

Temporomandibular Joint Ankylosis Among Patients at Saint Paul's Hospital Millennium Medical College, Ethiopia: a 9 Year Retrospective Study

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Abstract

Background: Temporomandibular joint ankylosis (TMJA) is a gradually developing pathological condition manifested by a limited mouth opening. It can result in an extremely disabling situation that may affect mastication, swallowing, speech, oral hygiene, and facial cosmetic appearance. The present study was aimed to determine the pattern of TMJA at St. Paul's Hospital millennium medical college (SPHMMC), Addis Ababa, Ethiopia.

Methods: A retrospective descriptive study design was conducted at SPHMMC. All medical records of patients with the diagnosis of TMJA that visited the Maxillofacial Surgery unit from September 2010 through August 2019 were reviewed. Clinical data including age, sex, place of residency, duration of the case, etiology, clinical presentations, imaging results, the type of operation and complications after surgery were collected, and analyzed by using SPSS version 20.0 windows software computer program.

Results: A total of 130 patients' medical records were reviewed. Out of this, 95 were included in the study. 42(44.2%) of the TMJA case were males, while the remaining 53(55.8%) were females with a female to male ratio of 1.26:1. The most affected age group was 20 to 39 years 36(37.9%), followed by the age group of 30 to 39 years 33(34.7%). Trauma was identified as the most common cause of TMJA. Notably, bilateral ankylosis was more common than unilateral, and mandibular deformity (micrognathia) was the most common deformity observed. The majority 52(54.7%) of TMJA patients were treated with Gap arthroplasty.

Conclusions: Trauma was identified as the main cause of TMJA. The majority of TMJA cases were surgically treated with Gap arthroplasty with almost no postoperative complications. Thus early detection and intervention to release the ankylosed joint is needed to improve patient's quality of life.

Background

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

Temporomandibular joint ankyloses (TMJA) implies to a clinical condition characterized by the fusion of the mandibular condyle to glenoid fossa in the base of the skull [2, 3]. Classifications of TMJA fall into different groups based on the number of joints involved as unilateral or bilateral; location as intra-articular or extra-articular; type of tissue involved as bony, fibrous, or fibro-osseous, and extent of fusion as complete, or incomplete [4, 5].

Besides, Sawhney classified TMJA into four groups as type I, II, III, and IV according to radiography results [6]. Type I is characterized by a deformity of condyle with little joint space on radiograph with the fibro adhesions making TMJ movement impossible [6]. In type II there is a consolidation of the deformed head of the condylar process and articular surface occurs mostly at the edges and in the anterior and posterior parts of the structures, and the medial part of the surface of the condylar head remain undamaged [6, 7]. In type III, the ankylotic mass involves the mandibular ramus and zygomatic arch; an

atrophic and displaced fragment of the anterior part of the condylar head is in a medial location. In type IV, the TMJ is completely obliterated by bony ankylotic mass growing between the mandibular ramus and cranial base [6, 7].

TMJA is frequently associated with trauma, infection, and systemic inflammatory conditions such as ankylosing spondylitis, rheumatoid arthritis, and psoriasis [8, 9]. Its clinical presentations depend on the age at which ankylosis occurs, the duration of TMJA, and whether the ankylosis is unilateral or bilateral. When it occurs in children before growth has ceased, it presents with serious and disabling problems of mastication, digestion, speech, appearance, and oral hygiene [10, 11]. Consequently, it will affect nutritional status, psychosocial development, growth, and development of the jaws and teeth as well as the oral hygiene status of the child [5, 12]. But when it occurs after the growth has ceased, patients present mainly with limited mouth opening [8].

The diagnosis of TMJA can be made using clinical history and physical examination. Besides, TMJ imaging can be used to appreciate the anatomy of the joint, to classify the ankylotic mass based on the tissue content and the anatomical structures involved. Therefore, imaging such as plain radiography, panoramic, CT scan, arthrography, three dimensional CT scan, MRI, ultrasonography, and radionuclide imaging could enhance the proper diagnosis of TMJ ankyloses [2, 13]. The management of TMJA is mainly through surgical intervention [4, 14]. Therefore, it should be initiated as soon as the condition is recognized, with the main objective of reestablishing joint function, harmonious jaw function, and improve the patient's quality of life [15, 16]. Thus, the present study was aimed to assess the pattern of TMJA at St. Paul's Hospital Millennium Medical College (SPHMMC), Addis Ababa Ethiopia. The hospital has been chosen for this study because the Maxillofacial Unit of the hospital is one of the pioneer center of excellence that provides cutting edge services related to Oral and Maxillofacial health conditions including TMJA cases in Ethiopia.

