(International Print/Online Journal)

SJIF IMPACT FACTOR: 5.565
PUBMED-National Library of Medicine ID-101739732

ISSN (Print): 2209-2870
ISSN (Online): 2209-2862

International Journal of Medical Science and Current Research (IJMSCR)
Available online at: www.ijmscr.com
Volume 4, Issue 6, Page No: 1314-1319
November-December 2021

IJMSCR

Management Of Condylar Fractures: To Open Or Not To Open? A Review Of The Literature

[1]Dr. Hani Yousuf Naik, [2]Dr. Mahima Goel, [3]Nida Baloch, [4]Aditi Maramat, [5]Dr. Smriti Kumari
[1,5]Oral and Maxillofacial Surgeon, [2]Professor, [3,4]Intern,
[2]Department of Oral and Maxillofacial Surgery
[2]Pacific Dental College and Research Centre, Udaipur
[3,4]BDS - Pacific Dental College and Research Centre, Udaipur
[1,5]MDS - I.T.S Dental College and Research Centre, Greater Noida

***Corresponding Author:**
Dr. Hani Yousuf Naik
Oral and Maxillofacial Surgeon, MDS - I.T.S Dental College and Research Centre, Greater Noida

Type of Publication: Original Research Paper
Conflicts of Interest: Nil

Abstract

The management of condylar trauma has long been a topic of discussion and controversy in Oral and Maxillofacial Surgery. There are various methods of managing condylar trauma. For each type, the techniques must be chosen taking into consideration many factors such as the presence or absence of teeth, the occlusal derangement, deviation of the mandible, patient compliance, masticatory forces and the internal derangements of the Temporomandibular Joint . The closed / conservative approach seemed to be favorable to most of the surgeons followed by intermaxillary fixation but in recent years, the open reduction and internal fixation has become a more common treatment modality. The aim of this review is to evaluate the various variables that are important in deciding the method of treatment of condylar fractures : Open or Closed – mentioning their pros and cons

Keywords: Condyle , Trauma , Temporomandibular joint , Open reduction , Internal Fixation

Introduction

Mandibular trauma is quite frequent in the maxillofacial skeleton and about 19 – 52 % trauma involves the condyle. The condylar fractures can be classified according to the anatomic location (intra and extracapsular) and the degree of dislocation of the articular head .[1,2,3]The management of condylar trauma is often associated with complications such as restriction in movement of the mandible , occlusal derangements , spasm of the muscles , Temporomandibular Joint pathologies , facial asymmetry and IMJ ankylosis , irrespective of whether the treatment was performed or not .[2,4,5] The complications also include fracture of the tympanic plate , temporal bone fracture with or without the displacement of the condyle into the middle cranial fossa , cranial nerve injury , vascular injury , Arteriovenous fistulae[6] and disruption of the balance in the masticatory load.[7] There has been a controversy regarding the management of the condyle after the introduction of osteosynthesis materials.[8]

In the recent years , the open reduction of the condyle has been favored because of the introduction of plates and screw fixation devices . Various reports and few series favoring the open treatment of the condyle have emerged in the world literature.[9]The majority of the condylar fractures involve the neck .Sagittal or vertical fractures of the mandibular condyle and chip fractures of the medial part of the condylar head are quite commonly detected by Computed Tomographic (CT) scans .[5]For moderately displaced fractures of

the condyle , closed reduction with IMF is still preferred. The most important reason for this may be the difficult surgical access to the condylar area and the frequently difficult repositioning of the proximal fragment .[10] ORIF of the condylar fractures may be indicated for bilateral trauma whereas the closed method with IMF may be indicated in the cases where the condylar displacement is minimal and the height of the ramus is near normal .[11] The closed reduction is more preferred because it enables the early mobilization and functional stimulation of the condylar growth and bone remodeling . The open method is indicated primarily in adults with displaced fractures or with dislocation of the condylar head . [12,13]

INDICATIONS FOR ORIF OF THE CONDYLE (HAUG AND ASSAEL, 2001 [14]) ; BRANDT AND HAUG 2003 [15])

