



## RESEARCH ARTICLE

### MANAGEMENT OF IMPACTED LOWER 2ND PRE-MOLAR: A CASE REPORT

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#### ABSTRACT

This case report presents treatment of a lingually impacted, mesially tilted 2<sup>nd</sup> Premolar on the right side of the mandibular arch. In this 19 year old boy radiograph is suggestive of impacted 2<sup>nd</sup> premolar underneath retained 1<sup>st</sup> deciduous molar in the fourth quadrant of the mouth. Considering the favourable position and normal anatomy of the tooth it was planned to bring the tooth into normal occlusion orthodontically.

##### Key words:

Impaction, Mandibular 2nd Premolar,  
Orthodontic Traction.

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## INTRODUCTION

The mandibular second premolar is highly variable developmentally. Agenesis, abnormal tooth germ position, and distal inclination of the developing tooth are among the reported developmental anomalies. In addition, the second most frequently impacted tooth was found to be the mandibular second premolar, excluding third molars, in some populations. The prevalence of impacted premolars varies according to age. The main etiological factors for premolar impaction appear to include arch length deficiency, lack of space, ectopic position of tooth germ, obstacles to eruption such as an ankylosed primary molar, and the presence of supernumerary teeth or odontomas. Some systemic and genetic factors involved include cleidocranial dysplasia, osteopetrosis, Down's syndrome, hypothyroidism, and hypopituitarism. Genetic and environmental factors involved in tooth development may be disturbed at any stage of tooth development<sup>2</sup>. Tooth germ of mandibular second premolar is ideally positioned between roots of second deciduous molar. Normally the path of eruption follows resorption of roots of deciduous molar with no major deviations. The mandibular premolars erupt after the mandibular first molar and mandibular canine; thus if the room for eruption of premolars is inadequate, one of the premolars usually the second

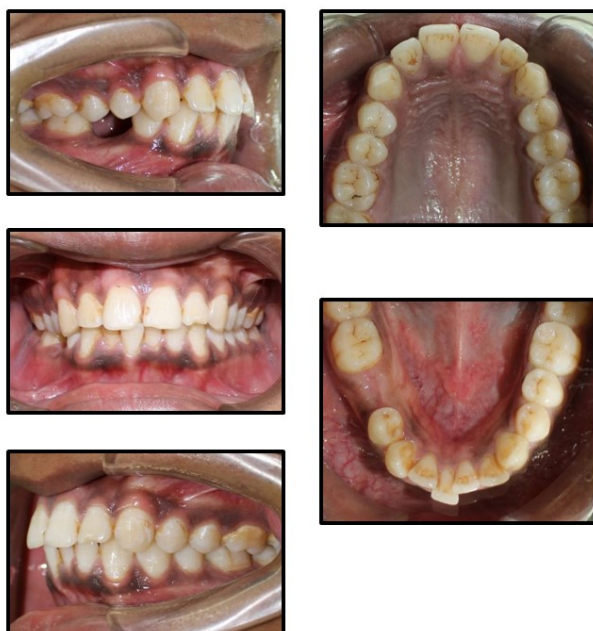
The overall prevalence in adults has been reported to be 0.5% (the range is 0.1% to 0.3% for maxillary premolars and 0.2% to 0.3% for mandibular premolars)<sup>7</sup>. Tooth impaction is frequently observed anomaly of eruption and is often the sole complaint of young patients visiting orthodontists.<sup>1</sup> If a tooth has erupted out of the jaw bone but not through the gumline, It is termed as soft tissue impaction. The impaction of premolar may be caused by loss of space due to early extraction of deciduous second molars, resulting in the mesial drift of permanent molars and the ectopic position of the tooth bud, obstacles to eruption such as an ankylosed primary molar, the presence of supernumerary teeth or odontomas and genetic factors<sup>8</sup>. Various treatment methods have been suggested including observation, intervention, relocation, and extraction depending on the tooth's position, depth of the impacted tooth, relationship with adjacent teeth, and orthodontic treatment. Conservative management with exposure of the crown has been advocated. The majority of reported cases involved distally impacted (distal root, mesial crown) premolars in which the long axis was inclined to favour eruption if exposed. Surgical exposure is unpredictable and best limited to cases with no more than 45° tilting of the long axis from its normal position<sup>6</sup>. Herein, we report a case of impacted Mandibular 2<sup>nd</sup> premolar treated with surgical exposure followed by Orthodontic traction.