Methods

A retrospective descriptive study design was conducted at SPHMMC, Addis Ababa, Ethiopia from September 2010 to August 2019. All patients with the diagnosis of TMJA and complete medical records were included in the study. Incomplete medical records were excluded. Data such as age, sex, place of residency, duration of the case, etiology, clinical presentations, imaging results, type of operation and complications after surgery were retrieved from medical records of the patients using a structured checklist developed by reviewing previously published articles. The collected data were analyzed by using SPSS version 20.0 windows software computer program.

Results

Socio-demographic characteristics

A total of 130 patient's medical records with the diagnosis of TMJA were reviewed. Of these, 95 (73.1 %) of the records fulfilled the inclusion criteria and were used for analyses. From a total of 95 reviewed medical records, 55(55.8%) were females, while the remaining 42(44.2%) were males. The majority, 36(37.9%), of patients were within the age group of 20-29 years with a mean age of 19.6 years (SD±10.31). 61(64.1%) of the participants were living in rural areas of the country (**Table 1**).

Causes and duration of TMJA

The causes of TMJA included trauma 74(77.9%), infection 16(16.8%), and unknown 5(5.3%) (**Figure 1A**). Fibroma was the most common cause of TMJA in 41 female and in 32 male patients. TMJA caused by trauma was predominantly seen among the age group of 20-29 years that accounted for 29 of the cases, while 11 of the cases caused by infection were commonly seen among patients of 30-39 years old. Most (46) of patients with TMJA live in rural areas (**Table 2**).

The time from the onset to the presentation of patients to our clinic was more than five years in 55(57.9%) of TMJA cases followed by 1-5 years in 33(34.7%), and less than one year in 7(7.4%) of the patients (**Figure 1B**).

Classes of TMJA and affected sides

From the total of 95 TMJA cases, 69(72.6%) were bilateral and the rest 26(27.4%) were unilateral (**Table 3**). Among the unilateral cases, 16(16.8%) were on the right side while the remaining 10(10.5%) were on the left side. 85(89.5%) of the TMJA cases were bony type, while the remaining 10(10.5%) were fibrous type. From the total of 85 bony TMJA cases, 64(75.3 %) of them were bilateral, and the rest 21(24.7 %) were unilateral where 12(12.6%) and 9(9.4%) of them were seen on the right and left side of TMJ, respectively. Of the 10(10.5%) fibrous TMJA cases, 5(5.2%) were bilateral and the rest 5(5.3%) were unilateral fibrous type of TMJA (**Table 3**).

Clinical presentations of TMJA

TMJA patients were presented with different clinical manifestations. Oral manifestation, mandibular deformity, antegonial notch, and bird face accounted for the highest proportions, 80(23.6%), 79(23.0%), 65(19.2%) and 61(18.0%), respectively (**Table 4**). On the other hand, maximum intercuspal opening followed by deviated to the affected side accounted for 28(8.3%) and 26(7.7%) of the cases, respectively (**Table 4**).

Surgical treatment and its complications

From a total of 95 patients, 55(57.9%) of the TMJA cases were treated with Gap arthroplasty, while 30(31.6%) and 10(10.5%) were treated with inter-positional arthroplasty and condylectomy, respectively (**Table 5**). There were only three reported complications due to the surgical treatments undertaken. Notably, two of the patients had reankylosis and one patient had an infection.

Discussion

Temporomandibular joint ankylosis (TMJA) is a debilitating health condition that causes difficulty in mastication, speech and mouth opening, and it can be debilitating if left untreated [9]. Its management requires careful surgical intervention plans. In this study, we described the pattern of TMJA in one of the tertiary level hospitals in Ethiopia over a period of 9 years.

In the present study, ankylosis cases were more predominant in females (55.8%) than males (44.2%), with a sex ratio of female to male 1.26:1. This finding is in agreement with other reports from Sudan [2], Morocco [17], South Africa [8], Pakistan [18], and Nigeria [19]. In contrast, studies from Nigeria [5] and India [16] reported the predominance of TMJA cases among males than females.

TMJA had a wide age range distribution ranging from 4 to 65 years, with a mean age of 19.6 years. It was frequently seen in the 3rd and 4th decades of life. This finding is similar to a report from Morocco [17] in which peak age was the 3rd decade of life. On the contrary, a report from Indonesia [11] revealed that 2nd decade of life as a peak age.

