

Frequency and Pattern of Presentation of Different Types of TMJ Ankylosis in Patients Presenting to Nisthar Institute of Dentistry, Multan

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ABSTRACT

Objective: Temporomandibular joint (TMJ) ankylosis is a disorder where the temporomandibular joint, which joins the lower jaw to the skull, fuses or becomes "ankylosed." This can result in pain, difficulty opening the mouth, and other symptoms as a result of an injury, infection, or other factors. TMJ ankylosis can be treated with surgery, medication, and physical therapy. Arthrocentesis, arthroscopy, and open-joint surgery are surgical options. This retrospective study sought to examine the temporomandibular joint (TMJ) ankylosis pattern and its underlying causes in patients who had received treatment at Multan's Nisthar Institute of Dentistry.

Methods: From 2018 to 2022, Nisthar Institute of Dentistry, Multan treated patients with temporomandibular joint ankylosis for 4 years. All patients whose records were sufficiently complete were analyzed in this research. Demographic data, the cause and pattern of ankylosis, the interval between the injury and therapy, simultaneous facial lacerations, remnant dislocation, a previous pedicle method, mouth opening prior to and following ankylosis treatment, health issues, the follow-up period, and physical therapy prior to and following ankylosis treatment are all included in the information.

Results: Out of 32 patients with 45 afflicted joints and a mean \pm standard deviation age of 29.90 ± 17.08 years, 25 (78%) occurrences of temporomandibular joint ankylosis were attributed to trauma (mainly between 20 and 29 years old). Bilateral participation outweighed unilateral involvement 13 to 9 and males outnumbered women 23 to 9. Restricted mouth opening was the patient's primary complaint the majority of the time ($n=24$, or 75%). The temporomandibular joint was completely ankylosed in 24 individuals. Prior to surgery, the mean maximum mouth openness was 0.95 ± 0.45 cm; however, it dramatically elevated to 4.50 ± 0.50 cm (p -value 0.001) following surgery.

Conclusions: This research found that the most frequent complication of temporomandibular joint ankylosis among the participants it looked at was trauma. The patient's limited mouth opening was their most frequent primary complaint. Additionally, this study's findings revealed that men are more likely than women to develop TMJ ankylosis and that these patients' TMJ functions can be significantly improved through the surgery.

Keywords: temporomandibular, TMJ, temporomandibular joint

INTRODUCTION

The pathological disease known as temporomandibular joint ankylosis results in decreased maximal mouth opening and compromised temporomandibular joint function [1, 2]. The extent of ankylosis may be determined by measuring the maximum mouth opening [3]. Patients may have more dental caries and periodontal issues as a consequence of a reduction in their maximum mouth opening since it might affect their ability to talk, eat, and maintain good oral hygiene [4–7]. When patients need intubation right away, TMJ ankylosis may be fatal. TMJ ankylosis may induce facial deformity in growing patients; If it is unilateral, the mandible becomes asymmetrical, and the jaw shifts in favor of the area that is affected; if it is bilateral, it can impede the mandible from growing properly [8]. The location, kind of affected tissue, and maximal mouth opening are some of the many classification factors for TMJ ankylosis [9,10]. TMJ ankylosis may be brought on by several conditions, including rheumatoid arthritis, trauma, systemic and regional infections, burns, Paget's disorder, local surgical tumor, and structural deformity [11, 12]. Different pathogenesis-related ideas have been put out by certain research, however, there isn't enough specific data to support any of them. The rapid and successful management of craniofacial trauma and the use of the suitable antibiotics to control recurring otitis media in advanced countries may be the reasons why TMJ ankylosis is more frequent in developing countries like Pakistan than in developed countries [13]. TMJ ankylosis is treated using a variety of approaches. This study sought to examine the pattern and root reasons for temporomandibular joint ankylosis in individuals who had previously had surgery for TMJ ankylosis.

