

NON-SURGICAL MANAGEMENT OF BILATERAL CONDYLAR FRACTURE WITH APPLICATION OF BITE-RAISING APPLIANCE

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ABSTRACT Fractures of the condylar process of the mandible are commonly fractured encountered in mandible bone. Although the treatment options of condylar fractures are still debatable. Majority of surgeons seem to favour nonsurgical treatment of condylar fracture because of its minor postoperative complications. However, nonsurgical treatment may still yield serious complications like post-traumatic malocclusion. Herein, we present the case of 19 years old male presented with post-traumatic malocclusion due to fractures of bilateral condylar process and symphysis mandible that treated with a combination of open reduction and internal fixation for symphysis mandible fracture and closed reduction with application of bite raising appliance and intermaxillary fixation for bilateral condylar process fracture—no symptomatology within one month of the follow-up period. The outcomes of this protocol therapy are effective and satisfying in treating the post-traumatic malocclusion in bilateral condylar and symphysis mandible fractures.

KEYWORDS Conservative management, Non-surgical, Mandibular condyles, Mandibular fracture, Bite-raising appliance

Introduction

Fractures of facial bones are prevalent. According to the anatomic and position, mandible and zygomatic bone are the two bones most commonly fractured.[1] The mandible is a unique horse-shoe shaped bone with identical joints at the end of the side and articulating with fossa glenoid from middle cranial fossa. Fractures of condylar process of the mandible are common fractured encountered in mandible bone, with a range around 25-35% of all mandibular fractures.[2] Multiple fractures associated with fractures of the condylar process are commonly found, like the fracture of ipsilateral parasymphysis of the mandible are generally related to fractured of contralateral condylar process of mandible, while fractures of symphysis of the mandible are

normally associated with fractures of bilateral condylar process of mandible.[3,4]

Malocclusion, open bite (anterior at fractures of the bilateral condylar process; contralateral at fractures of the unilateral condylar process), deviation in mouth opening, difficulty in mouth opening, oedema and tenderness around the temporomandibular joint are clinical signs and symptoms of fractures of the condylar process. Moreover, the clinical signs and symptoms in fracture of the condylar process can show laceration around external auricular meatus, retroauricular ecchymosis, cerebrospinal leak and otorrhea in association with skull base fracture in a few cases.[5-8]

The treatment options of fractures of the condylar process can be conservative treatment with closed reduction or open reduction using plates and screws.[9] Unlike the nonsurgical approach to the condylar fracture in children. The treatment of condylar fracture in adults is still highly debated.[2] Most of the surgeons seem to favour conservative treatment of condylar fracture with some considerations. First, conservative treatment gives a satisfactory result in the majority of cases. Second, surgical treatment is difficult with the anatomy because of inherent anatomical hazards (VII nerve).[2]

This case report aims to describe and evaluate the outcome of

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Figure 1: Pre-Operative Extraoral and Intraoral examinations.

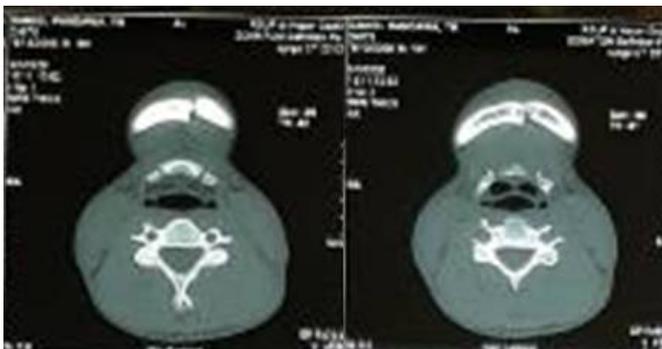


Figure 2: Axial CT Scan exhibiting fracture of symphysis mandible.

combination treatment of open and closed reduction for the patient with symphysis mandibular fractures and bilateral condylar fractures, consecutively.

