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Original Research

Comparison of outcome of surgical treatment of condylar fractures with non-surgical treatment

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***ABSTRACT*:**
Background: The displacement of condylar fracture is determined by the direction, degree, magnitude and precise point of application of the force, as well as the state of dentition and the occlusal position. Management of injuries of the condyle deserve special consideration apart from rest of the mandible due to their anatomic difference and their healing potential. Severe abnormalities in the function of the disco ligamentous system may result from fractures of this sort. Hence; the present study was undertaken for comparing the outcome of surgical treatment of condylar fractures with that of non-surgical treatment. **Materials & methods:** 54 patients of mandibular condylar fracture were included, out of which 27 patients managed surgically and 27 patients conservatively. Out of 54 patients 43 patients were males and 11 patients were females. Present study was undertaken to evaluate the demographics, compare the outcome of surgical and conservative treatments with advantages and disadvantages of both the techniques in terms of results and complications associated. All the results were recorded in Microsoft excel sheet and were analysed by SPSS software. **Results:** Mandibular deviation on mouth opening was present in all 54 patients in both the groups on preoperative examination. After treatment in group I there was no mandibular deviation present and in group II mandibular deviation on mouth opening was present in 8(29.6%) patients. There was statistically significant difference between two groups with p value .002 by applying Pearson Chi-Square test. At 6 months, follow-up in the closed treatment group, shortening was still (4.04 mm±1.91) and had not substantially improved when compared with the preoperative values. A similar situation occurred in the degree of angulation, which had only slightly improved with (26.43mm±6.53), with statistically significant difference between two groups (Student t-test, P<.001) in both the parameters when compared with the preoperative situation. **Conclusion:** In the long term, incomplete anatomical restoration in non-surgical methods can cause facial asymmetry and inclination of the occlusal plane, as well as functional occlusal problems, such as premature contact in protrusion and lateral excursion
Key words: Surgical, Condylar fracture, Non-surgical

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INTRODUCTION

The temporomandibular joint articulation is composed of bilateral, diarthrodial, temporomandibular joints (TMJs). Each joint is formed by a mandibular condyle and its corresponding temporal cavity (glenoid fossa and articular eminence). The temporomandibular joint (TMJ) is a vital component of the masticatory apparatus. Condylar trauma is common cause of the development of TMJ related complications such as internal derangement of the temporomandibular joint and ankylosis of the joint with resultant inability to move the jaw. Relation between condylar head and glenoid fossa as non-displaced, displaced or dislocated. Radiographic evaluation confirms the diagnosis of the fractures and also allows the detailed classification. Treatment planning of these injuries is based on the presentation of fracture and should be viewed in as much detail as possible.[1- 3]

The displacement of condylar fracture is determined by the direction, degree, magnitude and precise point of application of the force, as well as the state of dentition and the occlusal position. Management of injuries of the condyle deserve special consideration apart from rest of the mandible due to their anatomic difference and their healing potential. Severe abnormalities in the function of the disco ligamentous

system may result from fractures of this sort. The restoration of the physiological function of the temporomandibular system is of primary importance in the treatment of the condylar fracture. The goals of treatment with respect to fracture of mandible condyle are restitution of normal form and function with minimum injury to vital structures such as parotid gland and facial nerve.[4- 6] Hence; the present study was undertaken for comparing the outcome of surgical treatment of condylar fractures with that of non-surgical treatment.

MATERIALS & METHODS

The present study was conducted with the aim of comparing the outcome of surgical treatment of condylar fractures with that of non-surgical treatment. 54 patients of mandibular condylar fracture were included, out of which 27 patients managed surgically and 27 patients conservatively. Out of 54 patients 43 patients were males and 11 patients were females.

