International Surgery Journal
Ragupathy K. Int Surg J. 2016 Feb;3(1):47-51
http://www.ijsurgery.com
pISSN 2349-3305 | eISSN 2349-2902

DOI: http://dx.doi.org/10.18203/2349-2902.isj20151508

Research Article

Outcomes of surgical versus nonsurgical treatment of mandibular condyle fractures

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Received: 22 November 2015
Accepted: 16 December 2015

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ABSTRACT

Background: The purpose of the present study was to analyze the outcome result of surgical and nonsurgical treatment of mandibular condyle fractures in patients treated at the Department of Oral and maxillofacial surgery, Sree Balaji Dental College and Hospital.
Methods: A retrospective study of 27 patients treated for mandibular condyle fractures at Department of Oral and maxillofacial surgery, Sree Balaji Dental College and Hospital between 2008-2010 was performed. Sixteen patients were treated nonsurgically and 11 patients by surgical treatment. Outcome results on clinical and radiological parameters were evaluated during the follow up period.
Results: In nonsurgical group, 9 patients (56%) had loss of vertical ramus height and 6 patients (37.5%) had reduced mouth opening of below 35 mm. In open reduction group temporary facial nerve weakness was seen in 2 patients (18%) and one patient developed post operative infection. None of the patients in both groups had malocclusion.
Conclusions: The study concludes that nonsurgical treatment gives satisfactory clinical results, though the condyle is not anatomically normal in radiographs, whereas surgical treatment provided more accurate results clinically as well as radiographically.

Keywords: Condyle fracture, Open reduction, Closed reduction

INTRODUCTION

The mandible is the largest and strongest of the facial bones. Mandibular bone fracture is the tenth most common fracture in the human body and second most of the facial bones next only to nasal bones. Among the mandibular bone fractures, condylar region is the most frequent site accounting for about 25-35 %.[1] Condylar fractures are usually the result of a direct blow to the chin or to the lateral side of the jaw caused by Road traffic accidents, violence, accidental falls and sporting injuries. Injury to the mandibular condyle fracture deserves special consideration apart from the rest of the mandible because of its anatomical differences and healing potential.[2] The treatment of condylar fractures has generated a great deal of discussion and controversy in oral and maxillofacial trauma and there are many different methods to treat this injury. For each type of condylar fractures, the techniques must be chosen taking into consideration the presence of teeth, level of the fracture height, patients' adaptation, patients' masticatory system, disturbance of occlusal function, deviation of the mandible, internal derangements of the TMJ and ankylosis of the joint with resultant inability to move the jaw, all of which are Sequels of this injury.[3] There are two principal therapeutic approaches to these fractures: Open reduction or surgical treatment and closed reduction or non surgical treatment.

Many controversies exist as to if, when, and how fractures of the mandibular condyle should be treated.[4] Many surgeons seem to favor closed treatment with Maxillomandibular fixation (MMF) with arch bars, eyelet wires, or splints. Most cases of the condylar fractures are best managed through closed reduction or nonsurgical means.[5]The obvious advantage is the avoidance of morbidity and complications associated with surgery. The main objective of nonsurgical method is either to allow bony union to occur, where there is no significant displacement or, in the case of a fracture dislocation, to produce an acceptable functional pseudoarthrosis by re-education of the neuromuscular pathways. The nonsurgical management of condylar fracture ranges from observation and prescription of a soft diet to variable periods of immobilization followed by intense physiotherapy. The length of the period of immobilization is controversial: It must be long enough to allow initial union of the fracture segments but short enough to prevent complications such as muscular atrophy, joint hypomobility and ankylosis. Currently the period of immobilization ranges from 7 to 21 days. The period may be increased or decreased depending on concomitant factors such as the age and nutritional status of the patient, the level of the fracture, the degree of displacement, and the presence of additional fractures. But in recent years, open treatment of condylar fractures has become more common, probably because of the introduction of plate and screw fixation devices that allow stabilization of the fractures.[3] In surgical method the main objective is to perform a repositioning of the fractured condyle as near to its anatomical location as possible. This is achieved by exposing the condylar fragment, reducing it to a normal relationship with the mandibular fragment and then fixing it in that position. This study is aimed at comparing outcomes of surgical and nonsurgical treatments of mandibular condyle fractures in patients who reported to the Department of Oral and Maxillofacial surgery, Sree Balaji Dental College and Hospital, Chennai.

