

Bilateral Condylar Fracture: A Case Treated with a Conservative Myofunctional Approach

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Mandibular condylar fractures in a growing child may cause long-term consequences. A conservative approach has been recommended to permit the remodelling of the condyles as well as to re-establishing the mandibular dynamics and oral functions. This case report presents a bilateral mandibular condylar fracture in an 11 years old girl treated with myofunctional appliances in combination with exercises. The successful results from this clinical case support a conservative approach when treating mandibular condylar fractures in a growing child instead of an open surgical approach.

Keywords: Mandibular condylar fracture, Growing child, Myofunctional appliances, Myofunctional exercises, remodeling.

INTRODUCTION

Fractures of the mandibular condyle represent 20% to 35% of all mandibular fractures.^{1,2} In children, the fracture at the head of the mandibular condyle appears more frequently, whereas in adolescents the most common site of fracture is at the neck of the mandibular condyle.³ There are reports in the literature proposing different treatments including open surgical techniques with intraoral fixation,^{4,5} as well as conservative approaches with functional appliances.^{6,7}

Up today, there is no consensus on the best approach for the treatment of the mandibular condylar fractures. But the most important point to keep in mind when treating a mandibular fracture at the condyle is how it may affect the normal growth of the mandible, as well as the potential long-term consequences, such as growth disturbances, facial asymmetry and/or limited mouth opening, among others.⁸ One of the authors has reported in the literature two cases where a fracture of the mandibular condyle and a growth disturbance at the mandibular condyle, where treated with a myofunctional approach.^{9,10} In both cases the treatment yield to the remodelling of the mandibular condyle without long-term consequences.

In this case report, the authors present a bilateral mandibular condylar fracture in a growing child which was treated with a conservative myofunctional approach, as well as the 28 months-follow up of the patient after the treatment. The advantages of a conservative approach of the mandibular condylar fractures and the recovery of the oral functions in cases like this are discussed.

Case report

An eleven years old girl, fell down from a standing position having an impact on the mandibular mental area. The clinical exam performed immediately after the trauma revealed a bleeding cut on the submental area; mouth opening limitation (20 mm) associated with pain and limitation for the lateral excursions; pain at palpation

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on both Temporo-Mandibular Joints (TMJs); and, pain at the area of the premolars on the upper right quadrant. (Figure 1a) The clinical exam also revealed dental fracture of the maxillary premolars on the right quadrant, with pulp exposure on the first premolar. At the emergency visit, the bleeding was controlled and the wound sutured (Figure 1b). Anti-tetanic vaccine and antibiotics were prescribed. The patient was also referred to endodontic evaluation for the affected molars and premolars, resulting in the root canal for tooth 15, as there was a longitudinal coronal fracture, and splinting of tooth 14.

Extraoral radiographs (Panoramic and Lateral Cephalic) were prescribed as well as a Cone Beam CT-Scan. The radiographic records reported a bilateral mandibular condylar fracture with the mandibular condyles displaced medially (Figure 2a, b and c). The parents were presented with the alternative of either proceeding with a surgical approach to reposition the fractured mandibular condyles or start with a conservative functional approach intending to remodel the area of the fractures. They decided to proceed with the latter option.

Treatment was initiated with a Bionator appliance covering the occlusal surfaces of the posterior teeth with an acrylic width of 4 mm (Figure 3a). The inter-occlusal acrylic intended to displace the mandibular ramus downward, as well as maintaining the mandible in a forward position (6 millimeters advancement). The patient was instructed to use the functional appliance permanently removing it from the mouth for eating. She was instructed also to perform myofunctional exercises working on the mandibular lateral excursions chewing on silicon tubes (6 mm diameter) alternating on both sides three times per day for five minutes each time (Figure 3b)

After six months of treatment with the appliance and the chewing exercises described above, a different functional appliance was inserted for the treatment (Figure 4). The new appliance was composed by individual upper and lower acrylic plates added with a track guidance on both upper and lower appliances, which permitted the patient to perform mandibular lateral excursions. Such appliance is known as the Indirect Planas' Tracks. The patient was instructed to use the new appliance permanently as she did with the previous one, as well as to continue with the myofunctional exercises as previously instructed.

A new tomogram was taken after eight months of treatment. At that moment the fractured condyles were not observed anymore and remodelled condyles were observed on both TMJs. (Figure 5a) It was also observed a significant difference in the height and the shape between the mandibular condyles with the mandibular condyle on the right side positioned higher and with a rounded shape, whereas the opposite side appeared positioned lower and flattened. At that time, the patient was instructed to continue wearing the Indirect Planas' Tracks and to continue doing the myofunctional exercises with the silicon tubes as previously instructed. A follow up tomogram was taken at completing 16 months of treatment. It showed a more symmetrical leveling of the mandibular condyles as well as a more rounded shape of the mandibular condyles on both sides (Figure 5b).