Indications
Absolute Indications:
Patient preference (when no absolute or relative contraindications co-exist)
When manipulation and closed treatment cannot re-establish the pretraumatic occlusion;
When rigid internal fixation is being used to address another facial fracture affecting the occlusion;
When stability of the occlusion is limited (e.g., less than 3 teeth per quadrant, gross periodontal disease, skeletal abnormality);
Displacement into the middle cranial fossa;
Lateral extracapsular deviation;
Open fracture with potential for fibrosis;
Invasion by foreign body.
Relative Indications:
Edentulous jaws;
Periodontal problems;
Bilateral condylar fractures in an edentulous patient without a splint;
Unilateral or bilateral condylar fractures where splinting cannot be accomplished for medical reasons or because physiotherapy is impossible;
Bilateral condylar fractures with comminuted midfacial fractures, prognathia or retrognathia;
Unilateral condylar fracture with unstable base;
Displaced condyle with edentulous or partially edentulous mandible with posterior bite collapse;
Noncompliance;
Uncontrolled seizure disorders;
Status asthmaticus;
Obtunded neurologic status with documentation of predicted improvement;
Psychologic compromise (e.g., mental retardation, organic mental syndrome, psychosis) ;
Substance abuse.

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CONTRAINDICATIONS TO ORIF OF MANDIBULAR CONDYLE (HAUG AND ASSAEL, 2001 [14] , BRANDT AND HAUG 2003 [15])

Contraindications
Absolute Contraindications:
Condylar head fractures (at or above the ligamentous attachment – single fragment, comminuted, or medial pole);
When medical illness or systemic injury add undue risk to an extended general anesthetic;
Good occlusion;
Minimal pain;
Acceptable mandibular movement.
Relative Contraindications:
When a simpler method is as effective;
Condylar neck fractures (the thin, constricted region inferior to the condylar head);
Obtunded neurologic status when there is no documented hope for improvement.

Haug and Assael [14] compared results of 10 patients treated with closed reduction and 10 patients which were treated with ORIF . The patients were recalled after a period of 6 months and examined for age at the time of injury , gender and time since the operation and the etiology of the fracture . The results showed no statistically significant differences between the open reduction and the closed reduction groups . Moreover there were no differences for age at the time of injury , maximum interincisal distance , right and left lateral excursion , protrusive movement , deviation on opening or the status of occlusion. Differences were noted in the groups for time since operation, scar perception and the perception of pain. The ORIF group was associated with perceptible scars. As far as the treatment modality is concerned , there were few differences in the outcomes between patients treated with closed reduction and MMF and ORIF for subcondylar fractures .

In a study conducted by Santler et al [16] , 234 patients with condylar fractures were treated with closed and open methods .In the follow up study , 150 patients with a mean follow up time of 2.5 years were analyzed using radiologic and objective and subjective clinical examinations. No significant difference in mobility , status of occlusion , muscle pain , nerve disorders were observed when the surgically and non surgically treated patients were compared. Patients treated with ORIF showed significantly more sensitivity and pain on maximal mouth opening .

The study of Marker et al [17] was conducted to record the results of closed treatment of condylar fractures and to find out whether there were any variables that were predictive of complications After 1 year , 45 of the 348 patients (13 %) had minor physical complaints such as trismus , deviation or dysfunction. 10 of the patients (3 %) had joint or muscular pain . 8 patients (2 %) had deranged occlusion. 5 of the 8 patients had bilateral fractures They concluded that closed treatment of condylar fractures is non traumatic, safe and reliable only in a few cases .

Rutges et al [8] concluded a study with closed reduction that consisted of IMF with wires in the cases that had severe occlusal disturbances Mild occlusal disturbances were treated with elastic MMF. In cases with no occlusal disturbances , a soft diet was recommended. 60 patient files were analyzed and 28 patients were seen for re-examination and an X OPG was taken. Functionality was graded with the Helkimo index at an average of 3 years follow up. The clinical dysfunction index showed: severe symptoms in 11 %, moderate symptoms in 39 %, mild symptoms in 39 % and 11 % had no symptoms . The index for occlusal state showed: 21 % severe occlusal disturbances, 61 % moderate occlusal disturbances and 18 % with no occlusal disturbances . The re- examined group did not significantly differ from the control group. Villarreal et al [18] conducted a retrospective analysis of 104 mandibular condyle fractures to analyze and determine the relationship between the principal clinical variables and the post-operative results. The functional improvement attained by the open methods was greater than that obtained by the closed treatment. The variables that influenced the method of treatment and predicted the

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prognosis were the level of fracture , degree and direction of the displacement of the fractured segments , age , medical status of the patient , and the status of the occlusion and the dentition.