METHODS

The Nisthar Institute of Dentistry in Multan provided care for 32 patients who had been diagnosed with TMJ ankylosis between 2018 and 2022. The data analysis examined the maximum interincisal opening, different treatment techniques, age range,

gender distribution, location (bilateral vs. unilateral and left-right inpatients), etiology of TMJ ankylosis, and postoperative complications. The maximum mouth openness (MMO) was measured in millimeters using a caliper between the bottom and top incisal boundaries as part of the preoperative evaluation. In addition to one patient who had surgery with a temporalis myofascial flap, all patients underwent surgery using a preauricular technique while sedated. The questionnaire will include details on the patient, measures collected during the follow-up, and data from the patient's records that were sent to the university's teaching clinics. Data were presented as mean \pm SD for continuous variables and count (%) for categorical variables. Tables and figures summarized the data. Evaluating the opening of the mouth before treatment and after treatment was done using a paired sample t-test. SPSS version 26 was used to analyze all the data.

RESULTS

Information for this research was gathered between 2018 and 2022. Finally, the research included and examined the data from 32 individuals with temporomandibular ankylosis. The ages of the patients ranged from 4 to 74, with an average age of 29.90 ± 17.08 years. Ten patients, or 31% of the whole group, were in the 20–29 age group. In terms of population, men made up 71%. There were 23 males for every 9 women. Table 1 summarizes the demographic traits.

Table 2 displays the frequency distribution of bilateral vs unilateral and left-right ankylosis in patients. This table demonstrated that 78.1% ($n=25$) of traumas had this as their primary cause. It was a bilateral/unilateral ratio of 40.6% to 59.4%. Regarding right and left, there were others ($n=13$) on both sides 34.4% ($n=11$) were on the left, and 25% ($n=8$) were on the right. The majority of cases with prior condylar fractures (53.3%) (frequency $n=24$) were associated with intracapsular fractures.

Table 3 displays the specifics of this analysis. The incidence of full or partial ankylosing in patients is shown in Figure 1. The

greatest mouth openness has to be larger than or less than 5 mm to meet the study's requirements. Accordingly, 24 of the 32 patients exhibited total temporomandibular joint ankylosis. From one year to 41 years might pass between being injured and receiving treatment, which is a very wide range. The average age was 10.25 ±11.14. The duration of follow-up after therapy ranged from one month to six years, with a mean of 2.42 ±1.43 years and a median of two years.

Table 1: Patient's distribution based on gender and age

Variables	Mean(SD)	N	%
N		32 (100)	
Range		4-74	
Age	29.90 ±17.08		
60+		2	6.3
40-49		2	6.3
50-59		4	12.5
30-39		5	15.6
20-29		10	31.3
10-19		6	18.8
5-9		2	6.3
0-4		1	3.1
Gender	Female	9	28.1
	Male	23	71.9

Table 2: Ankylosis causes

Ankylosis cause	N	%
Position		
Bilateral	13	40.6
Right	8	25
Left	11	34.4
Unilateral/Bilateral	19 /13	59.4/40.6
Seizure	1	3.1
Previous surgery	1	3.1
Hyperplasia	2	6.3
Ear infection	1	3.1
Dislocation of TMJ	1	3.1
Congenital Pierre robin sequence	1	3.1
Trauma	25	78.1

Table 3: Distribution of Previous condylar fracture Extracapsular

Previous condylar fracture	N	%
No fracture	19	42.2
Intracapsular	24	53.3
Extracapsular	2	4.4
Total	45	100

