

# An epidemiological study of temporomandibular joint ankylosis

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## ABSTRACT

**Introduction:** The temporomandibular joint (TMJ) forms the very cornerstone of craniofacial integrity and its ankylosis in a growing child may cause problems in daily food intake, speech, appearance, and oral hygiene is affected to a major extent. It is one of the common acquired pathologies afflicting the skeleton. It is also the most overlooked and under-managed problem in children. **Materials and Methods:** A house to house survey was conducted between 2010 and 2011 in rural and urban areas of Lucknow. A total of 21,720 children aged between 3-15 years from 9090 houses comprising a representative sample were included. **Results:** Ten TMJ ankylosis cases were identified in 21,720 children. Of these, six were bilateral and four were unilateral. Male to female ratio was 1:9, with most patients (70.0%) being in the 10-15 years' age group (mean age was 11.1 years  $\pm$  3.34). The most common cause of ankylosis was trauma for 90.0% of cases. The majority of patients (70%) were reporting the condition for the first time, with 30% patients having had previous treatment. **Conclusion:** TMJ ankylosis is an acquired condition in most of the cases. Birth/childhood trauma would be the major causative factor. Knowledge amongst parents, providers of health about this entity was poor. Initial management of the causative factor was poor. Mere knowledge among the general population and healthcare providers can result in primary prevention and also secondary prevention along with its successful definitive treatment.

**Key words:** Ankylosis, children, temporomandibular joint

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## INTRODUCTION

Temporomandibular joint (TMJ) ankylosis is a pathological condition of the joint. The disease is manifested by limitation to total failure of the movement of TMJ usually resulting post trauma and post surgery in the majority of cases or due to local infection<sup>[1]</sup> such as otitis media and mastoiditis or systemic infection such as tuberculosis, scarlet fever and gonorrhoea, or systemic disease such as ankylosing spondylitis, rheumatoid arthritis,<sup>[2]</sup> sickle cell anemia,<sup>[3]</sup> psoriasis

and fibrodysplasia ossificans progressiva.<sup>[4]</sup> TMJ ankylosis is a problem seen mainly in the developing world, especially India and neighboring countries.

TMJ ankylosis is a disabling condition that may cause difficulty in mastication, speech, appearance, and oral hygiene is affected to a major extent. Sometimes acute compromise of the airway invariably results in physical and psychological disability.<sup>[5-8]</sup> TMJ forms the very cornerstone of craniofacial integrity and hence its ankylosis in a growing child, disturbances of the mandible and maxilla may occur together with malocclusion.<sup>[9,10]</sup> This may be accompanied by severe Class II malocclusion with posterior cross bite/anterior open bite.<sup>[5]</sup> A bird-face appearance forms in bilateral cases due to recession of the chin whereas facial asymmetry with deviation of the chin towards the affected side appears in unilateral cases.<sup>[11]</sup> The degree of recession and the asymmetry of the mandible depend on the growth situation and the onset of ankylosis.

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	<b>Quick Response Code:</b>
	<b>Website:</b> www.njms.in
	<b>DOI:</b> 10.4103/0975-5950.102146

Although it is one of the common acquired pathologies afflicting the skeleton, it is also the most overlooked and under-managed problem in children.<sup>[3,12]</sup>

## OBJECTIVES

### Primary

To study the epidemiology of TMJ ankylosis in and around Lucknow.

This study was proposed to evaluate the prevalence of TMJ ankylosis, its etiology, to identify the high-risk group for development of TMJ ankylosis and to derive preventive strategies to prevent TMJ ankylosis.

## MATERIALS AND METHODS

### Data collection

A house to house survey was conducted in rural and urban areas of Lucknow over a period of one year (between 2010 and 2011). The final selection of the locality was done through a lottery. Rural area survey was done in the village of Kakori and Mall. Of the urban localities Thakurganj, Triveninagar, Alambagh, Sadar, Telibagh and South city were included. The interviewers were trained social workers and trained dentists. A total of 21,720 children from 9090 houses comprising a representative sample were included [Figure 1].

During survey, a brief explanation of the study was given to participants and consent was taken for completing the survey. The parents/guardians of those child patients were questioned for the child's past history, history of delivery (investigator asked about the nature of delivery of child, natural/forcefully). Simultaneous examination of the oral cavity of the children was done by trained dentists. Modification of Kuppuswamy's Socioeconomic Status Scale has been

used for recording the socioeconomic status.<sup>[13]</sup>

Those children with restricted mouth opening were advised to visit the centre at CSMMU where they were investigated and diagnosed. The respondents were advised regarding the benefits of bringing their child to the centre.