METHODS

This retrospective study was conducted with the patients who were treated for mandibular condyle fractures at the Department of Oral and Maxillofacial surgery, Sree Balaji Dental College and Hospital, Chennai between 2008-2010.Twenty seven patients with isolated condylar fractures and condylar fractures associated with other additional fractures were included in the study. The study was conducted after obtaining approval from the university ethical committee, and informed consent was obtained from the patient after thoroughly explaining the advantages and disadvantages of nonsurgical and surgical treatment options. Out of the total number of 27 patients, 16 (11 males and 5 females) had undergone non surgical management which included closed reduction with Maxillomandibular fixation ranging from 2-4 weeks followed by physiotherapy. The other 11 patients (7 males and 4 females) were treated surgically by means of open reduction and rigid internal fixation. Extra oral approach to condyle was made in all these 11 patients, the retromandibular approach in 6 patients, modified Preauricular approach in 2 patients and submandibular approach in 3 patients. Post operative follow up period ranged from 3-18 months. Various complications associated with nonsurgical and surgical treatment of condyle fractures were assessed with respect to the following parameters: Mouth opening, deviation of the mandible, pain in temporomandibular joint, malocclusion, reduced ramal height, pain on lateral excursion.

RESULTS

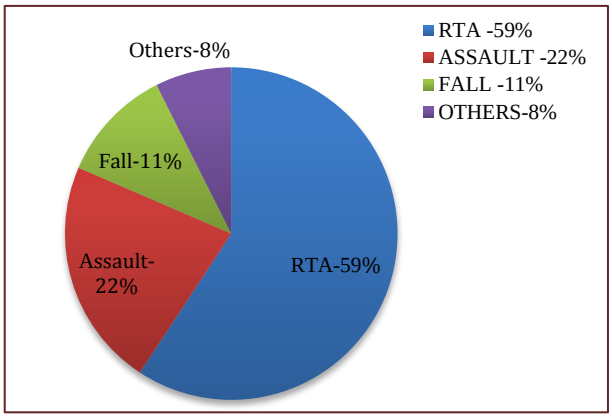

Figure 1: Fracture etiology.

In this present study, 27 patients with isolated condylar fractures and condylar fractures with other associated fractures were included. Out of 27 patients, 18 (67%) were male and 9 (33%) were female. Isolated condylar fractures were present in 13cases (48%) and condylar fractures with other associated fractures were present in 14 cases (52%). Road traffic accidents were the main cause of trauma in 16cases (59%) followed by Assault 6 cases (22%), Fall in 3 cases (11%) and other injuries in 2 cases (8%; Figure 1). Left condyle involved in 13 cases (48%), Right condyle involved in 11 cases (41%) and both side involved in 3 cases (11%). There were 12 patients (45%) with subcondylar fractures, 12 patients (45%) with condylar neck fractures and 3 patients (11%) with condylar head fractures (Figure 2). Out of 27 patients 16 patients (59%) were treated by closed reduction and 11 patients (41%) were treated by open reduction (Table 1). In closed reduction group the maximum interincisal opening ranged from 32-41 mm (average 35.75 mm). 6 patients (37.5%) in this group had reduced mouth opening of below 35 mm. In open reduction group the maximum interincisal opening ranged from 33-44 mm (average 37.50mm) one patient (18%) had reduced mouth opening. Mandibular deviation towards fractured side was noted in 6 cases (37.5%) of closed reduction group and 2 cases (18%) of open reduction group. Pain in TMJ was noted in 7 cases (44%) of closed reduction group and 3 cases (27%) of open reduction group which got subsided gradually on follow

up period. None of the patients in both groups had malocclusion. Radiographically vertical ramus height reduction present in 9 patients (56%) of closed reduction group, but open reduction group patients had normal vertical ramus height postoperatively. Pain on lateral excursion was present in 6 patients (37.5%) of closed reduction group and 3 patients (27%) of open reduction group (Figure 3). In open reduction group 2 patients (18%) had temporary facial nerve weakness; one patient (9%) had postoperative infection.

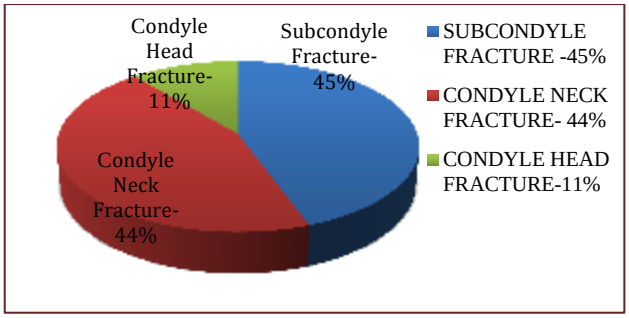

Figure 2: Fracture location.