Table 4 summarizes the frequency distribution of the trauma's underlying causes, most of which were car- motorcycle collisions. Table 5 provides an overview of the patient's primary complaint frequency. The findings demonstrated that, at nearly 75%, mouth-opening restriction alone accounted for the majority of major complaints. Table 6 shows the frequency distribution of the different treatment techniques, jaw relationships, and Ramus location in regard to the glenoid fossa. According to the findings of this table, the condylectomy and coronoid ectomy procedure was associated with the greatest frequency of invasive surgery (57/78%), and class 2 has the largest frequency of occlusion (50.0%) and Ramus position relative to glenoid fossa (50.0%). 75 percent of individuals were in the intermediate position. 18.75% of patients who had surgery suffered side effects, such as sagging eyelids and eyebrows and an insufficient closure of the lips, in 6 out of 32 patients. Before surgery, the maximum average mouth openness was 0.95 ± 0.45 cm, however, after surgery, it was much larger at 4.02 ± 0.50 cm (p-value < 0.001). (Figure 2).

Table 4: Trauma occurrence causes

Trauma cause	N	%
Car Accident	13	52
FD	10	40
Car-to-Car Accident	2	8
Total	25	100

Table 5: Main complaints distribution

Main complaint	N	%
asymmetry/mouth opening/pain	4	12.5
pain/mouth opening	1	3.1
asymmetry/mouth opening	3	9.4
Mouth opening	24	75
Total	32	100

Table 6: Distribution of the various treatment modalities, occlusion, and ramus location

Variables	N	%
Position of the ramus		
Medial	0	0
Middle	24	75
Lateral	8	25
Occlusion		
Edentulous	2	6.2
Class3	5	15.6
Class2	16	50
Class1	9	28.1
Treatment Type		
Coronoidectomy	8	17.78
Coronoidectomy+Condylectomy	26	57.78
condylectomy	11	24.44

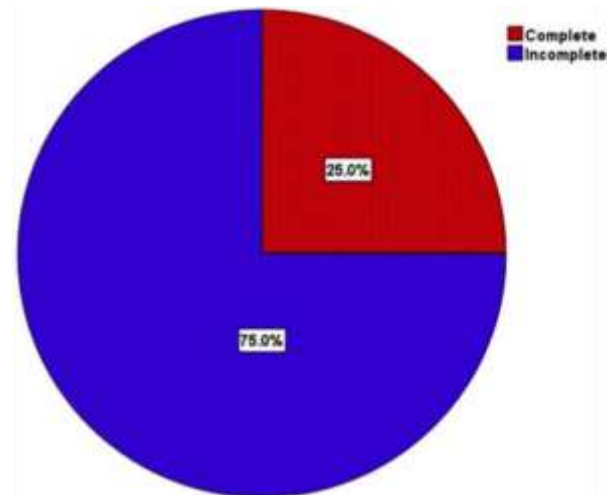


Figure 1: The proportion of individuals with either full or partial TMJ ankylosis

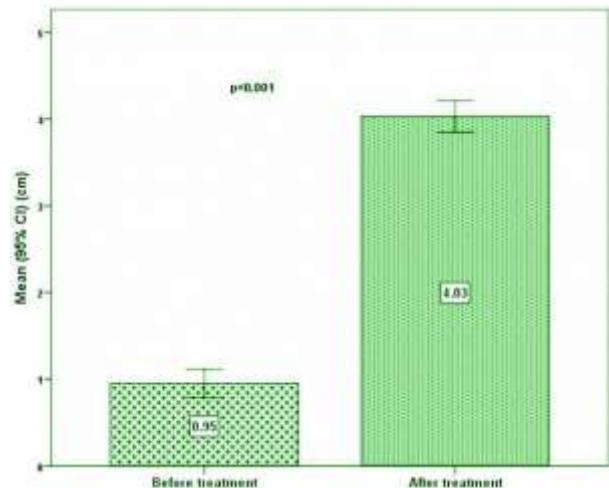


Figure 2: Maximal mouth openness before and after therapy

DISCUSSIONS

One of the disorders that might reduce the efficiency of the masticatory system is ankylosis of the temporomandibular joints (TMJA)[14]. TMJA often strikes between the ages of one and two. A study found that patients between the ages of 11 and 20 had a

higher prevalence of TMJA [15]. Additionally, it was noted in a different study that roughly two-thirds of the patients were under the age of 15 [16]. However, the research we conducted revealed that the age group most impacted was between 20 and 29 years old, with a frequency of 10 people (31.3%). We think this mismatch comes from the fact that, in our research, the patients' ages were recorded throughout the therapy period rather than at the commencement of the disease.