Inclusion criteria of this study were children between 3-15 years of age, inability/ difficulty to open 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, oral submucous fibrosis leading to restricted mouth opening, trismus and post-radiotherapy patients.

The SPSS software was used for data analysis. Mean and standard deviation was computed for age and percentages for different categorical variables.

## RESULTS

In the house to house survey of 21,720 children between 2010 to 2011, 10 TMJ ankylosis cases were identified in Lucknow (the overall prevalence of TMJ ankylosis was 0.46 per 1000 children population).

Table 1 shows the demographic profile of TMJ ankylosis patients, of which most of the patients (70.0%) were in the 10-15 years' age group (mean age was 11.1 ± 3.34 years). There was female preponderance; the male to female ratio was 1: 9. Most of the cases (90%) were seen in the lower middle and upper lower class.

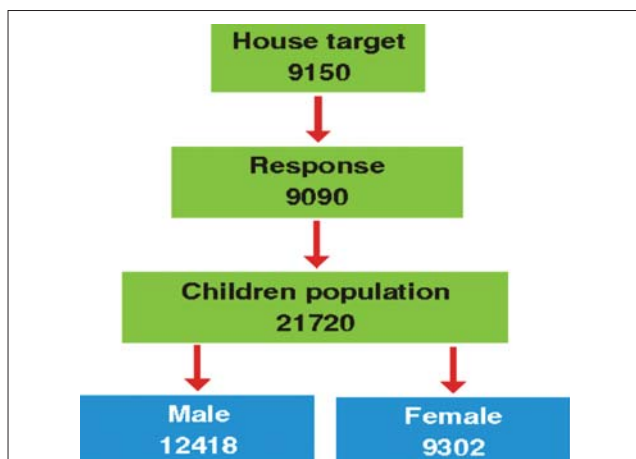


Figure 1: Study population

Variables	No. of cases	Percentage
Gender		
Male	1	10
Female	9	90
Age groups		
3-5 years	0	0
5-10 years	3	30
10-15 years	7	70
Location		
Rural	3	30
Urban	7	70
Socioeconomic status		
Upper	0	0
Upper middle	1	10
Lower middle	3	30
Upper lower	6	60
Lower	0	0
Religion		
Hindu	7	70
Muslim	3	30
Sikh	0	0
Christian	0	0

**Table 2: Causes of TMJ ankylosis in subjects**

Causes (n = 10)	No. of cases	Percentage
Trauma		
Different falls	7	70
Forceps delivery	2	20
Congenital	1	10
Ear infection	0	0

**Table 3: Features associated with TMJ ankylosis in patients (n = 10)**

Features	No. of cases	Percentages
Type of case		
First-time operation	7	70
Post op 1-4 ops	3	30
Duration of ankylosis		
< 1 year	1	10
1-5 years	6	60
> 5 years	3	30
Side of ankylosis		
Left	2	20
Right	2	20
Bilateral	6	60
Pre-op interincisal opening		
0-5 mm	4	40
6-10 mm	4	40
11-15 mm	2	20
> 15 mm	0	0

Overall, the most common cause of ankylosis was trauma (birth trauma and falls of various types) accounting for 90% of cases [Table 2].

The majority of patients (70%) had not undergone any kind of management and 30% patients had been previously treated (operated). Out of 10 cases of TMJ ankylosis six were bilateral and four cases were unilateral (two left and two right-sided).

Duration of ankylosis and preoperative measurements of interincisal openings is shown in Table 3.

## DISCUSSION

It is said that a child learns to explore the world through his mouth. Any pathology that afflicts the TMJ restricts the mouth opening, hence carries a mental stigma that outweighs the physical disability posed by the problem in growing children.

To our knowledge there is no published data on a population-based study on TMJ ankylosis. Various hospital-based studies have been published on different modalities of treatment of TMJ ankylosis. The reviewed and hospital-based studies on TMJ ankylosis in SE Asia region suggest that the prevalence is high compared to Europe and America. Compared to population-based studies, these hospital-based studies are small and are more liable to bias. The hospital-based studies are not a true representation of the general population, especially

in relation to prevalence but somehow it is compared in relation to etiology, gender preponderance and site.

