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Case Report

Dentistry Section

Management of Unilateral Multiple Impacted Molars- An Interdisciplinary Approach of a Rare Clinical Case

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ABSTRACT

Impaction of first, second and third molars at once comprise a rare clinical scenario with diverse therapeutic approaches and possess a great challenge for the dentist. Early detection of the eruption disturbances helps to manage and produce optimal outcomes. Here, the authors reported a case of 17-year-old male patient who reported with the chief complaint of pain in his lower left back tooth region with difficulty in mouth opening and chewing that revealed impacted mandibular left first, second and third molar on radiographic investigation. A proper decision making is required to satisfy the patient and also get an effective result. As the patient had severe pain in the left side of the jaw near the angle of the mandible, surgical removal of the impacted molars was planned and performed using extra oral submandibular approach. Following the removal of the teeth, implants were placed in the extracted site supported by bone graft material and fixed orthodontic appliance therapy was carried out to correct the supra-erupted upper molars on the left side and arch expansion screw with upper Hawley's appliance was given to expand the maxillary arch to aid in appropriate occlusion. Restoration of the implant was done after one year of orthodontic treatment using ceramic crowns. The combined surgical, orthodontic and periodontal interdisciplinary approach helped the patient to gain proper occlusion and satisfactory masticatory function.

Keywords: Dental implants, Multidisciplinary approach, Occlusion correction, Surgical extraction, Transalveolar management, Unerupted teeth

CASE REPORT

A 17-year-old male patient reported to the Outpatient Department of our dental college and hospital with the chief complaint of pain in his lower left back molars region since one week associated with difficulty in mouth opening and chewing food in the same region since three days. Pain was sharp, intermittent in nature that radiated to the temple and back of the neck occasionally. The patient gave a history of similar episodes of pain in the past that resolved with analgesics. Review of the medical, dental, and family histories revealed no significant findings.

Extra oral examination revealed grossly symmetrical face with limited jaw movement and mouth opening was restricted to 25mm [Table/Fig-1]. The patient presented with skeletal Class II, division 1 malocclusion and a protrusive facial profile. On intraoral examination tenderness with erythematous mucosa was present in the lower left buccal vestibular region. Class II molar relation was observed on the right side [Table/Fig-2] whereas on the left side upper first and second molars were supra-erupted due to the absence of the opposing teeth. Slightly proclined maxillary incisors were present with an overjet of about 3 mm. No other significant intraoral findings were noted.

Pretreatment Orthopantomogram (OPG) revealed deeply positioned mandibular molars in the left side below the occlusal plane suggesting impaction with mesial inclination, immediately related to the inferior alveolar nerve and above the angle of the mandible. Root formation of the impacted left first and second molar was almost at the stage of completion while the impacted third molar had immature roots with completely formed crown [Table/Fig-3].

A provisional diagnosis of mesioangular impaction in relation to lower left first, second and third molars with supra-erupted upper left first and second molar in a skeletal Class II, division 1 malocclusion was given. Treatment options included orthodontic management or surgical management or by combination of both. Orthodontic line of treatment primarily includes dis-impaction of the first molar using fixed orthodontic appliance therapy to aid in uplifting deeply impacted molars followed by surgical exposure of the occlusal surfaces of second molar by excising overlying mucosa usually combined with

[Table/Fig-1]: Clinical Photograph of the patient showing limited mouth opening (25 mm) on extraoral examination; **[Table/Fig-2]:** Clinical photograph of the patient showing Class II molar relation (right side) on intraoral examination. (Images from left to right)

[Table/Fig-3]: Pretreatment Orthopantomogram (OPG) image showing impacted left mandibular molars.

surgical removal of third molar. On the other hand, surgical removal of all the impacted molars accompanied by re-establishing the lost bone using bone augmentation procedure (graft material) can be performed. Treatment options for correction of the supra-erupted molars include removable appliances with elastics, temporary anchorage devices using miniplates and mini-implants, elastomeric chains, magnets, modified palatal arch systems, reduction of the crown height to aid in prosthetic rehabilitation, surgical levelling of maxillary molars, and fixed appliance with bends in fabrication of arch-wire. In the present case, labiolingual arch-wire fixed appliance was planned to intrude the upper molars simultaneously aided by correction of malocclusion rapid maxillary expansion screw to create sufficient space and facilitate normal occlusion over an estimated period of 18-24 months with upper Hawley's appliance to aid in appropriate occlusion was preferred. This was preceded by placing implant supported ceramic crowns on the lower arch near the extracted left molar region to create proper molar-guided occlusion.