Men frequently have TMJA at higher rates than women do. The male-to-female participation ratio in our research was 23 to 9, with 71.9% of participants being males.

There are numerous causes of TMJA. Numerous studies have determined that trauma is a common factor in TMJA. For instance, 86% of cases in a study had trauma as an etiological factor [17].

Additionally, in another study, 83.33% of patients with TMJ ankylosis had experienced trauma [18]. According to our study, trauma—which most often came from car accidents (n=13)—caused TMJA in 78.1% of patients. The classification of TMJ ankylosis uses a variety of criteria (involving tissue type, location, and the extent of the fusion). We utilized the fusion's extent in our investigation. This approach classifies a patient as having full ankylosis if their maximal mouth opening is less than 5mm, and as having partial ankylosis if it is more than 5 mm. Accordingly, 24 of the 32 patients exhibited total temporomandibular joint ankylosis.

Zygomatic arch fractures that are left untreated might result in extracapsular temporomandibular joint ankylosis. In our study of 25 patients with temporomandibular joint ankylosis and 33 impacted joints, one patient presented with an undetermined zygomatic arch fracture without any condylar fracture. The condylar fracture that produced TMJA in the other 24 patients, who had 32 affected joints, occurred in 30 condyles and two extracapsular ones. Ankylosis in the temporomandibular joint is often brought on by intracapsular injuries, according to research on the connection between the condition and condylar fractures [19]. Additionally, research on the 40 affected joints found that 37 joints had an intracapsular condylar fracture pattern [20]. An animal study used in another investigation concluded that ankylosis of the TMJ was more likely in patients with an intracapsular condylar fracture [21]. A limitation in mouth opening was the most common patient complaint in our research. In every study that included TMJA patients who had surgery, the maximal mouth opening considerably increased. The maximal mouth opening in individuals with ankylosed joints increased to 30.2 mm after surgery which was 3.8 mm before surgery, according to another research that treated 12 patients with TMJ ankylosis [22]. The mean maximal mouth opening in our research was 9.5 mm before surgery, and it rose dramatically to 40.02 mm thereafter. Therefore, this illness should be identified and treated as quickly as feasible to enhance the life quality of these people. It might be difficult to control TMJA [23]. In investigations, many treatment strategies for TMJA have been developed [24]. The most common surgical procedures are hemi or complete joint replacement, gap arthroplasty, and interposition arthroplasty [25,26]. In the current investigation, condylectomy with coronoidectomy was often used, how ever gap arthroplasty with an inter position flap was used to treat every patient.

Mouth opening and re-ankylosis restriction are the two most frequent problems that might develop after surgery for the treatment of TMJA [27,28]. Other consequences include facial nerve injury, malocclusion, and restriction in mouth opening.

CONCLUSIONS

In the current research, men had a higher prevalence of TMJA than females. It is significant to note that the most typical cause of TMJA was found to be trauma. The vast majority of patients had condylectomy and coronoidectomy surgery. Our premise is that the patient's quality of life would be enhanced by early identification and surgical release of the ankylosed joint.