## CASE REPORT

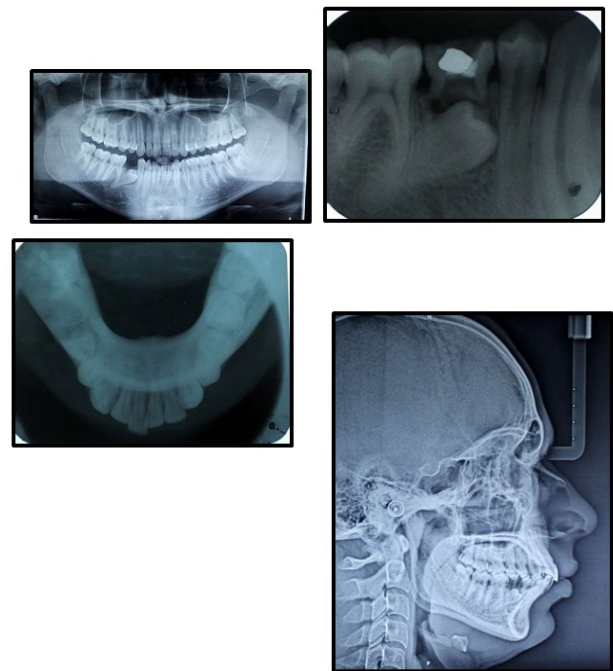
### MEDICAL HISTORY AND DIAGNOSIS

A 19 years old boy reported to the department of Orthodontics with the chief complaint of missing tooth in the right lower back tooth region. His medical and dental history was not significant. He had no history of dental extractions or orthodontic treatment. Patient had Apparently symmetrical, mesoprosopic face with convex profile, symmetric U shaped maxillary and mandibular arches, mandibular anterior crowding and missing 2<sup>nd</sup> Premolar in fourth quadrant and a lingual bulge palpable w.r.t. the same region.

OPG reveals impacted 2<sup>nd</sup> premolar in fourth quadrant. Premolar was tilted mesially at around 45 degrees.