All the treatment options discussed above were explained to the patient briefly. However, patient refused to wait for a long duration to orthodontically extrude deeply impacted molars due to severity of the pain and personal concerns, the selected treatment plan included extraction of all the lower left mandibular molars under general anaesthesia with antibiotic coverage of Cefotaxim 1gm twice a day (BD) and injection Metronidazole 500 mg thrice a day (TID) through intravenous route for seven days and preserving the socket for the dental implants using bone augmentation by graft material and proceeding with orthodontic correction of the malocclusion. As the position of the molars in relation to the occlusal surface and angle of the mandible was not favourable for intraoral procedure, extra oral approach was planned. Patient was advised to prefer extra oral surgical approach after explaining the advantages of the procedures such as prevention of damage to the inferior alveolar nerve, fracture in the angle of the mandible, limited accessibility and visibility to perform the procedure. A written informed consent was obtained from the patient for performing surgery, orthodontic treatment, disclosure of the photographs and radiographs for scientific purposes.

Surgical approach: Prior to surgical procedure routine blood investigations (complete blood count, bleeding time, clotting time, haemoglobin estimation) were carried out, which were within normal limits. Under general anaesthesia and complete aseptic environment, a conventional submandibular Risdon approach was performed [Table/Fig-4]. Incision was placed about a finger width below the angle of the mandible parallel to the inferior border through the skin and subcutaneous tissue to the level of the platysma muscles and retracted. The platysma muscle is undermined bluntly with scissors and divided sharply using scalpel 2-3 cm below the mandibular border to protect marginal mandibular branch of the facial nerve (Cranial Nerve VII) and ligation of the facial artery and vein followed by retracting the vessel superiorly was performed to protect the facio-vascular bundle during dissection. After dividing the pterygo-masseteric fascia through the subperiosteal reflection, the inferiolateral surface of the ramus was exposed. The impacted molars at the inferior border presented as smooth elevation, and crown was exposed by guttering through the follicular space using Rose-head round bur no: 3 mounted on a low speed micromotor straight hand piece. The neurovascular channels were ligated and placed superiorly just above the impacted crown through the canal. The entire molars follicle removal was performed [Table/Fig-5] by taking buccal surface of the crown exposure as the reference point. After complete removal of the molars, the sharp bony margins were smoothened using surgical round bur and bone file followed by ample irrigation and the Inferior alveolar nerve was placed back in its canal position [Table/Fig-6]. Subsequently bone augmentation was done to maintain the width and volume of bone using Bio-Oss™ bone graft material and stabilised with Bio-Mend absorbable collagen membrane [Table/Fig-7]. Postoperative recovery was uneventful. No associated complications were observed following surgical procedure. The mouth opening was significantly improved to 35 mm after seventh day (postoperative) and was evaluated regularly over a period of four weeks (43 mm opening) [Table/Fig-8]. The histo-pathological examination of the excised follicle using Haematoxylin and Eosin stain (H&E stain) revealed both epithelial and connective tissue components. The epithelium component showed 2-3 layers of low cuboidal cells resembling reduced enamel epithelium. The connective tissue shows loose stromal components like blood vessels, fibroblast along with inflammatory cells predominantly Poly-morphonuclear Neutrophils (PMN'S) and free of any tumour or cystic transformation [Table/Fig-9].

[Table/Fig-4]: Clinical operative image showing extra oral submandibular approach using Risdon incision.