REFERENCES

1. CHACKO, R., KUMAR, S., & PAUL, A. (2022). Three Dimensional Morphological Grading of the Ankylosed TMJ for Surgical Planning: A Retrospective Observational Study. *Journal of Clinical & Diagnostic Research*, 16(2).
2. Esehani, M., Tofangchiha, M., Poorsayyah, N., Rahimi, H., Kholafazadeh, S., Radfar, S., ... & Testarelli, L. (2022). Relationship between Posterior Permanent Dentition Pattern and Radiographic Changes of the Mandibular Condyle. *Methods and Protocols*, 5(6), 97.
3. Jain, N., Pilmans, M., Skagers, A., Jain, S., & Fedirko, P. (2023). Temporomandibular Joint Ankylosis in a Girl Child: Immunohistochemical Evaluation of Tissue Material Obtained from Repeated Arthroplasty Surgeries. *Dentistry Journal*, 11(1), 16.
4. Sweeney, K., Handa, S., August, M., & Keith, D. A. (2022). Are There Identifiable Risk Factors Associated With Heterotopic Ossification of the Temporomandibular Joint?. *Journal of Oral and Maxillofacial Surgery*, 80(8), 1318-1330.
5. Castejón-González, A.C., Stefanovski, D., & Reiter, A.M. (2022). Etiology, clinical presentation, and outcome of mandibular fractures in immature dogs treated with non-invasive or minimally invasive techniques. *Journal of Veterinary Dentistry*, 39(1), 78-88.
6. Yeşiltepe, S., Alkış, H.T., Kurtuldu, E., & Kılıç, G. (2022). Articular eminence pneumatization in patients with different sagittal skeletal patterns: Cone-beam computed tomography study.
7. Posnick, J. C., & Kaban, L. B. (2022). A conceptual framework for treating jaw deformities in patients with abnormal condyles: preservation versus replacement of the glenoid fossa—disc—condyle—ramus. *International Journal of Oral and Maxillofacial Surgery*, 51(1), 98-103.
8. Adeyemi, M.F., Ernest, M.A., Ibikunle, A.A., Taiwo, A.O., Ochingwa, I.D., & Ige-Ogedenge, B. (2022). Temporomandibular joint dislocation: A 7-year retrospective study in Two Nigerian Teaching Hospitals. *Nigerian Journal of Basic and Clinical Sciences*, 19(2), 96.
9. Villafort, R. N., Silva, P. C. N. G., Martins, G. H., Daruge, R. J., & Amaral, M. B. F. (2022). Condyle fracture associated with glenoid fossa and/or tympanic plate fractures: an unusual diagnosis. *Journal of Oral and Maxillofacial Surgery, Medicine, and Pathology*, 34(2), 146-149.
10. Morisada, M. V., Tollefson, T. T., Said, M., Hwang, J., Hsieh, T. Y., & Funamura, J. L. (2022). Pediatric mandible fractures: mechanism, pattern of injury, fracture characteristics, and management by age. *Facial Plastic Surgery & Aesthetic Medicine*, 24(5), 375-381.
11. Canger, E. M., Coşgunarslan, A., Dilek, F., & Çaliş, H. T. (2023). Evaluation of temporomandibular joint components and mandibular bone structure in ankylosing spondylitis patients. *Oral Surgery, Oral Medicine, Oral Pathology and Oral Radiology*, 135(1), 136-146.
12. Adnan, S., Zafar, K., & Khan, F.R. (2022). A Bibliometric Analysis of Dental Literature Published In Journal Of College Of Physicians And Surgeons Of Pakistan, JCPSP. *J Ayub Med Coll Abbottabad*, 34(1).
13. de Melo Silva, E.M.V., Valdez, R.M.A., da Silva, I.M.B., Chateaubriand, M.M., Duarte, A.L. P., & Gueiros, L. A. M. (2022). Association between axial spondyloarthritis and temporomandibular disorders: a systematic review. *Oral Diseases*.
14. Delpachitra, S. N., & Dimitroulis, G. (2022). Osteoarthritis of the temporomandibular joint: a review of aetiology and pathogenesis. *British Journal of Oral and Maxillofacial Surgery*, 60(4), 387-396.
15. Niezen, E. T., van Minnen, B., Bos, R. R. M., & Dijkstra, P. U. (2022). Temporomandibular joint prosthesis as treatment option for mandibular condyle fractures: A systematic review and meta-analysis. *International Journal of Oral and Maxillofacial Surgery*.
16. Zhai, X., Huang, D., Hu, Y., Li, X., Wang, J., Ma, J., & Jiang, H. (2022). Cone-beam computed tomographic characteristics in degenerative temporomandibular joint disease patients with chewing side preference.
17. Rahman, F., Femiano, F., Louis, P. J., & Kau, C. H. (2022). An Evaluation of Jaw Tracking Movements in Patients with Total Joint Replacements versus a Control Group. *Medicina*, 58(6), 738.
18. Keller, S., Bocell, F. D., Mangrum, R., McLorg, A., Logan, D., Chen, A. L., & Tarver, M. E. (2022). Patient-Reported Outcome Measures for Individuals with Temporomandibular Disorders: A Systematic Review and Evaluation. *Oral Surgery, Oral Medicine, Oral Pathology and Oral Radiology*.
19. Cantanhede, A. L. C., Olate, S., de Assis, A. F., & de Moraes, M. (2022). Central Giant Cell Granuloma in the Mandibular Condyle in a Teenager. *ACase Report with Literature Review. Journal of Clinical Medicine*, 11(14), 4239.
20. da Costa, T.M.P., Narchini, M.D.C.N., Peralta-Mamani, M., Rubira-Bullen, I.R. F., Junqueira, J. L. C., & Soares, M. Q.S. (2022). Prevalence of orofacial alterations in patients with sickle-cell disease: Systematic review and meta-analysis. *Oral Surgery, Oral Medicine, Oral Pathology and Oral Radiology*.
21. Schmidt, C., Ertel, T., Arbogast, M., Hügler, B., von Kalle, T., & Neff, A. (2022). The Diagnosis

