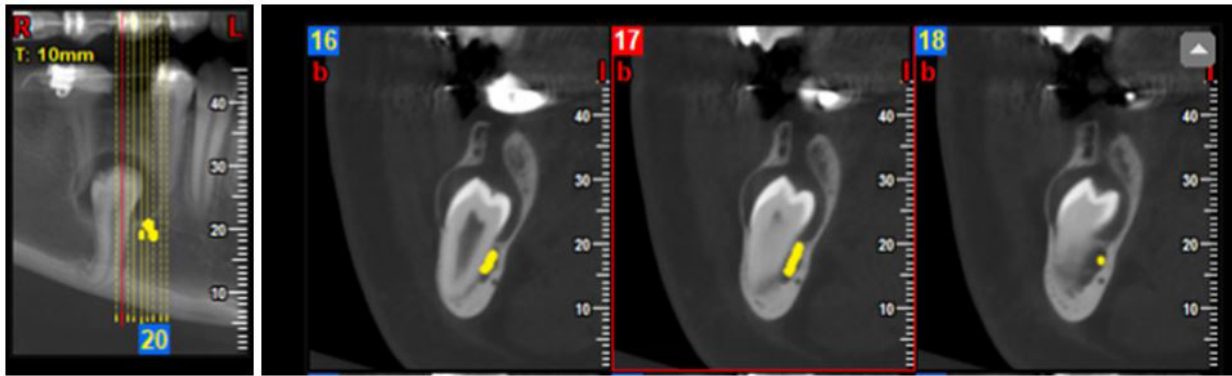


Figure 1: Cone beam computerized tomography of the impacted lower right second premolar.



Figure 2: Initial patient 's status.

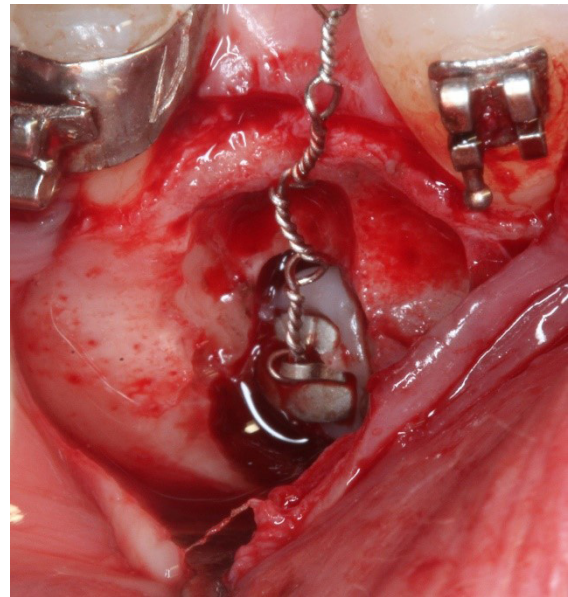


Figure 4: Placement of the chain with the use of composite resin.



Figure 3: Surgical exposure of clinical crown of the premolar.



Figure 5: The flap was replaced and sutured with simple interrupted sutures.

was removed and an orthodontic bracket and metallic chain was placed at the crown of the tooth with the use of composite resin (Figure 4). Following the replacement of the flap, the latter was sutured with simple interrupted sutures (Figure 5). The patient was prescribed antibiotic regimen containing a combination of amoxicillin (500mg) and clavulanate (125mg) three times per day for one week. Additionally, he was consulted to rinse with a mouthwash containing 0.2% chlorhexidine twice daily for one week.

The patient 's post-surgical course was uneventful, and the su-

tures were removed one week after the operation. The premolar was moved orthodontically, being visible intraorally, after 4 months (Figure 6).

Discussion

A case of patient with a lower impacted premolar was described above. The combined use of orthopantomography and cone beam computerized tomography let the proper evaluation of the tooth. Subsequently, the surgical exposure of the impacted tooth was conducted, followed by the placement of

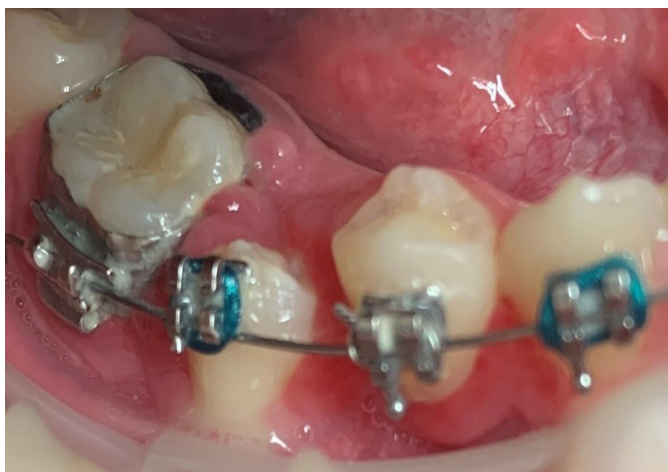


Figure 6: Patient 's clinical status 4 months post-surgically.

the chain and suturing of the flap at its initial site. Our case is in accordance to the average age of occurrence (13 years of life), although our patient was a male in contrast to the female prevalence.

Impaction of premolars usually occurs due to local etiological factors [5]. Among all these factors, the location out of the arch is reported as the most frequent cause of impacted premolars, even though in few cases the tooth initially out of the arch may result in a normal eruption [2]. Other local factors include lack of space due to premature loss of primary molars, and anchored primary molars [4]. A number of genetic diseases including osteoporosis and Down syndrome may lead in impacted premolars as well [5].

Proper diagnosis demands combined clinical and radiographic evaluation of the case [5]. A cone beam computerized tomography constitutes the radiographic examination of choice in order to define the exact location of the tooth and the surrounding anatomical structures, such as the inferior alveolar nerve [5]. It is a common case an initial treatment plan based on evaluation merely with the use of a panoramic radiograph may be altered following a second evaluation with the use of cone beam computerized tomography, especially when the impacted tooth is located nearby major anatomical structures [6,7,8]. The latter lets the clinician to choose the appropriate surgical technique for the exposure of the impacted tooth, and the orthodontist to evaluate the level of difficulty during the tooth movement in the arch [5].

In case of impacted premolars, the surgical procedure of choice includes conservative crown exposure, even though this technique is unpredictable with difficult surgical steps [5]. This procedure is indicated merely for impacted premolars the vertical axis of which has a slope less than 45° compared to the ver-

tical axis of the tooth at its ideal place [5]. In that case, a full-thickness flap is needed to be elevated buccally or lingually, depending to the location of the tooth, and afterwards a chain has to be placed at the crown of the tooth [5].

Prognosis of surgical exposure of impacted teeth is good. However, it is affected by the type of the surgical technique, the placement of the bracket and the orthodontic movement [9]. Additional factors that affect the prognosis of the procedure may be the dental plaque, the presence of periopathogens, the periodontal architecture and their interaction as well [9].

In conclusion, second premolars of the mandible are often detected as impacted. The combined use of orthopantomography and cone beam computerized tomography are crucial in order to evaluate the case and proceed to the proper surgical technique.

Competing interests

Authors declare no conflict of interest.

Grand information

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