

**Original Article**

# Epidemiological Study of The Pediatric Mandibular Condylar Fractures (The Outcomes of The Management): Retrospective Study

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## Abstract

**Purpose:** In our study, the characteristics, conservative cure strategies and long-term results of mandibular pediatric condylar fractures treated in the Oral and Maxillofacial Surgery department, Faculty of Dentistry, Cairo University in the previous 10 years have been evaluated. **Material and Methods:** This retrospective study with the participation of pediatric patients with mandibular condylar fractures who had been dealt with in the Oral and Maxillofacial surgery department were selected from the paper and computerized archived files related to the conservative therapy applied. Statistical analyses have been carried out with SPSS (Statistical Package for Social Sciences) for IBM 25 bundle program. **Results:** It was found that 67% of the pediatric traumatized patients had mandibular condylar fractures, and 72.4% had unilateral condyle fractures. It was as soon determined that 59.5% of the pediatric victims underwent conservative measures only. **Conclusion:** Falls from bicycles and traffic accidents, which are the most causative factors for this type of fracture, with a higher incidence in the ratio of boys to girls, and prolonged follow-up proved that severe occlusive disorder in adulthood is the most common complication of bilateral pediatric fracture associated with open bite managed with inadequate conservative measures in childhood.

**Keywords:** Pediatric, Condylar, Fractures

## I. INTRODUCTION

Mandibular condyle fractures are typically caused via a direct blow to the face and are less frequent in children compared to adults [1]. The effectiveness of the therapy protocol is very necessary in pediatric patients who are in the development period because feasible issues can harm facial symmetry in the long term. Conservative closed and open interventions used for the remedy of condyle fractures should be determined based on the growth duration of the youngsters and be handled with foresight in this direction. Therefore, the therapy protocol for pediatric

condyle fractures is controversial. The prevalence of pediatric facial fractures tiers from 15% to 21% of whole oral and maxillofacial fractures [2,3]. Condyle fractures occupy a large vicinity among pediatric mandible fractures [4,5]. There is research in the literature reporting temporomandibular joint ankylosis issues [6,7]. In this context, a treatment protocol needs to be decided to hold the most gorgeous method for the patient, taking into account the age of the patient and the function of the broken bone.

When planning the method for managing maxillofacial fractures, the site of the

fracture, its degree of severity, and the associated either soft or hard tissue injuries should be considered. For this purpose, examination of all the maxillofacial regions and the full mouth should be encountered precisely using 2 and 3D images. Maxillofacial fractures are regularly complex, and multiple and have an asymmetrical pattern from side to the other one. The site, extent, and displacement of the maxillofacial fracture are of great significance [8, 9]. After the necessary examination methods are made, conservative, closed reduction, and/or open methods (ORIF) are usually the treatment protocols that are regularly used in maxillofacial fractures [10]. Monitoring the early and long-term outcomes is necessary for pediatric condyle fracture management. Studies in which the effects of the used managing technique are evaluated; are multiple. They also evaluate the predicted results, maintain the correct practices, and develop/change the inadequate techniques. In this study, we collected the characteristics, incidence, causative factors, and long-term consequences of condyle fractures treated in the Oral and Maxillofacial surgery department in the previous 10 years.

## II. MATERIALS AND METHODS

Our study was accomplished as a retrospective study. 186 Pediatric patients (age range 3-13 years) with either unilateral/bilateral) condyle fractures who were managed at the Oral and Maxillofacial Surgery department of Cairo University Faculty of Dentistry between February 2012 and February 2022 were admitted to the study. All pediatric mandibular condylar fracture patients managed within the stated date range were comprehended in the sample. Patient data were investigated retrospectively using paper and computerized archived patient files and listed in dossiers developed by the investigators. Data were collected from the parents of the child and recorded: Personal data (Name, Age, sex, and telephone number), past medical and dental history, and

history of trauma (Cause, Time, Place, other investigations and treatments performed before arrival to our Clinic. Pediatric patients who had mandibular condyle fractures in their childhood and were managed by the faculty department where the study was carried out were called and arranged an appointment with the surgery department and were examined one by one. Long-term outcomes and complications were determined according to the patient's history, clinical examination findings, and radiographic imaging methods.

