

An Interdisciplinary Approach to Upright Partially Impacted Maxillary Second Molar- A Case Report

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ABSTRACT

We present a case of a partially impacted maxillary right second molar treated by ortho-surgical approach. The patient had a Class II malocclusion and was treated using sectional orthodontic mechanics after surgical uprighting of tooth 17. The treatment was finished in 8 months with adequate uprighting of the maxillary second molar and the results were stable after 1 year. When other conventional treatment modalities are ineffective or contraindicated the surgical uprighting approach can be used.

KEYWORDS: Impacted maxillary molars, interdisciplinary, surgical uprighting

INTRODUCTION

The issue of permanent teeth impaction is quite intricate, with the highest occurrence noted in the maxillary and mandibular third molars, followed by maxillary canines and mandibular second molars.¹ Insufficient development of the skeletal structure is one reason cited for the altered eruption patterns of second molars.² Several potential causes for these impactions have been proposed, including a) insufficient space for normal eruption, b) absence of guidance from the distal root of the first molar due to significant gaps between the first and second molars, which may be caused by the early loss of a primary molar, c) the permanent first molar not moving mesially as a result of a primary molar ankylosis and d) blocked eruption due to cystic pathology.³⁻⁶

Surgical extraction, surgical uncovering with orthodontic-assisted eruption and surgical uprighting

are the available treatment options for impacted second molars.⁷ If the impacted molar is deeply buried beneath the soft tissue, surgical uprighting offers an effective solution with low tooth morbidity and a favorable long-term prognosis.⁸ This case report provides an overview of the ortho-surgical procedure of an impacted right maxillary second molar.

Case report

A 17-year-old female patient came in with a primary complaint of pain in her upper right back tooth that had been occurring for the past week. Upon examination a partially impacted tooth 17 was found, with its crown exerting pressure on the roots of 16, which made tooth 16 sensitive to percussion despite not having an active carious lesion. The patient exhibited an Angle's Class II subdivision right malocclusion on a mild Class II skeletal base, with bimaxillary proclination, a horizontal growth pattern and crowding in her upper arch. (Figure1)



Figure 1: Pre-treatment photographs and OPG

Treatment plan

Upon careful assessment and diagnosis two treatment options were proposed :

1. Extraction of 17 which would facilitate the mesial migration of the developing 18, enabling it to replace 17.
2. Surgical uprighting of 17 followed by fixed orthodontic treatment to ensure stability of the positioned tooth within the arch.

The patient preferred to avoid extraction and chose to proceed with the surgical uprighting along with sectional orthodontic mechanics.

Surgical Procedure

Surgical uprighting involves the luxation of a tooth that is impacted within its socket, utilizing an elevator.

In this instance, following the administration of local anesthesia, an oral surgeon used a straight elevator to luxate and disimpact tooth 17. After sufficient uprighting was accomplished tooth 17 was secured in place using a double wedge technique and left without any orthodontic forces for three weeks to promote primary healing. GIC bite blocks were positioned to disocclude the tooth and prevent any undesired occlusal forces on tooth 17. The patient received a prescription for a five-day course of anti-inflammatory medications. An OPG was taken immediately after the surgical procedure, revealing the intended results. The patient was seen again after five days, and no complications were observed.(Figure 2)

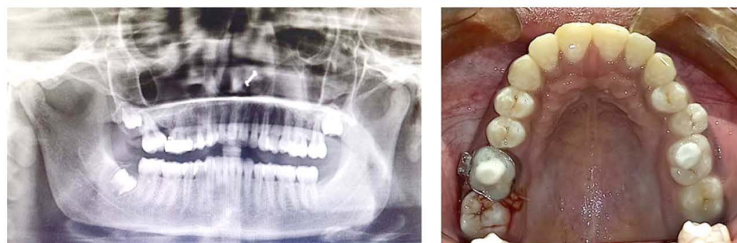


Figure 2: OPG and photograph just after surgical uprighting

Orthodontic procedure

Despite having a Class II malocclusion, the patient opted for sectional mechanics rather than comprehensive orthodontic therapy. Molar tubes and 0.022" MBT prescription brackets were used for sectional orthodontics. On the day of the surgical uprighting, tooth 16 was banded. Brackets and molar tubes were bonded on 13, 14, 15 and 17 respectively after a three-week latency period and 0.014" sectional

