*Type of Study- Retrospective Study*

# Prevalence of Different Patterns of Temporomandibular Joint Ankylosis in South Indian Population

**Ramvihari Thota[1], Senthilnathan Periasamy[2], Mahathi N[3]**

*[1]Research Associate, Dental Research Cell, [2]Professor & Head, Department of Oral & Maxillofacial Surgery, [3]Reader, Department of Oral & Maxillofacial Surgery, Saveetha Dental College and Hospitals, Saveetha Institute of Medical And Technical Science (SIMATS) Saveetha University, Chennai*

## Abstract

The aim of this study was to identify the incidence of different patterns of temporomandibular joint ankylosis in the south Indian population. Case records of a total of 86000 patients between June 2019 and March 2020 were collected and analyzed from patient records, out of which a total of 7 cases of mandibular temporomandibular joint ankylosis cases who had undergone treatment for the same were identified and included in the present study. All these were checked retrospectively for pattern/type of ankylosis by using the radiographs with Sawhney's classification. Results show that there's a significant male predilection of about 85.7% and shows more unilateral ankylosis cases of about 57.1%. Based on Sawhney's classification it shows 14.3% of type - 1 cases, 42.9% of type - 2 cases, 28.6% of type - 3 cases and 14.3% of type - 4 cases. Within the limitations of this study, it showed that there was a male predilection, unilateral ankylosis cases were common, and among all ankylosis cases Sawhney's type 2 temporomandibular ankylosis cases were high in number.

***Keywords:*** *TMJ, Temporomandibular joint, Ankylosis, TMJ Ankylosis.*

## Introduction

The temporomandibular joint is a bilateral, diarthrodial joint in the maxillofacial region. The joint is formed by the bony articulation of mandibular condyle and the temporal bone [1]. Temporomandibular joint ankylosis is a pathologic condition where the mandible is fused to the fossa by the bony or fibrotic tissues. This interferes with mastication, speech, oral hygiene, and normal life activities, and can be potentially life-threatening when struggling to acquire an airway in an emergency. Attempting to open the mouth, stretching the periosteum can also result in pain [2].

**Corresponding Author**
**Senthilnathan Periasamy**
Professor & Head, Department of Oral & Maxillofacial Surgery, Saveetha Dental College and Hospitals
Saveetha Institute of Medical And Technical Science (SIMATS) Saveetha University, Chennai.
Email Address - senthilnathan@saveetha.com
Ph no. - 9340040030

There are multiple factors that can result in temporomandibular ankylosis such as trauma, arthritis, infection, previous Temporomandibular surgery, congenital deformities, idiopathic factors [3], and iatrogenic causes. Trauma is the most common cause of temporomandibular joint ankylosis, followed by infection [4]. Temporomandibular ankylosis in growing patients can result in dentofacial deformity.

Diagnosis of temporomandibular joint ankylosis is usually made by clinically examining the patient and imaging studies, such as plain films, orthopantomogram, computed tomography (CT) scans, MRI, and three-dimensional reconstruction.

Ankylosis can be classified as true (intra-articular) and false (extra-articular). True ankylosis has been classified as type I, II, III, and IV by Sawhney's based on his experience with interpositional arthroplasty using an acrylic cylinder in 70 cases of bony ankylosis of temporomandibular joint [5].

## Materials and Methods

Case records of a total of 86000 patients between June 2019 and March 2020 were collected and analyzed from patient records, out of which a total of 7 cases of mandibular temporomandibular joint ankylosis cases who had undergone treatment for the same were identified and included in the present study.

The radiographs were collected for all the cases and were taken for pre-treatment diagnostic purposes. This is a descriptive, cross-sectional and retrospective study in which all the radiographic images are screened by using examiner for the identification and classification of type/ pattern of temporomandibular joint ankylosis

**Inclusion criteria:**

- Patients with temporomandibular joint ankylosis.
- Dentulous & Edentulous patients.

Exclusion criteria:

- Patients with reduced mouth opening with etiology other than ankylosis.
- Patients with temporomandibular joint pathology other than ankylosis.