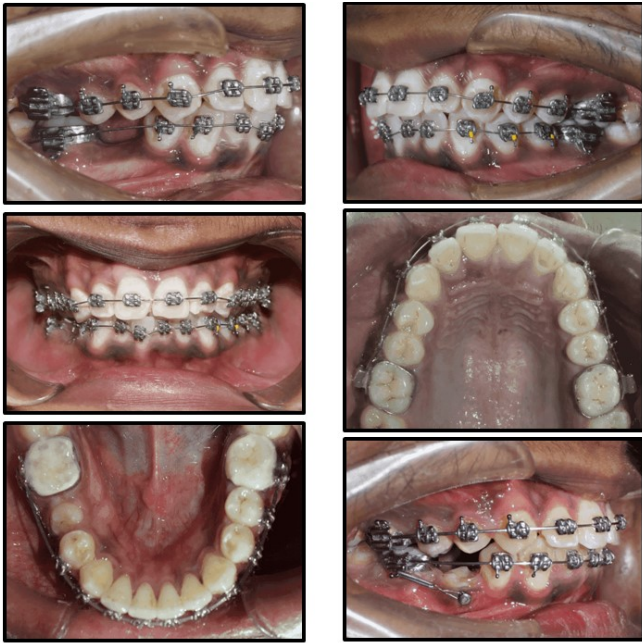
Pretreatment intra-oral Photographs



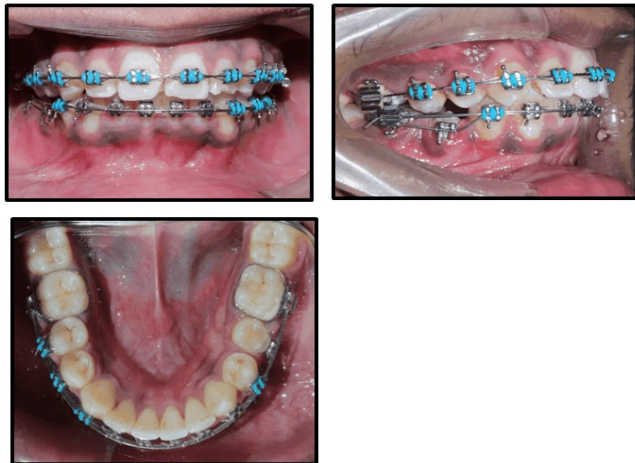
Pre-treatment radiographs

**TREATMENT:** Considering the favourable inclination of the impacted tooth surgical exposure followed by Orthodontic traction was the finalized treatment plan. The treatment progressed by using a straight wire appliance (0.022" slot). A 0.014" NiTi arch wire was placed in upper and lower arches with the objective of Levelling and aligning which was accomplished through sequential change in arch wire from 0.019" × 0.025" heat activated NiTi to 0.019" × 0.025" SS wire. Before performing the surgical exposure, the interocclusal clearance from the opposing dentition should be examined, in order to verify that sufficient vertical space exists between the impacted second premolar tooth, in the mandible and the opposing maxillary premolar tooth. Since the space available in this case was enough to accommodate the impacted premolar, it was surgically exposed and a button was bonded on the buccal surface to aid in traction of the tooth. The surgical procedure, can easily be carried out under local anesthesia.

The surgical method used here is the closed exposure surgery. A muco-gingival incision made and a muco – periosteal flap extending from the first molar to the first premolar area from the buccal side, the flap at the 2nd premolar area, is reflected as to expose the bone surrounding the impacted second premolar. Bone is carefully removed in order to expose the height of the crown of the impacted second premolar tooth. Then the tunneling technique was used and a Titanium button is bonded on the impacted crown, Soft tissue closure is done in an ordinary fashion, using resorbable or unresorbable sutures. In several cases, apically repositioned flaps, has to be incorporated, in order to better expose the uprighted tooth crown. After the surgical exposure a distally directed force was applied to the 2nd premolar tooth by using active tie back to the molar band hook, after a few months of treatment in lower arch, the second premolar was seen clinically in the mouth. A bracket was then bonded to the erupted premolar for final positioning of the tooth. The objectives of eruption of impacted tooth into the occlusion, levelling and alignment of arches and correction of midline deviation were achieved. The appliance was removed 18 months after initiation of the treatment.



Traction of premolar in 4<sup>th</sup> Quadrant



Button was replaced by Premolar Bracket



Intraoral photographs post debonding



Extra-oral photographs post debonding

Table 1. Pre treatment and post treatment cephalometric analysis

Measurements	Norms(mean+SD)	Pre-treatment	Post-treatment
SNA	85.57°±1.66°	84.0°	83.0°
SNB	82.50°±1.89°	80°	83.4°
ANB	3.07°±1.39°	4°	0.4°
Convexityangle(NA-APog)	0°	1°	0.7°
Facialplanto SN(SN-Pog)	82.2°	75.7°	83.2°
SN-maxillaryplane	7.19°±3.17°	6.2°	4.2°
SN-mandibularplane	29.41°±5.57°	31°	35.9°
Wits appraisal	-1mm	-2mm	-1.9mm
MMPA	22.51°±5.16°	27.3°	34.7°
U1-NA	27.24°±6.46°	25°	32.5°
U1-NA	7.39±2.19mm	6mm	9.0 mm
L1-MP	117.67°±8.34°	109°	83°
L1-NB	9.34±2.5mm	10mm	5.4 mm
Upperanteriorfaceheight	45%	43%	44.8mm
Loweranteriorface height	55%	57%	71.6mm
Faceheight ratio	75.1±6.50%	55.7%	60.3%
Inter-incisalangle	117.67°±8.34°	105.7%	128.4°
Upperlip→E-line	-0.9±2.3mm	0.1mm	-3.9mm
Lowerlip→E-line	1.5 ±2.4mm	4.4mm	1.6 mm
Nasolabialangle	90.7°	69°	80°

