

COMPARISON OF SURGICAL WITH NONSURGICAL TREATMENT FOR FRACTURED MANDIBULAR CONDYLE — A STUDY

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ABSTRACT

Condylar fractures are the second most-common fractures of the mandible. The purpose of this study was to compare the surgical (open reduction+internal fixation) and nonsurgical (closed reduction+immobilization) treatment of mandibular condylar fracture in terms of occlusion and maximum mouth opening(inter-incisal distance of the jaws) after these two procedures. The study followed a prospective comparative design and was carried out at the Department of Oral and Maxillofacial Surgery, King Edward Medical University / Mayo Hospital, Lahore on sixty patients with uni-lateral condylar fractures (neck and / or subcondylar). Thirty patients were treated by nonsurgical method and thirty by surgical method. At different intervals of their post-operative visits, patients were evaluated in terms of occlusion and maximum mouth opening to assess the difference between the two groups. Patients treated by nonsurgical treatment i.e. closed reduction had greater percentage of malocclusions (44%) at the final post operative visit i.e. one year, as compared with patients treated by surgical treatment i.e. open reduction and internal fixation (8.3%) $p=0.005$. Similarly patients treated surgically exhibited better improvement in maximum inter incisal opening ($46\text{mm}\pm4.50$) than patients treated non-surgically ($37\text{mm}\pm5.50$) at the final post operative visit i.e. one year ($p<0.05$). Based on this study, more consistent occlusion and better improvement in maximum mouth opening can be expected when fractures of the condyle are treated by surgical technique.

Key words: Temporomandibular Joint, Condyle, Occlusion, Maximum Mouth opening, Mandibular motion, Osteosynthesis.

INTRODUCTION

The proper management of the fractured mandibular condyle is one of the most controversial topics if not the most controversial in maxillofacial trauma.¹ The commonly accepted, and generally agreed on, goal of treatment is the re-establishment of the preoperative function of the masticatory system. This restoration typically involves the reestablishment of the preoperative relationship of the fractured segments, the occlusion and maxillofacial symmetry.² The incidence of fractures involving the mandibular condyle are stated by most authors to be the second-most common type of fracture of the mandible with male-female ratio: 2:1.^{3,4,5} Condyle can be treated with one of the two methods i.e., non-surgical (closed reduction+immobilization) or surgical (open reduction +internal fixation). Both these

techniques have their indications and contraindications, merits and demerits.^{6,7,5}

Closed technique (non-surgical) maintains the normal occlusion with less morbidity, produces satisfactory results, because immediate or early mobilization of jaw and maintaining the occlusion with the help of the arch bars and elastics, functional recovery is achieved earlier and union always occurs with less complications.^{3,8,9} However, closed technique is frequently associated with poor long term function i.e. reduced mouth opening, mal-occlusion and deviation on opening. Closed reduction can be uncomfortable for the patient, along with changes in the diet.^{8,10}

Zeid and Kent's¹¹ classic report regarding the indications of the open reduction of the mandibular condyle fractures has been the "Gold Standard" for the past

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decade and a half. Among the absolute indications for open reduction and internal fixation (ORIF) are: Patient preference (when no absolute or relative contraindications coexist), when manipulation and closed reduction cannot reestablish pretraumatic occlusion, when rigid internal fixation is being used to address the other fractures affecting the occlusion and when stability of the occlusion is limited. Among the absolute contraindications are: Condylar head fractures (including single fragment, comminuted and medial pole) and when medical illness or systemic injury add risk to an extended general anesthesia.¹² Open reduction and rigid fixation of condyle fractures ideally gives the condyle process its pre-traumatic position or close to the position restoring skeletal continuity, re-establishing normal mandibular position and bringing the teeth into their proper relationship.¹³ Moreover mini plates¹⁴ and lag screws¹⁵ have made surgical treatment more advantageous. However, some reluctance¹⁶ is found to use surgical treatment because of certain complications. The choice of surgical¹⁷ versus non-surgical¹⁸ treatments for fractures of the condylar process remains a controversial¹ issue. Regardless of the type of treatment use, exact anatomic repositioning of the fractured condylar process seems to be the most important objective.

