CASE REPORT

Conservative Management of Dislocated Pediatric Unilateral Condylar Fracture Using Orthodontic Treatment and Guiding Elastics

Nancy Goel[1], Shruti Jha[2], Ruchi Singhal[3], Nisha Gupta[4], Ritu Namdev[5], Charu Dayma[6]

Abstract

Introduction: Mandibular fractures in children, when compared to adults, are quite less common. Treatment approaches for mandibular fracture differ in children due to their growth and developing dentition. Minimal manipulation of bony architecture is done to achieve a stable position.

Case description: An 8-year-old girl with right-side condylar fracture with dislocation reported to the emergency trauma unit, Post Graduate Institute of Dental Sciences, Rohtak.

Result: The case was well managed by a conservative approach whereby orthodontic treatment along with guiding elastics was used in the reduction of unilateral condylar fractures.

Keywords: Case report, Child Dentistry, Condyle fracture, Occlusion, Pediatric condyle fracture, Pediatric mandible fracture, Pediatrics patient.

International Journal of Clinical Pediatric Dentistry (2024): 10.5005/jp-journals-10005-2753

Introduction

Trauma to the maxillofacial region in children has an impact on their growth and development, function, and esthetic appeal. Overall, there are substantially fewer pediatric facial fractures than there are in the adult population. In >50% of instances, the mandible is one of the most frequently involved in juvenile face fractures. Condyle is the mandible's most frequently affected location, followed by angle, symphysis, and body.[1] In the craniofacial region, the mandibular condyle is a crucial secondary growth site, adjusting to various functional requirements while preserving the joint's typical integrity during growth. The fractures of condyle represent 20–35% of all mandibular fractures. The lower prevalence of mandibular fractures in children can be explained by the smaller proportion compared with the cranial volume, the presence of tooth germs, and cartilaginous growth sites, which contribute to the resilience and stability of the jaw in children under the age of 2 years. As the mandible grows and develops between the ages of 7–8 years, it bears structural resemblance to the adult one making extracapsular fractures more often that involve neck or condyle. The frequency of condylar fractures under the age of 6 years is higher than in adults.[2]

There exists a controversy in the management of pediatric mandibular condylar fractures. There are two approaches—(1) open reduction and internal fixation (ORIF) and (2) conservative therapeutic regime.

Open reduction may cause growth disturbances. Pediatric mandibular condylar fractures have a greater ability to remodel than adult fractures; a conservative approach is often recommended.[3,4]

Here, we present a conservative approach whereby orthodontic treatment, along with guiding elastics, was used as an adjunct in the reduction of unilateral condylar fracture.

Case Description

An 8-year-old girl reported to the emergency trauma unit, Post Graduate Institute of Dental Sciences, Rohtak, with complaints of facial pain, inability to eat and sleep, and restricted mouth opening. The patient gave a history of falls from a swing 1 day back. Orthopantomogram (OPG) revealed right side condylar fracture. The patient was advised physiotherapy exercises initially along with semiliquid diet consumption for 1 month and kept on follow-up. The patient reported to the Department of Pedodontics after 3 months of initial trauma with a complaint of facial asymmetry. On examination, deviation of the mandible to the right-side during mouth opening was observed (Fig. 1A). Facial asymmetry with fullness on the right side was appreciable extraorally, and on palpation of temporomandibular joints (TMJ), no movement on the right side was observed.

Intraoral examination revealed mixed dentition with posterior cross-bite on the right side and anterior open bite (Fig. 1B). Mouth opening was 28 mm, and mandibular deviation of 4 mm to the right-side during mouth opening was noted. OPG revealed a nonunion right-side condylar fracture with dislocation (Fig 1C).

[1,3,5,6]Department of Pedodontics and Preventive Dentistry, Post Graduate Institute of Dental Sciences, Rohtak, Haryana, India

[2]Department of Pedodontics and Preventive Dentistry, Subharti Dental College, SVSU, Meerut, Uttar Pradesh, India

[4]Department of Pedodontics and Preventive Dentistry, Bangalore Institute of Dental Sciences and Hospital, Bengaluru, Karnataka, India

