MANDIBULAR CONDYLE FRACTURE- EFFECT OF TREATMENT ON OCCLUSAL RELATIONSHIP

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ABSTRACT

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. Condylar fracture may result in restricted mouth opening, restricted movement of the jaw and malocclusion, Malocclusion following condylar trauma may result from alteration in the condylar growth center or union of the fractured segments in a position other than that existing prior to injury. Therefore, the aim of the treatment should be to achieve normal static and dynamic occlusal relationships after treatment. The purpose of this study was to see the improvements in the occlusal relationships after the treatment of the fractured mandibular condyle. Two different treatment modalities surgical and nonsurgical were used to assess their impact on occlusion. The study followed a prospective comparative design and was carried out at the Department of Oral and Maxillofacial Surgery, Children Hospital, Lahore, Pakistan on sixty patients with uni-lateral condylar fractures. 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 to assess the difference between the two groups. Patients treated by nonsurgical method, 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 (8.3%) p=0.005. Based on this study, more consistent occlusion can be expected when fractures of the condyle are treated by the open reduction and internal fixation technique.

Key Words: Temporomandibular Joint, Condyle, Occlusion, Mandibular motion, Osteosynthesis.

INTRODUCTION

Injury to the condyle may be caused by a variety of mechanisms and knowledge of the mechanism of fracture greatly simplifies the diagnosis. There are 3 types of traumatic forces causing condylar injury: one, energy imparted on a static individual by a moving object, e.g., a blow to the face by a fist, cricket bat etc, two, a moving individual striking a static object, e.g., a child falling and striking the chin against the ground and three, the combination of the above two forces, e.g., an individual is moving forward and the automobile is moving in the opposite direction. This type of force is usually the greatest and produces the most severe injury patterns.

The management of the fractured mandibular condyle is one of the most difficult and controversial topic in maxillofacial trauma. Different treatment modalities have been used to treat the fractured mandibular condyle, most common and effective treatment option being the open reduction in case of maximum displacement of the fractured condyle and disturbed occlusion. This restoration typically involves the re-establishment of the preoperative relationship of the fractured segments, the occlusion and maxillofacial symmetry. 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. Mal-occlusion following condylar trauma may result from alteration in the condylar growth center or union of the fractured segments in a position other than that existing prior to injury. The displacement of the mandible by even 1mm can disrupt the mastication process enough to cause a patient discomfort. Therefore, the aim of the treatment should be to achieve reasonably normal, relatively pain-free range of mandibular motion soon after the injury. Symmetry of the mandible, as well as a good occlusion should also be among the treatment goals.

Time has revolutionized the field of surgery and the management of maxillofacial fractures has also been improved likewise. Treatment modalities changed from closed reduction to open reduction and fixation with wires and screws and plates. However, there are still some disadvantages present in the modern techniques.

Closed technique is a better option when the fracture condyle is less displaced, during the growing ages, no extraoral scar mark, no risk to the facial nerve injury and can be managed under local anesthesia. 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. Moreover, in nonsurgical method, incomplete anatomical restoration can cause facial asymmetry and inclination of the occlusion plane, as well as functional occlusion problems such as premature contact in protrusion and lateral protrusion.

The second treatment option is through the surgical methods which has its own indications, merits and demerits. Among the absolute indications for open reduction and internal fixation (ORIF) are; one, patient preference which means when patient wants early mobilization. Two, when manipulation and closed reduction cannot reestablish occlusion. Three, when rigid internal fixation is being used to address the other fractures affecting the occlusion. Four, when stability of the occlusion is limited. Among the absolute contraindications is when medical illness or systemic injury add risk to general anesthesia. The relative indications for open reduction and rigid internal fixation are; Edentulous jaws, Uncontrolled seizure disorders, Status asthmaticus, Psychologic compliance (e.g. mental retardation, organic mental syndrome). When a simple method is effective and condylar neck fractures (the thin, constricted region inferior to the condylar head) are among the relative contraindications.

The purpose of this study was to see the improvements in the occlusal relationships after the treatment of the fractured mandibular condyle using Closed Reduction and open Reduction Techniques.

**METHODOLOGY**

The study followed a prospective comparative design and was carried out at the Department of Oral and Maxillofacial Surgery, Children Hospital, Lahore and Department of Oral & Maxillofacial Surgery, The University of Lahore on sixty patients with uni-lateral condylar fractures. Thirty patients were treated by surgical method (Group A) and thirty by nonsurgical method (Group B). The treatment allocation was done using simple random sampling after identifying the patient number using Random Numbers Table. The following selection criterion was 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 and patient’s consent to participate and gross pre-traumatic skeletal mal-relationship of the jaws.

**Exclusive Criteria**

Patients below 12 years of age, with normal occlusion and 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. Study was conducted after approval from ethical committee.

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.