The present study, in a population-based door to door survey, showed that the overall prevalence of TMJ ankylosis in Lucknow is 0.46 per 1,000 children. This shows that the condition has significant prevalence. Although TMJ ankylosis has a deep impact on an individual, the awareness of the possibility of its management amongst parents and healthcare providers was found to be very low. Referral practice and initial management of the causative factor were found to be poor.

In spite of the fact that the subjects had difficulty in daily food intake, verbal communication and esthetics which lead to emotional and psychological disturbance, parents felt helpless as they were ignorant of its management.

The present study showed that trauma was the main etiological factor which is similar to hospital-based studies<sup>[8,10,11,13-20]</sup> conducted in different parts of the world. The trauma that usually results in ankylosis of the TMJ is predominantly experienced in childhood. If the decision of treatment is not taken in time the facial characteristics are affected as facial remodeling is greater when the release is done in childhood.<sup>[15]</sup>

A significant female excess confirms the previous hospital-based study<sup>[11]</sup> and dissimilar with the studies<sup>[16,21,22]</sup> conducted and the study<sup>[16]</sup> stated that reason behind males excess is they are subjected more to outdoor activities compare to female. In the present study data on female excess provide groundwork for additional study for the cause behind higher prevalence of ankylosis in girls which could be due to hormonal differentiation between boys and girls or could be related to the differentiation in the anatomy of the neck of the condyle.

In the series of TMJ ankylosis, bilateral cases were more than the unilateral ones, which is similar to the published hospital-based data<sup>[12]</sup> but in the published data<sup>[11,13,16]</sup> unilateral were more.

Studies<sup>[23,24]</sup> stated that TMJ ankylosis is commonly seen in children and young adults. In the present study most of the patients were in the 11-15 years' age group. Various hospital-based studies showed that the most prevalent age group presenting with TMJ ankylosis is 6-10 years<sup>[16]</sup> and 11-20 years.<sup>[12]</sup>

The growth studies showed that very young children who underwent surgery for congenital ankylosis showed greater growth of their mandibles than the mandibles in children who underwent surgery at a later

age and also their postoperative mandibular growth rate was nearly the same as that observed in normal adults.<sup>[25]</sup> According to Laskin<sup>[26]</sup> one of the principles of the management of TMJ ankylosis is to operate as early as possible. Early detection and early intervention to release the ankylosed joint minimizes the severity of the restriction of facial growth, risk of facial asymmetry; development of mental and social stress thus preventing psychosocial problems and produces a healthy citizen who can further take the nation to highest growth.

In the present study the child and parents were provided comprehensive psychological rehabilitation before, during and after surgical intervention. The patients were made to realize that they were normal as any other child of their age and they would soon regain the ability to throw a wide open hearty smile. The parents were similarly motivated and encouraged to prepare their child for surgery.

This study shall help us identify the high-risk group for developing TMJ ankylosis, enable us to limit its occurrence in the larger population. Early detection and surgical intervention would minimize the deformity. Epidemiologic studies of defined populations can serve as a means of establishing data which are important for laying down strategies to curb its detrimental effects on an individual or on society as a whole.

## CONCLUSION

The study concludes that

1. TMJ ankylosis was detected in significant numbers in a population-based door to door survey (the overall prevalence of TMJ ankylosis was 0.46 per 1000 in the 3-15 years' age group).
2. Birth/childhood trauma was the major causative factor.
3. Knowledge of this entity amongst parents was very low.
4. Knowledge of this entity amongst healthcare providers was miniscule.
5. Initial management of the causative factor was poor.
6. Definitive treatment is generally not undertaken by a surgeon even at a District-level hospital
7. Referral practice and knowledge of surgeons in cities to refer these patients was poor.
8. Mere knowledge among the general population and healthcare providers can result in primary prevention and also secondary prevention along with its successful definitive treatment.

## ACKNOWLEDGMENT

This survey was funded by the Research Cell, CSM Medical University, Lucknow, India.

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**How to cite this article:** Gupta VK, Mehrotra D, Malhotra S, Kumar S, Agarwal GG, Pal US. An epidemiological study of temporomandibular joint ankylosis. *Natl J Maxillofac Surg* 2012;3:25-30.

