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Temporomandibular Joint Ankylosis Pattern, Causes and Management among a Sample of Sudanese Children

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Abstract

Background: Temporomandibular joint ankylosis is the fusion of mandibular condyle to the glenoid fossa, which causes distressing conditions. It may be due to trauma or infection. The aim of this study is to determine the frequency of TMJ Ankylosis in Khartoum teaching dental hospital among children.

Materials and methods: A retrospective cross sectional study for 48 patients (32 male, 16 female) aged 0-18 years old. Data were collected from patients records registered from January 2009 to April 2015.

Results: Males were more affected than females, the most affected age group was 7-12 years old, bilateral ankylosis more common than unilateral, intra capsular ankylosis is the most common type, and micrognathia is the most common deformity. 41 patients received treatment, coronoidectomy with condylectomy and physiotherapy is the most preferable treatment method. Also Condylectomy + Gap arthroplasty + Physiotherapy and Gap arthroplasty + Coronoidectomy + Physiotherapy were used. In some cases physiotherapy overcome the ankylosis, and only 7 patients didn't receive any type of treatment.

Conclusion: The prevalence of TMJ ankylosis among children was high; the most common causes were trauma and infection, whereas most of patients came with intracapsular type ankylosis in children leads to facial deformities. Improvement of awareness regarding condyle fracture is required.

Keywords: Temporomandibular joint; Ankylosis; Condyle fracture

Introduction

Temporomandibular joint (TMJ) is a synovial diarthrodial joint formed between the condyle of the mandible and the articular tubercle of temporal bone and articular fossa [1].

TMJ Ankylosis is fusion of the mandibular condyle to the glenoid fossa in the base of the skull, which causes distressing conditions such as impaired speech, difficulty in chewing, poor oral hygiene, facial disfigurement, compromise of the airway, and psychological stress [2].

Various etiological factors had been attributed to TMJ ankylosis; trauma, local and systemic inflammatory conditions, neoplasm, and TMJ infection. The most frequent one trauma and infection [3].

Fractures of the condylar head are more prone to postoperative ankylosis of the TMJ, and that the possible risk factors seem to include the technique used for fixation and damage to the disc, together with an anterior mandibular fracture and with the remaining fractured fragment [4].

Bilateral TMJ ankylosis caused by systemic infection is reported [4]. The clinical findings of TMJ ankylosis in children in unilateral ankylosis reveal unilateral hypoplasia of the mandible and deviation of the chin to the affected side. Bilateral ankylosis results in bird-face appearance; night snoring and obstructive sleep apneas are the other clinical findings in bilateral ankylosis [5]. Later joint involvement after 15 years of facial deformity is marginal or nil but functional loss is severe [6].

TMJ imaging comprise; plain radiography, panoramic radiography, tomograms, conventional CT, arthrography, three dimensional CT, magnetic resonance imaging, ultrasonography, and radionuclide imaging [7,8].

The management goal in TMJ ankylosis is removal of the ankylotic mass, restoring the form and function of the joint, mouth opening, relief of upper airway obstruction, and prevention of recurrence [9].

A number of surgical approaches have been advised to restore normal joint functioning and prevent re-ankylosis.

Three basic techniques are used; gap arthroplast, interposition arthroplasty and joint reconstruction [10,11].

Methodology

Ethical approval was obtained from University of Khartoum Faculty of Dentistry, Ethical committee review board, and from research unit at Khartoum Teaching Dental Hospital to conduct this study.

This retrospective cross-sectional hospital based study was carried out to determine the pattern of TMJ ankylosis in KTDH among children, it consist of patients who were diagnosed with TMJ ankylosis and underwent surgical treatment in the period January 2009 to April 2015, this study conducted for Sudanese patients under 18 years old and diagnosed with TMJ ankylosis, and patients who had TMJ disorder other than ankylosis or their records were incomplete were excluded.

Total coverage of all patients records from January 2009 to April 2015 who fulfilled inclusion and exclusion criteria were included accordingly the sample size was 48 patients, the age of the patients range between 0 and 18 years old.

Data was collected from completed records of the patients, data collection form was used, the completed data collection sheet contained the following items regarding the age, gender, side, type of ankylosis, mouth opening during theatre and treatment:

- Age
- Gender
- Side
- Bilateral
- Unilateral
- Type
- Mouth opening during theater
- Growth deformities
- Treatment modality

Data was collected, summarized, coded and entered to the Statistical Package for Social Sciences (SPSS) program (version 20) in the computer. Frequency distribution tables, graph were used to represent the results.