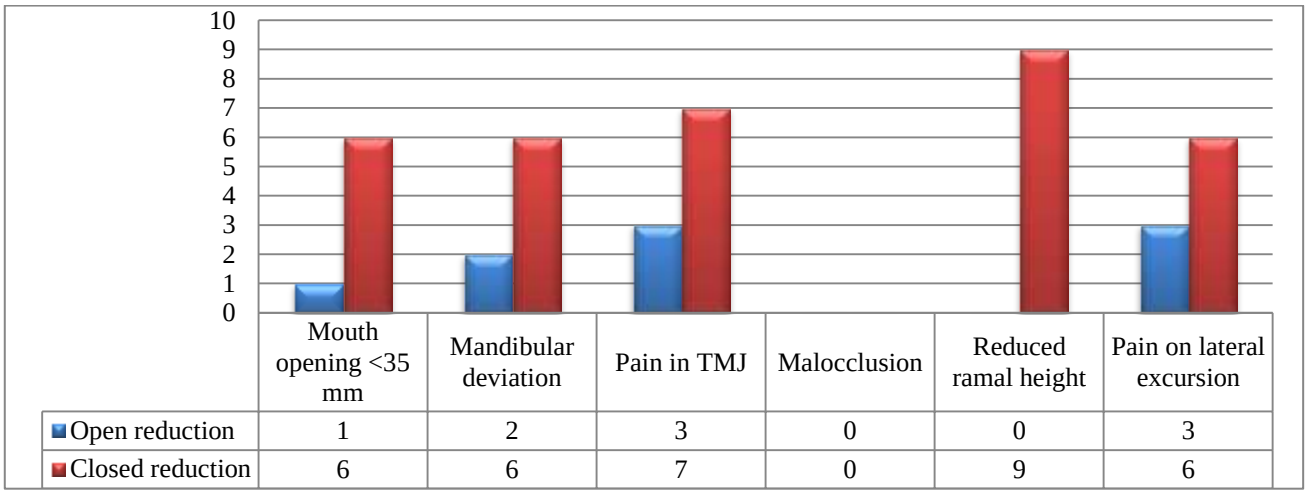

Figure 3: Comparison of surgical and nonsurgical treatment with respect to postoperative outcome.

Table 1: Patients data.

Parameter	Non-surgical (n=16)	Surgical (n=11)	Total (n=27)
Gender (Male/Female)	11/5	7/4	18/9
Age at injury (years)	29 (18-47)	30 (16-47)	29.5 (16-47)
Side			
Right	7	4	11
Left	7	6	13
Bilateral	2	1	3
Location of fracture			
Subcondyle	5	7	12
Condylar neck	9	3	12
Condylar head	2	1	3
Cause			
RTA	9	7	16
Assault	2	4	6
Fall	3	0	3
Others	2	0	2
No. of condyle fracture	9	4	13
No. with associated mandible fractures	7	7	14

Values are presented as number or range
RTA- Road traffic accident

DISCUSSION

In the past decades a number of investigations and outcome study appeared in the literature that have compared nonsurgical with surgical treatment of mandibular condyle fractures. We have discussed the outcomes of nonsurgical and surgical treatment for mandibular condyle fractures from the results of our study. In our study 27 patients with condylar fractures treated in the Department of Oral and Maxillofacial surgery, Sree Balaji Dental College and hospital, Chennai between 2008-2010 were included. Out of 27 patients 16 (59%) patients were treated nonsurgically by maxillomandibular fixation ranging from 2-4 weeks followed by guiding elastics and physiotherapy. Other 11 patients (41%) were treated surgically by open reduction and rigid internal fixation by miniplate osteosynthesis. Post operative follow up period ranged from 3-18 months. Ellis et al[6-13] provided the most detailed and thorough comparison of the outcomes of the closed and open approaches to mandibular fractures in a series of 9 publications. In summarizing the outcomes literature regarding the closed approach versus open reduction and internal fixation (ORIF), ORIF has been associated with scar development and temporary (6 months) paralysis of facial nerve branches. The closed approach is associated with numerous problems. These include chronic pain,

malocclusion, asymmetry, limited mobility, and gross radiographic abnormalities. Hidding et al[14] compared the 1 to 5-year postoperative findings of 20 patients treated with ORIF to 14 who were managed conservatively. The conservative group was treated with maxillomandibular fixation for 2 weeks and then postoperative physiotherapy. The ORIF group was managed with wire or rigid osteosynthesis. They found that deviation on opening occurred in 64% of patients treated conservatively compared with 10% managed with ORIF. No differences were found in mastication, or maximum interincisal opening between groups. Radiographic findings noted anatomic reconstruction in 93% of ORIF patients but only 7% of the conservative group. Haug et al[15] reported the long-term postoperative results of 10 patients treated with closed reduction and 10 patients by ORIF. There were no statistically significant differences between the ORIF and closed reduction. Satisfactory results do not always require exact anatomical repositioning. Even when impaired growth of the mandibular ramus on the fractured side is apparent, good aesthetic and functional results are possible. The ORIF group was associated with perceptible scars, and the closed reduction group with chronic pain.

