

Temporomandibular joint ankylosis: A tertiary center-based epidemiological study

ABSTRACT

Introduction: Limitation of mouth opening can be caused by bony or fibrous ankylosis of the temporomandibular joint (TMJ) as a sequel to trauma, infection, or autoimmune diseases. The incidence of TMJ ankylosis differs significantly in different parts of the world. The purpose of this study was to analyze the etiological incidence of TMJ ankylosis at our tertiary-level center, which covers a huge population from parts of Bihar and eastern Uttar Pradesh.

Materials and Methods: This study was conducted from July 2016 to April 2019, and a total of 1607 children were screened in the duration of 33 months. Participants were included in this study as per the inclusion and exclusion criteria.

Results: After screening of the 1607 children, 128 TMJ ankylosis cases were identified. Out of the 128 cases of TMJ ankylosis, 33 cases were bilateral and 95 cases were unilateral (48 left sided and 47 right sided). Most of the patients (83.5%) were in the 10–15-year-old age group (mean age was 12.1 ± 2.83 years). There was a female preponderance, and the male-to-female ratio was 7:10. Overall, the most common cause of ankylosis was found to be childhood trauma.

Conclusion: The major etiologic factor of TMJ ankylosis was found to be birth/childhood trauma. TMJ ankylosis cases were detected in significant numbers in this study. This increased prevalence may be due to the lack of knowledge about this pathological entity among the general population and health-care professionals at primary level, which leads to poor initial management.

Keywords: Childhood trauma, children, epidemiological study, temporomandibular joint ankylosis

INTRODUCTION

Bony or fibrous adhesion of anatomical component of the temporomandibular joint (TMJ) is termed TMJ ankylosis. It causes loss of function and joint movement, and it mainly manifests as mandibular hypomobility.^[1] TMJ ankylosis usually occurs after trauma, surgical intervention, local infection in the ear,^[2] or due to other systemic infection and diseases.^[3,4] In children, it is a major cause of facial asymmetry and retrognathia. Major facial asymmetry and limited mouth opening causes several functional limitations such as difficulty in mastication and poor oral hygiene, which may lead to other sequelae, and finally can lead to psychosocial disability.^[3-6] Severe Class II malocclusion with posterior crossbite and anterior open bite may occur in the case of TMJ ankylosis.^[3] There is a bird's face appearance in bilateral cases due to decreased growth of the chin,

whereas in unilateral cases, there is facial asymmetry with a deviation of the chin toward the affected side.^[7] The

**NITESH MISHRA, NARESH KUMAR SHARMA¹,
NEERAJ KUMAR DHIMAN¹, CHANDRESH JAISWARA¹,
PREETI TIWARI¹, AKHILESH KUMAR SINGH¹**

Department of Dentistry, Kalpana Chawla Government Medical College and Hospital, Karnal, Haryana, ¹Department of Oral and Maxillofacial Surgery, Faculty of Dental Sciences, Institute of Medical Sciences, Banaras Hindu University, Varanasi, Uttar Pradesh, India

Address for correspondence: Dr. Nitesh Mishra, Room No. 16, Block B, Resident Doctor Hostel, Kalpana Chawla Government Medical College and Hospital, Karnal - 132 001, Haryana, India.
E-mail: mishranit25@gmail.com

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degree of retrognathia and the asymmetry of the mandible depend on the growth period and the onset of ankylosis. TMJ ankylosis in children is quite common and mostly remains undetected for a long time till it presents with severe facial and functional impairment. Early detection, psychological support, management, and rehabilitation are the keys in the management of these cases.

Objectives

This study was carried out to evaluate the prevalence of TMJ ankylosis and its etiology, to identify the high-risk group for the development of TMJ ankylosis, and to suggest preventive strategies. The study was approved by the Institutional ethical committee.