The last tomogram before preparing this report was taken 28 months after establishing the functional treatment. The latest radiographic follow up showed a rounded shape of the mandibular condyles, as well as a similar heights of the mandibular condyles and fossae on both sides. (Figure 6a) However, the mandibular condyle on the left side showed like a bony extension on the posterior area on the panoramic view. A coronal view of the mandibular

condyles (Figure 6b), showed a more flattened superior area in the mandibular condyle on the left side, with less spherical shape when compared with the opposite side. Another interesting finding on the tomographic coronal view was the shape of the mandibular fossa on the left TMJ, which appears like presenting a double concavity. In deeper section of the tomogram the mandibular condyles presented a heart shape, being more noticeable on the left side. (Figure 6c) At this time, there was no limitation in mouth opening or in the mandibular lateral excursions (Figure 7)

Figure 1. Photographs of the patient showing (A) the mouth opening limitation and the site of the cut at the mandibular mental area de day of the trauma; (B) some days after the trauma with the cut at the mental area sutured.



Figure 2. Radiographic pictures showing the mandibular condylar fractures on both sides on (A) panoramic radiograph; (B) TMJ tomogram; and (C) 3D tomogram reconstruction.

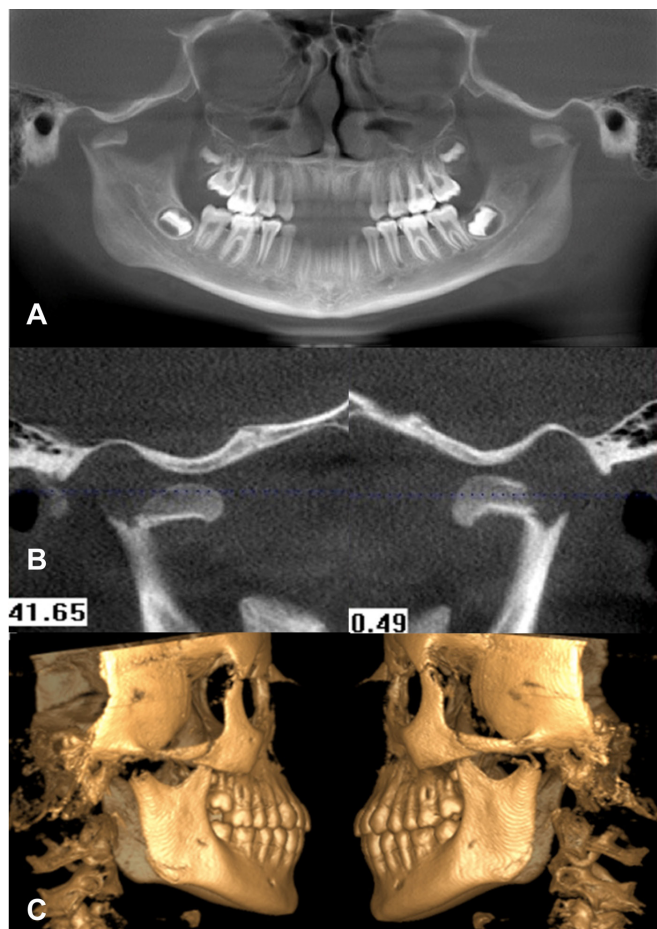


Figure 3. (A) Photograph of the Bionator appliance placed after the trauma to maintain an increase in the vertical dimension and the mandible positioned forward; and (B) photographs of the patient exercising mandibular excursions with silicon tubes on both sides.



Figure 4. Intraoral photograph of the second appliance, the Indirect Planas' Tracks, delivered to the patient on the sixth month of the myofunctional treatment.



Figure 5. Panoramic radiographs taken for follow up at (A) eight and (B) sixteen months of the treatment. The mandibular condyles are remodelled showing differences in the height of the TMJs and a flattened mandibular condyle on the left side on the radiograph taken after 8 months of the myofunctional treatment. More symmetrical TMJs and condyles are observed after 16 months of treatment.

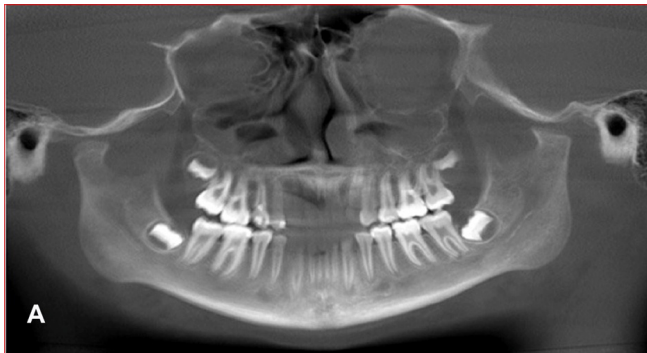


Figure 6. Radiographic pictures showing the remodelled mandibular condyles on both sides after 28 months of myofunctional treatment. (A) panoramic radiograph; (B) TMJ tomogram; and (C) a deeper slide of the TMJ tomograms showing heart-shaped condyles, more noticeable on the left side.

