

# Unusual Impaction of a Mandibular Second Premolar: Case Report

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## ABSTRACT

**Aim** The aim of this study is to present clinical and radiographic features along the treatment of an unusual impacted mandibular second left premolar of a patient applied to our faculty.

**Case Report** A 23-year-old female patient was referred to our clinic with pain and mild swelling that is localized at mandibular left area. We examined her panoramic radiography and we noticed that her mandibular second left premolar was impacted vertically and the point of root crossed the cortical bone at the inferior border of mandible. Then, we took a dental volumetric tomography from the patient for a more sensitive assessment of the localization of the impacted tooth and its relationship with the mandibular canal. The tooth was extracted at the Department of Oral Surgery to relieve the pain and the patient was followed up periodically.

**Discussion** In the case of having an impacted tooth, periapical, orthopantomographs or occlusal radiographs are used to detect it. The images obtained with these conventional techniques are 2-dimensional and not sufficient for determining of the exact localization and the relation of the tooth with adjacent structures. Latest research shows that instead of conventional radiographies, Cone beam computed tomography is more successful in defining the localization of impacted teeth.

**Conclusion** In the treatment of impacted teeth, orthodontic treatment or tooth extraction can be applied according to the age of the patient and the condition of the dental arch.

**Keywords** Cone-beam computed tomography, Dentistry, Impacted teeth, Mandible, Tooth

## Introduction

Impacted teeth, are those teeth whose eruption is delayed or ceased for various reasons. Tooth eruption failures are quite frequent developmental anomalies and third molars are the most common impacted teeth followed by maxillary canines, maxillary and mandibular premolars (1-4). The impaction of teeth may be the consequence of local or systemic factors. Local factors include supernumerary teeth, cysts and tumors that prevent tooth eruption, and insufficient space in the dental arch due to micrognathia or premature loss of deciduous teeth. Systemic factors are genetic diseases, endocrine disorders, and irradiation of the jaws due to head and neck radiotherapy (5-7).

When a clinically impacted tooth is suspected, the presence of an impacted tooth is investigated with periapical, panoramic or occlusal radiographs. However, 2D imaging techniques are insufficient in detecting impacted teeth due to imaging errors such as magnification, distortion, and superposition. For this reason, cone-beam computed tomography has been used in recent years to accurately determine the positions of impacted teeth and their relationships with neighboring structures (3, 8, 9).

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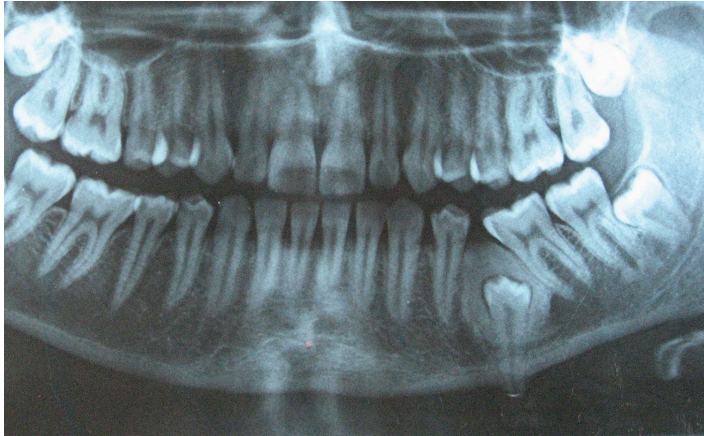
## Case Report

Our patient is a 23-year-old female without any systemic disease. She referred to İstanbul University Faculty of Dentistry with swelling and pain with palpation, at her left mandibular area. Extraorally there was no evident asymmetry, but a small swelling was perceived with palpation, at the lower edge of left mandibular area. The patient had pain when the swelling was palpated. The intraoral examination revealed that the mandibular left second premolar was absent. The patient pointed out that her deciduous mandibular left second molar was extracted because of caries. She did not remember if her permanent mandibular left second premolar had erupted and then been extracted. The mandibular left first molar was observed to have moved towards mesially. (Figure 1)



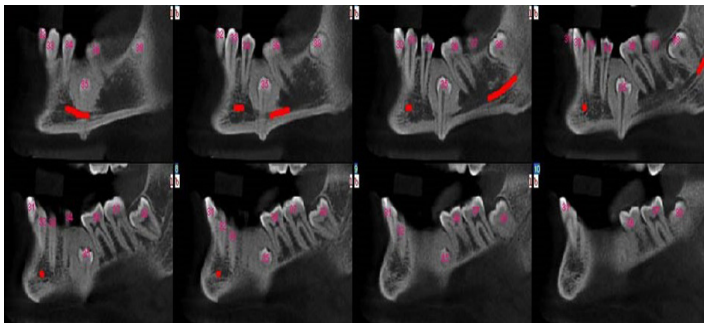
**Figure 1:** An intraoral view of the patient.