Present study was undertaken to evaluate the demographics, compare the outcome of surgical and conservative treatments with advantages and disadvantages of both the techniques in terms of results and complications associated. After taking consent all the patients were enrolled in the study. Patients were clinically examined for facial asymmetry with swelling in prearicular region, bleeding from ear, bruise or laceration over chin, restricted mouth opening and TMJ movements, mandibular deviation, deranged occlusion and tenderness on palpation in prearicular region. Open Treatment Group Patients who selected open surgery had arch bars placed on the maxillary and mandibular dentition. All mobile fractures of the maxilla and mandible were rigidly stabilized, using internal bone plate and screw fixation. The surgical technique for the condylar process was retromandibular, modified retromandibular mostly and preauricular for high condylar fractures. Fractures were stabilized using mini plates without compression that allowed a minimum of two 2.0~mm screws on each side of the fracture. No postsurgical MMF was used in any patient. Closed Treatment Group Patients underwent application of arch bars and rigid internal fixation of other fractures of the mandible or maxilla. The fractured condylar process was not surgically repositioned or stabilized. IMF was done from 4 to 6 weeks. Patients in both groups were instructed in the same physiotherapy protocol. All the results were recorded in Microsoft excel sheet and were analysed by SPSS software.

RESULTS

Mandibular deviation on mouth opening was present in all 54 patients in both the groups on preoperative examination. After treatment in group I there was no mandibular deviation present and in group II mandibular deviation on mouth opening was present in 8(29.6%) patients. There was statistically significant difference between two groups with p value .002 by applying Pearson Chi-Square test.

Table 1: Postoperative Mandibular Deviation and Occlusion

Parameter		Group I	Group II	Pearson Chi-Square Test (p value)
Mandibular deviation Post. Op.	Not Present	27	19	.002
	Present	0	8	
Mandibular deviation Post. Op.	Deranged	0	7	.009
	Intact	27	20	

Preoperatively occlusion was deranged in all 54 patients present in both cases. Post operatively in group I there was no deranged occlusion in all 27 patients while in group II occlusal derangement was present in 7 patients while occlusion was intact in 20 patients.. There was statistically significant difference between two groups with p value .009 by applying Pearson Chi-Square test. In group I facial nerve paresis was present in 6 patients on post-operative day 7, in 1 patient on postoperative 6 weeks and complete recovery noticed after 3 month follow up. Patients were kept on tablet cyanocobalamin 1500µg for one month. Incidence of postoperative sialocele noticed in 3 patients which subsided subsequently after applying pressure dressing for 5 to 7 days. No cases of infection, implant failure and postoperative hypertrophied scar were reported.

Table 2: Comparison of displacement

Displacement	**Pre-treatment**			**Post-treatment**		
	Open Reduction (Mean ± SD)	Closed Treatment (Mean ± SD)	Significance	Open Reduction (Mean ± SD)	Closed Treatment (Mean ± SD)	Significance
Coronal plane (Towne's image) condyle/ramus angle difference	32.11±8.86	29.56±7.72	p =0.29	3.11±1.24	26.43±6.53	p < 0.001
Ramus height Shortening	5.19±1.60	4.78±1.95	P=0.42	0.5±0.7	4.04±1.91	p < 0.001

The precision of fracture reduction and the stability of fixation were evaluated by radiographs obtained preoperatively, 6 weeks, 3 and 6 months follow-ups. In the group I, the average preoperative shortening of the ascending ramus was (5.19 mm±1.95). The average degree of preoperative fracture angulation was (32.11°±8.86). Six months after the surgical treatment, the average shortening of the ascending ramus height was (0.5mm ±0.7)and the average residual angulation was (3.11°±1.24). In the closed treatment group, the average pretreatment shortening was (4.78 mm±1.95) and the angulation was (29.56°±7.72). Thus, both treatment groups were comparable preoperatively with no significant differences in these parameters (shortening, P=0.42; degree of angulation, P=0.29). At 6 months, follow-up in the closed treatment group, shortening was still (4.04 mm±1.91) and had not substantially improved when compared with the preoperative values. A similar situation occurred in the degree of angulation, which had only slightly improved with (26.43mm±6.53), with statistically significant difference between two groups (Student t-test, P<.001) in both the parameters when compared with the preoperative situation.

