

Management of a rare case of impacted mandibular second premolar in an unusual position

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ABSTRACT

There is always a high possibility for any tooth to follow a different eruptive path and become impacted within the dentoalveolar process, or other anatomic sites, which include the sinus, mandibular ramus, or inferior border of the mandible. This report describes the case of a 35-year-old male, who was presented with the complaints of pain in the left lower arch for 7 days. On radiographic investigation, it was found that there was a horizontally impacted 2nd premolar in the left mandibular posterior region, positioned below the roots of the 1st and 2nd mandibular molars on the left side inclined distally. Due to the unusual positioning of the tooth and its proximity to the inferior alveolar nerve, the patient was operated extra-orally under general anesthesia for the removal of the impacted tooth.

Keywords: *Extraoral approach, Impacted premolar, Mandibular second premolar, Surgical removal, Unerupted tooth.*

According to World Health Organisation (WHO), an impacted tooth is one that is unable to fully erupt in its normal functional occlusion/ location by its expected age of eruption, because it is blocked by overlying soft tissue or bone or another tooth. Archer, in 1975, proposed that an impacted tooth or an embedded tooth is the tooth that has failed to erupt completely to its correct normal position in the dental arch, and its eruption potential has been lost [1].

The third molars are the last to erupt and have a relatively high chance of becoming impacted, with a frequency of occurrence generally reported to be from 18 to 32% [2]. Impaction happens when the eruption is prevented or the tooth is locked in position by bone or the adjacent tooth [3]. The most commonly impacted tooth is the permanent third molars, following which are maxillary permanent canines and ranked third are mandibular second premolars [4]. Mandibular second premolar varies highly developmentally. Some of the developmental anomalies include agenesis, abnormal tooth germ position and distal inclination of the developing tooth [5].

The mandibular second premolars usually erupt after mandibular first molars and permanent canines. Thus, if the space for the eruption of the premolars is inadequate, one of the premolars (especially 2nd premolar) fail to erupt and the chances of getting impacted are higher [6]. Mandibular second premolar itself accounts for about 24% of all dental impactions. Various factors that need to be considered while selecting a treatment option include the underlying etiological factors, space requirements, need for extraction of primary molars, degree of impaction, and root formation of impacted premolars. Other factors such as patient's medical history, dental status, oral hygiene, functional

and occlusal relationship, their attitude and compliance with treatment, will also influence the choice of treatment [7-9].

Some of the etiological factors responsible for premolar impaction include arch length deficiency, lack of space, ectopic positioning of the tooth germ, and obstacles to eruption such as ankylosed primary molars, presence of supernumerary teeth or odontomes. Certain systemic and genetic factors involved include cleidocranial dysplasia, osteopetrosis, Down's syndrome, hypothyroidism and hypopituitarism [10, 11].

The tooth germ of the mandibular second premolar is located between the roots of the deciduous second molar. Following the resorption of the roots of the deciduous molars, the premolars erupt. The eruption of mandibular premolars takes place after the mandibular first permanent molar and mandibular permanent canine. In case of inadequate space available for the eruption of premolars, one of the premolars, most commonly the second premolar remains unerupted, with higher chances of getting impacted [12,13].

We present a case of 35-year-old male who was presented with a horizontally impacted mandibular 2nd premolar on the left side, positioned at the roots of the left mandibular permanent molars. Due to its unusual position and to avoid injury to the inferior alveolar nerve, an extraoral approach was planned for the removal of the tooth under general anesthesia.

CASE REPORT

A male patient aged 35 years, was referred to the Department of Oral and Maxillofacial Surgery with a history of pain in the left lower arch for 7 days. He described the pain to be dull, intermittent



Figure 1: Unilateral missing mandibular 2nd premolar seen with a retained deciduous molar on the left side

and of non-radiating type. There were no aggravating or relieving factors associated with the pain. On clinical evaluation, a unilateral missing 2nd premolar was seen in the left mandibular arch with a retained deciduous molar in its place. The 2nd premolar on the contralateral side was present (Fig. 1).

On radiological evaluation, an intraoral periapical radiograph (IOPA) in relation to the left lower premolar region showed no pathological condition in relation to the deciduous 2nd molar. An opaque structure could be visualized below the roots of the posterior teeth. An Orthopantomogram (OPG) was taken, which revealed a horizontally impacted second

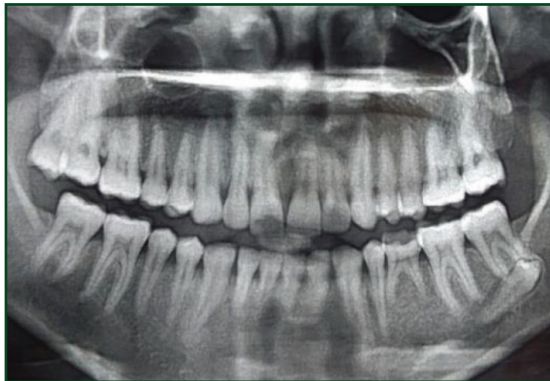


Figure 2: Pre-op OPG – showing the impacted mandibular 2nd premolar below the roots of the permanent molars on the left side

premolar, inclined distally with its root at the apex of the mandibular permanent 1st molar and crown at the apex of the permanent 2nd molar (Fig. 2).