The examination of orthopantomograph (OPG) revealed that the mandibular left first premolar erupted normally, the mandibular left second premolar impacted vertically and the point of its root crossed the cortical bone at the inferior border of mandible. The crown of the tooth was covered totally by a layer of bone with sclerotic appearance. (Figure 2)

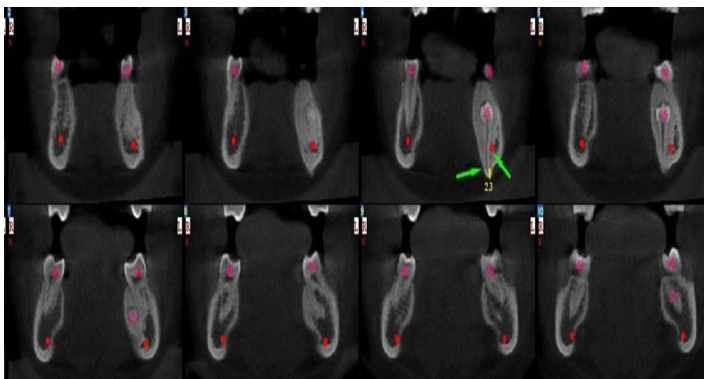


**Figure 2:** An orthopantomograph of the patient. The impacted second premolar is seen at the left mandibular area.

Cone beam computed tomography (CBCT) was taken from the patient to determine the exact localization of the impacted tooth and its relationship with the mandibular canal. (Figure 3, 4)



**Figure 3:** The sagittal section of the Cone beam computed tomography (CBCT) image of the patient. The root of the impacted premolar is seen in close proximity to the mandibular canal marked in red.



**Figure 4:** The coronal section of the CBCT image of the patient. The position of the mandibular canal is indicated by the red dot in the image marked with green arrows. In addition, the root tip of the impacted tooth which crossed 2.3 mm from the base of the mandible can be observed.

### Surgical treatment

The patient was referred to Department of Oral and Maxillofacial Surgery after the clinical and radiological examinations for surgical extraction of the impacted second premolar. The patient's impacted tooth was extracted by a maxillofacial surgeon under local anesthesia. After the soft tissue flap was removed in the lower left premolar region during the operation, a biopsy was taken from the sclerosed bone tissue covering the tooth by a bone drill. After tooth extraction, an Epi-Guide® Bioresorbable Barrier Matrix (Kensey Nash, Pennsylvania) resorbable membrane was placed and sutured in order to accelerate healing and prevent the migration of connective tissue to the wound area (Figure 5,6).



**Figure 5:** An intraoral view after flap removal.



**Figure 6:** After the flap was removed in the lower left premolar region during the operation, a biopsy was taken from the sclerosed bone tissue and after tooth extraction a resorbable membrane was placed and sutured.

The patient was followed up after the operation. The histopathologic examination of the biopsy tissue revealed no pathologic condition and that it was condensed healthy bone tissue. In the control radiograph taken 3 months after the operation, it was observed that bone formation occurred at the extraction cavity. (Figure 7).





**Figure 7:** Orthopantomograph of the patient taken 3 months after the operation

## Discussion

Tooth impaction is a common dental anomaly and several authors reported that most often impacted teeth are the third molars followed by maxillary canines. Although studies on the rate of impacted premolar teeth are limited, rates ranging from 0.2 to 1.79% have been reported. There may be local or systemic causes of impacted premolars in the jawbones. These reasons are the lack of the existing space in the jaws due to early loss of primary molars, pathological lesions such as dentigerous cysts as well as genetic diseases characterized by multiple impacted teeth, such as cleidocranial dysplasia (3,10-13).