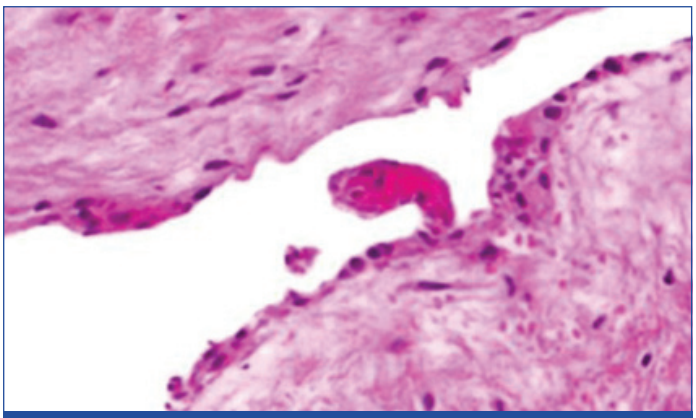
[Table/Fig-5]: Clinical image showing extracted molars in sections.

[Table/Fig-6]: Clinical operative image showing dissected protected inferior alveolar nerve placed back in position.

Orthodontic and periodontal rehabilitation: After a waiting period of one year for bone augmentation, two implants of size 4.0 mm×11 mm was placed in relation to lower left first and second molar region [Table/Fig-10]. Adequate primary stability was achieved and patient was recalled for review after a week for suture removal. After six months of follow up appointment, there was an excellent healing in the implant site without any anaesthesia or paresthesia. An adequate period of

[Table/Fig-7]: Orthopantomogram (OPG) image showing postoperative extracted molar region and augmented bone site.

[Table/Fig-8]: Clinical Photograph of the patient showing improved mouth opening (43 mm) on extraoral examination after four weeks (postoperative).



[Table/Fig-9]: Haematoxylin and Eosin stained Photomicrographic image showing 2-3 epithelial layers of low cuboidal cells and loose connective tissue stroma with inflammatory cells (40X).

another six more months was given to achieve proper osseointegration before loading the implants. In the meantime, orthodontic treatment was carried out simultaneously to intrude the upper left first and second molars which were supra-erupted due to the absence of left lower impacted molars and expansion of the maxillary arch was planned following arch perimeter and bolton's model analysis. The upper left molars were intruded by using labiolingual arch-wire fixed appliance over a period of 18 months and sufficient space was created for the replacement of missing molars in the implant placed area. Rapid Maxillary arch expansion screw with Upper Hawley's appliance was recommended concurrently [Table/Fig-11] and activation was done every two months over a period of 12 months to establish a proper occlusion. The patient was asked to maintain good oral hygiene and a chlorhexidine mouth rinse was prescribed for plaque control. Patient was recalled at regular intervals for consistent supportive periodontal therapy and evaluated for appropriate osseo-integration [Table/Fig-12]. Healing abutments were given prior to the placement of prosthetic abutment to get an emergence profile for a period of four weeks. After complete healing, ceramic crowns were placed in the region of lower left first and second molar and proper occlusion was restored and re-established [Table/Fig-13]. The patient was followed-up over a period of 12 months following which excellent functional occlusion was achieved with patient satisfaction [Table/Fig-14].

[Table/Fig-10]: Clinical image showing the exposed bone with implant placement in relation to lower left first and second molar region.

[Table/Fig-11]: Clinical image showing rapid maxillary arch expansion screw with upper Hawley's and fixed arch wire appliance.

[Table/Fig-12]: Postoperative Orthopantomogram (OPG) image showing two implants placed at the lower left extracted molar region with augmented bone.

[Table/Fig-13]: Clinical image showing proper occlusion re-establishment with implant restored ceramic crowns placed in lower left molar region.

[Table/Fig-14]: Clinical photograph of the patient showing occlusion following completion of treatment after 12 months follow-up.

DISCUSSION

Impaction of permanent first molar is often rare with prevalence rate of less than 0.02% and 0.01% for maxillary and mandibular arches in comparison with second molar incidence of 0.03% and 0.21%, respectively [1,2]. The three main causes have been distinguished with regard to eruption disturbances namely ectopic position, obstacles in the eruption path, and failures in the eruption mechanism associated with various systemic and local factors [3]. Among which, local factors such as position of the adjacent teeth, malocclusion, occlusal disturbances of the deciduous dentition, supernumerary teeth, odontomas, or cysts, space insufficiency in the dental arch contributes majority of cases involving multiple impaction either on the same side or in relation to both sides [4]. In the present case, the first molar was found inferior to the inferior alveolar canal in the left angle of the mandible and was grossly displaced, found to be ectopic. Investigations commonly used for the impacted lower third molar includes Intraoral Periapical Radiographs (IOPA), OPG, Cone Beam Computed Tomography (CBCT) [5]. In case of the present study, we opted for OPG investigation as the patient was not willing to take CT or cone beam CT owing to financial and personal concerns. It was evident that exact position of inferior alveolar nerve could not be determined as the radiograph did not reveal more information following which the exact position of inferior alveolar nerve was confirmed only during surgical procedure.

