

CONE BEAM COMPUTED TOMOGRAPHY- A BOON FOR TREATMENT PLANNING OF HORIZONTALLY IMPACTED MANDIBULAR SECOND MOLAR

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ABSTRACT

The impacted mandibular second molar is a rare finding. The arrest in the eruption of the lower second molars can lead to disturbances of aesthetics and mastication. Various treatment options could be proposed for malposition and impaction of second molar. The treatment approach of choice may be decided on the basis of evaluation of factors like amount of space present in the dental arch (if any), status of adjoining teeth and patients' choice. Accurate location of the impacted molar by the means of cone beam computed tomogram aids in the appropriate treatment plan. In this article, we report a case of impacted lower second molar which was managed by surgical treatment.

KEY WORDS

Horizontal second molars; impacted second molar; surgical extraction; lower second molar

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INTRODUCTION

The impaction of mandibular second molars is a rare complication in tooth eruption. The presence of deeply horizontally impacted lower second molars is even more unusual.¹ The arrested eruption of the lower second molars can determine disturbances of mastication and aesthetics. Moreover, an increased risk of caries in the distal side of the first lower molar is possible.² Indeed, orthodontic treatment, transplantation, and extraction of impacted second molars have been suggested to avoid potential damage to the first molar root.³ The cone beam computed tomogram (CBCT), aids in accurate location of the impacted second molar, thus, acts as a boon in treatment planning for such cases. In this article, we report the management and the outcome of the surgical treatment of an unusual case of impacted mandibular second molar.

CASE REPORT

A male patient, aged 30 years, reported to our institution with a chief complaint of mild pain in lower back teeth region of left side since 08 months. The patient presented with a medical history, which was not contributory. On an intraoral examination, a mesially inclined tooth on the left side of the lower arch, distal to the first molar, was observed. (Figure 1,2).

A panoramic radiograph showed that the left mandibular second molar was deeply impacted horizontally. The left mandibular third molar was erupted and mesially inclined. All the teeth were erupted except lower left second molar. Cone Beam Computed Tomographic scan revealed the relationship of the inferior alveolar canal with the second molar as well as the relationship of second molar with adjoining teeth. (Figure 3, 4, 5).

After a proper informed consent of the patient, surgical removal of impacted lower left second molar was planned. Surgical procedure was performed under local anaesthesia. Patient was draped for isolation and the surgical site was scrubbed with povidone iodine. Induction of the local nerve block anaesthesia was done on the lower left side. A full-thickness mucoperiosteal flap was raised. The necessary osteotomy was performed to



Figure 1



Figure 2

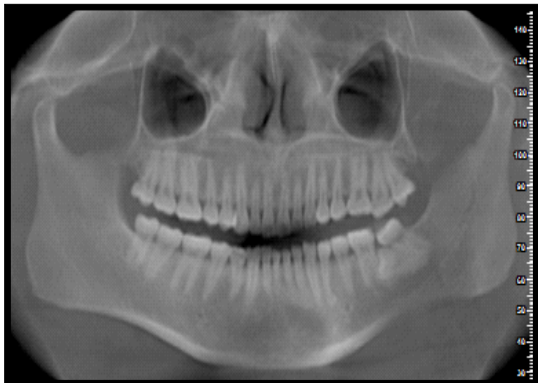


Figure 3

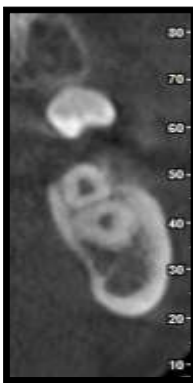


Figure 4



Figure 5

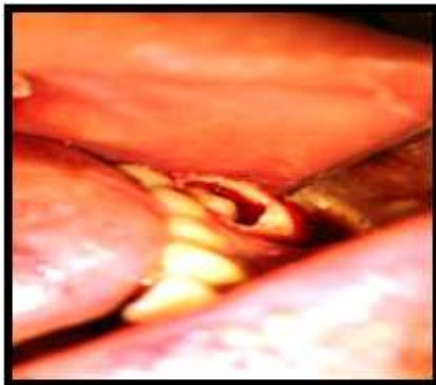


Figure 6



Figure 7

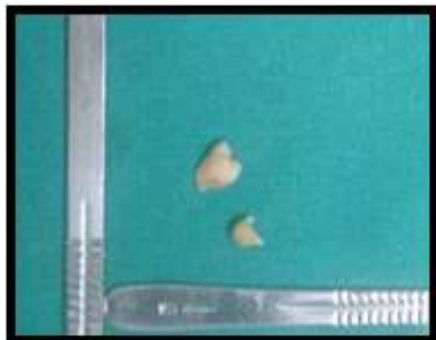


Figure 8



Figure 9

visualize the impacted second molar using bur and handpiece (Figure 6). After exposure of the tooth, it was sectioned into 2 parts (Figure 7). After sectioning, the 2 fragments were removed (Figure 8). The remaining socket was curetted, followed by irrigation with physiological saline. Primary closure of the flap was performed with 3-0 vicryl suture. Healing in the postoperative phase was satisfactory.