Exclusion criteria: patients with incomplete or missed radiographic/clinical data and/or refused to participate in our study.

## III. RESULTS

The following characters of pediatric patients with mandibular condylar fractures and collected data about the treatment method are listed in the following Table 1. All patients were examined carefully. According to the table, 62.36% of the pediatric patients were in the 3-8 age range, and 73.11% had been male. The main causative factor of this fracture is noticed that 59.13% had been accomplished with the aid of falling from a bicycle and 26.34 % had been accomplished in road traffic accidents. It was listed that 55.91% of the pediatric sufferers had accompanying facial fractures, and 73.11 % had only unilateral condyle fractures. It was once determined that 59.13% of pediatric patients were managed with conservative and/or closed methods only. When the long-term outcomes after the management had been examined, it was once discovered that the physical complications were 17.74%, and the development of malnutrition was 30.64%. It also noted that those who were diagnosed with a psychiatric analysis after condylar fracture treatment were 32.27%. (Table 1)

Complications developed at least six months after condyle fracture treatment and their management are listed in the above Table.

According to the table, malocclusion developed in 63.63% of pediatric patients, deviation in mouth opening in 12.12%, ankylosis in 6.06% and limitation in jaw movements at the same

rate, asymmetry in 3.03% and chronic pain in 9.09%. (Figure 1,2)

**Table (1): Characteristics of pediatric patients with mandibular condylar fractures and collected data about the treatment methods**

<b>Age range (year)</b>	<b>Number of patients (total 186)</b>	<b>Percentage (%)</b>
• 0-3	27	14.53
• 3-8	116	62.36
• 8-13	43	23.11
<b>Gender</b>		
• Male	136	73.11
• Female	50	26.86
<b>Causative factors</b>		
• Falling from a bicycle	110	59.13
• Road traffic accident	49	26.34
• Battle Injuries	12	6.45
• Sports injuries	10	5.376
• Other	5	2.68
<b>Presence of other concomitant facial fractures</b>		
• Yes	104	55.91
• No	82	44.09
<b>The pattern of condylar fracture</b>		
• Unilateral	136	73.11
• Bilateral	8	4.3
• Other Intracapsular	42	22.59
<b>Treatment applied</b>		
• Conservative	110	59.13
• Intermaxillary fixation (IMF)	23	12.36
• Open reduction internal fixation (ORID)	8	4.3
• ORIF+IMF	45	24.21
<b>Long-term outcomes</b>		
• Development of physical complications after at least 6 months. Growth and development slowed down	33	17.74
• Malnutrition development	57	30.64
• school success decreased after condyle fracture	36	19.35
• Any psychiatric diagnosis after condyle fracture (anxiety, depression, bedwetting, etc.)	60	32.27
<b>Advanced physical complications and management at least six months after condylar fracture treatment (33 patients)</b>		
• Malocclusion	21	63.63
• Deviation in the mouth opening	4	12.12
• Ankylosis	2	6.06
• Limitation in jaw movement	2	6.06
• Asymmetry	1	3.03
• Chronic pain	3	9.09

