

Multimodal Management of Mandibular Parasymphysis Fracture in a Growing Child: A Case Report with 6-month Follow-up

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ABSTRACT

Mandibular fractures in paediatric patients are relatively uncommon due to key anatomical and developmental differences from adults, such as greater bone elasticity, the presence of developing tooth buds, and a smaller facial skeleton. Among these, parasymphysis fractures are particularly rare in young children and present distinct diagnostic and management challenges. Paediatric mandibular fractures necessitate customised treatment approaches to avoid disrupting facial growth and dental development. In this report, the authors present a five-year-old male child with a mandibular parasymphysis fracture managed using a multimodal approach involving cap splint stabilisation combined with selective fixation. Over a 6-month follow-up period, the patient achieved satisfactory healing, restoration of occlusion and function, and no apparent disruption to underlying tooth development or mandibular growth. This case underscores the critical importance of individualised planning in paediatric facial trauma, balancing conservative methods with surgical support when indicated. The findings suggest that a hybrid strategy can yield favourable outcomes while minimising long-term risks in young patients.

Keywords: Conservative methods, Developing tooth buds, Mandible fractures, Maxillofacial trauma, Paediatric facial trauma

CASE REPORT

A five-year-old male child was brought to the Department of Paediatric and Preventive Dentistry with a history of a fall from a motorcycle while riding on a highway. The patient was brought to the department within two hours of the accident. The parents reported immediate pain, swelling, bleeding in the oral cavity, difficulty in closing the mouth, and apparent misalignment of teeth. There was no loss of consciousness, vomiting, or neurological symptoms. Medical history was non-contributory. No known allergies. On extraoral examination, there was marked swelling and tenderness over the right and left-sides of the midface and lower jaw [Table/Fig-1,2]. Intraoral examination revealed a laceration in the palate,



[Table/Fig-1]: Preoperative frontal view showing facial asymmetry due to swelling over right and left-side of midface.



[Table/Fig-2]: Preoperative lateral view showing marked swelling over left-side of midface and lower jaw.

mobility of palatal segments, a visible midline diastasis in the palatal vault, and altered occlusion with difficulty in bringing the upper and lower arches into normal contact. In the mandibular region, the parasymphysis on the left-side was tender, with slight mobility. Teeth involved in that region were deciduous, with no evident root exposure or pulpal injury.

Radiographic assessment was advised. Imaging included panoramic radiographs and occlusal/maxillary palate views, which were appropriate for this particular case. The radiographic assessment

revealed multiple fractures in Orthopantomogram (OPG) [Table/Fig-3], maxillary mid-palatal fracture in the maxilla with separation of palatal shelves in the midline [Table/Fig-4]. Parasymphysis fracture of the left mandible [Table/Fig-5] in the paediatric (deciduous/mixed) region,



[Table/Fig-3]: Orthopantomogram showing the regions of multiple fractures.



[Table/Fig-4]: Occipitomental view showing mid palatal fracture on the maxilla (red arrow).



[Table/Fig-5]: Occlusal view showing parasymphysis fracture in the mandible (red arrow).

other facial bone fractures were detected, and no intracranial injury on screening. Vital signs and general systemic examination were stable. Based on clinical evaluation and radiographic correlation, a diagnosis of combined maxillary mid-palatal fracture and left mandibular parasymphysis fracture was established in a five-year-old child.

A multidisciplinary treatment plan was formulated in coordination with specialists from the Department of Oral and Maxillofacial Surgery. After informed consent from parents, surgical management was planned under general anaesthesia. The procedure included:

1. Open reduction of both fractures: Palatal shelves were repositioned; mandibular parasymphysis was reduced.
2. Acrylic plate was fabricated for Intermaxillary Fixation (IMF) [Table/Fig-6].
3. Lower arch stabilisation: A cap splint was fabricated and placed to support and protect the mandibular parasymphysis region, preventing displacement [Table/Fig-7].
4. Upper arch stabilisation: Palatal plate was fabricated for stabilisation of mid palatal fracture of maxilla [Table/Fig-8].