MATERIALS AND METHODS

This study was conducted in the faculty of dental sciences of our tertiary health-care center. This study was performed between July 2016 and April 2019, and a total of 1607 children were examined during this period. All the participants were informed about the nature and the process of the study. Inclusion criteria of this study were children between 3 and 15 years of age and children who had inability or difficulty to open the mouth with restricted/loss of TMJ movements and radiographic finding of obliteration of joint space. Exclusion criteria of this study were children below 3 years of age and above 15 years of age and children with oral submucous fibrosis, trismus and postradiotherapy patients.

The parents/guardians of those children were questioned for the child's past history, history of delivery (natural or forceps delivery), or history of trauma or related diseases. Simultaneous clinical examination of the children was done by postgraduate students of oral and maxillofacial surgery. Kuppuswamy's Socioeconomic Status Scale was used for measuring socioeconomic status which was slightly changed.^[8] Data collected from history that was obtained by questioning the parents and guardian of the patients were summarized and coded, and the results were represented in the form of tables and graphs.

RESULTS

In this study, 128 TMJ ankylosis cases were identified [Figure 1], of which 107 patients (83.5%) were in the 10–15-year-old age group (mean age was 12.1 ± 2.83 years). A female preponderance was seen in this study, and the male-to-female ratio was 7:10. Most of the cases (98%) were seen in the lower-middle and upper-middle classes. Most of the

population belongs to rural area (81 patients, 63.2% cases) [Table 1 and Graph 1].

Overall, the most common cause of ankylosis was trauma (birth trauma and falls of various types), which accounted for 82% of the cases, and 16.4% of the cases were due to ear infection and only 1.5% were due to congenital causes [Table 2 and Graph 2].

Larger number of patients (64.8%) had a duration of ankylosis between 1 and 5 years. The study revealed that out of 128 cases of TMJ ankylosis, 33 cases were bilateral and 95 cases were unilateral, with 48 cases of left-sided and 47 cases of right-sided ankylosis. Interincisal openings at the time of preoperative examination were as follows: 16 patients lie in 0–5-mm range, 47 patients lie in 6–10-mm

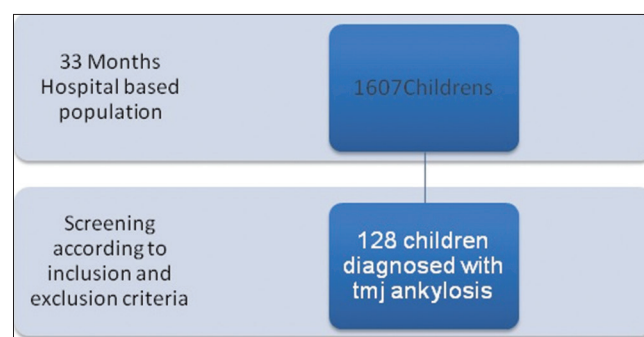


Figure 1: Study population

Table 1: Tertiary center-based demographic profile of temporomandibular joint ankylosis patients (n=128)

Variables	Number of cases (%)
Gender	
Male	56 (43.25)
Female	72 (56.25)
Age groups (year)	
3–5	3 (2.2)
5–10	18 (14.06)
10–15	107 (83.50)
Location	
Rural	81 (63.2)
Urban	47 (36.7)
Socioeconomic status	
Upper	2 (1.5)
Upper middle	57 (44.50)
Lower middle	42 (32.80)
Upper lower	27 (21)
Lower	0 (0)
Religion	
Hinduism	83 (64.84)
Islam	44 (34.375)
Sikhism	1 (0.78)
Christianity	0 (0)

TMJ: Temporomandibular joint

Table 2: Causes of temporomandibular joint ankylosis in reported patients

Causes (n=128)	Number of cases (%)
Trauma	
Falls of various types	98 (76.5)
Forceps delivery	7 (5.4)
Congenital	2 (1.5)
Ear infection	21 (16.4)

TMJ: Temporomandibular joint

Table 3: Features associated with temporomandibular joint ankylosis in patients (n=128)