Results

A total of 48 patients were included in this study, according to their gender result showed that 66.6% (n=32) were males while 33.4% (n=16) were female **Figure 1**.

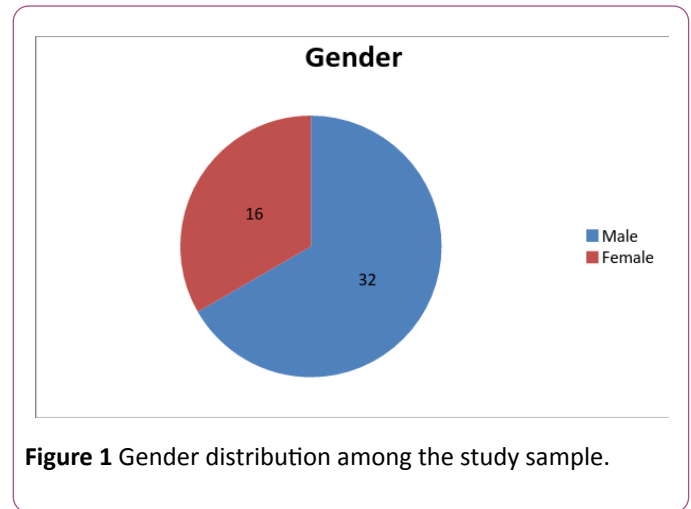


Figure 1 Gender distribution among the study sample.

The age of the patients ranged from 0 to 18 years old the highest percentage group was from 7-12 years 44% shown in **Table 1**.

Table 1 Shows the age distribution among the study sample.

Age	Number	Percentage
0 to 6 years	9	19%
7 to 12 years	21	44%
13 to 18 years	18	37%
Total	48	100%

The study revealed that bilateral ankylosis was the predominant one account (40%), and the unilateral ankylosis on the right side (30%) was more predominant than the left side (21%) shown in **Figure 2**.

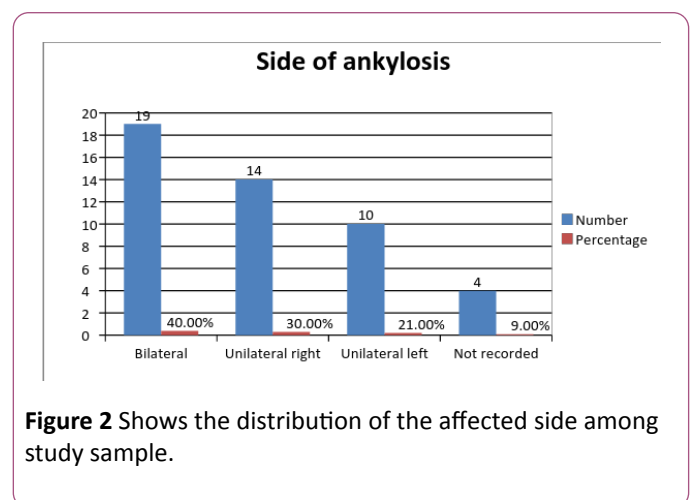


Figure 2 Shows the distribution of the affected side among study sample.

According to the types the majority of patients presented with intracapsular type 60% shown in **Figure 3**.

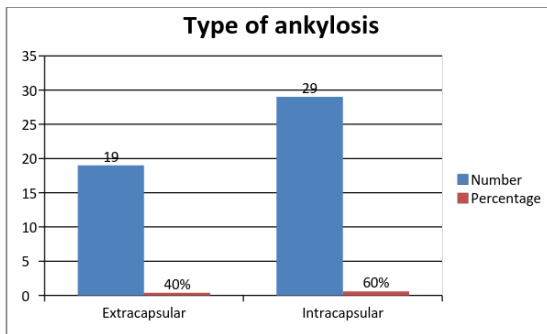


Figure 3 Shows the distribution of the ankylosis type among the study sample.

The intra-operative mouth opening achieved ranged from 0 cm to 8 cm, the predominant reading was from 2.1 cm to 4 cm were 19% as seen in Figure 4.