[Table/Fig-6]: Plate for Intermaxillary Fixation (IMF).



[Table/Fig-7]: Fabricated open cap splint.

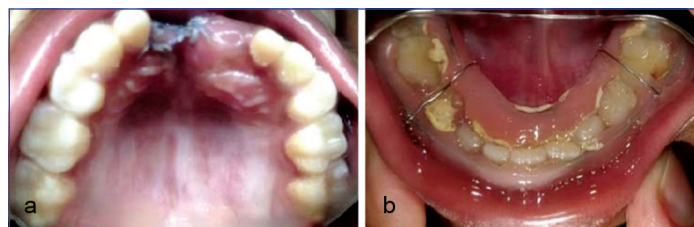


[Table/Fig-8]: Fabricated palatal plate.

5. Occlusal stabilisation: Intermaxillary Fixation (IMF) was applied to maintain occlusion and stabilise the repositioned bones during healing.

Following the surgical intervention, the patient was admitted for inpatient monitoring to ensure stability and to facilitate recovery. Postoperative care included pain management with age-appropriate analgesics to maintain patient comfort. Paracetamol was administered at a dose of 10-15 mg/kg per dose every 6-8 hours. Antibiotic therapy was initiated to prevent postoperative infections, Prophylactic antibiotic therapy with amoxicillin-clavulanic acid (20-45 mg/kg/day in two divided doses for 5-7 days) was administered to prevent infection. Oral hygiene measures were reinforced, including gentle rinsing with antiseptic mouthwash and supervised cleaning to maintain hygiene around the splint and surgical sites, especially given the patient's age and limited cooperation. Dietary modifications were advised, with the patient placed on a soft-to-liquid diet to reduce masticatory strain on the healing fractures and support adequate nutrition during recovery. The cap splint and IMF were maintained throughout the initial healing phase to provide stability and ensure proper alignment of the maxillary and mandibular arches. Patient was discharged once immediate postoperative evaluation confirmed stable fixation and acceptable oral intake.

Follow-up protocol: The patient was reviewed weekly during the first postoperative month to assess soft-tissue healing, stability of fixation, maintenance of oral hygiene, and the presence of any early postoperative complications, including infection, loosening of hardware, plate exposure, or malunion. Following the initial month, follow-up visits were scheduled monthly to monitor continued healing, evaluate occlusal development, and assess the overall well-being of the patient. At each follow-up visit, clinical assessments were supplemented with photographic documentation to monitor the progression of healing and facial symmetry. The follow-up period also focused on identifying any potential disturbances in dental development, craniofacial growth as they are considerations in the long-term management. [Table/Fig-9a,b,10a-c,11a-c] at 15 days, three and six months, respectively.



[Table/Fig-9]: Maxillary and mandibular occlusal view at 15 days Follow-up a) Maxillary view; b) Mandibular view.



[Table/Fig-10]: Clinical images at three months follow-up a) Frontal view showing fixed cap splint during healing process; b) Maxillary view; c) Mandibular view.



[Table/Fig-11]: Clinical images at six month follow-up a) Frontal view showing completely healed mandibular jaws; b) Maxillary view; c) Mandibular view.

The limitation of this case report is the unavailability of follow-up radiographs, as they were inadvertently misplaced by the patient's attendant. However, comprehensive clinical evaluation and photographic documentation were conducted during follow-up, which provided clear evidence of functional recovery, occlusal stability, and soft-tissue healing. Appropriate consent has been obtained from the patient's parents for the images presented in this article. Despite the absence of radiographic imaging, the clinical outcomes observed were consistent with successful fracture management, and no signs of complications or growth disturbances were noted.