Features	Number of cases (%)
Duration of ankylosis (years)	
<1	16 (12.5)
1-5	83 (64.8)
>5	29 (22.6)
Side of ankylosis	
Left	48 (37.5)
Right	47 (36.7)
Bilateral	33 (25.7)
Preoperative interincisal opening (mm)	
0-5	16 (12.5)
6-10	47 (36.7)
11-15	26 (20.3)
>15	39 (30.4)

TMJ: Temporomandibular joint

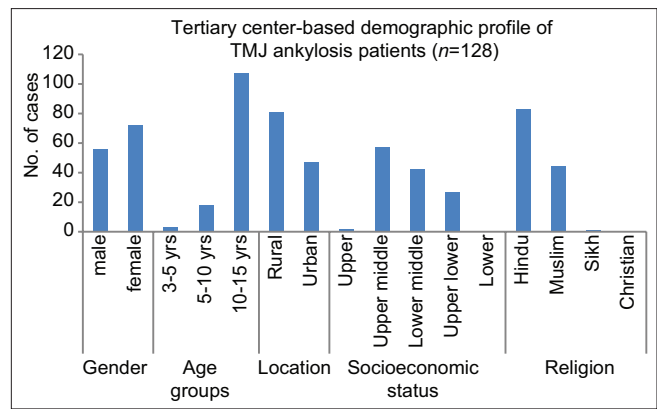
range, 26 patients lie in 11–15-mm range, and 39 patients have > 15 mm of interincisal openings [Table 3 and Graph 3].

DISCUSSION

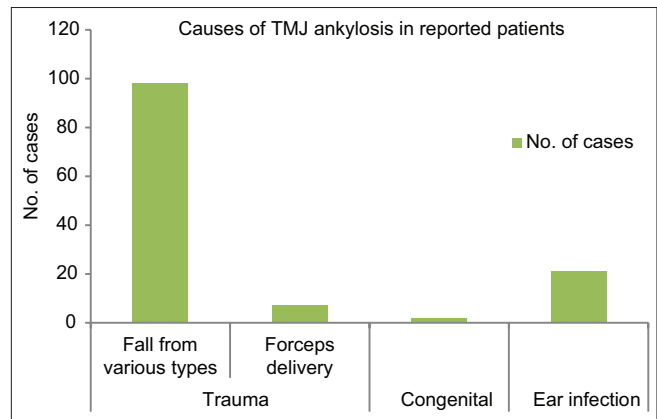
This study throws light on the prevalence and incidence of TMJ ankylosis in a population. The lack of awareness of the possible management of TMJ is still present in developing countries. Thus, referral practice and initial management are poor. Despite having too much functional, emotional, social, and psychological impairment due to this pathology, parents still find themselves helpless as they lack knowledge of its management.

The present study showed trauma as the common etiology whose results are similar to those of different studies conducted worldwide.^[6-16] Most commonly, the childhood trauma either due to forceps delivery or injuries due to various falls results in ankylosis of TMJ. The time of decision of treatment is crucial as the facial features and function are affected over time and facial growth and remodeling are greater when ankylosis release is done in childhood.^[11]

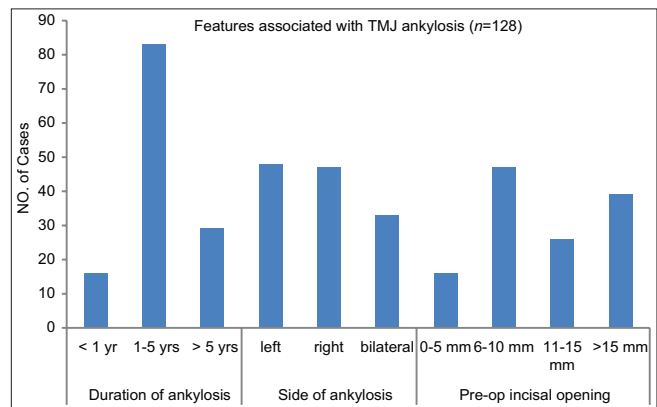
According to the present study, there is more female predilection, which is similar to several other hospital-based studies^[7] in literature but this result is also contradictory to