Post operatively those patients who had even a minor complaint about occlusal disturbances such as
pre-mature contact, anterior openbite and posterior openbite were considered having poor occlusion and were assessed. SPSS 17.0 was used to analyze the data 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%) male and 22 (36.6%) female. Left side was involved in 28 cases and the right in 32 (P > 0.05). There were 32 subcondyle and 28 neck fractures (P > 0.05). Among the 30 patients in the non-surgical group, 16 had fracture of the neck and 14 were having subcondylar fractures. Among the 30 patients in the surgical group, 12 had fracture of the neck and 18 had subcondylar fractures.

Associated mandibular fractures were 12 out of 30 in surgical group and 6 out of 30 in non-surgical group.

Those patients who had no complaints about the occlusion but they were having either improper wear and tear of the teeth or they had no proper 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 i.e. Wear and tear patterns of the teeth and Inter-digitation of cusps.

In our study we found that patients treated surgically have less rate of occlusal disturbances as compared to patients treated with nonsurgical technique.

DISCUSSION

The aim of this study was to see the improvements in the occlusal relationships after the treatment of the fractured mandibular condyle. The results of the study confirm that the patients treated by nonsurgical technique had significantly greater percentages of malocclusion than the patients treated by surgical method. This finding is similar to the finding of the study conducted by Ellis-III 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. This study had also patients with good occlusion treated by nonsurgical technique, though their number was less than surgical group. In this regard, the study matches with Ellis-III,

<table>
<thead>
<tr>
<th>TABLE 1: CHARACTERISTICS OF THE SAMPLE</th>
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<tbody>
<tr>
<td>Total patients</td>
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<tr>
<td>Location of fracture.</td>
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<tr>
<td>Subcondyle</td>
</tr>
<tr>
<td>Neck</td>
</tr>
<tr>
<td>Side</td>
</tr>
<tr>
<td>Right</td>
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<tr>
<td>Left</td>
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<tr>
<td>Sex</td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Female</td>
</tr>
</tbody>
</table>

<p>| TABLE 2: COMPARISON OF OCCLUSION BY TREATMENT GROUP AT VARIOUS TIME PERIODS |
|--------------------------------|------------------|------------------|------------------|</p>
<table>
<thead>
<tr>
<th>Period</th>
<th>Observation</th>
<th>Surgical</th>
<th>Non-surgical</th>
<th>P (Surgical vs. Non-Surgical)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Month</td>
<td>Total observed Patients.</td>
<td>30</td>
<td>30</td>
<td>0.2734</td>
</tr>
<tr>
<td></td>
<td>Patients with poor occlusion.</td>
<td>8</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td></td>
<td>%age of poor occlusion.</td>
<td>26.67%</td>
<td>40%</td>
<td></td>
</tr>
<tr>
<td>3rd Month</td>
<td>Total observed Patients.</td>
<td>14</td>
<td>14</td>
<td>1.0000</td>
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<tr>
<td></td>
<td>Patients with poor occlusion.</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>%age of poor occlusion.</td>
<td>29%</td>
<td>29%</td>
<td></td>
</tr>
<tr>
<td>6th Month</td>
<td>Total observed Patients.</td>
<td>14</td>
<td>14</td>
<td>0.1573</td>
</tr>
<tr>
<td></td>
<td>Patients with poor occlusion.</td>
<td>2</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>%age of poor occlusion.</td>
<td>14%</td>
<td>29%</td>
<td></td>
</tr>
<tr>
<td>1 year</td>
<td>Total observed Patients.</td>
<td>8</td>
<td>10</td>
<td>0.0001</td>
</tr>
<tr>
<td></td>
<td>Patients with poor occlusion.</td>
<td>0</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>%age of poor occlusion.</td>
<td>0%</td>
<td>40%</td>
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</tbody>
</table>
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. The results of the present study are also comparable with the results of studies conducted by Luc22, who concluded that in considerable displacement of the condylar fragment, surgical repositioning and rigid internal fixation should be considered and Yang WG12, concluded that open reduction gives good occlusion (78%) as compared to the closed technique (43%). This study also reports minimum mouth opening after surgical and non-surgical treatment of condylar fractures. The results of the present study are comparable to the study conducted by Ales vesnaver23, who treated 13 patients with condylar neck fractures by open reduction and reported an average mouth opening of 40 mm. 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 closed method. Followup results and conclusion of this study regarding maximum mouth opening are comparable with the study done by Throckmorton.24 Chen and Feng25 concluded in their study that open reduction with rigid fixation for bilateral condylar fractures provided satisfactory functional outcomes in this study.

CONCLUSION

The results suggest that post operative occlusion was better rehabilitated at different follow up visits with minimal concerns for those patients where mandibular condylar fractures were treated with open reduction and internal fixation (surgical technique) as compared to the closed reduction method.

REFERENCES