DISCUSSION

Mandibular fractures in children are relatively uncommon but clinically significant, owing to the complex interplay between skeletal development and dental maturation [1]. The unique anatomical features of the paediatric mandible, such as greater bone elasticity, ongoing growth, and the presence of developing tooth buds, necessitate a distinctly cautious and tailored approach to management [2,3]. Parasymphysis fractures, though rare in this age group, are particularly challenging due to the proximity to developing permanent incisors and the functional importance of the anterior mandible.

This case is notable for its successful use of a dual-modality treatment approach, combining a cap splint with selective internal fixation, in a five-year-old child. While cap splints are traditionally favoured for their minimally invasive nature and their ability to stabilise fractures without disrupting underlying structures [4]. Conversely, Open Reduction and Internal Fixation (ORIF), though effective in achieving rigid stability, carries the risk of injuring developing tooth buds or growth centres if not meticulously planned [5].

By combining both techniques, this case achieved an ideal balance of conservative stabilisation through the cap splint to support occlusion and targeted internal fixation for anatomical realignment at the fracture site. This hybrid strategy allowed for early functional recovery while minimising surgical trauma, a key concern in young children [6,7]. Importantly, no disturbance to dental development or mandibular growth was noted during the 6-month follow-up, and clinical healing was uneventful.

Compared to similar cases in the literature, where either conservative or surgical management alone was used, this dual approach appears to provide a clinically stable and developmentally safe alternative, especially in complex cases where displacement is present but not severe enough to mandate full surgical exposure. [Table/Fig-12] presents a literature review of similar fracture cases with management approach and outcome [8-12].

Author	Year	Similar fracture types	Management approach	Outcome
Khairwa A et al., [8]	2015	Paediatric mandibular symphysis and parasymphysis fracture- Six patients (four boys and two girls, mean age 3 years, range between 2 and 5 years)	MacLennan splint (acrylic cap splint) was planned	The splint exhibited enough stability and stiffness to allow for the mandible's initial bone repair
Nezam S et al., [9]	2018	Mandibular right parasymphysis fracture in six-year-old boy	An acrylic splint with circummandibular wiring	On the fourth postoperative week, no mobility was present at the fracture site. Postoperative recovery was uneventful and the occlusion achieved was satisfactory
Garg I et al., [10]	2020	Paediatric mandibular parasymphysis fracture in six-year-old boy	Conservative treatment using an open cap splint; no internal fixation, closed management	The clinical outcome in the present case shows that an open cap splint is a safe and effective treatment option for paediatric mandibular parasymphysis fractures in terms of occlusion-guided fracture reduction, ease of oral hygiene maintenance, and comfort for young patients
Singh D et al., [11]	2022	Mandibular parasymphysis fracture in a three-year-old boy	Arch bar for the reduction of mandibular fracture fragment	Arch bar fixation showed proper healing of the fracture bone with no obvious soft-tissue/gingival injuries
Akulwar S et al., [12]	2024	Mandibular parasymphysis fracture in a five-year-old girl	Parasymphysis fracture was managed by closed reduction and short-term immobilisation with an arch bar	In the second postoperative week, no mobility was present at the fracture site, and occlusion was satisfactory. At one month follow-up, clinical examination revealed satisfactory occlusion. Radiographic presentation on one month follow-up revealed complete healing of the fracture site
Present case report	2025	Mandibular parasymphysis and mid palatal fracture of maxilla in a five-year-old male	Mid palatal fracture was stabilised using palatal plate. Mandibular parasymphysis fracture was stabilised using open cap splint Intermaxillary Fixation (IMF) was applied to maintain occlusion and stabilise the repositioned bones	Early functional recovery was noted. Importantly, no disturbance to dental development or mandibular growth was noted during the 6-month follow-up, and clinical healing was uneventful

[Table/Fig-12]: Literature review of similar fracture cases with management approach and outcome [8-12].

CONCLUSION(S)

The present case highlights that a dual approach using cap splints and selective fixation can be effective and safe in managing paediatric mandibular parasymphysis fractures. When carefully selected, such patients can benefit from improved stability and functional recovery with minimal risk.

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