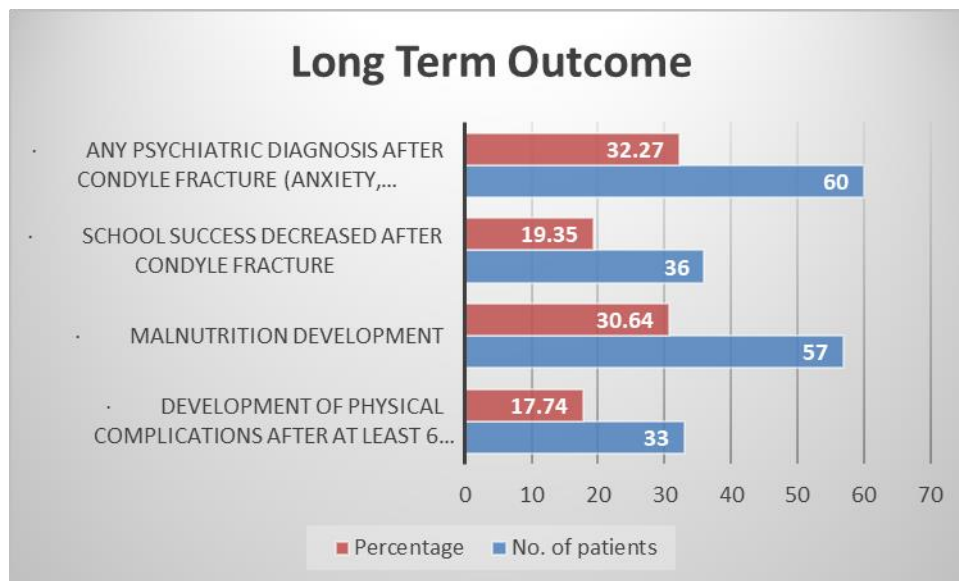


Figure (1): Long term outcomes of pediatric mandibular condylar fractures.

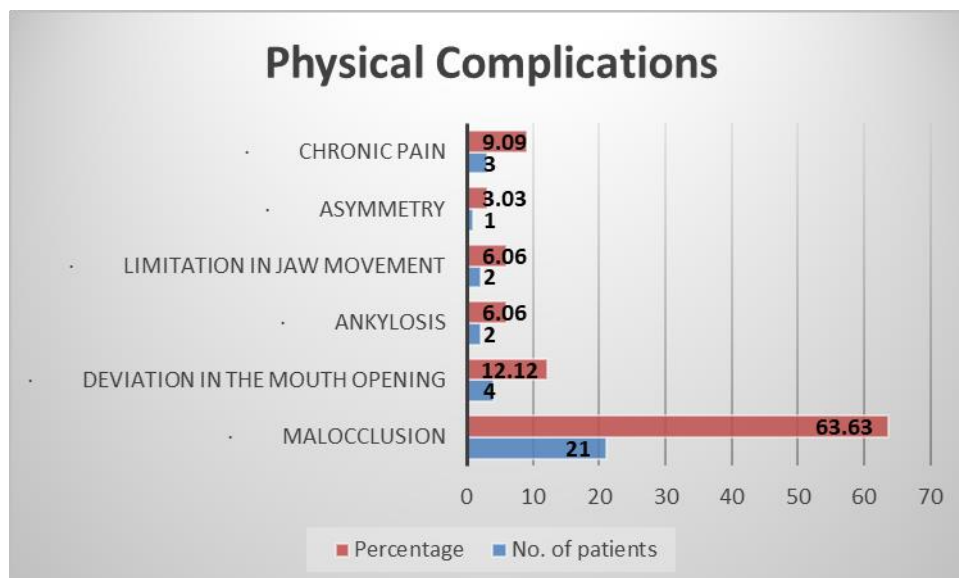


Figure (2): Physical complications of pediatric mandibular condylar fractures.

#### IV. Discussion

Condyle fractures have an important place among mandible fractures. Condyle, mandible, and facial fractures are most common in pediatric patients due to falls and traffic accidents<sup>[10-12]</sup>. In our study, falling from a bicycle was the first etiological factor of condylar fractures, and traffic accidents were in second place. In the same study, it was recorded that complications developed in 18.33% of

pediatric patients after surgery, and the most common complications were deviation in mouth opening and growth disorder<sup>[13]</sup>. In our study, the treatment methods applied to pediatric patients with a condylar fracture who applied to a training and practice hospital in the last 10 years and the long-term outcomes of these treatments were examined. All pediatric patients who had condyle fractures during this period were in the 0- 8 age range. In our study, it was recorded that the number of pediatric patients who developed physical complications after condyle fracture repair was 17.74%.