A cone beam computed tomography (CBCT) was performed to locate the exact position and relationship of the impacted tooth to the adjacent structures, in order to plan the appropriate method of extraction. The impacted tooth was seen to be placed more towards the buccal cortex (Fig. 3). The inferior alveolar nerve was traced, which was found to be in close proximity to the impacted 2nd premolar.

Due to the unusual positioning and direction of the horizontally impacted left mandibular 2nd premolar and its close relation to the inferior alveolar nerve, the patient was planned to be operated extraorally under general anesthesia. After explaining the complete treatment plan and obtaining due consent from the patient for the procedure to be done under general anesthesia, the patient was intubated nasally, painted with 10% betadine solution and draped aseptically. Incision marking was made for an extraoral left submandibular approach about 2 finger width below the inferior border of the mandible (Fig. 4).

Local infiltration, 2% lignocaine with adrenaline was injected and an incision was given along the marking. Dissection was done to reach the periosteum of the mandibular segment. The periosteum was stripped off the bone and a bony window was made at the approximate location of the impacted premolar (Fig. 5). The bony cuts were given using a bur and cortical bone



Figure 3: CBCT imaging showing the placement of the impacted pre molar



Figure 4: Marking done for submandibular approach

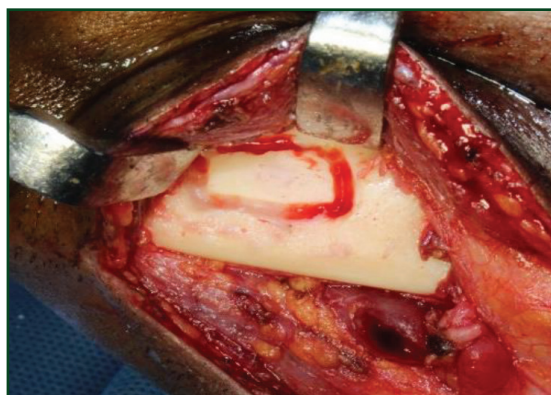


Figure 5: Osteotomy cuts given and a bony window made

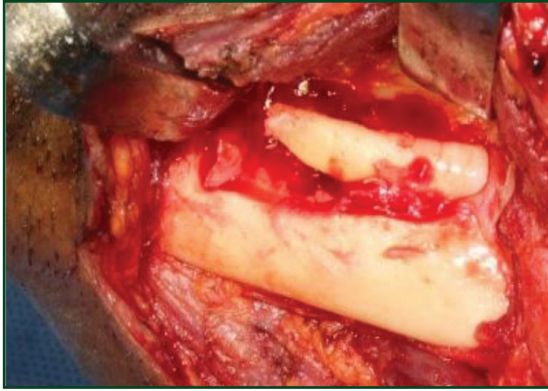


Figure 6: Tooth exposed after removal of the buccal cortex over the impacted tooth

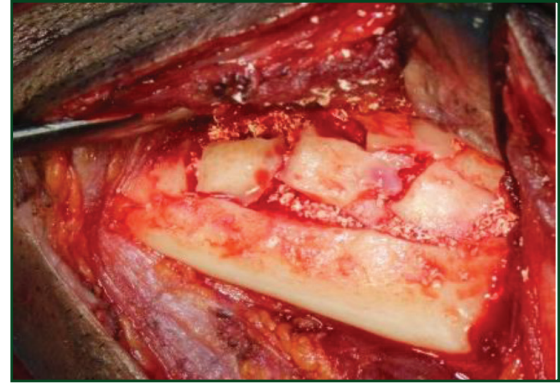


Figure 7: Defect filled with G-bone, autologous blood and bony pieces



Figure 8: Post-op OPG

was removed with an osteotome and the tooth exposed with respect to tooth no. 35 (Fig. 6). The removed cortical bone was preserved in saline for replantation.

A purchase point was made and the tooth was elevated; curettage was done and follicle removed. Thorough irrigation with saline and gentamycin was done. The defect was filled with G-bone and autologous blood. The cortical bone removed prior to tooth exposure was placed over this (Fig 7). Suturing was done in layers using 3-0 vicryl and 4-0 ethilon. A pressure dressing was placed over the operated site. Anesthesia was reversed, the patient was shifted to post-op ward uneventfully and put on a standard regimen of post-operative medication for the following five days.