Case presentation

A 19 years old male patient with the history of motor vehicle accident came to the emergency department with chief complaint bleeding from face and mouth. Clinical extraoral examination revealed a lacerated wound at chin area, bilateral preauricular oedema, crepitation around the preauricular bone, and preservation of mandibular movements limited by pain. Intraoral examination showed lacerated wound at lower lip, anterior open bite, and multiple teeth avulsion at anterior maxilla (11,12) and anterior mandible (31,32). (Figure 1) Radiographic examination exhibited fractures of the symphysis and bilateral condylar process of the mandible with lateral displacement of the left condyle and medial displacement of the right condyle. (Figures 2 and 3)

Initial treatments of the patient in the emergency department were suturing of lacerated wound and application of Erich arch bars at maxilla and mandible to stabilize the fracture segment at symphysis mandible and prepare for using intermaxillary fixation (IMF) post-operatively. After seven days, surgical reduction and fixation for fracture of symphysis mandible were performed with application of miniplates and screw with 2.0-mm through intraoral access; while bilateral condylar fracture

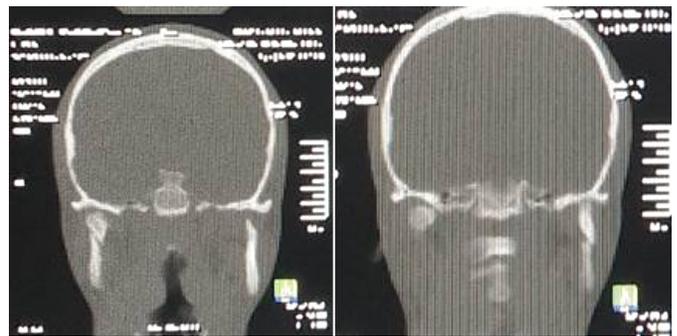


Figure 3: Coronal CT Scan exhibiting bilateral fractures of the condylar process with lateral displacement of the left condyle and medial displacement of the right condyle.



Figure 4: Intraoperative ORIF of symphysis mandible fracture.



Figure 5: Post-operative day 1 with the application of bite-raising appliances and elastic IMF.



Figure 6: Occlusion in post-operative one month.



Figure 7: Post-operative one month, preservation of laterality movements of the mandible.

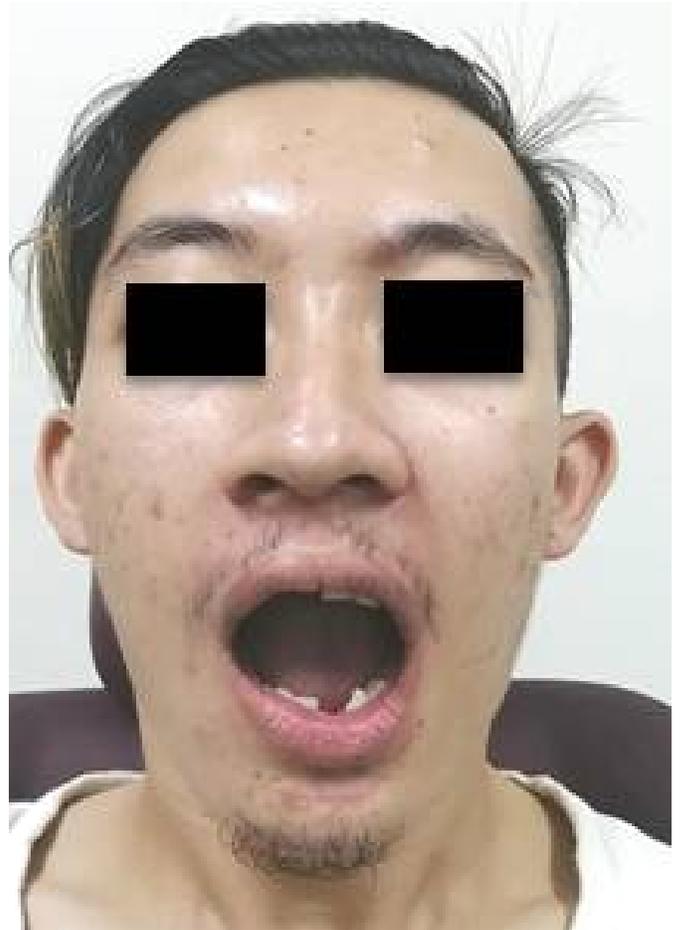


Figure 8: Post-op one month, the patient did not report symptomatology and presented with 40 mm of mouth opening.