To compare the occlusal relationships after open and closed methods , a total of 137 patients with unilateral fractures of the mandibular condyle (neck or subcondyle) , 77 treated with closed reduction and 65 treated with the open method were included in the study of Ellis , Simon and Throckmorton. The patients treated with closed reduction methods had a significantly greater percentage of malocclusion as compared to the patients treated with ORIF , inspite of the greater initial displacement in the patients treated with open reduction.

Discussion

There is much evidence in the world literature regarding the management of intracapsular and extracapsular condylar fractures in children which regard closed reduction as the treatment modality . Some of the researchers have mentioned the possibility of using open reduction in cases of condylar fractures in children , provided the technique was minimally invasive as endoscopic surgery . [20] ORIF has more been accepted in recent times as a result of the greater experience of the surgeons when dealing with rigid fixation materials. [9]

However , many authors agree that the treatment of condylar fractures in adults must be chosen on a case by case basis and the personal experience of each surgeon . [21,22,23] There are three main treatment options advocated for condylar fractures in adults 1) A period of IMF followed by functional therapy . 2) Functional therapy without a period of IMF 3) Open reduction with or without internal fixation .[4] .

The absolute indications for open treatment of condylar fractures are in cases of bilateral fractures [21,23] , considerable dislocations , cases in which closed reduction cannot establish occlusion [15] , concomitant fractures of other areas of the face that compromise occlusion and for which rigid internal fixation will be used , dislocation of the condyle into the middle cranial fossa. Some of the complications implicated are aseptic necrosis of the condylar segment as a result of loss of periosteal blood supply during dissection , extra oral scars ,[24,25] facial nerve injury , difficulty in access .

The blood supply has been a topic of discussion since few years , because the surgeons argue that surgical access to the condylar process to perform

The treatment of condyle with closed method in adults is indicated in cases of minimum and high dislocations , fractures of the head of the head (intracapsular) [26] . The complications with regard to closed treatment of the condyle are chronic pain , shortening of the face and the ramus on the affected side and a greater percentage of malocclusion.[19]The TMJ being a ginglymoarthroidal joint , is necessary for the masticatory forces to function efficiently and maximally , but it is also uncertain that open treatment would provide a more effective temporomandibular articulation than closed treatment .

The results of Nussbaum et al (2008) were inconclusive regarding whether open or closed treatment should be used for the management of mandibular condylar fractures . As a result of the poor quality of the available data and the lack of other important information , the preferred choice of treatment still remains a controversy . The authors suggest that the patients need to be further randomized into treatment groups , and the examiners need to be blinded to the manner in which the patients are to be treated .Studies with adequate sample sizes to determine clinically meaningful effects should be undertaken .

Conclusion

After reviewing the various articles published over the last few years, it is believed that with the exception of absolute indications of closed treatment in children, there are still no rules and /or norms defined for treating condylar fractures. The decision about the choice of treatment must always be taken into consideration some of the factors such as the patients' general health status, type of fracture, diagnostic accuracy and mainly the capability, experience and the skill of the surgeons.

