

Case Report

An Unusual Case of Traumatic Unilateral Anterior Dislocation of Temporo-Mandibular Joint in Pediatric Patient: Step by Step Approach to Management

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ABSTRACT:

Aim: To diagnose and effectively manage traumatic anterior dislocation of temporo-mandibular joint (TMJ) in pediatric patient with difficult airway. **Background:** Anterior mandibular dislocation (AMD) is defined as the displacement of the condylar head out of the glenoid fossa beyond the articular eminence, and that does not reduce spontaneously to its normal position.¹ The dislocation can be classified into acute (most common), chronic, habitual, recurrent, and long-standing. Though there are no specific guidelines to differentiate between chronic and acute dislocation literature suggests untreated or inadequately treated dislocation for more than 72 hours can be considered chronic.² Mean age of occurrence is around 44.4 years.³ **Case Description:** This case report outlines the unilateral anterior TMJ dislocation in paediatric patient which is only once reported previously in literature.⁶ The case presented with history of trauma due to fall from bed while sleeping 2 weeks back making it a difficult chronic case which was not reducible under local anaesthesia. Sedation was attempted which resulted in two hypoxic episodes. Hence despite of difficult airway patient was intubated for modified manual reduction. **Conclusion:** The chronic paediatric cases of TMJ dislocation are to be treated safely with close co-ordination between skilled anaesthetist and surgeon under general anaesthesia. **Clinical Significance:** While attempting reduction of paediatric unilateral dislocation, opposite condyle dislocates laterally and then both the condyles can be relocated into the respective fossae. The looks might be deceiving as more force is required due to decreased mechanical advantage of short mandibular body.

Keywords: Unilateral, Post-trauma, Pediatric, Anterior TMJ dislocation.

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CASE REPORT

Background: Anterior mandibular dislocation (AMD) is defined as the displacement of the condylar head out of the glenoid fossa beyond the articular eminence, and that does not reduce spontaneously to its normal position.¹ The dislocation can be classified into acute (most common), chronic, habitual, recurrent, and long-standing.² Though there are no specific guidelines to differentiate between chronic and acute dislocation literature suggests untreated or

inadequately treated dislocation for more than 72 hours as chronic.² Mean age of occurrence is around 44.4 years.³ As per systematic reviews 0.94% cases were unilateral.⁴ Paediatric cases are extremely rare.⁵

Case Description: A 4 year old female patient reported to out-patient department of Oral and Maxillofacial surgery, with history of fall from bed and chief complaint of pain in left preauricular region since 5 days (Figure 1).

Figure 1: Pre-operative picture



The pain was continuous and aggravated upon opening mouth (Figure 2).

Figure 2: Pre-operative mouth opening



There was deranged occlusion with deviation of jaw and crossbite on right side (Figure 3).

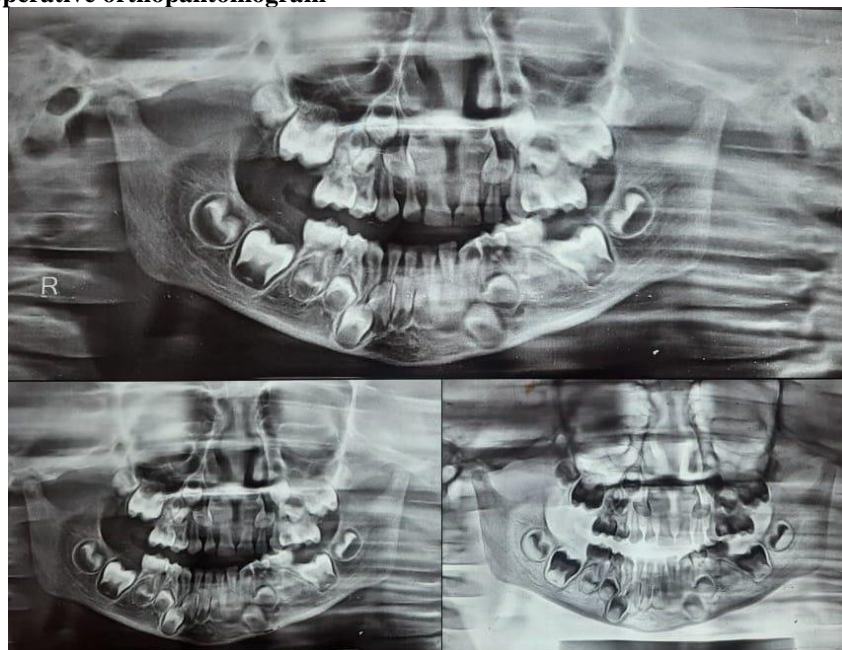
Figure 3: Pre-operative Occlusion



Systemic examination was non-contributory.

Extra-orally there was deviation of jaw towards right side. On palpation left condylar movements were not palpable. Orthopantomogram(OPG) revealed dislocation of left condyle of mandible anterior to articular eminence (Figure 4).