The patient was followed up for 18 months with no evidence of pain in the affected area, tenderness on percussion, paresthesia or mobility in lower first molar and third molar of left side. There was radiographic evidence of normal healing of extraction socket.(Figure 9).

DISCUSSION

The incidence of impacted lower second molars is only 0.03 to 0.21%, depicting its rarity. Its unilateral presentation is more common than bilateral, and it is more common in the mandible than in the maxilla. It is seen more in males than females, and its mesial inclination is more usual.² Andreasen and Kuroi proposed that 3 events could lead to the absence of eruption of the second molar : impaction, primary retention, and secondary retention.⁴

Impaction of the second molar may be due to a physical obstacle, which may occur because of collision between the follicles of the third and second molars, lack of space, supernumerary teeth, odontome, odontogenic tumors and giant cell fibromatosis in the line of eruption. An ectopic eruption pathway could also be considered as a cause of the impaction of the second molar. Third molar is neither involved in the timing nor in the path of the eruption of the lower second molar. And also, as Garcí a Caldero ´n et al stated, simply extraction of third molar does not lead to the proper eruption of an impacted second molar.² Indeed, it cannot be considered that the third molar is a cause of lower second molar impaction.

Primary retention is the arrest in the eruption of the second molar before the rupture of the gum. It is caused by unknown reasons usually. It is found in patients affected by syndromes with a compromised osteoclastic activity in some cases.⁵ Secondary retention is the cessation of the eruption of the tooth after gingival rupture. It is associated with absence of a physical obstacle. Secondary retention is more common than primary retention, and it is determined by ankylosis, mainly in the inter radicular zone.⁶ Vedtofte et al⁷ showed that morphological anomalies in the dentition occur more frequently in patients with arrested eruption of the lower second and third molars, than in other dentitions; the retention of single teeth would be not only a local deviation but, probably, also part of an extended deviant developmental disorder. On the contrary, our case didn't reveal this; i.e. there was a single tooth in both the dental arches which was impacted. Different

therapeutic approaches could be proposed for second molar impaction and malposition: surgical removal of the second molar, surgical exposure of the second molar, and positioning of the orthodontic buttons for traction and to force its proper eruption; surgical removal of the third molar and transplantation of the second molar in a correct position; surgical removal of the second molar and replacement of the third molar in a correct position.¹

The most successful therapeutic option could be orthodontic.⁸ In our case, the patient's interest lead to treatment plan of surgical removal of impacted second molar.⁹

As Vedtofte et al and Magnusson and Kjellberg stated, it is important to diagnose arrested eruption of the permanent lower second molar as early as possible because orthodontic treatment at a late stage could be complicated and present difficult clinical problems. Indeed, the apexes of the involved teeth could already be closed. Therefore, deep impaction and advanced age of the diagnosis are the factors associated with a poor result of the treatment.^{1,7}

Preoperative assessment of surgical difficulty is fundamental to correctly plan the extraction of impacted molars.¹⁰ It is extremely important to assess the various elements that could influence the extraction, such as relative depth, angulation and form of the root, number of roots, relationship of the tooth to the ramus, proximity to the mandibular canal, and lack of periodontal membrane space.

The advances in radiographic techniques lead towards better planning of surgical procedures by helping surgeons to accurately locate the structure of interest (e.g. impacted tooth) and also the adjoining vital structures which need to be preserved during the procedure.¹¹

A CBCT scan clearly demonstrates impacted teeth in the maxillary and mandibular bone. Resorption of the bone and adjoining teeth due to the impacted teeth is depicted more clearly on the CBCT than on conventional radiographs. Information about location and the relationship between the impacted teeth and their adjacent anatomical structures, such as the mandibular canal and maxillary antrum is also accurately provided by CBCT scan. Due to its high resolution and low radiation dose, CBCT is useful for preoperative examination prior to surgical intervention for impacted teeth.^{10,12} In our case, the roots of first molar and third molar were saved from damage and the neurovascular bundle was also preserved by aid of cone beam computed tomography. Great attention was paid not to damage the inferior alveolar nerve and not to cause iatrogenic mandibular fracture.

CONCLUSION

The arrested eruption of the mandibular second molars is an extremely rare condition. CBCT scan

acts as a boon for proper preoperative assessment of impacted second molars. Different therapeutic options should be considered. Unfortunately, because of the rarity of this clinical finding and the great clinical diversity, it is difficult to propose clinical treatment protocols.

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