The pathogenesis of TMJA can either be primary, when the pathological process directly affects the TMJ, as in the case of systemic diseases such as ankylosing spondylitis, rheumatoid disease, and psoriasis; or secondary, as in traumatic injury, which may cause intra-capsular condylar fractures and heamarthrosis [20, 21]. Trauma was identified as the most common cause of TMJA among our patients accounting for about 77.9% of the cases. This finding is consistent with reports from different parts of the world, such as Sudan [2], India [3], China [15], Indonesia [11], Turkey [14], and Pakistan [18] that reported trauma as the most common cause of TMJA. This could be because the majority of our patients were from rural areas where dental services in general and maxillofacial surgery services in particular are still in infancy. As a result, most of the patients with jaw fractures might have either remain undiagnosed or are managed unsatisfactorily.

TMJA cases could be presented as a bilateral or unilateral based on the number of joints affected. Most (72.6%) of our patients were presented with bilateral TMJA. This finding is coinciding with a report from Sudan [2], China [22] and India [23]. The high prevalence of bilateral TMJA might be due to trauma (falling) mechanism that could result in mandibular symphysis fracture which in turn produces a higher chance of osteogenic potential bone fragments in the condylar process. On the other hand, our finding is inconsistent with a report from Pakistan [18] that reported more cases of unilateral than bilateral TMJA. Among unilateral patients, most cases were seen on the right side than the left side, a finding consistent with reports from Sudan and Pakistan [2, 18]. However, a study from China reported a higher number of TMJA cases on the left side than the right side [22].

In the present study, the majority of TMJA cases were presented to our clinic after a significant delay, more than five years, from the onset of their symptoms. This finding is consistent with a report from Sudan [2]. The delay in the presentation of the patients might relate to the place of the residence of the patients where the majority of them live in rural areas that have limited access to early treatment.

Furthermore, the lack of awareness and poor socio-economic status could potentially attribute to the higher number of TMJA [24].

TMJA is one of the complex health problems that could result in mandibular deformity, difficulty in mastication and swallowing of food, and speaking, and poor oral hygiene leading to dental caries and periodontal diseases [7]. In the present study, our TMJA patients were presented with mandibular deformity (23.0%), poor oral hygiene (23.6%), antegonial notch (19.2%), difficulty of mouth opening (8.3%), and deviation to affected side (7.7%). This finding is in line with reports from India [3], Morocco [17] and South Africa [8]. Thus, early detection and surgical intervention to release the ankylosed joint improves the patient's quality of life.

The management of TMJA mainly relies on surgical procedures that aim at restoring joint function and prevent reankylosis [15]. Gap arthroplasty (GA), interpositional arthroplasty (IA), and reconstruction of the articulation (RA) after resection of the ankylotic mass with autogenous or alloplastic grafts are the three main surgical procedures that are currently used to treat TMJA cases [15]. In the present study, 57.9% of the patients were treated with GA, while the remaining 30.6% had IA. Our result showed no significant difference in the incidence of reankylosis between GA and IA. This finding is consistent with meta-analysis study that showed no significant difference in the incidence of reankylosis between the IA and the GA [15].

Conclusion

This study identified trauma as the main cause of TMJA. The majority of our patients were surgically treated with either gap arthroplasty (GA) or interpositional arthroplasty (IA). Importantly, only three of the patients had complications after surgical treatments, of which two patients had reankylosis and one patient had an infection. Thus, early detection and surgical intervention to release the ankylosed joint improves the patient's quality of life.

Abbreviations

SPHMMC - St. Paul's hospital millennium medical college.

TMJ - Temporomandibular joint.

GA- Gap arthroplasty

IA- Interpositional arthroplasty

RA- Reconstruction of the articulation

Declarations

Ethics approval and consent to participate

Ethical clearance was obtained from the Research and Ethical committee of St. Paul's Hospital Millennium Medical College (SPHMMC), and permission was sought from SHMMC board before the study was conducted.

Consent for publication

Not applicable as secondary data was used.

Data Availability

The raw data for this study are available on request from the corresponding author

Conflicts of Interest

No conflict of interest.

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The study was funded by SPHMMC. The funding institute has no role in the design of the study, and collection, analysis, and interpretation of data, and in writing the manuscript.

Authors' contributions

Conceived and designed the study: DM and BK.

Collected data: DM.

Analyzed the data: DM, AG and BK.

Wrote the paper: DM, AG and BK. All authors read and approved the final manuscript.

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Tables

Table 1. Socio-demographic characteristics of the patients.

Socio-demographic status		Frequency (%)
Age (years)	0 - 9	6 (6.3)
	10 - 19	14 (14.7)
	20 - 29	36 (37.9)
	30 - 39	33 (34.7)
	≥ 40	6 (6.3)
Sex	Male	42 (44.2)
	Female	53 (55.8)
Residency	Rural	61 (64.2)
	Urban	28 (29.5)
	Not recorded	6 (6.3)

Table 2. Distribution of TMJA causes by age, sex, and place of residency.