Figure 4: Pre-operative orthopantomogram

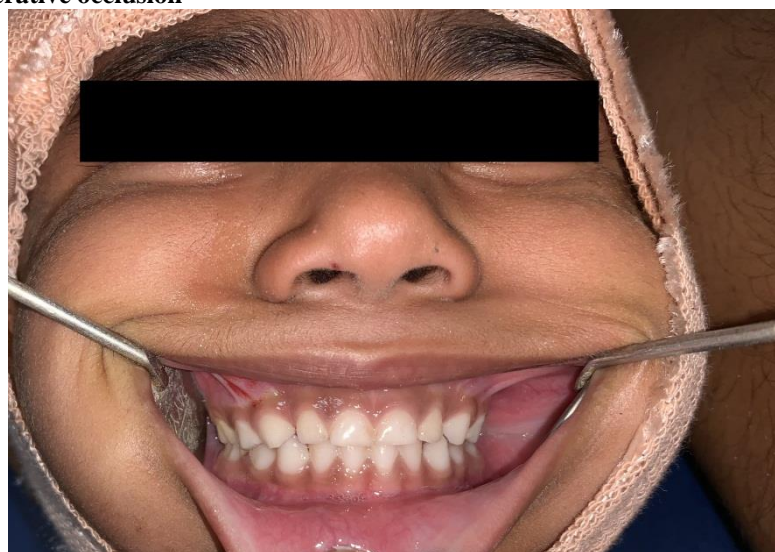


Objective was to relocate the anatomical position of condyle in to fossa

With normal CBC, RBS, Chest X-ray and negative viral markers patient was planned for manual reduction under Paediatric Procedural Sedation (PPS) as condyle was not reducible under local anaesthesia. Paediatric Procedural Sedation(PPS) with Injection glycopyrrolate 0.2mg IV followed by midazolam 1mg IV and fentanyl 40mcg IV was given, manual reduction was attempted but patient was landing into hypoxia due to apnoea. Hence 4ml propofol was administered after pre-oxygenation. Airway control was gained by fiberoptic endoscopic nasal intubation with 4.5 number flexometallic endotracheal tube.

Anaesthesia maintenance was done with oxygen and Isoflurane 1.5% at combined flow of 4 Litre/minute. With vitals stable mouth prop or jaw opener (Heister) was applied in between left side teeth to distract the left condyle inferiorly past articular eminence. Simultaneously first inferior and then posterior superior force was applied on the left side mandible to relocate the condyle into the fossa.. After dislocation of affected condyle past glenoid fossa assistant surgeon pushed the opposite condyle into the fossa which was displaced laterally. Barton Bandage was placed to maintain the anatomical position of condyle and occlusion was confirmed (Figure 5).

Figure 5: Post-operative occlusion



After reversal patient was extubated with all vitals within normal limits. Post-procedure OPG was advised to confirm normal position of both condyles into their respective fossae (Figure 6).

Figure 6: Post-operative orthopantomogram



Patient was kept on soft liquid diet for 7 days and was instructed to restrict wide opening of jaw. Patient was recalled after 14 days to check the functional movements and position of condyle.

DISCUSSION

Aetiology of dislocation of temporomandibular joint accounts to trauma, forceful mouth opening during yawning, laughing, vomiting⁷ and from endotracheal intubation⁸, endoscopy, ENT/ dental procedures. It can be prevalent in Marfan's syndrome⁹ and Ehlers' Danlos syndrome¹⁰. In this case it was traumatic aetiology.

It is classified as partial(sub-luxation) or complete (luxation), Acute or chronic, bilateral or unilateral, Dislocation of the temporomandibular joint is the dislodgement of the head of the mandibular condyle from its normal position in the glenoid fossa located in the squamous-temporal portion of the cranial base. In this case it was chronic, complete, unilateral TMJ dislocation.

The pathogenesis of TMJ dislocation is multifactorial, attributed to capsular weakness, ligamentous laxity, atypical eminence size (morphology or projection), myo-spasm, trauma, or aberrancy in masticatory movement¹¹. The common reason for dislocation of TMJ in paediatric patients is under-formed eminence and flat glenoid fossa, but in this case fossa and eminence was well defined, hence heavy forces were needed to push condyle past eminence.

CLASSIFICATION OF TMJ DISLOCATION

Classification based on the clinic-radiological aspect by Akinbami¹²

- Type I - the head of the condyle is directly below the tip of the eminence
- Type II - the head of the condyle is in front of the tip of the eminence
- Type III - the head of the condyle is high-up in front of the base of the eminence.

Conservative Management options for mandibular condylar dislocation in Paediatric patients.