Graph 1: Demographic profile of the study population



Graph 2: The distribution of causes of temporomandibular joint ankylosis among the study population



Graph 3: The distribution of features associated with temporomandibular joint ankylosis among the study population

many studies as they state the reason that male do more outdoor activities as compared to females.^[12] In this study, females had a high prevalence of TMJ ankylosis as compared to males, which may be due to the difference in the anatomy of condyle and differences in their hormonal level.

In this study, 83% of cases were found in 11–15-year-old age group, and this finding is similar with that of various studies^[17,18]

that stated TMJ ankylosis is commonly seen in children and young adults, but according to some hospital-based studies, the most prevalent age groups presenting with TMJ ankylosis are 6–10 years^[12] and 11–20 years.^[19] In this study, unilateral TMJ ankylosis (74%) was more prevalent as compared to bilateral TMJ ankylosis (26%). According to the literature, unilateral cases tended to show better clinical outcomes than bilateral cases.

Several studies have shown that children who undergo earlier intervention in the case of congenital ankylosis experience more growth of the mandible as compared to children who undergo surgery at a later age and their postoperative mandibular growth rate is nearly the same as that observed in normal adults.^[20] According to Laskin,^[21] one of the key principles in the management of TMJ ankylosis is to do surgical intervention as early as possible. Early detection and intervention is necessary to minimize the severity of the restriction of facial growth, risk of facial asymmetry, and development of psychological stress. Thus, it prevents all psychosocial and functional complications and helps a child to grow up as a healthy individual. Gap arthroplasty is a term given to surgical procedure that helps to release ankylosed chunk, causing a gap between the temporal bone and ramus of the mandible. However, now with the use of various interposition grafts, it is better termed as interpositional arthroplasty. Prevention of re-ankylosis must always be considered while releasing the ankylosis. Autogenous temporalis myofascial flap is a preferred option in the case of interpositional arthroplasty due to its proximity to the surgical site. Other techniques such as total joint replacement with the help of costochondral grafts or distraction osteogenesis to restore the ramus–condyle unit have also been reported.^[22] Distraction osteogenesis is a preferred technique in contemporary practice as it leads to increase in mandibular length and height with minimal complications. Patients undergoing distraction osteogenesis have reduced chances of re-ankylosis and in patients with severe micrognathia, distraction osteogenesis causes improvement in posterior airway space naturally.^[23]

This study intends to identify the high-risk group that can develop TMJ ankylosis and helps us to keep a check on its occurrence in larger population. This study sets up data which are very important for laying down strategies and plans to overcome the consequences of this pathology on a patient's development.

CONCLUSION

TMJ ankylosis remains a challenge to the maxillofacial surgeon in developing countries because of poor management of