Socio-demographic status	Causes			Total	
	Trauma	Infection	Others		
Sex	Female	41	7	5	53
	Male	32	9	1	42
Age (years)	0 to 9	5	0	1	6
	10 to 19	11	1	2	14
	20 to 29	29	4	3	36
	30 to 39	22	11	0	33
	≥ 40	6	0	0	6
Residency	Rural	46	12	3	61
	Urban	21	4	3	28
	Not recorded	6	0	0	6

Table 3. Frequency distribution of TMJA classes based on affected side and tissue type.

Affected side	Tissue		Total Frequency (%)
	Bony Frequency (%)	Fibrous Frequency (%)	
Bilateral	64 (67.4)	5 (5.2)	69 (72.6)
Right unilateral	12 (12.6)	4 (4.2)	16 (16.8)
Left unilateral	9 (9.4)	1 (1.1)	10 (10.5)
Total	85 (89.5)	10 (10.5)	95 (100)

Table 4. Frequency distribution of clinical presentation of the patients.

Clinical presentation	Frequency (%)
Oral manifestation	80 (23.6)
Mandibular deformity	79 (23.0)
Antegonial notch	65 (19.2)
Bird face	61(18.0)
Deviated to the affected side	26 (7.7)
Nil mouth opening	28 (8.3)

Table 5. Frequency distribution of surgical treatments used in the management of patients.

Type of treatment	Frequency (%)	
Gap arthroplasty	52 (54.7)	
Condylectomy	6 (6.3)	
Interpositional arthroplasty	Temporalifacial flap	34 (35.8)
	Abdominal fat	2 (2.1)
	Custom made prosthesis	1 (1.1)
Total	95 (100)	

Figures

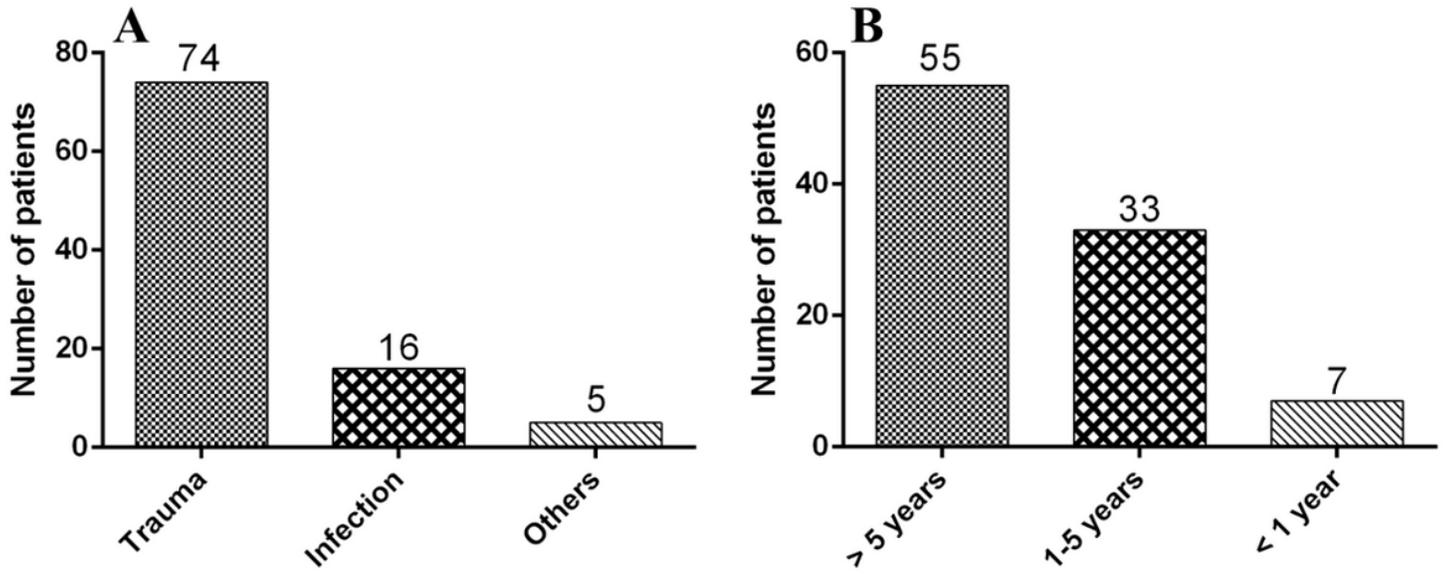


Figure 1

Causes and duration of TMJA. The causes (A) and time from the onset to the presentation of patients to the clinic (B).