NiTi wire was ligated. After three weeks, the active force (wire engagement) was applied on 17; nonetheless, it experienced a slight relapse in its uprighted position. Sectional 0.018" NiTi wire was ligated and left in place for two months after a 21 days interval and then 0.017"x0.025" NiTi wire was inserted. The degree of uprighting attained was assessed via periodic radiographical evaluation. (Figure 3)

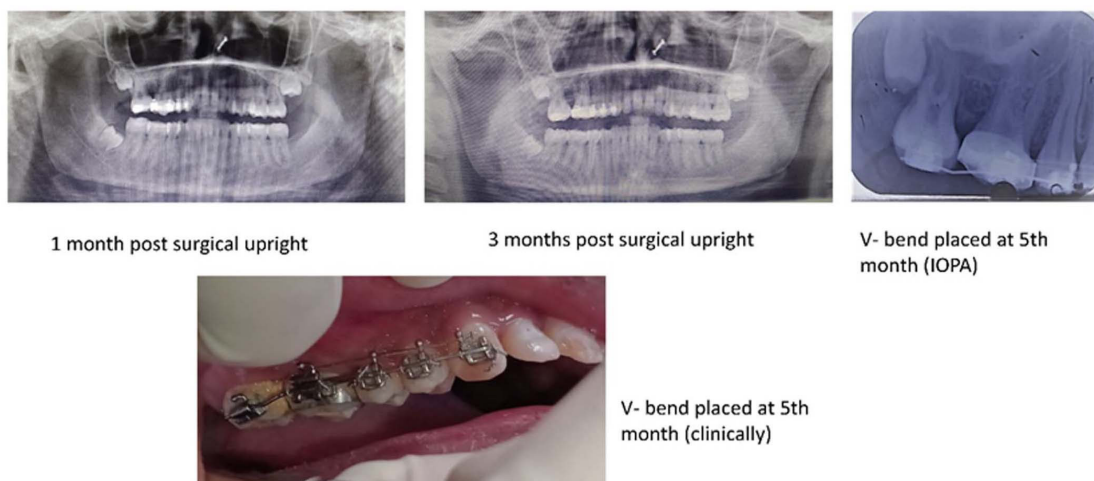


Figure 3: Mid-treatment OPG and IOPA & V-bend

Clinical and radiographic evaluation revealed required amount of uprighting on 17, consequently 0.016" × 0.022" stainless steel wire with asymmetric V bend was provided and modified throughout periodic visits. To eliminate counterbalancing moment created on 17 owing to asymmetric V bend, GIC bite blocks were altered on 37,

47 and consolidation of the arch from 16 to 13 was done. CNA wire dimensioned 0.019"X0.025" was used for final finishing. Then a modified retainer was provided. The entire course of treatment lasted eight months and after a year, the outcomes remained consistent. (Figures 4 & 5)



Figure 4: Post-treatment photographs and OPG



Figure 5: Modified retainer

DISCUSSION

Tooth impaction occurs in roughly 20% of the population.⁹ Due to the upper third molar's delayed growth, second molar impactions are more common in the mandible than in the maxilla. These impactions are typically unilateral. Cho and colleagues found greater incidence on the left side and in females, while Varpio and Wellfelt observed higher prevalence on the right side and in males.^{10,11}

The successful eruption of the second molar requires tight guidance along the distal root of the first permanent molar, according to Becker's guiding theory of upper canines.¹² An impacted second molar's tooth bud may occasionally tip mesially during the developmental stage, resulting in its mesial eruption and lodging against the first molar's distal prominence.¹³ As an asymptomatic pathology, failure of eruption is more

likely to be a secondary finding during orthodontic treatment.¹⁴

Surgical uprighting of second molars can be best carried out when one-half to two-thirds of their root development is complete and the third molars have only partially developed i.e. during early adolescence age thereby, simplifying the procedure and improving their long term prognosis.¹⁵ However in our case, the patient was 17 years old, with a well-developed risk during uprighting, however the whole procedure went uneventful. The periodontal ligament regenerates its attachment by coronal migration up to mesial root after luxation. Along the mesial aspect of the uprighted molar, fresh Sharpey's fibers embed themselves in the bone and cementum.