**Source of Support:** Research Cell, CSM Medical University, Lucknow, India. **Conflict of Interest:** None declared.



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### Section A

#### Demographic data

Name: \_\_\_\_\_ Age/DOB: \_\_\_\_\_ Sex:  M  F

Full Postal Address:

C/o: \_\_\_\_\_ House: \_\_\_\_\_ Mohalla: \_\_\_\_\_ Village: \_\_\_\_\_ PO: \_\_\_\_\_ District: \_\_\_\_\_

Telephone: \_\_\_\_\_

Religion:  Hindu  Muslim  Sikh  Christian  Others

Marital Status:  Single Unmarried  Married  Divorced  Widow

Domiciliary Status:  Rural  Urban

#### Socio-economic status:

(A) Education	Score	(B) Occupation	Score	(C) Family income per Month (in Rs)	Total Score	Socioeconomic class
				original Score Modified		
1. Profession or Honors	7	Profession	10	= 2000 12 = 19575	26-29	Upper (I)
2. Graduate or postgraduate	6	Semi-Profession	6	1000-1999 10 9788-19574	16-25	Upper Middle (II)
3. Intermediate or post high school diploma	5	Clerical, Shop-owner, Farmer	5	750-999 6 7323-9787	11-15	Middle Lower middle (III)
4. High school certificate	4	Skilled worker	4	500-749 4 4894-7322	5-10	Lower Upper lower (IV)
5. Middle school certificate	3	Semi-skilled worker	3	300-499 3 2936-4893	<5	Lower (V)
6. Primary school certificate	2	Unskilled worker	2	101-299 2 980-2935		
7. Illiterate	1	Unemployed	1	= 100 1 = 979		

### Section B

Chief complaint & history told by  child /  parent /  guardian.

#### I. Chief complaint (प्रमुख समस्याएँ)

- (i) क्या आपको मुँह खोलने में परेशानी होती है  हाँ  नहीं, यदि हाँ, तो कितने समय से  माह  
(ii) आपके मुँह में कितनी उंगलियाँ जाती हैं। (मुँह ज्यादा से ज्यादा बड़ा खोलने पर) 1 से कम  1  2  3  4  4 से ज्यादा   
(iii) आपको दाएं या बाएं मुँह (जबड़ा) चलाने में परेशानी  हाँ  नहीं  
(iv) मुँह खोलते समय जबड़ा का  दायें तरफ  बायें तरफ  सीधे सामने की ओर जाना।

#### Other complaint (अतिरिक्त समस्याएँ)

- (i) Impairment of speech (शब्दों के उच्चारण में परेशानी)  हाँ  नहीं  
(ii) Difficulty in mastication (भोजन कूच-कूच कर खाने में परेशानी)  हाँ  नहीं  
(iii) Difficulty in maintaining good oral hygiene (मुँह, दाँत, जीम साफ रखने में परेशानी)  हाँ  नहीं  
(iv) Caries (दाँतों की सड़न)  हाँ  नहीं  
(v) Malocclusion (दाँतों का टेढ़ा-मेढ़ा होना)  हाँ  नहीं

#### II. History

- (i) Of trauma (कभी किसी प्रकार की मुँह में चोट लगी है)  हाँ  नहीं  
• यदि हाँ तो किस प्रकार की \_\_\_\_\_  
• कब चोट लगी \_\_\_\_\_  
• कैसे चोट लगी \_\_\_\_\_  
(ii) Of ear infection (कभी किसी प्रकार का कान का संक्रमण रोग हुआ है)  
• यदि हाँ तो कब से \_\_\_\_\_ (दिनांक) कब तक \_\_\_\_\_ (दिनांक)  
• कितने समय से है/तक था \_\_\_\_\_ (महिना/दिन)  
(iii) Mode of child delivered (प्रसव)  Normal delivery (सामान्य)  Forceps delivery (खींच कर)  Caesarian section (आपरेशन से)  
• प्रसव कहाँ हुआ?  घर  सरकारी अस्पताल  प्राइवेट अस्पताल  कहीं और  
(iv) Of treatment of oral problem; मुँह की परेशानी के इलाज के लिए)  
• कहाँ दिखाया \_\_\_\_\_  
• क्या किया गया \_\_\_\_\_  
• क्या आपको फायदा है \_\_\_\_\_  
• क्या आप इलाज से सन्तुष्ट हैं \_\_\_\_\_

#### III. Clinical Examination

- (i) Mouth opening in mm (interincisal distance)  mm  
(ii) Deviation of Mandibular jaw  Right /  Left /  No duration  
(iii) Pain in Temporomandibular joint region  
 Yes /  No  
(iv) Swelling in  Right /  Left /  Both Temporomandibular regions  
Others (Please specify) \_\_\_\_\_

#### Vi. Diagnosis

- Temporomandibular Joint (TMJ) Ankylosis  Present /  Absent  
 Left /  Right /  Bilateral  
• Others \_\_\_\_\_