METHODOLOGY

This study was carried out between May 2005 to May 2006 on 60 patients presenting with the features of condylar fractures in the Department of Oral and Maxillofacial Surgery, Mayo Hospital, Lahore. The patients were divided into two equal groups A and B and treated with two techniques i.e. Surgical technique (open reduction + fixation with miniplates). (Group A) and Nonsurgical technique (Closed reduction + immobilization of the jaws by maxillomandibular fixation). (Group B). The treatment allocation was done using simple random sampling after identifying the patient number using Random Numbers Table. The following inclusion and exclusion criteria were considered:

Inclusive Criteria: Unilateral fracture of the condyle, age above 12 years irrespective of sex, medically fit to undergo surgical intervention sufficient bilateral dentition to allow maxillomandibular fixation on assessment of occlusal relationship. Patient's consent to participate and gross pre-traumatic skeletal mal-relationship of the jaws.

Exclusive Criteria: Following patients were excluded from the study; Patients below 12 years of age, patient with normal occlusion, patient with all other skull

fractures except mandibular fractures, patients with bilateral mandibular condylar fractures and fracture of the head of the condyle.

A standard history and examination chart was completed for each patient and orthopantomogram was taken as the standard radiograph for each patient. The expected outcome of the surgical procedures was explained to every patient included in this study and an informed consent was taken before the surgical procedures.

For the surgical technique a pre-auricular incision was given and fractures were reduced and fixed by miniplates after maintaining normal occlusion. With non surgical technique maxillo-mandibular fixation was applied for four to six weeks and patients were discharged. Patients in both groups were instructed in the same physiotherapy protocol consisting of maximal mouth opening, right and left excursion.

Post operatively those patients who had no complaints about the occlusion but they were having either improper wear and tear of the teeth or they had improper occluded cusps of the teeth were considered having good occlusion. However, those patients who had even a minor complaint about occlusal disturbances were considered having poor occlusion even though they fulfilled the other two requirements for good occlusion. The maximum mouth opening (inter-incisal distance of the jaws) was measured with the help of mm tape, when the patient's mouth was fully opened.

The data of this study were presented as proportions. The proportions in two groups were compared using the chi-square test with one degree of freedom and at an alpha level at 0.05. This was done using SPSS 16.0 on a computer.

RESULTS

Sixty dentate patients having unilateral condylar and associated mandibular fractures were treated in this study. The sample included 38 (63.3%) males and 22 (36.6%) females.

The left side was involved in 28 cases and the right in 32. There were 32 subcondylar and 28 neck fractures.

At first post surgical visit 5 (16.67%) patients came with poor occlusion treated with surgical method (Group A) whereas patients with poor occlusion were 13 (43.33%) in (Group B) treated by the nonsurgical method ($p=0.02$). At the second post-op visit 4 (13.33%) patients had poor occlusion treated by surgical technique, and 46.67% patients treated non-surgically reported poor occlusion ($p=0.005$).

TABLE 1: COMPARISON OF OCCLUSION BY TREATMENT GROUP AT VARIOUS TIME PERIODS

Period	Observation	Surgical	Non-surgical	P (Surgical vs Non-Surgical)
1 st Month	Total observed patients	30	30	0.02
	Patients with poor occlusion	5	13	
	%age of poor occlusion	16.67%	43.33%	
3 rd Month	Total observed patients	30	30	0.005
	Patients with poor occlusion	4	14	
	%age of poor occlusion	13.33%	46.67%	
6 th Month	Total observed patients	26	27	0.002
	Patients with poor occlusion	2	13	
	%age of poor occlusion	7.7%	48.10%	
1 year	Total observed patients	24	25	0.005
	Patients with poor occlusion	2	11	
	%age of poor occlusion	8.3%	44.0%	

TABLE 2: COMPARISON OF MEAN MAXIMUM MOUTH OPENING BY TREATMENT GROUP AT VARIOUS PERIODS

Period	Mean Maximum mouth opening (mm)		p-value
	Surgical (Open)	Non-Surgical (Close)	
1 st Month	25.00±9.20	23.00±5.90	P>0.05
3 rd Month	39.00±5.51	31.00±4.08	P<0.05
6 th Month	40.50±5.50	35.50±5.20	P<0.05
1 year	46.00±4.50	37.00±5.50	P<0.05

At third post-op visit group “A” had 2(7.7%) patient with poor occlusion out of 26 patients checked and group “B” had 13(48.10%) patient with poor occlusion out of 27 patients checked (p=0.002). At the final post-op visit 2 (8.3%) out of 24 checked patients of group A had poor occlusion, and 11 (44.00%) out of 25 checked patients of group B reported with poor occlusion (p=0.005).