condylar trauma and infections. Lack of awareness about this pathological entity further adds to the development of ankylosis. Lack of knowledge about this pathological entity among the general population and health-care professionals at primary level is the major reason for its poor initial management. Creating general awareness about this entity among primary health-care professionals and the general population can prevent the development of ankylosis and also help to achieve better esthetic and functional outcomes in ankylosed cases after definitive treatment.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Long X, Li X, Cheng Y, Yang X, Qin L, Qiao Y, *et al.* Preservation of disc for treatment of traumatic temporomandibular joint ankylosis. *J Oral Maxillofac Surg* 2005;63:897-902.
2. Guthua SW, Maina DM, Kahugu M. Management of post-traumatic temporomandibular joint ankylosis in children: Case report. *East Afr Med J* 1995;72:471-5.
3. Chidzonga MM. Temporomandibular joint ankylosis: Review of thirty-two cases. *Br J Oral Maxillofac Surg* 1999;37:123-6.
4. Kobayashi R, Utsunomiya T, Yamamoto H, Nagura H. Ankylosis of the temporomandibular joint caused by rheumatoid arthritis: A pathological study and review. *J Oral Sci* 2001;43:97-101.
5. Su-Gwan K. Treatment of temporomandibular joint ankyloses with temporalis muscle and fascia flap. *Int J Oral Maxillofac Surg* 2001;30:189-93.
6. Posnick JC, Goldstein JA. Surgical management of temporomandibular joint ankylosis in the pediatric population. *Plast Reconstr Surg* 1993;91:791-8.
7. Erol B, Tanrikulu R, Görgün B. A clinical study on ankylosis of the temporomandibular joint. *J Cranio Maxillofac Surg* 2006;34:100-6.
8. Kumar N, Shekhar C, Kumar P, Kundu AS. Kuppuswamy's socioeconomic status scale-updating for 2007. *Indian J Pediatr* 2007;74:1131-2.
9. Raveh J, Vuillemin T, Ladrach K, Sutter F. Temporomandibular joint ankylosis: Surgical treatment and long-term results. *J Oral Maxillofac Surg* 1989;47:900-6.
10. Chossegros C, Guyot L, Cheynet F, Blanc JL, Gola R, Bourezak Z, *et al.* Comparison of different materials for interposition arthroplasty in treatment of temporomandibular joint ankylosis Surgery: Long term follow up in 25 cases. *Br J Oral Maxillofac Surg* 1997;35:157-60.
11. Manganello-Souza LC, Mariani PB. Temporomandibular joint ankylosis: Report of 14 cases. *Int J Oral Maxillofac Surg* 2003;32:24-9.
12. Vasconcelos BC, Bessa-Nogueira RV, Cypriano RV. Treatment of temporomandibular joint ankylosis by gap arthroplasty. *Med Oral Patol Oral Cir Bucal* 2006;11:E66-9.
13. Murad N, Rasool G. Trauma as a most frequent cause of TMJ ankylosis. *Pak Oral Dent J* 2011;31:45-7.
14. Güven O. Fractures of the maxillofacial region in children. *J Craniomaxillofac Surg* 1992;20:244-7.
15. Oztan HY, Ulusal BG, Aytemiz C. The role of trauma on temporomandibular joint ankylosis and mandibular growth retardation: An experimental study. *J Craniofac Surg* 2004;15:274-82.

16. El-Sheikh MM, Medra AM, Warda MH. Bird face deformity secondary to bilateral temporomandibular joint ankylosis. *J Craniomaxillofac Surg* 1996;24:96-103.
17. Abbas I, Jamil M, Jehanzeb M, Ghous SM. Temporomandibular joint ankylosis: Experience with interpositional gap arthroplasty at Ayub Medical College Abbottabad. *J Ayub Med Coll Abbottabad* 2005;17:67-9.
18. Belmiro C, Ricardo V, Rafeal V. Treatment of TMJ ankylosis. *Oral Med Oral Pathol Oral Radiol* 2005;11:66-9.
19. Qudah MA, Qudeimat MA, Al-Maaita J. Treatment of TMJ ankylosis in Jordanian children-A comparison of two surgical techniques. *J Craniomaxillofac Surg* 2005;33:30-6.
20. Khanna NN, Sinha JK, Tripathi FM, Srivastava AB, Khanna S. Temporomandibular ankylosis. *Ann Acad Med Singapore* 1981;10:175-9.
21. Laskin DM. Role of the meniscus in the etiology of posttraumatic temporomandibular joint ankylosis. *Int J Oral Surg* 1978;7:340-5.
22. Kaban LB, Bouchard C, Troulis MJ. A protocol for management of temporomandibular joint ankylosis in children. *J Oral Maxillofac Surg* 2009;67:1966-78.
23. Andrade NN, Kalra R, Shetye SP. New protocol to prevent TMJ reankylosis and potentially life threatening complications in triad patients. *Int J Oral Maxillofac Surg* 2012;41:1495-500.