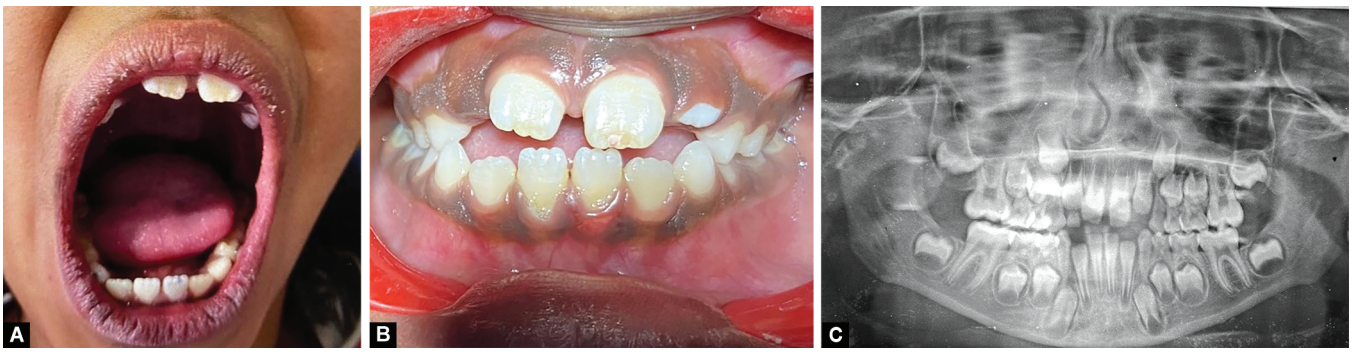
Corresponding Author: Nancy Goel, Department of Pedodontics and Preventive Dentistry, Post Graduate Institute of Dental Sciences, Rohtak, Haryana, India, Phone: +91 9711440423, e-mail: nancygoel03@gmail.com

How to cite this article: Goel N, Jha S, Singhal R, *et al.* Conservative Management of Dislocated Pediatric Unilateral Condylar Fracture Using Orthodontic Treatment and Guiding Elastics. Int J Clin Pediatr Dent 2024;17(2):184–186.