Table 2 shows that at first postoperative visit on first month maximum mouth opening MMO(mean) was 25.00 + 9.20 mm in surgical group and it was 23.00+ 5.90 mm in non-surgical group (p=>0.05) Range was taken 0 to 40 mm. At second postoperative visit on third month MMO was 39.00 + 5.51 mm in surgically treated group while it was 31.00 + 4.08 mm in non-surgical group (p=<0.05) Range was taken 20 to 50 mm. At third postoperative visit on sixth month MMO was 40.50 + 5.50 mm in surgical group and it was 35.50 + 5.20 mm in non-surgically treated group (p=<0.05). After one year MMO was 46.00 + 4.50 in surgically treated patients and was 37.00 + 5.5 mm in non-surgical group(p=<0.05). Note: The range of

maximum mouth opening (MMO) mean was same for second third and fourth postoperative visits i.e. (20 to 50 mm).

DISCUSSION

The purpose of this study was to compare the surgical(open reduction+internal fixation) and nonsurgical (closed reduction+immobilization) treatment of mandibular condylar fracture in terms of occlusion and maximum mouth opening(inter-incisal distance of the jaws) after these two procedures. The results of the study confirm that the patients treated by nonsurgical technique had significantly greater percentages of mal-occlusion than the patients treated by surgical method. This finding is similar to the finding of study conducted by Ellis-III⁵ which showed that percentage of poor occlusion was greater in the non-surgically treated patients and found an over all low percentage of the malocclusion for surgical treatment.⁵ This study had also patients with good occlusion treated by non-surgical technique, though their number was less than surgical group. In this regard, the study matches with Ellis-III⁵ i.e. patient with isolated condylar process

fracture (no associated mandibular fracture) who were treated by closed technique had significantly more malocclusions than those treated by open reduction. Ellis III⁵ reported that this would be the ideal treatment, but it is dependent on the surgeon's ability to perform a satisfactory reduction. The results of the present study are also comparable with the results of studies conducted by Luc¹⁹, who concluded that in considerable displacement of the condylar fragment, surgical repositioning and rigid internal fixation should be considered and Yang WG⁹, who concluded that open reduction gives good occlusion (78%) as compared to the closed technique (43%).

This study also reports maximum mouth opening after surgical and non-surgical treatment of condylar fractures. The results of the present study are comparable to the study conducted by Ulrich Joos²⁰, who treated 122 adult patients with 138 condylar neck fractures and reported an average mouth opening of 41 mm in the nonsurgical group and 45 mm in the surgical group. Throckmorton carried out a study on 136 patients (74 treated by closed and 62 by open method) and concluded that in patients treated with open method, maximum interincisal opening was significantly different from those treated with close method. Our follow-up results and conclusion of study regarding maximum mouth opening are comparable with the study done by Throckmorton.²¹

Richard and Leon¹² measured the outcomes of open versus closed treatment of mandibular subcondylar fractures and found no statistically significant difference of maximum inter-incisal opening in open versus closely treated patients. Present study differs from that of Richard Leon¹² in the way that this study confirms the difference of interincisal opening between the two groups which was measured as well as assessed by an individual oral and maxillofacial resident. In addition to above mentioned findings we also found that patients treated surgically exhibited faster rate of improvement in maximum inter-incisal opening than the patients who were treated non-surgically.

CONCLUSION

The results suggest that generally open reduction and internal fixation (surgical technique) is a better solution for the management of condylar fractures. It is because of relative simplicity of the surgical technique, the faster and better recovery rates and the easier functional therapy. However, before going to plan the condylar process fracture reduction, one must always weigh the potential benefits of open treatment

against the potential morbidity that accompanies open surgery.

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