Although conservative treatment is highly preferred in the management of pediatric condyle fractures [14-16], it was noted that traumatized condyle is involved in the etiology of facial asymmetry in young adulthood [17]. In our study, the rate of patients who received conservative treatment was 59.13%. None of the condyle fractures that were treated conservatively were accompanied by other facial and mandible fractures. Moreover, ORIF+IMF was preferred in the presence of an intra-extra capsular fracture. Care should be taken in the selection of conservative treatment in the repair of condyle fractures because individuals who were not treated in childhood may apply to the hospital for surgical treatment to obtain an aesthetic appearance in later years. In addition to aesthetic problems, when condylar fractures are not treated surgically in childhood, they may cause pain and crepitation during chewing due to ruptured or displaced discs in advanced stages [18]. In the literature review, it was found that in the treatment of pediatric facial fractures, not only the bone but also the intra-articular soft tissues are seriously injured in all fractures and dislocations, the glenoid fossa protrudes with the medial fracture in condyle dislocations, and the posterior ligament is often torn [16]. For this, it is of great importance to revise the intra-articular soft tissues in all condyle dislocations and to fix the disc in place by reducing it [18]. In our study, 59.13% of pediatric condyle fractures were treated with conservative measures only (analgesics and muscle exercises), and in the presence of 1 or more other facial fractures, IMF, ORIF, or ORIF+IMF were carried out. In our study, it was seen that IMF, ORIF, and ORIF+IMF are applied in the repair of bilateral condyle fractures and ORIF+IMF is preferred in the presence of intra-extra capsular fractures. While determining the treatment protocol for condyle fractures, it is still not possible to predict which methods will be determined very clearly. The surgeon's observation, experience, and patient-related factors are determinants of the treatment method to be applied. In our study, it was concluded that the type of condyle

fractures and mandibular fractures are predictors for the treatment method applied.

In this study, the rate of pediatric patients whose growth and development slowed down after condyle fracture was determined as 17.74% and malnutrition development as 30.64%. Surgical treatment of pediatric condyle fractures is thought to prevent growth and development [15]. It is also argued that the surgical treatment of condyle fractures has nothing to do with growth disorder [17]. The usage of low-volume and high-calorie enteral nutrition products after a condyle fracture can help meet the protein and energy deficit of pediatric patients who are in the growth and development period, and since the products are in liquid form, the consumption of condylar patients is easy. Most of the time, pediatric patients suffer from malnutrition in the advanced stages because they cannot be fed according to their needs. Increased catabolism and high protein deficit due to surgery cause nutritional disorders. This study, it was found that malocclusion developed in 1.8% of pediatric patients after condylar fracture, deviation in opening mouth in 0.6%, ankylosis in 1.2%, and limitation in jaw movements at the same rate, asymmetry in 0.6% and chronic pain in 1.2%. Intracapsular fractures have a higher risk of disc displacement and condylar neck fracture [19-21]. The literature reported that the most common complications and their rates are ankylosis 0.8% and limitation of jaw movement 3.92%, deviation in mouth opening 5.4%, malocclusion 0.8% [22], and facial nerve injury 8.6% [23]. Condylar fracture treatment-related complications are influenced by factors like the surgeon's ability and experience, selecting the best course of action, post-operative care, and physical therapy support. As a result, different complications arise at different rates. It was acknowledged as a limitation that our research was conducted in a single center. The results of this research cannot be extrapolated to the entire human population because they reflect the dynamics of the sample population. The lack of universal validity of the treatment

methods used in our research is one of the other limitations because the age groups of the patients and the cause of condylar fractures differ, and the treatment protocol is determined according to patient-related factors.

## V. CONCLUSIONS

Considerations such as whether there is an accompanying fracture, the severity of the existing fracture, and patient-specific factors should be considered when choosing the best course of therapy for pediatric condyle fractures. If the patient's most effective treatment technique is not used, complications could be fatal and place a heavy burden on the patient's shoulders. First and foremost, it is crucial to avoid condyle fractures, so parental focus and awareness should be heightened in this direction. For juvenile patients with condyle fractures, surgical intervention should not be postponed in the event of additional facial and mandibular fractures. The patient needs to be well-fed and given emotional assistance during the healing process. The need for postoperative care education should be raised. Condyle fractures should receive the erroneous repair.

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