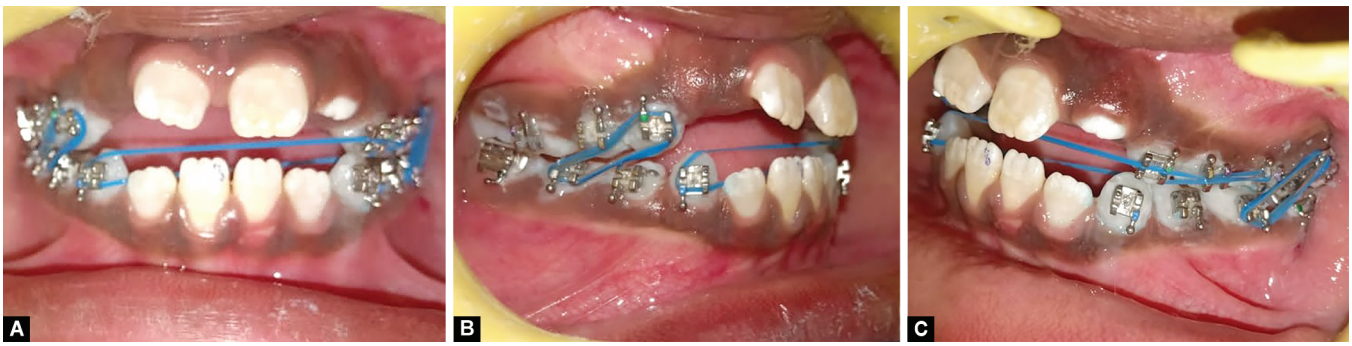
Source of support: Nil

Conflict of interest: None

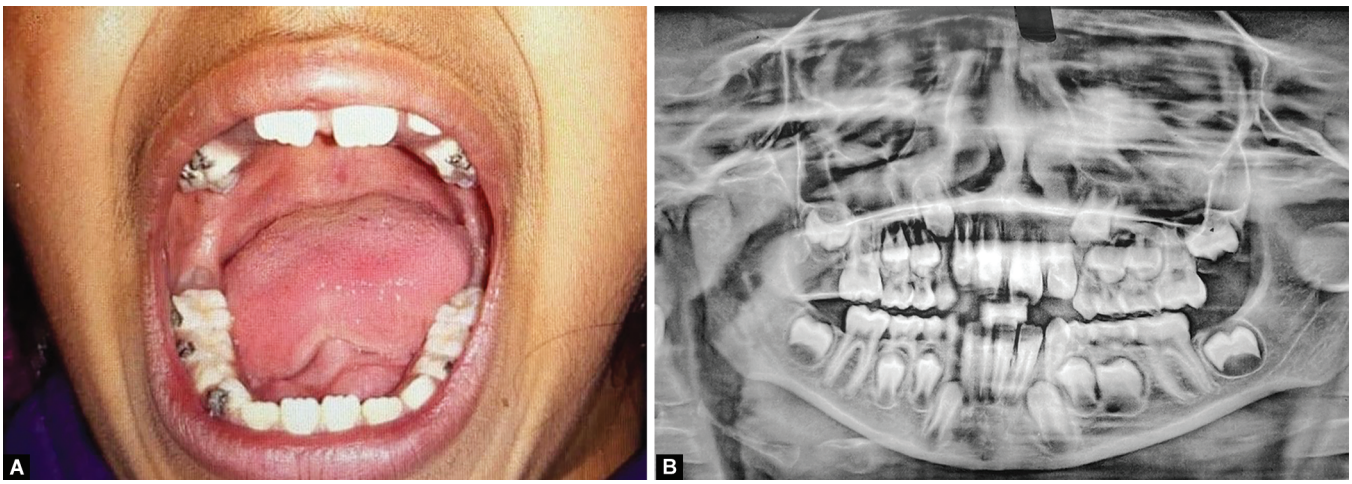
Patient consent statement: The author(s) have obtained written informed consent from the patient's parents/legal guardians for publication of the case report details and related images.



Figs 1A to C: (A) Extraoral view showing deviation of mandible toward the right side; (B) Intraoral view without any deviation of the mandible; (C) Radiographic view showing condylar fracture on the right side



Figs 2A to C: Intraoral view after placement of orthodontic brackets and guiding elastics



Figs 3A and B: Extraoral view showing no deviation of the mandible during mouth opening; (B) Postoperative radiographic view

The treatment strategy includes a combination of the orthodontic approach with interarch elastic guidance to stimulate mandibular condylar growth. Bonding of brackets on all primary canines and primary first and second molar and first permanent molar was done, and interarch elastics of 3.5 oz were placed, and the patient was advised to change the elastic daily for 45 days (Figs 2A to C). On follow-up, the patient was cooperative and bonding was checked. After 45 days, guiding elastics were removed, and the patient was observed for any relapse for 10 days. After 10 days of follow-up, no relapse was seen, and during maximal mouth opening, no clicking sounds or lateral deviation of the mandible towards the right side was observed (Figs 3A and B). Debonding was done, and the patient was kept on 3 months of follow-up till the entire growth period of the patient was covered. A total of 2 years has passed since the trauma, and the patient is asymptomatic and leading a normal life.

Discussion

Condylar fractures, both intra- and extracapsular, are considered mechanisms to prevent brain damage through cranial penetration of the condyle.[2] A study reported that condylar base fractures are

Table 1: Treatment of condylar injuries

Conservative	Soft diet (nonchewing) analgesics
Orthodontic approach, along with guiding elastics	
Intermaxillary fixation	Wire elastics
Myofunctional appliance therapy	
Surgery	TMJ arthrocentesis arthroscopy; open reduction ± internal fixation

the most common group of fractures (59.7%), followed by condylar head fractures (28.8%).[5]

The treatment approach is depicted in Table 1.[6]

In the present case closed reduction was chosen as a treatment method to allow initial fibrous union of the fracture segments followed by remodeling with normal functional stimulus.

The principles of the treatment of mandible fractures in children can differ from the treatment in adults since the closed reduction using rigid fixation with plates and screws can lead to risks for skeletal growth and for teeth that have not yet erupted.[7,8] The main goals of conservative therapy are the restoration of mandibular movements, allowing bone remodeling, and restoring intraarticular functional structures concerning the injured condyle. Complete remodeling is frequent in children due to the high potential of osteoblast and osteoclast rearrangement; if occlusion is restored and normal functions continue, the articular surfaces will regenerate and remodel while the lower jaw position is maintained. The best regeneration can be seen in an active growth stage, under the age of 12. In children, the treatment of choice in the case of mandibular fractures is the maxilla mandibular fixation, while for condylar fractures, good results are generally obtained after just the functional orthodontic treatment that we used.

The use of an arch bar and intermaxillary fixation is also a treatment option for such fractures. Using rigid intermaxillary fixation has some disadvantages, including limitations in asthmatic patients and seizure patients.[9] Disadvantages of arch bar intermaxillary fixation include risk of infection with blood-borne pathogens at the site of trauma, prolonged treatment, and poor oral hygiene. A more acceptable, comforting and less threatening approach accepted by pediatric patients is the orthodontic approach that we have used. The use of elastics for fixation did not lead to complete intermaxillary fixation and offered some functional activity, and at least once a day, the patients could remove the elastics.

