

# FUNCTIONAL TREATMENT OF CONDYLAR MANDIBULAR PROCESS FRACTURES.

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## Abstract:

**Background:** Mandibular fracture is one of the commonest facial skeletal injuries, the classical treatment for condylar fracture either by close or open reduction. The purpose of this study is to prove the effectiveness of early functional rehabilitation through the effect of neuromuscular adaptation in unilateral and bilateral condylar fractures .

**Patients and Methods:** A prospective study included thirty patients presenting with condylar fractures, divided into three age groups , group I children less than 12 years old , group II teenagers age range 12-17 years old and group III adult more than 17 years those admitted to maxillofacial department in Al-Basra Teaching Hospital from May,1,2015 until October,30,2016 presented with a malocclusion, a deviated midline, and a limited mouth opening. Computed Tomography is done as early as possible. The method used in our study was the early closed active functional treatment.

**Results:** Young patients less than 12 years of age were 17 (56.7%), also we found that the dislocation of condylar head fracture was more common in the very young age group according to the CT- Scan. Teenagers patients (12-17) years of age were 2 (6.7%) while adult patients more than 17 years old were 11 (36.7%) .

**Conclusion:** The complete condylar remodeling (restitution of condylar head) occurs in very young age group (less than 12 years old) and to less extent in others age groups , the diagnosis depend on ct scan findings in pre and post imaging .

**Keywords:** MMF maxillary mandibular fixation, FUN function, TMJ tempromandibular joint, BI bilateral, UNI unilateral

## **Introduction:**

**T**he condyle represents a structural weak point in the mandibular skeleton<sup>1&2</sup>, and sometimes its being fractured avoids more serious consequences such as fractures of the base of the skull which can traumatically interrupt propulsive strength<sup>3</sup>, the position of the fracture is related not only to the location and severity of the trauma but also to the position and action of the masticatory muscles as well as the presence of dental elements.<sup>4</sup> The study aims to provide valuable insights into the potential benefits of this approach in promoting recovery and improving patient outcomes. This research seeks to contribute to the understanding of treatment strategies for condylar fractures and their effects on the neuromuscular system, with the ultimate goal of enhancing the overall management and rehabilitation of such injuries.

## **Patients and methods:**

A prospective study for thirty patients presenting with condylar fractures, divided into three age groups, group I children less than 12 years old, group II teenagers age range 12-17 years old and group III adult more than 17 years those attributed to maxillofacial department in Al-Basra

Teaching Hospital from May,1,2015 until October,30,2016. More than this number of patients was operated upon but they either refused participation in this study or dropped from follow up. The main presentation symptoms were a malocclusion, a deviated midline, and a limited mouth opening. Computed tomography taken for the patients as early as possible. The method used in our study was the early closed active functional treatment, which depend on bringing the patient to functional movement either at the first day of injury or as early as possible after bringing the teeth into centric occlusion, this was done by manual guiding the mandible directly or indirectly by elastic traction through the application of either arch bar or orthodontic brackets. The exercise was done by the patient or by the help of his escorts for several times at least 10 times every 4 hours. Used closed active functional treatment, which depend on bringing the patient occlusion to functional movement either at the first day of injury or as early as possible after bringing the teeth into centric occlusion which was done by manually guiding the mandible directly or indirectly by elastic traction through the application of either arch bar or orthodontic brackets. Immediate active mobilization was used for mild cases of

unilateral condylar fractures or stabilizing of centric occlusion for short period of 1-2 days for moderate cases or delayed mobilization extended period 5-7 days in severe cases of open bite. , the diagnosis depend on CTscan findings in pre and post imaging . The primary objective of this study is to demonstrate the efficacy of early functional rehabilitation in the context of neuromuscular adaptation for both unilateral and bilateral condylar fractures by investigating the impact of early functional rehabilitation on these types of fractures. Additionally, CT

scans revealed a higher incidence of condylar head fracture dislocation in the very young age group following trauma. Treatment started immediately by guiding the patient to normal centric occlusion, then active functional exercise started from the first day for one month. The patient followed soft diet for several days then normal feeding. After an 8-month follow-up, the patient successfully restored their pre-traumatic mouth opening, CT scan revealed complete restitution remodeling of the condyle. as depicted in Figure I



Fig I:CT scan revealed complete restitution remodeling of the condyle

Statistical analysis was performed by using of SPSS (Statistical Package for Social Sciences) version 19. Numbers and percentages were used to describe categorical variables.

**Results:**

Thirty patients were admitted to Al-Basrah General Hospital in Basrah, Iraq, with ages ranging from 3 to 50 years. These patients underwent active functional treatment using the described technique. Of the total patients, 70% (21) were male and 30% (9) were female. The patients were categorized into three groups based on age: 17 patients (56.7%) were very young, less than 12 years old; 2 patients (6.7%) were teenagers aged 12-17; and 11 patients (36.7%) were adults over 17 years old Table I.

**Table I: Patients characteristics**

Characters		Number	Percent
Sex	Male	21	70
	Female	9	30
Age	< 12	17	56
	Teenagers 12-17	2	6.7
	>17	11	36.7

Additionally, the study found that the dislocation of condylar head fractures was more commonly uni extracapsular ( 33.3%) and less frequently bi extracapsular (6.7%) as seen in Table II.