## DISCUSSION

Impacted permanent mandibular second premolar are detected quite regularly in the clinical and radiographic examination of a young dental patient The treatment options open to a patient with a permanent impacted teeth include:

**Interceptive removal:** Interceptive removal of the deciduous molar to enhance eruption of the premolar is done when the root has not formed completely and space is available for eruption.

**No treatment:** No treatment, except periodic radiographical evaluation for pathological changes, is done when there are limitations to surgically expose or extract.

**Surgical removal:** Surgical removal of the impacted premolar and prosthetic replacement is done when there are limitations for salvaging the tooth.

**Surgical exposure followed by Orthodontic traction:** Surgical exposure of the impacted premolar and orthodontic alignment is done when indicated and deemed feasible.

Kokich describes the surgical and orthodontic management of impacted teeth and identifies the position and angulation of the impacted tooth, length of treatment time, available space and the presence of keratinized gingiva as critical factors that will affect prognosis and treatment outcome. Operational complications, none of which occurred in this case, include injury to adjacent periodontium, injury to adjacent teeth, nerve damage, multiple exposures of the impacted tooth and failure of the orthodontic bond when performing a closed-flap eruption procedure.<sup>9</sup> Literature specific to impacted premolars is not extensive despite the fact that mandibular second premolars alone account for approximately 24% of all dental impactions. In selecting an appropriate treatment option, the underlying etiological factors, space requirements, need for extraction of primary molars, degree of impaction and root formation of the impacted premolar should be considered. Andreasen et al.<sup>10</sup> suggests that surgical exposure should be confined to cases, both maxillary and mandibular with no more than 45° tilting and limited deviation from the normal position. Conservative surgical exposure of the impacted premolar with orthodontic traction and eruption proved to be the most appropriate treatment option for the patient. Factors such as the patient's medical history, dental status, oral hygiene, functional and occlusal relationships and attitude toward and compliance with treatment will influence choice of treatment options.

*The length of orthodontic and surgical treatment and expenses are additional sideline issues to be considered and discussed with the patient, parents or guardians before formulating a treatment plan. The length of orthodontic treatment to guide the impaction into the dental arch and into occlusion, usually takes 1-3 years (depending on patient age, bone density, the amount of root formation and dilaceration, depth and angulation of the impaction, available arch space etc.). Expenses are directly correlated to the aforementioned parameters (the longer it takes to bring the impaction into position the more it will cost). An estimate should be made prior to commencing treatment.*

Data such as age and sex, space for alignment, presence of the primary molar, migration of the first premolar in the site of the impacted tooth, and other aforementioned issues must be assessed and documented. If the tooth is strategic and should it be desired to save it, then a feasibility study must also be done to see whether the impacted premolar can respond to surgical exposure and forced eruption or if it has to be surgically removed.<sup>11</sup>

## Declarations

- Ethics approval and consent to participate: N/A
- Consent for publication: Written informed consent obtained from the patient's guardian for publication of this case report and any accompanying images.
- Availability of data and material: All data generated or analyzed during this study included in this published article and its supplementary information files

## Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient has given his consent for his images and other clinical information to be reported in the journal. The patient understand that his name and initials will not be published and due efforts will be made to conceal his identity.

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