The techniques used for detecting impacted teeth are intraoral radiographs, orthopantomographs, occlusal radiographs, and in the recent years cone beam computerized tomography (CBCT) technique due to its advantages in 3D imaging the relationships with structures such as adjacent teeth, sinus floor or mandibular canal (2,8). Alamri et al. (1) investigated the prevalence of impacted teeth by evaluating orthopantomographs in 539 patients and reported that 71 patients (13.2%) had impacted teeth. Siotou et al. (12) evaluated the intraoral photographs and OPGs of 1400 orthodontic patients in their study in which they investigated the prevalence of impacted teeth, and reported that the most impacted teeth were the upper canines with a rate of 32.28%. In the aforementioned study, the rate of impacted lower second premolar teeth was found to be 11.39%. In our patient, impacted lower left second premolar and lower third molars were observed on panoramic radiograph, and the patient was referred to the Department of Oral and Maxillofacial Surgery for surgical treatment.

Different treatment options have been suggested for the impaction according to the condition of the impacted tooth and the occlusal relations with other teeth in the mouth, such as observation, surgical exposure, orthodontic intervention, extraction, and autotransplantation (6,8,14). Alberto (6), after evaluating with OPG and CBCT in her study in which she presented the treatment of the two maxillary canines and the second left premolar, applied surgical exposure and orthodontic alignment. Manjunatha et al. (10) in the study of 4 cases where they presented the treatment of impacted upper premolar teeth, surgically removed the impacted teeth after radiographic examination of the patients with OPG and CBCT. Mc Namara & Mc Namara (15) treated two patients with impacted premolar teeth in the lower jaw with surgical exposure and orthodontic intervention. Bae et al. (16), after evaluating the

patient with an impacted and inverted upper premolar tooth with OPG and cephalometric radiography, provided the right occlusion by the rotation of the impacted tooth with orthodontic treatment. In our case, after the radiographic examination, it was decided that the impacted mandibular second premolar could not be erupted with orthodontic treatment and should be removed by intraoral surgery, and the operation was performed with the patient's consent.

There are limited studies in the literature on the treatment of severely impacted teeth. Pippi et al. (17) detected a horizontally impacted canine tooth in the left lower jaw inferior to the premolars and molars in the OPG of an 18-year-old female patient. In the axial section of the CBCT image of the patient, it is observed that the tip of the crown of the tooth disrupts the continuity of the lingual cortex of the mandible. Surgical treatment of the tooth was performed extraorally under general anesthesia. Göçmen et al. (18) detected a vertically impacted first molar in the left lower jaw of a 32-year-old male patient in orthopantomographic examination. In the sagittal section of the patient's CBCT image, it was observed that the tooth has reached the base of the mandible and the cortex has been thinned. Surgical treatment of the tooth was performed by opening the bone lid with an extraoral approach under general anesthesia. In our case, the root of the impacted second premolar tooth exceeded the base of the mandible by 2.3 mm. Although the extraoral extraction is used in some cases in such deeply impacted teeth, this method has risks such as mandibular nerve damage, fracture of the mandible and scar formation (19, 20). For this reason, in our patient, tooth extraction was performed intraorally under local anesthesia. In the control radiograph taken 3 months after the extraction of the tooth, it was observed that bone formation occurred in the tooth extraction cavity and there was no complaint of paresthesia or infection.

## Conclusion

Choosing the correct radiographic method is important in the diagnosis of impacted teeth. After the presence of impacted teeth is detected by techniques such as intraoral radiographs or orthopantomographs, cone beam computed tomography is used to examine the relationship of the tooth with the surrounding tissues in 3D. While deciding on the orthodontic or surgical treatment of the tooth, certain criteria are evaluated such as the age of the patient, the distance of the dental arch, the regulation of chewing function, and aesthetic factors.

## Declarations

**Author Contributions:** Conception/Design of Study-Ş.N.S., S.C.İ., T.L.E.; Data Acquisition-T.L.E.; Data Analysis/Interpretation-Ş.N.S.; Drafting Manuscript- Ş.N.S.; Critical Revision of Manuscript-T.L.E.; Final Approval and Accountability-T.L.E.; Material and Technical Support- Ş.N.S., S.C.İ., T.L.E.; Supervision- S.C.İ.

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