**Table II: Distribution according to the site**

Fracture type	Number	Percent
Uni intracapsular	7	23.30%
Uni extracapsular	10	33.30%
Bi intracapsular	5	16.70%
Bi extracapsular	2	6.70%
Intra &extracapsular	6	20%
Total	30	100%

The follow-up period ranged from 6 to 8 months. Twenty patients (66.7%) were treated with immediate active function, while 10 patients (33.3%) were treated with delayed active function Table III.

**Table III: Treatment strategy**

Response	Number	Percent
Acceptable occlusion	27	90
Mild derangement	2	6.7
Slight derangement	1	3.3
Total	30	100

In different age groups, 27 cases achieved good or acceptable occlusion. Additionally, in the young age group with mixed dentition, there were 2 cases of mild derangement of occlusion, which could be balanced by the eruption of newly permanent teeth. Furthermore, one adult case had slight derangement of occlusion (Table IV).

**Table IV : Response to treatment**

Age	Immediate function	delay function
<12 ys	13	7
12-17 ys	1	2
>17 ys	6	1
Total	20	10
	66.6	33.4

**Discussion:**

In our study we depend on classification according to the position from the joint as in classification (intra capsular & extra-capsular fractures) with adding subdivision to high level and low level in extra capsular Fracture , depending to the Spiessl & Schroll classification.<sup>5</sup>

We didn't depend on Lindahl, (1977) classification (condylar head fracture,

condylar neck fracture and sub-condylar ) due to the difficulty in differentiation between condylar neck and sub-condylar region in x-ray or CT scan , but we depend on (vertical and horizontal) types of intra capsular fracture.<sup>6</sup>

The initial diagnosis of the TMJ using panoramic radiograph scan be problematic due to low reliability of the response pattern of the different appraisers for the presence of

morphological changes of the TMJ, these low rates can indicate a deficiency in the relationship of the panoramic image to its resolution it can not be used effectively as a diagnostic tool for bone components in this region .

In our study many patient who had been send for panoramic radiographs we couldn't discover the fracture condyle especially in intra capsular fracture which not match with the clinical examination so we depended on the C.T. scan in the diagnosis and found that in one case presenting with derangement of occlusion with shifting in the midline the panoramic radiographs revealed nothing , but C.T. scan revealed fracture in the mid cranial fossa only , so we exclude the case.<sup>7</sup> Condylar head dislocated fracture more common in the young age group.<sup>8</sup> a relatively large number of fractures of the condylar neck, whereas most authors have reported more sub condylar fractures than fractures of the condylar neck.<sup>9</sup> Avoiding immobilization, encouraging good mobility of the mandible in as short a time as possible , avoiding MMF allows one to institute physiotherapy from the outset and helps the patient achieve their pre traumatic range of motion sooner than when a period of MMF is used<sup>10</sup> . radiographically the ability of a new condylar process to regenerate after closed treatment of condylar process fractures.<sup>11</sup>They called this adaptation “restitutional” remodeling<sup>12</sup>. In our study we found that complete remodeling of fracture condylar processes of mandible in (group I ) patient even in severe dislocated condylar processes , in (group II) patient we saw approximation of the fracture pieces with less extent of remodeling and the

number of the patient not enough to come out with a good results, in (group III) patient we noticed slight approximation of fracture pieces and the time taking for remodeling with advanced age was so more time so we didn't get accurate results with this limited period of study . one adult case had slight derangement of occlusion due to delay in seeking for treatment . The complete condylar remodeling (restitution of condylar head) occurs in very young age group (less than 12 years old) and to less extent in others age groups , the diagnosis depend on ct scan findings in pre and post imaging .

### **Conclusion**

The male patient are more susceptible to fracture condyle than female patient. Younger patients more susceptible to fracture . The early functional treatment will help the patients to get good mouth opening in short period , the mandibular movement includes (excursion and protrusive movements) were acceptable in 90% of patients after one month and the rate increased after 3 mouths , complete condylar remodeling (restitution of condylar head) occurs in very young age group (less than 12 years old) and to less extent in others age groups , the diagnosis depend on CT scan findings in pre and post imaging , as far as the loss of vertical height we did not see any clinical problems during function and occlusion , the dislocation of condylar head fracture also more common in the very young age group .

## Recommendations :

Use the CT scan measures to compare the difference in vertical height between the fracture side and normal side or pre treatment and after treatment in case of bilateral fracture condyle .

Determined a standard index for the follow up of the patient including score for mouth opening , deviation and other parameters .  
The use of activators functional positioning devices for complicated cases .

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**Authors' Contributions:**

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Work concept and design 1,2

Data collection and analysis 1

Responsibility for statistical analysis 1

Writing the article 1,2

Critical review, 1, 2

Final approval of the article 1,2

Each author believes that the manuscript represents honest work and certifies that the article is original, is not under consideration by any other journal, and has not been previously published.

**Availability of Data and Material:** The corresponding author is prompt to supply datasets generated during and/or analyzed during the current study on wise request.

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