- and Treatment of Rheumatoid and Juvenile Idiopathic Arthritis of the Temporomandibular Joint. *Deutsches Ärzteblatt International*, 119(4), 47.
22. Khandelwal, G., Roychoudhury, A., Bhutia, O., & Shariff, A. (2022). Longitudinal surveillance of serum titanium ion levels in patients with indigenous 3D printed total temporomandibular joint replacement.
23. Duggal, I., Pandey, U., Kumar Chaudhari, P., & Duggal, R. (2023). Klippel–Fiel syndrome with rare representation of bilateral temporomandibular joint osteoarthritis—A case report. *Special Care in Dentistry*.
24. Jiang, N., Chen, H., Zhang, J., Cao, P., Wang, P., Hou, Y., ... & Zhu, S. (2023). Decellularized-disc based allograft and xenograft prosthesis for the long-term precise reconstruction of temporomandibular joint disc. *Acta Biomaterialia*.
25. Handa, S., Shaefer, J. R., & Keith, D. A. (2022). Oro-mandibular dystonia and temporomandibular disorders. *The Journal of the American Dental Association*, 153(9), 899-906.
26. Frequenti, O. C. M., & Deformities, J. (2022). Temporomandibular Disorders: Effects of Occlusion, Orthodontic Treatment, and Orthognathic Surgery. *Orthognathic Surgery-2 Volume Set: Principles and Practice*, 306.
27. Maranini, B., Ciancio, G., Mandrioli, S., Galiè, M., & Govoni, M. (2022). The role of ultrasound in temporomandibular joint disorders: an update and future perspectives. *Frontiers in Medicine*, 9, 926573.
28. Schmidt, C., Reich, R., Koos, B., Ertel, T., Ahlers, M. O., Arbogast, M., ... & Neff, A. (2022). Controversial Aspects of Diagnostics and Therapy of Arthritis of the Temporomandibular Joint in Rheumatoid and Juvenile Idiopathic Arthritis—An Analysis of Evidence- and Consensus-Based Recommendations Based on an Interdisciplinary Guideline Project. *Journal of Clinical Medicine*, 11(7), 1761.