treated conservatively. (Figure 4)

Intermaxillary fixation was maintained for the first 24 hours. On a postoperative day one, bite-raising posterior with two wooden tongue depressors placed at the bilateral posterior occlusal region, with the application of elastic intermaxillary fixation involving primarily the anterior teeth. This fixation associated with posterior support was kept for two weeks. (Figure 5)

After this period, the patient was followed up and bite raising appliances were removed. The patient was referred to as postoperative physiotherapy, including opening, bilateral laterality, and protrusion exercise. On post-operative one month, the patient did not report symptomatology, presented with normal mouth opening, lateral excursion and protrusion movements of the mandible. (Figures 6, 7, dan 8)

Discussion

The treatment choice for fracture of the condylar process is still controversial in pieces of literature. Despite being often considered a modality with minor complications, closed treatments may yield complications like malocclusion, chronic pain, and reduced mandible movement.[10] Malocclusion is a severe complication of post-traumatic sequela and can cause open bite with functional disturbances, reduced of posterior facial height, asymmetrical face.[10] Some kinds of literature reported that patients with condylar process fracture treated with non-surgical therapy would have a higher prevalence for malocclusion compared to the ones treated surgically.[11] The treatment options of post-traumatic malocclusion can involve occlusal adjustment by adjusting occlusal plane and orthodontic treatment in mild to moderate cases, moreover, orthognathic surgery may be indicated in severe cases. [12-14]

This case report aimed to present the alternative nonsurgical treatment to manage the early post-traumatic malocclusion due to bilateral condylar process fractures. In this study, the patient presented with anterior open bite malocclusion from the fractures of bilateral condylar process, however, the associated fracture of symphysis mandible can even deteriorate the condition of post-traumatic malocclusion in this case report. Accordingly, the open reduction and internal fixation at symphysis mandible fracture were first performed before the closed reduction treatment for bilateral condylar process fractures.

In this case report, the application of bite-raising posterior appliances followed with elastic intermaxillary fixation used to treat a complication of anterior open bite malocclusion from bilateral condylar fractures. The amount of anterior open bite was first measured according to the amount of condyle displacement exhibited in the CT scan. This will give an idea regarding the amount of distraction required posteriorly. The goal of the application of posterior bite-raising in the case of condylar process fracture is to distract the posterior mandible caudally along a vertical axis and to rotate the mandible counterclockwise to avoid the fractures parts from overriding when brought to occlusion, [15] hence eliciting a reduction manoeuvre and proper anatomical alignment simultaneously.

The result of this case report indicated that the early treatment of post-traumatic malocclusion in fractures of the condylar process with nonsurgical treatment could give a satisfactory outcome without the need for surgical treatment to fix the post-traumatic malocclusion. However, in certain conditions, such as the severe reduction of ramus mandible height (>8mm), displacement of the condylar segment to the middle cranial fossa,

and association with mid-facial fracture, the surgical treatment is more indicated. [14,16]

In the cases of long-term malocclusion where the patients already get used to post-traumatic malocclusion. The use of bite-raising aims to bring the patient out of an occlusal comfort zone and will disrupt the feedback mechanism that has developed during the period of post-traumatic malocclusion. With resetting of the feedback mechanism, the possibility of developing a new-correct-habituatation of occlusal after the removal bite-raising can be achieved. Moreover, the critical role of physiotherapy during the period of deregulating bite is required.[6]

There are a few types of bite raising appliance that can be used in post-traumatic malocclusion, such as, acrylic blocks, drops of dental composite, and etc.[6,15] In this case, report, the usage of wooden tongue depressor can be an alternative bite-raising appliance because it is easy to be applied and removed during its use.