A wide range of treatment options for impacted molars would include surgical removal by intraoral or extra oral approaches, orthodontic correction by up-righting, transplantation, surgical orthodontic approach [6] followed by prosthetic implant replacement with or without bone augmentation depending on the method of preservation and nature of the alveolar bone [7]. Intraoral approach is the most common preferred surgical approach for the lower impacted third molar with advantage of being aesthetically good without any extraoral scar. However, in cases of deeply impacted teeth associated with restricted mouth opening, position of teeth in close proximity to the alveolar nerve, there is an increased risk of causing injury to inferior alveolar nerve and also damaging the adjacent teeth at the time of removal [8]. Extraoral approaches like submandibular (Risdon) or preauricular approaches were often preferred in cases where teeth are located in the ramus, condyle region or in close proximity to the sigmoid notch or even closer to the lower border of the mandible depending on the stage of formation of the impacted molars [9]. Though intraoral sagittal split osteotomy is primarily introduced to avoid an extensive alveolar bone removal however extraoral approach prevents unintentional fracture of the mandible with proper exposure of the surgical site through three dimensional orientation of the impacted molars [10].

After complete removal of the molars, bone augmentation was done to maintain the width and volume of bone to aid in implant placement and restoration. Several bone augmentation methods were described such as incorporation of growth and differentiation factors at the bone site, bone grafting materials, Guide bone regeneration and distraction osteogenesis [11]. Analysis of literature studies [12,13] revealed bone graft materials such as freeze-dried bone graft, demineralised freeze-dried bone graft, hydroxyapatite materials failed to show the exact healing nature and amount of bone fill. In contrast Bio-Oss natural porous bone material showed significant bone fill, efficient healing with no crestal bone loss and eliminated the need for additional surgery to receive autogenous bone material [14]. Thus, in the present case Bio-Oss™ bone graft material was used and stabilised with Bio-Mend absorbable collagen membrane. Implant abutments supporting ceramic crowns was preferred over metal crowns as studies have demonstrated better survival rate, aesthetically pleasing with excellent biological stability and biocompatibility [15].

Orthodontic correction of the supra-erupted molars can be achieved by removable appliances with elastics, temporary anchorage devices using miniplates and mini-implants, elastomeric chains, magnets, modified transpalatal arch systems [16]. Alternative treatments include reduction of the crown height to aid in prosthetic rehabilitation, surgical levelling of maxillary molars, and fixed appliance with bends in fabrication of arch-wire [17]. In the present case, fixed orthodontic appliance was preferred along with rapid axillary expansion screw activated over a period for every two months that aided in minimal molars movement such as tipping and provided maximum skeletal movement [18] that aided in correction of class II malocclusion.

CONCLUSION(S)

The present case scenario represents an inter-disciplinary management approach used to treat an impaction with concomitant malocclusion, which helped in restoring the edentulous site with proper occlusion to re-establish masticatory function and ensured complete satisfaction of the patient to improve the quality of life. Thus selection of treatment plan for multiple impacted molars requires proper decision making which must be handled very carefully as a result of uncertain aetiology, the lack of standard treatment and scarcity of cases reported. It is essential to diagnose and treat eruption disturbances as early as possible, ideally during the early mixed-dentition period because treatment at a later stage is usually more complex and involve extensive invasive procedures. Most importantly, clinicians must inform the patient of the potential risks and possible benefits of treatment alternatives before making the final decision, which should be evaluated on an individual case basis.