The new periodontal connection results in the formation of new bone.¹⁶ Pulpal necrosis external root resorption and ankylosis are the main dangers associated with any kind of surgical relocation. These risks are especially noticeable in case of old ages, full root formation and high tooth inclination, which can put permanent strain on the apical vessels.^{4,17} As the distal bone returns to its normal height, orthodontic therapy should begin one to two weeks following surgery and be relatively well healed in six to nine months.⁸ Molar uprighting should be the outcome of a suitable combination of sagittal and vertical tooth motions and the necessary tooth

movements should be assessed in three spatial planes when selecting the treatment mechanics.¹⁸

a beneficial alternative when standard non-invasive procedures are contraindicated or are inadequate.

CONCLUSION

This case report demonstrates the successful use of a surgical strategy for uprighting and repositioning impacted molars. This surgical approach provides



REFERENCES

1. Grover PS, Lorton L. The incidence of unerupted permanent teeth and related clinical cases. *Oral Surg Oral Med Oral Pathol.* 1985;59:420–5.
2. Alling C, Helfrick JF, Rocklin D. *Impacted teeth.* Philadelphia: Saunders; 1993. p. 210–27.
3. Shapira Y, Borell G, Nahlieli O, Kuftinec MM. Uprighting mesially impacted mandibular permanent second molars. *Angle Orthod.* 1998;68:173–8.
4. McAboy CP, Grumet JT, Siegel EB, Woldenberg Y, Sonis A. Surgical uprighting and repositioning of severely impacted mandibular second molars. *J Am Dent Assoc.* 2003;134:1459–62.
5. Frank CA. Treatment options for impacted teeth. *J Am Dent Assoc.* 2000;131:623–32.
6. Boynton T, Lieblich SE. Surgical uprighting of second molars. *Atlas Oral Maxillofac Surg Clin North Am.* 2013;21:235–42.
7. Frank CA. Treatment options for impacted teeth. *J Am Dent Assoc.* 2000;131:623–32.
8. Kravitz ND, Yanosky M, Cope JB, Silloway K, Favagehi M. Surgical uprighting of lower second molars. *J Clin Orthod.* 2016;50(1):33–40.
9. Andreasen JO, Petersen JK, Laskin DM. *Textbook and color atlas of tooth impactions.* Copenhagen: Munksgaard; 1997. p. 199–208.
10. Varpio M, Wellfelt B. Disturbed eruption of the lower second molar: Clinical appearance, prevalence, and etiology. *ASDC J Dent Child.* 1988;55:114–8.
11. Cho SY, Ki Y, Chu V, Chan J. Impaction of permanent mandibular second molars in ethnic Chinese school children. *J Can Dent Assoc.* 2008;74:521.
12. Alling CC, Helfrick JF, Alling RD. *Impacted teeth.* Philadelphia: Saunders; 1993. p. 210–27.
13. Palma C, Coelho A, González Y, Cahuana A. Failure of eruption of first and second permanent molars. *J Clin Pediatr Dent.* 2003;27:239–45.
14. Proffit WR, Fields HF. *Contemporary orthodontics.* 3rd ed. St. Louis: Mosby; 2000. p. 541.
15. Magnusson C, Kjellberg H. Impaction and retention of second molars: Diagnosis, treatment, and outcome. A retrospective follow-up study. *Angle Orthod.* 2009;79:422–7.
16. Isidor F, Karring T, Nyman S, Lindhe J. The significance of coronal growth of periodontal ligament tissue for new attachment formation. *J Clin Periodontol.* 1986;13:145–50.
17. Hermann NV, Lauridsen E, Ahrensburg SS, Gerds TA, Andreasen JO. Periodontal healing complications following extrusive and lateral luxation in the permanent dentition: A longitudinal cohort study. *Dent Traumatol.* 2012;28:394–402.
18. Melsen B, Fiorelli G, Bergamini A. Uprighting of lower molars. *J Clin Orthod.* 1996;30:640–5.