## Results and Discussion

The result shows the incidence among temporomandibular joint ankylosis patient as Type 1 as 14.3%, type 2 as 42.9%, type 3 as 28.6%, and type 4 as 14.3% also the case of temporomandibular joint ankylosis which is unilateral is of 57.1% and bilateral is of 42.9 %.

It showed temporomandibular joint ankylosis cases were more common in males (85.7% ) than females (14.3%) with mean age as 23.29 +- 23.5 years.

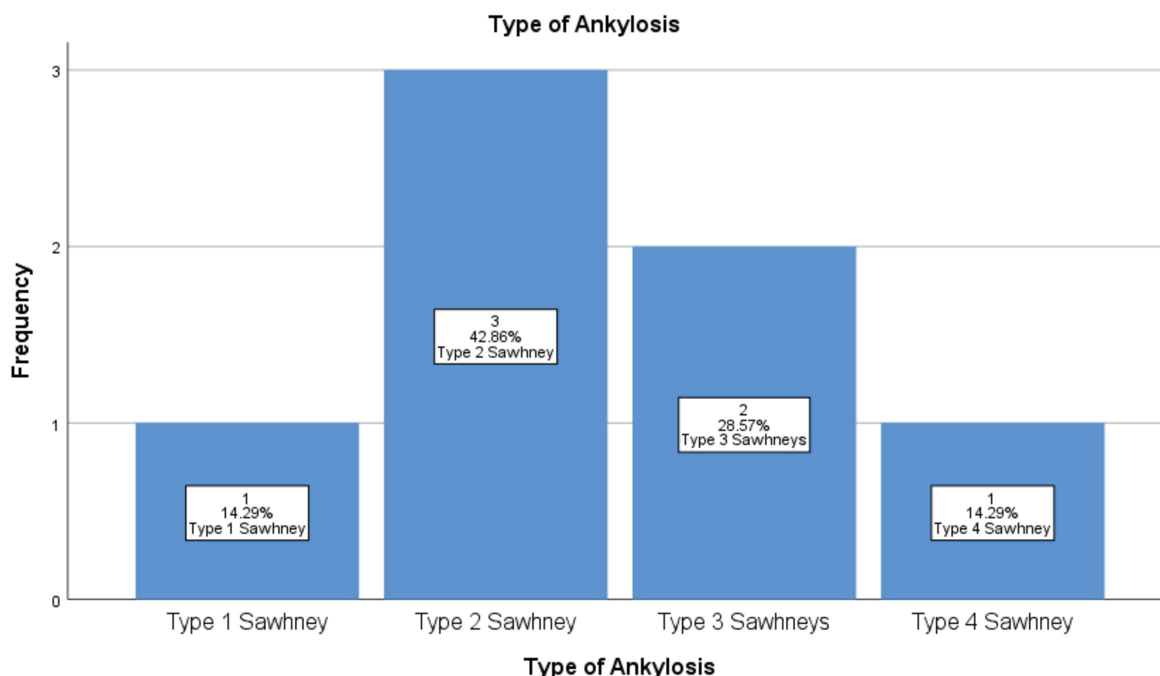


**Figure 1: Bar graph shows the distribution of type of ankylosis in frequency and percentage among cases of temporomandibular joint ankylosis. The graph shows that there are more number of Sawhney's type 2 cases with 42.86% followed by Sawhney's type 3 with 28.57%, type 1 and 3 with 14.29%.**