The patient was followed up for 1 week, after which the skin sutures were removed. Healing was found to be uneventful. A post-operative OPG was taken on the 8th day in which, the freshly grafted region was seen at the apex of the left mandibular molar teeth. No sign of infection was detected [Fig 8]. Further, follow up could not be done due to relocation of the patient to a different state.

DISCUSSION

Treatment options for an impacted premolar usually include observation, intervention, relocation, and extraction. Observation involves no treatment other than monitoring the patient clinically and radiologically. Generally, observation is carried out in growing children. The intervention involves a simple extraction

of the obstructing primary tooth, while relocation refers to either surgically repositioning of the impacted tooth or more commonly orthodontically aiding in the eruption of the impacted tooth [14]. In our case, neither of the options to preserve the tooth was possible owing to the position of the tooth.

Majority of reported cases involve distally impacted premolars, where the long axis was inclined in favor of eruption in case of exposure. But, surgical exposure of the tooth is limited to cases with a tilt of not more than 45° and minimal deviation from its normal position [2]. Two most important and common reasons of impaction occurring in the second premolars are - the angulation of the tooth bud and the early loss of the primary adjacent tooth i.e., the molar [15]. But in this case report, the patient was presented with the presence of the deciduous molar in place of the permanent premolar.

Mehta et al in 2017 gave a new classification for mandibular second premolar based on the position of the impacted tooth. This classification segregated mandibular premolar impactions into 7 types, along with the probable treatment option for each type. According to this classification, our case was a type 2 impaction, i.e., distal inclination, where the tooth is positioned in the body of the mandible below the apices of the molars [14].

In a study by Gaku Yamamoto et al, another classification was given for Impacted Second Premolars based on OPG. [15] Impacted second premolars were classified as follows: Type I — vertically impacted second premolars, located between the first premolars and first molar with the tooth axis almost perpendicular to the occlusal plane with the canine inclined distally or the first molar inclined mesially. Type II — canines located in a lower portion than type I teeth with the second premolar in close relation to the apex of the first premolar. Type III — impacted second premolars inclined mesially or distally with the second deciduous molar remaining in the dental arch. Type IV — horizontally impacted second premolars with the tooth axis almost parallel to the occlusal plane with the crown directed mesially. Type V — horizontally impacted second premolars with the tooth axis almost parallel to the occlusal plane with the crown directed distally. Type VI — inversely impacted second premolars. Type VII — second premolars with the axis incline in the buccolingual (palatal) direction. [15]

In all of the above types of impactions, the treatment plan should be decided based upon the following few points – closeness to the inferior alveolar canal, resorption of the adjacent teeth, any pathological changes, or patient symptoms. Thus, early diagnosis can prevent undesirable changes and helps to prepare a proper treatment plan. Shastri et al, in 2014, described a case similar to the current case of horizontally impacted mandibular 2nd premolar on the right side, in a 16-year-old patient. Due to the peculiar positioning of the tooth at the apex of the mandibular permanent 1st molar, the only treatment option was to extract the impacted premolar. A buccal surgical approach was employed for the removal of the tooth taking precaution to avoid injury to the mental nerve [16].

Abu-Hussein M et al, in 2015, described a case of a 16-year-old patient, with an almost horizontally placed impacted mandibular second premolar on the right side diagnosed radiographically using an OPG. The impacted mandibular second premolar was associated with a follicular cyst, with the crown facing towards the first molar. The tooth was seen to be in close proximity to the inferior alveolar nerve. In this case, orthodontic treatment was started and surgical exposure was planned. Closed exposure surgery was done in this case [17].

Datana S et al, in 2017 reported a case of a 9-year-old patient with a developing malocclusion. On radiographic investigation (OPG), they found all teeth positioned normally, except for the lower left mandibular premolar. The tooth was angulated at an angle of 70° to the long axis of the adjacent tooth, the crown directed distally approximating the root of the first permanent molar and root apex approximating apex of the first premolar. In addition, the impacted premolar had a prominent dilaceration. Orthodontic guidance of the tooth by closed eruption technique was the treatment done for this patient [18].

In our case, the treatment plan was chosen and executed based on the patient's complaint and the closeness of the tooth to the inferior alveolar nerve. Considering the deep-seated tooth, extraction was planned under general anesthesia using an extra-oral approach. This approach gave better access to the tooth with a minimum amount of tissue manipulation required, the only disadvantage being a scar below the inferior border of the mandible.

CONCLUSION

Early and appropriate diagnosis of the impacted cases can help to form a suitable treatment plan for the patient. The treatment plan should always be based on the proximity to the nerve, and pathological condition of the tooth as well as patient's symptoms to avoid unpleasant outcomes. The appropriate knowledge

of anatomy along with careful manipulation of the tissues and correct application of mechanical principles involved in tooth extraction provided surgical success. This rare case may provide some information on impacted lower premolar and its treatment using an extraoral approach.

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