REFERENCES

[1] Bondemark L, Tsiopa J. Prevalence of ectopic eruption, impaction, retention and agenesis of the permanent second molar. The Angle Orthodontist. 2007;77(5):773-78.
[2] Bortoluzzi MC, Manfro R. Treatment for ectopic third molar in the subcondylar region planned with cone beam computed tomography: A case report. Journal of Oral and Maxillofacial Surgery. 2010;68(4):870-72.
[3] Alami S, Aghoutan H, Bellamine M, El Quars F. Impacted first and second permanent molars: Overview. Human Teeth-Key Skills and Clinical Illustrations. 2019 Nov 6.
[4] Kurol J. Impacted and ankylosed teeth: Why, when, and how to intervene. Am J Orthod Dentofacial Orthop. 2006;129(4 suppl):S86-90.
[5] Topkara A, Sari Z. Investigation of third molar impaction in Turkish orthodontic patients: Prevalence, depth and angular positions. European Journal of Dentistry. 2013;7(S 01):S094-98.
[6] Shpack N, Finkelstein T, Lai YH, Kuftinec MM, Vardimon A, Shapira Y. Mandibular permanent second molar impaction treatment options and outcome. Open J Dent Oral Med. 2013;1(1):09-14.

[7] Gowd MS, Shankar T, Ranjan R, Singh A. Prosthetic consideration in implant-supported prosthesis: A review of literature. Journal of International Society of Preventive & Community Dentistry. 2017;7(Suppl 1):S01-07.
[8] Pippi R, Sfasciotti GL, Perfetti G. Extra oral extraction: A very rare surgical approach to molars impaction. A case report. Minerva Stomatologica. 2005;54(3):171-77.
[9] Shenoy V, Vishnu P, Kannadasan K, Kengagsubbiah S, Kumar S. Extra oral approach for removal of ectopic impacted lower third molar: A case report. J Clin Diag Res. 2014;8(11):ZD27-28.
[10] Ahmed NM, Speculand B. Removal of ectopic mandibular third molar teeth: Literature review and a report of three cases. Oral Surgery. 2012;5(1):39-44.
[11] Zhao L, Xu T, Hu W, Chung KH. Preservation and augmentation of molar extraction sites affected by severe bone defect due to advanced periodontitis: A prospective clinical trial. Clinical Implant Dentistry and Related Research. 2018;20(3):333-44.
[12] Fairbairn P, Leventis M. Protocol for bone augmentation with simultaneous early implant placement: a retrospective multicenter clinical study. International Journal of Dentistry. 2015;2015:589135. Doi: 10.1155/2015/589135.
[13] Friberg B. Bone augmentation for single molars implants: A review of the literature. Eur J Oral Implantol. 2016;9(Suppl 1):S123-34.
[14] Gokhale ST, Dwarakanath CD. The use of a natural osteoconductive porous bone mineral (Bio-Oss™) in infrabony periodontal defects. Journal of Indian Society of Periodontology. 2012;16(2):247-52.
[15] Atsü SS, Aksan E, Bulut AC. Fracture Resistance of Titanium, Zirconia, and Ceramic-Reinforced Polyetheretherketone Implant Abutments supporting CAD/CAM Monolithic Lithium Disilicate ceramic crowns after aging. International Journal of Oral & Maxillofacial Implants. 2019;34(3):622-30.
[16] Sugii MM, Barreto BD, Francisco W, Simone KR, Bacchi A, Caldas RA. Extruded upper first molar intrusion: Comparison between unilateral and bilateral miniscrew anchorage. Dental Press Journal of Orthodontics. 2018;23(1):63-70.
[17] Taffarel IP, Meira TM, Guimarães LK, Antelo OM, Tanaka OM. Biomechanics for orthodontic intrusion of severely extruded maxillary molars for functional prosthetic rehabilitation. Case Reports in Dentistry. 2019;2019:8246129. Doi: 10.1155/2019/8246129.
[18] Lagravère MO, Carey J, Heo G, Toogood RW, Major PW. Transverse, vertical, and anteroposterior changes from bone-anchored maxillary expansion vs traditional rapid maxillary expansion: A randomized clinical trial. American Journal of Orthodontics and Dentofacial Orthopedics. 2010;137(3):304.e1-12; discussion 304-5

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