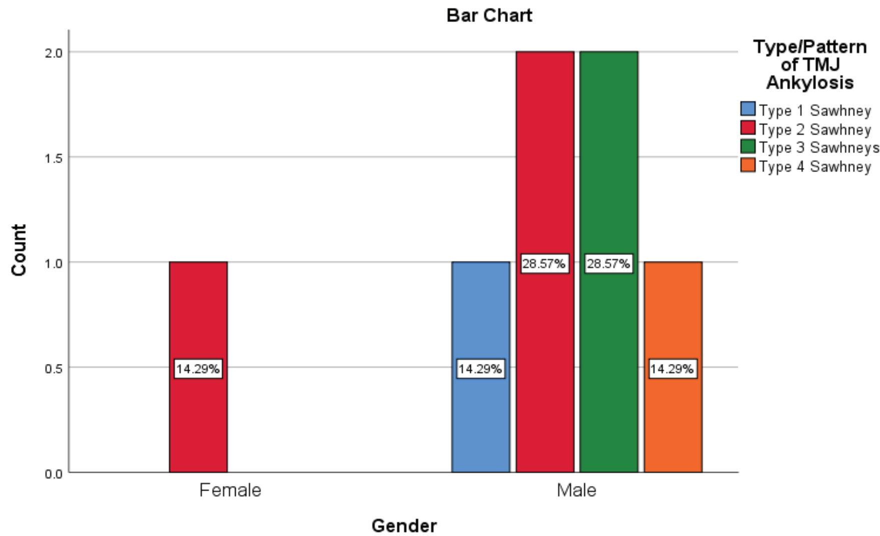


**Figure 2: Bar chart representing the association between the type of ankylosis and gender distribution in temporomandibular joint ankylosis cases. The X-axis represents gender and Y-axis represents the number of patients and color-coding used for type/pattern of temporomandibular joint ankylosis with blue for type 1, red for type 2, green for type 3, and saffron for type 4 in Sawhney's classification of temporomandibular joint ankylosis. Males showed more numbers of type 2 and type 3 patterns of sawhney's type of temporomandibular joint ankylosis. Chi-square test was done and the association was found to be statistically not significant. Pearson's Chi-square value: 1.556, P-Value: 0.670 (>0.05) hence statistically non-significant, proving gender does not have any association with the type of temporomandibular joint ankylosis.**

Figure 3: Bar chart representing the association between the type of ankylosis and involvement of the number of joints in temporomandibular joint ankylosis cases. The X-axis represents the involvement of the joints and Y-axis represents the number of patients and color-coding used for type/pattern of temporomandibular joint ankylosis with blue for type 1, red for type 2, green for type 3, and saffron for type 4 in Sawhney's classification of temporomandibular joint ankylosis. Chi-square test was done and the association was found to be statistically not significant. Pearson's Chi-square value: 7.000, P-Value: 0.072 (>0.05) hence statistically non-significant, proving that the unilateral or bilateral involvement of the joints does not have association with the type of temporomandibular joint ankylosis.

Dentistry comprises practices related to the oral cavity. Oral diseases are a major problem among the general population and there are various procedures carried out to prevent and treat them. Oral health has a direct impact on general health patterns as it helps to talk, eat, and feel confident [6].

Bony ankylosis of temporomandibular joint is a disabling disease that is not confirmed just to the first two decades but can occur in later stages of life also [7]. Different causes have been attributed to the condition condylar fracture with the involvement of articular surfaces, advanced arthritis, and trauma from obstetric forceps [8]. Radiography is an essential diagnostic tool for TMJ ankylosis. Current methods include panoramic radiography and CT. Recently, the value of three-dimensional CT (3D-CT) before surgery has been advocated [9].

Ankylosis can be classified into intracapsular/articular or true ankylosis extra-articular or false ankylosis. Intra-articular ankylosis has been classified into four types as Type I, II, III, and IV [5].

Type I occurs where the condyle is medially angulated and associated with deformed articular fossa together with a mild to moderate amount of new bone formation. the head was flattened or deformed but lay closely approximated to the upper articular surface. There are injury-producing fracture-dislocation to head and neck of mandible and laceration of capsular ligaments

Type IV is found when the joint architecture is replaced completely by bone with a fusion of the fibrous adhesions all around the joint, making the movement impossible. This is probably followed by a comminuted fracture of the head of mandible/condyle.