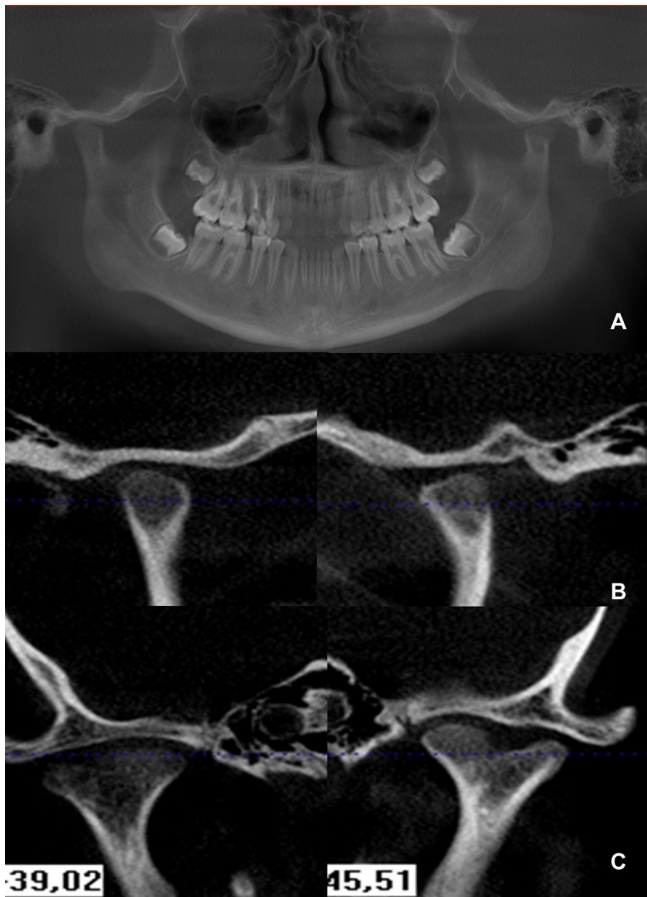


Figure 7. Photograph of the patient showing a normal mouth opening with no mandibular deviations.



DISCUSSION

The treatment of the mandibular condylar fractures in a growing child must focus on the potential long-term effects. A conservative treatment have been reported to render a satisfactory remodeling result when treating both unilateral and bilateral mandibular condylar fractures, adding that such treatment leads to a successfully recovery of the mandibular dynamics and the oral functions.¹⁰⁻¹² The results from the clinical case presented here support treating the mandibular condylar fractures with a conservative approach, in this case using myofunctional appliances and exercises, instead of a surgical approach, which may be more traumatic for a child and not focusing in the functional long-term consequences. Furthermore, a treatment with functional appliances may permit a remodelling of the still growing mandibular condyle without interference from surgical hardware intending to join the fragments at the surgery,⁵ as well as permitting a better position of the condyle in the TMJ as presented here. In that context, it appears that a conservative approach with intraoral appliances to guide the remodelling of the fractured mandibular condyle plus therapeutic exercises leading to re-establishing the oral functions appear as the best option when treating mandibular condylar fractures in growing children.

The clinical case reported here showed after 28 months a basal bone at both mandibular condyles with a cortical bone on the condylar surface, as well as trabecular bone underneath, which may be considered a normal bony structure at both mandibular condyles. Interestingly the mandibular condyles remodelled ending in a heart-shaped mandibular condyle, being more noticeable on the left side. Condylar bifidism or heart-shaped condyles have been reported to occur as a consequence of trauma and condylar fractures.^{13,14} Such a morphological consequence has been associated with a chip fracture of the medial part of the condylar head.¹³ Although there was a variation in the shape of the mandibular condyles in the case presented here, no limitations in the mandibular excursions or in mouth opening for the patient after the myofunctional treatment were recorded.

The case presented here showed a satisfactory remodelling of the mandibular condyles on both sides when the bilateral mandibular condylar fracture was treated with a conservative myofunctional approach for about a year. However, the recovery of the anatomy of the mandibular condyles and the temporo-mandibular joints last for about two years. Based on the results presented here and other cases reported in the literature,^{10,12,15} a non-surgical treatment of the mandibular condylar fractures leads to acceptable remodelling of the structures involved with good clinical outcomes. However, such an approach requires time and a closer follow up of the patient to achieve a successful result. Also, the guidance of the mandibular dynamics through the appliance in combination with myofunctional exercises appears to have been a key factor in the recovery of the oral functions in this patient and the success of the treatment.

CONCLUSIONS

The bilateral mandibular condylar fracture case reported here support a conservative approach when treating cases like this. The presented results also suggest that establishing a treatment with functional appliances in combination with myofunctional exercises lead to successful remodelling of the fractured condyles, as well as re-establishing the oral functions with no long-term consequences.

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