References

1. Mitchell DA. A multicentre audit of unilateral fractures of the mandibular condyle. British

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Journal of Oral and Maxillofacial 1997; 35: 230-6.
2. Talwar RM, Ellis III E, Throckmorton GS. Adaptations of the masticatory system after bilateral fractures of the mandibular condylar process. J Oral Maxillofac Surg 1998; 56: 430-9.
3. De Riu G, Gamba U, Anghinoni M, Sesenna E. A comparison of open and closed treatment of condylar fractures: a change in philosophy. Int J Oral Maxillofac Surg 2001; 30: 384-9.
4. Ellis III E, Throckmorton GS. Treatment of mandibular condylar process fractures: biological considerations. J Oral Maxillofac Surg 2005; 63: 115-34
5. Long X, Goss AN. A sheep model of intracapsular condylar fracture. J Oral Maxillofac Surg 2007; 65: 1102-8.
6. Long X, Cheng Y, Li X, Li H, Hu S. Arteriovenous fistula after mandibular condylar fracture. J Oral Maxillofac Surg 2004; 62: 1557-8.
7. Choi J, Rotaru H, Kim IK. Treatment of post-traumatic open bite by radiofrequency. British Journal of Oral and Maxillofacial Surgery 2007; 45: 311-3
8. . Rutges JPHJ, Kruizinga EHW, Rosenberg A, Koole R. Functional results after treatment of fractures of the mandibular condyle. British Journal of Oral and Maxillofacial Surgery 2007; 45: 30-4.
9. Landes CA, Lipphardt R. Prospective evaluation of a pragmatic treatment rationale: open reduction and internal fixation of displaced and dislocated condyle and condylar head fractures and closed reduction of non-displaced, non-dislocated fractures. Part I: condyle and subcondylar fractures. Int J Oral and Maxillofacial Surgery 2005; 34: 859-70
10. Eckelt U, Schneider M, Erasmus F, Gerlach KL, Kuhlisch E, Loukota R, Rasse M, Schubert J, Terheyden H. Open versus closed treatment of fractures of the mandibular condylar process–a prospective randomized multi-centre study. Journal of Cranio-Maxillofacial Surgery 2006; 34: 306-14.
11. Terai H, Shimahara M. Closed treatment of condylar fractures by intermaxillary fixation with thermoforming plates. British Journal of Oral and Maxillofacial Surgery 2004; 42: 61-3.
12. Davis BR, Powell JE, Morrison AD. Free-grafting of mandibular condyle fractures: clinical outcomes in 10 consecutive patients. Int J Oral and Maxillofacial Surgery 2005; 34: 871-6.
13. Landes CA, Lipphardt R. Prospective evaluation of a pragmatic treatment rationale: open reduction and internal fixation of displaced and dislocated condyle and condylar head fractures and closed reduction of non-displaced, non-dislocated fractures. Part II: high condylar and condylar fractures. Int J Oral and Maxillofacial Surgery 2006; 35: 115-26.
14. Haug RH, Assael LA. Outcomes of open versus closed treatment of mandibular subcondylar fractures. J Oral Maxillofac Surg 2001; 59: 370-5.
15. Brandt MT, Haug RH. Open versus closed reduction of adult mandibular condyle fractures: a review of the literature regarding the evolution of current thoughts on management. J Oral Maxillofac Surg 2003; 61: 1324-32.
16. Santler G, Kärcher H, Ruda C, Köle E. Fractures of the condylar process: surgical versus nonsurgical treatment. J Oral Maxillofac Surg 1999; 57: 392-7.
17. Marker P, Nielsen A, Lehmann Bastian H. Fractures of the mandibular condyle. Part 2: results of treatment of 348 patients. British Journal of Oral and Maxillofacial Surgery 2000; 38: 422-6
18. 18.Villarreal PM, Monje F, Junquera LM, Mateo J, Morillo AJ, Gonzalez C. Mandibular condyle fractures: determinants of treatment and outcome. J Oral Maxillofac Surg 2004; 62: 155-163.
19. Ellis III E, Simon P, Thockmorton GS. Occlusal results after open or closed treatment of fractures of the mandibular condylar process. J Oral Maxillofac Surg 2000; 58: 260-8.
20. Zimmermann CE, Troulis MJ, Kaban LB. Pediatric facial fractures: recent advances in prevention, diagnosis and management. Int J Oral and Maxillofacial Surgery 2005; 34: 823-33.
21. Banks P. A pragmatic approach to the management of condylar fractures. Int J Oral Maxillofac Surg 1998; 27: 244-6.

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22. Choi J, Oh N, Kim IK. A follow-up study of condyle fracture in children. Int J Oral Maxillofac Surg 2005; 34: 851-8.
23. Tominaga K, Habu M, Khanal A, Mimori Y, Yoshioka I, Fukuda J. Biomechanical evaluation of different types of rigid internal fixation techniques for subcondylar fractures. J Oral Maxillofac Surg 2006; 64: 1510-16.
24. Anastassov GE, Lee H, Schneider R. Arthroscopic reduction of a high condylar process fracture: a case report. J Oral Maxillofac Surg 2000; 58: 1048-51.
25. Wagner A, Krach W, Schicho K, Undt G, Ploder O, Ewers R. A 3-dimensional finite-element analysis investigating the biomechanical behavior of the mandible and plate osteosynthesis in cases of fractures of the condylar process. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2002; 94: 678-86
26. Hlawitschka M, Eckelt U. Assessment of patients treated for intracapsular fractures of the mandibular condyle by closed techniques. J Oral Maxillofac Surg 2002; 60: 784-91.

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