Type II is found where there is no recognizable condyle or fossa but instead a large mass of new bone extending from the ramus to the base of the skull. The head is misshapen or flattened, but it is still distinguishable and lay in close approximation to the articular surface. There is, however; Bony fusion of the head to the outer edge of the articular surface either anteriorly or posteriorly, but this is limited to small areas. Deeper to this, the upper articular surface and articular disc are undamaged. this probably was followed by a severely comminuted fracture of the head with associated partial damage to the upper articular surface

Type III ankylosis usually results from medially displaced fracture-dislocation with bone bridging the mandibular ramus to the zygomatic arch. A bony block is seen to bridge across the ramus of the mandible and the zygomatic arch. the upper articular surface and articular disc and deeper aspect are intact. The displaced head is seen to atrophic and laying either .free are fused medial side of the upper end of the ramus. This is probably followed by a severe condyle. Sigmoid notch and coronoid process to the zygomatic arch and glenoid fossa. The Bony block was wide and deep and extended between the ramus and the upper articular surface, completely replacing the architecture of the joint. this perhaps followed. fracture of the neck of the mandible with dislocation of the head and associated injury to the capsule ligaments, Articular disc, and even the upper articular surface

It is possible to reconstruct the series of events and changes that would have taken place from infliction of trauma to the development of the bony ankylosis. Trauma leads to the development of Bony ankylosis. Trauma leads to the fracture of the head or neck of the mandible with or without dislocation of the head, disruption of the capsular ligament, Articular surface, and /or articular disc as well as adjoining periosteum, and accompanying hemarthrosis. Also, Cancer cells exhibit a wide range of genetic alterations that include gene rearrangements, point mutations, and gene amplification, leading to disturbances in molecular pathways modifying cell growth, survival, and metastasis [1011]. This is followed by a varying period of restricted mobility or complete immobility of the joint because of pain. The hematoma organizes, and the ensuring fibrosis in and around the joint leads to further restriction of mobility and gradual bone formation across the joint or between the upward displaced ramus and the zygomatic arch from the disrupted periosteum. The bone formation varies with the severity of the injury and disruption of the structures, i.e; varying from thin bony spicules across the joint to complete replacement of the joint by a bony bridge extending from mandibular ramus to upper articular and/or the zygomatic arch. The bony bridge maybe 1 ¼ inch across and more than 1 inch in thickness [5,7].

The upward displacement of ramus reduces the apparent vertical height of the mandible. and in unilateral cases produces facial asymmetry and deviation of the chin to the affected side, which starts appearing relatively full. In bilateral cases, it causes the rescission of the chin and open bite. restriction in the range of

mouth opening and persistent efforts by depressors in the mandible (digastric mylohyoid) produces marked notching in the lower border of the mandible in front of the insertion of the masseter and medial pterygoid. This is especially marked during childhood and adolescence. The presence or absence of dental malocclusion depends on the relative position of the teeth and their fixation following trauma [1213]. With the rise of mandibular ramus by the upward pull of masseter and the pterygoid on the affected side there is relaxation of temporalis, masseter, and medial pterygoid on the affected side, which over a period of months and years become atrophic from disuse and get contracted. These changes in muscles may also occur on the normal side. This interferes with immediate restoration of the full range of mouth opening after temporomandibular joint arthroplasty because of the inability of these muscles to stretch to normal dimensions. Several factors may influence the perception of pain as it is a complex process. Dental pain and needs to be considered more often as a possible diagnosis also [14151617].

Therefore, it is recommended that coronal and axial CT are essential in identifying the relationship of these vital structures to the ankylosed bone mass. It is important for surgeons to improve their knowledge to enable the diagnosis and management of patients to have a more positive attitude toward these patients [181920]. It can be recommended that the choice of investigation can depend on the size of the lesion [2122]. These findings do not match the results of the previous literature, but this difference may be due to a change in geographical distribution which plays the role in the change in etiological factor, socioeconomic status of the patients we recommend more detailed and long term followup to include more numbers of cases.

## Conclusion

Our result shows there is significant male predilection with more number of unilateral temporomandibular joint Ankylosis cases than bilateral and also higher incidence of Sawhney's type 2 temporomandibular joint followed by type 3 and type 1 & 4 respectively. And, there is no association between type of temporomandibular joint ankylosis and gender or type of temporomandibular joint ankylosis with the number of joints involved.

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