DISCUSSION

The treatment of the mandibular condyle is one of the most widely debated topics in the maxillofacial literature. Several variables must be considered when determining treatment and predicting the prognosis, including the level of fracture, degree and direction of displacement, age and medical status of the patient, concomitant injuries and status of the dentition. The treatment options are categorized into surgical and non-surgical modalities. Complications of condylar injury are far reaching in their effect and not always immediately evident. Disturbances in mandibular mobility, occlusion, deviation of mandible, internal derangement of the TMJ and ankylosis of the joint are all possible sequels of such injury. Fractures of mandibular condyle have been treated for more than one and half century, but still remain the subject of much discussion with regards to standardizing the therapy, due to wide variance of forms this may take, leads to difficulty in justifying the treatment implemented by the result affected.[7-9]

Particular intervention and management strategy should consider that similar problems are being addressed under similar circumstances. This necessitate that simple classificatory criterion is of fundamental importance to correctly apply any therapy, which must necessarily take into account parameters such as the age of the patient, the intra- or extra-capsular location of the fracture, whether it is uni or bilateral, the kind of dislocation of the stumps and the presence or absence of luxation of the condylar head from the glenoid cavity.[10] Hence; the present study was undertaken for comparing the outcome of surgical treatment of condylar fractures with that of non-surgical treatment.

In the present study, reduced mandibular mobility was one of the common problems encountered by the patients treated conservatively, which was recorded on the periodic post treatment follow-ups. Maximum interincisal mouth opening in conservatively treated patients (mean 34.45 mm SD was significantly reduced on the follow–ups as compared to the surgically managed patients(mean 42.46 mm SD ± 4.30), highly significant (Student t-test p =.00) on the 6 month follow-up. It could be due to the deformed condyle/loss of posterior facial height and altered neuromuscular co-ordination. In the present study noticeable progression in laterotrusion in the surgical group at all stages of follow up was seen. After 6 months of treatment both treatment groups had significant reduction in their ability to perform the contralateral excursion where on an average, patients in open group were able to move mandible through 7.52±1.59mm to non-fractured side and 8.31 ± 1.52mm to fractured side while closed group through 4.33±0.70 mm to non-fractured side and 7.24±0.97mm to fractured side. The difference in lateral excursive movements was highly significant in both groups (Student t-test, p <.001).Reason for reduced lateral excursion particularly to contralateral side could be non-return of optimum function of lateral pterygoid muscle due to its abnormal contraction as a result of malposition of fractured condyle in closed treatment group. Al-Moraissi et al in their systemic review and meta-analysis of surgical management versus closed treatment showed that ORIF patients had a greater postoperative MIMO than patients treated with closed treatment. Danda et al and Gupta et al in their respective studies found the similar results. But Sforza et al in their study found that no significant difference was present between patients with open and closed treatment. Similarly, laterotrusive movement was better in ORIF patients, indicating better condylar motion in the studies of Haugh et al, but disagrees with the results of others like Landes et al as no significant difference of laterotrusion to and from the fractured side was found. However it is of importance that all the studies are non- randomized studies, there is the shortcoming that usually the more complicated displaced or dislocated fractures were more likely to receive operative treatment and less displaced fractures to receive closed treatment. Thus, there is a bias due to patient selection. In our study, patients were randomized into both treatment groups.[11-16]

Mandibular deviation on mouth opening in the present study was present in all the patients in preoperatively and significantly reduced postoperatively in group I than group II (Chi-Square test P=.002). Open reduction and internal fixation achieve the pre traumatic position of condylar process, or close to that position, restoring skeletal continuity, re-establishing normal mandibular position

and hence the control of musculoskeletal harmony of the jaw during mouth opening movements. Hidding et al in clinical, radiographic and axiographic study of surgical versus non-surgical treatment of fractures of the articular process of the mandible reinvestigated 34 patients with dislocated fractures of the condyle.20 of them had been treated by open reduction, 14 in a conservative-functional way. The instrumental registration and the X-ray findings showed considerable deviations in the joint physiology in the conservative group. 19 of 20 patients operated on showed near- anatomical reduction of the mandibular condyle with mandibular deviations in 64 % of the patients in the conservative group as opposed to 10 % in the operation group. Similar results were found in the meta-analysis of concerned studies by Al-Moraissi and Ellis III.[11, 17]

CONCLUSION

Our results suggest that, in the long term, incomplete anatomical restoration in non-surgical methods can cause facial asymmetry and inclination of the occlusal plane, as well as functional occlusal problems, such as premature contact in protrusion and lateral excursion. Moreover, non-surgical treatment, even correctly performed, is lengthy requires continuous adjustment of the elastics applied to the arch bars, and is more uncomfortable for the patient than the open reduction and rigid fixation.

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