Sequelae such as TMJ ankylosis, persistent pain, deformities, malocclusion, facial asymmetry, and infections may occur.[6] Patients younger than 10 years of age have a greater predisposition to the development of ankylosis after trauma. The risk of ankylosis is more seen in bilateral condyle and mandibular symphysis fractures due to immobility. Ankylosis was not anticipated in this patient; still, the patient was kept on regular recalls.

Open reduction and internal fixation (ORIF) should be avoided if:

- The two fragments are separated but not widely dislocated.
- The fracture line doesn't include the intracapsular area. This finding is important as it ensures the absence of blood in the articular area, which eliminates the risk of fibrous formulation in the TMJ.
- The occlusion and vertical dimensions are maintained.
- The patient is of young age at the time of injury.[10,11]

The fracture site, the degree of dislocation, and the severity of the injury are more likely to condition the remodeling process.[12] Guiding elastics are more tolerable for children.[5,13] An incomplete remodeling is frequent (56%), particularly in case of displaced fractures (80%), the main sign being a flattened or irregular surface of the condylar head with neck deformity. The correct function of the masticatory system is certainly the most important variable in the remodeling of the TMJ. Although the traumatized TMJ can be completely functional and asymptomatic after just a short period of time, in order to prevent ankylosis, clinical and radiological follow-ups must cover the entire growth period during mixed dentition until the permanent occlusion becomes stable.

References

1. Pandey R, Khatri A, Gupta R, et al. Use of orthodontic brackets for intermaxillary fixation 12 for management of mandibular fracture in a pediatric patient. J Dent Allied Sci 2017;6(1):35. DOI: 10.4103/2277-4696.205445
2. Leandro AV, Leonardo AV, Leandro MT, et al. Conservative treatment in condylar fracture in pediatric patients: case study. Acta Sci Dent Sci 2017;14–20.
3. Cucurullo R, Giannuzzi I, Clivio A, et al. Management of unilateral condylar fracture in a 9.6-year-old female. Eur J Paediatr Dent 2009;10(2):95–101.
4. Xu Y, Gong SG, Zhu F, et al. Conservative orthodontic fixed appliance management of pediatric mandibular bilateral condylar fracture. Am J Orthod Dentofacial Orthop 2016;150(1):181–187. DOI: 10.1016/j.ajodo.2016.02.012
5. Mahgoub MA, El-Sabbagh AH, Abd El-Latif EA, et al. Condylar fractures: review of 40 cases. Ann Maxillofac Surg 2018;8(1):19–27. DOI: 10.4103/ams.ams_133_17
6. Lesko RP, De Ruiter BJ, Kamel GN, et al. The management of a pediatric condylar fracture with dynamic elastic therapy. Eplasty 2019;19:ic16.
7. Steed MB, Schadel CM. Management of pediatric and adolescent condylar fractures. Atlas Oral Maxillofac Surg Clin North Am 2017;25(1):75–83. DOI: 10.1016/j.cxom.2016.10.005
8. Tuna EB, Dündar A, Cankaya AB, et al. Conservative approach to unilateral condylar fracture in a growing patient: a 2.5-year follow up. Open Dent J 2012;6:1–4. DOI: 10.2174/1874210601206010001
9. Kamel GN, De Ruiter BJ, Baghdasarian D, et al. Establishing a protocol for closed treatment of mandibular condyle fractures with dynamic elastic therapy. Plast Reconstr Surg Glob Open 2019;7(12):e2506. DOI: 10.1097/GOX.0000000000002506
10. Cassi D, Magnifico M, Di Blasio C, et al. Functional treatment of a child with extracapsular mandibular fracture. Case Rep Dent 2017;2017:9760789. DOI: 10.1155/2017/9760789
11. Rahimov C, Farzaliyev I, Khankishiyev S, et al. Non-surgical treatment of condylar fractures in children. Oral Maxillofac Surg Cases 2020;6(1):100134.
12. Ghasemzadeh A, Mundinger GS, Swanson EW, et al. Treatment of pediatric condylar fractures: a 20-year experience. Plast Reconstr Surg 2015;136(6):1279–1288. DOI: 10.1097/PRS.0000000000001811
13. Tabrizi R, Langner NJ, Zamiri B, et al. Comparison of nonsurgical treatment options in pediatric condylar fractures: rigid intermaxillary fixation versus using guiding elastic therapy. J Craniofac Surg 2013;24(3):e203–e206. DOI: 10.1097/SCS.0b013e318293d605