Ellis et al, discussed about the advantages of retromandibular approach over the preauricular approach, submandibular approach and intraoral approach for ORIF of condylar fractures.[6] In their opinion the best approach for ORIF of condylar fracture is Retromandibular approach. In our study 6 cases (55%) were approached through the retromandibular approach for reduction of subcondylar fractures. Out of 11 patients in open reduction group, 2 patients had facial nerve weakness, one had upper eyelid weakness and the other had lower lip weakness which resolved in 3-4 weeks. Based on our study retromandibular approach provides safer and better reduction of condylar fractures and this finding correlates with the study of Narayanan et al,[16] Tang et al,[17] Biglioli et al[18] and Devlin et al[19]. Patients' mouth opening ranged from 32-41 mm in closed reduction group and 33-44mm in open reduction group. Our results showed statistically significant difference in maximal mouth opening. Open reduction group exhibits good mouth opening post operatively when compared to closed group, which correlates with the study of Eckelt et al,[20] Vesnaver.[21] Mandibular deviation towards fractured side was noted in 6 patients (37.5%) treated by closed method which was attributed to reduced ramal height. This finding correlates with the study of Silvennoinen et al.[22] In our study there is no statistically significant difference in malocclusion found between open and closed group which correlates with the study of Haug et al.[15] Radiographically Vertical ramus height was significantly reduced in 9 patients (56%) treated by closed method. whereas open group had normal vertical ramus height. This finding correlates with the study of Ellis et al,[9] Eckelt et al,[20] Danda et al.[23] Lateral excursive movements were within the normal limits for both the groups which correlate with the findings of De Riu et al.[24] Pain on lateral excursion was elicited in 6 patients (37.5%) treated conservatively whereas 3 cases (27%) of open group patient had pain on lateral excursion. This findings correlates with the observation by Worsae et al.[25] Two of the patients treated by open reduction had temporary facial nerve weakness which subsequently resolved in 3-4 weeks of duration. There were no severe clinical complications in either treatment group. In particular, there was no permanent damage to the facial nerve branches in the surgically treated group. This finding correlates with the study of Eckelt et al.[19] According to Haug et al there was higher perception of scaring associated with open group when compared to closed group.[14] In our study all patients who were treated by open method showed acceptable surgical scar. Post operative infection rate in our study is very minimal; out of 11 patients in open group one patient had post operative infection which was managed by proper antibiotics. Patients' treated by open method had the advantage of early recovery of function in terms of pretraumatic occlusion, mastication, speech and enhanced nutrition. On the other hand nonsurgically treated patients required prolonged period of maxillomandibular fixation and elastic traction which cause significant disturbances.

CONCLUSION

A retrospective study of mandibular condyle fracture was carried out in the Department Of Oral and Maxillofacial Surgery, Sree Balaji dental college and hospital, Chennai between 2008-2010.

The following observations were made:

1. Reduced mouth opening was observed more commonly in closed reduction group than in open reduction group.
2. Mandibular deviation towards the fractured side was more common in the patients' treated by closed reduction. In contrast it was less common in open reduction group.
3. Pain in TMJ was more frequently observed in closed reduction group than in open reduction group.
4. Malocclusion was not observed in both groups of patients in our study.
5. Radiographically vertical ramus height reduction was observed more commonly in closed reduction group, whereas open reduction group has anatomically normal vertical ramus height.
6. Pain on lateral excursion was observed more frequently in closed reduction group than in open reduction group.
7. In open reduction group facial nerve weakness was seen in 2 patients, one patient developed postoperative infection.

Based on the above findings this study concludes that patients treated by closed reduction give reasonably good clinical results, though the condyle is not anatomically normal in radiographs. Whereas patients treated by open

reduction show excellent results clinically as well as radiographically. This retrospective study yields functional results which were clearly in favor of open reduction and fixation of moderately displaced condylar fractures. In our opinion open reduction is indicated in cases of dislocated condylar fractures with ramus shortening and occlusal disharmony and closed reduction in cases of undisplaced condylar fractures without occlusal disharmony. Perhaps a study conducted on larger number of patients with longer post operative follow up will throw more light on the subject.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the institutional ethics committee

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Cite this article as: Ragupathy K. Outcomes of surgical versus nonsurgical treatment of mandibular condyle fractures. Int Surg J 2016;3:47-51.