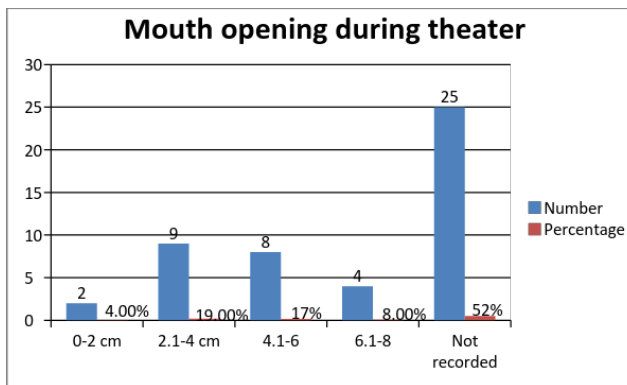


Figure 4 Shows the mouth opening during theatre.

According to the study micrognathia was the predominant growth deformity 19% as shown in Table 2. Treatment was done to 41 patients, the most common treatment modality used was Coronoideotomy + Condylectomy + Physiotherapy for 21%, 15% of patients had Gap arthroplasty + Physiotherapy and 15% didn't receive any treatment refer Table 3.

Discussion

The aim of this study was to determine the frequency of TMJ ankylosis in Khartoum Teaching Dental Hospital among children according to; age, type, cause, severity, treatment and the side involved.

Based on the study the mean age of the sample was 11.5 years which coincides with the studies by Madjidi and Bala [12,13]. The result was in contrast with He, Ellis and Zhang findings in which the mean age was 23 years [12-14].

Male to female ratio in the study was 2:1 Based on the study most patients presented with unilateral ankylosis with bilateral ankylosis presenting to lesser degree which coincides with He, et al. results and Bala results [13,14].

Table 2 Shows the growth deformities among study sample.

Growth deformity	Number	Percentage
Retrognathia	7	15%
Micrognathia	9	19%
Retrognathia + Micrognathia	3	6%
Not recorded	29	60%

Table 3 Shows the types of treatment recorded among study sample.

Treatment	Number	Percentage
Gap arthroplasty + Physiotherapy	7	15%
Interpositional gap arthroasty + Physiotherapy	0	0%
Coronoideotomy + Physiotherapy	5	10.00%
Condylectomy + Physiotherapy	6	12.50%
Coronoideotomy + Condylectomy + Physiotherapy	10	21%
Physiotherapy	3	6.00%
Condylectomy + Gap arthroplasty + Physiotherapy	6	12.50%
Gap arthroplasty + Coronoideotomy + Condylectomy + Physiotherapy	1	2%
Interpositional gap arthroplasty + Coronoideotomy + Condylectomy + Physiotherapy	1	2%
Gap arthroplasty + Coronoideotomy + Physiotherapy	2	4%
No treatment done	7	15.00%

The cause of ankylosis in the majority of patients in the study was duo to trauma which coincides with Bala findings,

and contrast with Madjidi A. findings in which the majority of the cases were duo to infection [12,13].

In this study, the mean mouth opening achieved during theater was 4.1 cm which coincides with Bob Rishiraj et al. findings also in contrast with UM Das et al. results and Rahul Hegde et al. findings in which a mouth opening of 2.5 cm was achieved [15-17].

The patients in the study dominantly presented with micrognathic deformities which coincide with de Castro e Silva et al. results, conversely it is in contrast with Liaqat et al. results in which the patient presented with retrognathia and Rahul Hegde et al. findings in which the patient presented with both micrognathia and retrognathia [17-19].

In this study the most used treatment was Coronoidectomy + Condylectomy + Physiotherapy, also Condylectomy + Gap arthroplasty + Physiotherapy which coincide with Orhan Guven findings [20].

Conclusion

TMJ ankylosis in children is a challenging problem affecting the mandible resulting in esthetic and functional deformities. The most common causes are trauma and infection. Males are affected more than females. Ankylosis in children leads to facial deformities such as micrognathia which is more common than retrognathia. Majority of patients presented with unilateral ankylosis. intracapsular TMJ ankylosis is found to be more prevalent than extracapsular. Coronoidectomy + condylectomy + physiotherapy is the most used protocol for treatment, which lead to improvement in mouth opening with a mean of 4.1 cm during surgery which can be increased by using aggressive physiotherapy.

Recommendation

As a result of this study researchers recommended improvement of the awareness regarding condylar fracture, early intervention by distraction osteogenesis to reduce the psychological impact of jaw deformities, continuous follow up to the patients after surgery to prevent recurrence and the surgeons in Sudan should learn about new surgical skills and technique to reduce the post-operative complications.

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