Conclusion

Based on the present case report, it can be concluded that the protocol of non-surgical therapy with the application of bite-raising appliance is effective and satisfying in bilateral condylar fractures.

Patient informed consent

The patient has given consent for their images and other clinical information to be reported in the journal.

Conflict of interest

There are no conflicts of interest to declare by any of the authors of this study.

References

1. Sharif MO, Fedorowicz Z, Drews P, Nasser M, Dorri M, Newton T, et al. Interventions for the treatment of fractures of the mandibular condyle. *Cochrane Database of Systematic Reviews*. 2010(4).
2. Ellis E, Throckmorton GS. Treatment of mandibular condylar process fractures: Biological considerations. *Journal of Oral and Maxillofacial Surgery*. 2005;63(1):115-34.
3. Pau M, Reinbacher KE, Feichtinger M, Navysany K, Kärcher H. The mandibular symphysis as a starting point for the occlusal-level reconstruction of panfacial fractures with bi-condylar fractures and interruption of the maxillary and mandibular arches: Report of two cases. *Journal of Cranio-Maxillofacial Surgery*. 2014;42(4):e51-e6.
4. Manson PN, Clark N, Robertson B, Slezak S, Wheatly M, Kolk CV, et al. Subunit Principles in Midface Fractures: The Importance of Sagittal Buttresses, Soft-Tissue Reductions, and Sequencing Treatment of Segmental Fractures. *Plastic and Reconstructive Surgery*. 1999;103(4).
5. Costa e Silva AP, Antunes JI Fau - Cavalcanti MGP, Cavalcanti MG. Interpretation of mandibular condyle fractures using 2D- and 3D-computed tomography. (1806-4760 (Electronic)).

6. Rozeboom AVJ, Dubois L, Lobbezoo F, Schreurs R, Milstein DMJ, de Lange J. Management of post-traumatic malocclusion: an alternative treatment. *Oral Surgery*. 2018;11(3):241-6.
7. Sastrawan AD, Sjamsudin E, Faried A. Penatalaksanaan emergensi pada trauma oromaksilofasial disertai fraktur basis kranii anterior. *Majalah Kedokteran Gigi Indonesia*. 2017;3(2):111.
8. Siau C, Arumsari A, Syamsudin E, Fathurachman F. Management of sinistra condyle fracture in emergency: case report. 2018. 2018;3(3):4.
9. Ellis E, McFadden D, Simon P, Throckmorton G. Surgical complications with open treatment of mandibular condylar process fractures. *Journal of Oral and Maxillofacial Surgery*. 2000;58(9):950-8.
10. Zachariades N, Mezitis M Fau - Mourouzis C, Mourouzis C Fau - Papadakis D, Papadakis D Fau - Spanou A, Spanou A. Fractures of the mandibular condyle: a review of 466 cases. Literature review, reflections on treatment and proposals. (1010-5182 Print).
11. Haralabakis N, Sifakakis I, Papadakis G. Etiology and management of posttraumatic malocclusions. *World journal of orthodontics*. 2007;8:335-43.
12. Ellis E, 3rd, Walker RV. Treatment of Malocclusion and TMJ Dysfunction Secondary to Condylar Fractures. *Cranio-maxillofac Trauma Reconstr*. 2009;2(1):1-18.
13. Park I-P, Heo S-J, Koak J-Y, Kim S-K. Post traumatic malocclusion and its prosthetic treatment. *J Adv Prosthodont*. 2010;2(3):88-91.
14. Rezandaru F SE, Priyanto W, Fathurachman. Management of Right Parasymphysis and Condylus Mandible Fracture with Combination Open and Closed Reduction: A Case Report. *International Journal of Science and Research*. 2019;8(2).
15. Thelekkat Y, Aravindakshan sm. Hypomochlion aided reduction for sub-condylar fractures. *Kerala dental journal*. 2014;3(1).
16. Abdel-Galil K, Loukota R. Fractures of the mandibular condyle: evidence base and current concepts of management. *British Journal of Oral and Maxillofacial Surgery*. 2010;48(7):520-6.