- **Bimanual or Hippocratic Method under Local anaesthesia:** Most commonly used traditional technique. After administration of local anaesthesia by auriculo-temporal nerve block assistant stabilises patient's head, gloved thumbs are placed on patients mandibular molars or along the external oblique ridge and thumbs are wrapped in gauze for protection. The surgeon's fingers are placed extra orally to lift mandibular body and chin. The initial inferior, then posterior, superior force pushes condyle past articular eminence¹³.
- **Wrist Pivot Method:** Its similar alternative method in which thumbs are placed on chin tilted towards midline and index and middle fingers are placed on mandibular molars¹⁴.
- **Recumbent (or Supine) Technique:** It's the variant of the bimanual technique with difference in the position of the patient which is supine and head is stabilised at the surgeon's abdomen.
- **Gag Reflex Method by Awang:** An instrument is touched on soft palate to induce gag reflex which triggers sudden activation of depressor and protrude muscles, which may flex and relocate the mandibular condyle into the temporal fossa.¹⁵ Major advantage is that it avoids injury to surgeon's fingers but is discouraged as there is an increased risk of vomiting and aspiration when stimulating the gag reflex.
- **Syringe Method:** 5-10ml Syringe is rolled backward and forward till condyle is reduced. Procedural sedation or anaesthesia is not a required in this technique.¹⁶
- **External Approach:** The provider fingers of one hand are placed on ascending ramus, grasping the

mandibular angle. Thumb placement is on the malar eminence of the maxilla or zygomatic bone. The opposite side is positioned using the thumb above the displaced coronoid process, applying posterior pressure. The fingers of the same hand pull traction on the mastoid process of the temporal bone. The simultaneous action of both hands is performed to reduce the mandible¹⁷.

- **Botulinum Toxin A Injection:** 25-50 units of Botulinum Toxin A can be given intra muscularly in to lateral pterygoid muscle¹⁸. The mechanism of action blocks the release of acetylcholine of the neuromuscular junction by blocking the calcium-mediated release. The result of blocking the release of acetylcholine is a temporary weakening of the muscle. The use of the toxin has been reported to be a reasonable, safe treatment option for use in the paediatric population with recurrent TMJ dislocation¹⁹.
- **Manual reduction under Paediatric procedural sedation(PPS):** PPS is not exclusively practiced by anaesthetists but can be performed under controlled environment by other specialists.

According to Ramsey scale there are 4 levels of sedation based on points²⁰.

2-3: Anxiolysis.

4-5: Moderate sedation.

6 :Deep sedation.

7-8: General anaesthesia.

As paediatric patients show thin line of demarcation between level 6 and 7, they have tendency to unintentionally fall into deeper level of sedation, hence it is mandatorily done under close monitoring. It is difficult to pull off a successful reduction of mandibular condyle under moderate and deep sedation as there is incomplete relaxation of muscles of mastication. During light sedation with midazolam or combination of midazolam and propofol the grip strength decreases while bite force increases²¹. Which further hampers reduction, this is where muscle relaxants play a critical role in relaxing the muscles of mastication for atraumatic reduction.

- **Manual reduction under general anaesthesia:** Fentanyl with bolus dose of 2 to 3 mcg/kg followed by a 1 to 3 mcg/kg/hour continuous infusion is most commonly used in paediatric TIVA(Total Intra-Venous Anaesthesia)²². Only propofol generally suffices for manual reduction of mandibular condyle but combination of propofol with I.V. Midazolam (150 mcg/kg) maybe administered for synergistic effect.

3-5mg/kg induction dose of propofol is required which is double the adult dose as paediatric patients have larger central compartment size and volume of distribution, but for maintenance similar doses as adults i.e. 1.5-2mg/kg/hour are needed²².

CLINICAL SIGNIFICANCE

Management of TMJ dislocation in paediatric patients is altogether more difficult once glenoid fossa and

articular eminence are formed. While attempting reduction of paediatric unilateral dislocation, opposite condyle dislocates laterally and then both the condyles can be relocated into the respective fossae. The looks might be deceiving as more force is required due to decreased mechanical advantage of shorter length of mandibular body. The idea should be to increase the applied force just when surgeon feels urge to give up. That is the point after which there is actual movement of condyle past articular eminence. Multiple attempts without complete relaxation should be avoided as it causes hemarthrosis, scarring and fibrosis and ultimately reduces the chances of successful reduction at later stage, hence anaesthesiologist plays vital role in chronic TMJ dislocation in paediatric patients.

DECLARATIONS

FINANCIAL DISCLOSURE

No financial disclosures.

CONSENT

Written informed consent taken.

CONFLICT OF INTEREST

Authors declares no conflict of interest.

AUTHOR CONTRIBUTIONS

Dr. Neeraj Kumar Dhiman, Dr. Chandresh Jaiswara, Dr. Atul Kumar Singh, Dr. Arjun Mahajan, Dr. Sweta R., Dr. Sudeep Kumar contributed to manuscript and design. The first draft of manuscript was written by Arjun Mahajan and all authors commented on manuscript. All authors read and approved the final manuscript.

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