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**Case Report**

# Post-traumatic ankylosis of the temporomandibular joint: a report of two cases

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ABSTRACT

Ankylosis of the temporomandibular joint is a disabling condition that leads to impairment of jaw function and restricted mouth opening. Trauma is the most important etiologic factor in ca using TMJ ankylosis often resulting in haematoma, which eventually organizes and ossifies. It can be true ankylosis of the TMJ, i.e. due to fibrous or bony fusion of the mandibular head to the temporal fossa and false ankylosis, which is due to other pathological mechanisms causing inhibition of mouth opening. In this article, we report two cases of TMJ ankylosis in a 23 year-old male patient and a 10 year female patient showing characteristic features of this condition.

## Introduction

Ankylosis is the Greek for "stiff joint". The term "ankylosis of the temporomandibular joint" (TMJ) refers to bony or fibrous adhesion of the anatomical components of the joint and their ensuing loss of function. The adhesion could be between the condylar head of the mandible and the glenoid fossa of the temporal bone, or between any tissue component of the lower jaw (hard and soft) and the maxilla, zygoma, or the base of the skull.[1] As early as 1938 it is classified into two types by Kazanjian into intra-articular and extra-articular ankylosis. Present classification includes bony, fibrous, fibroosseous, complete and incomplete. The causes of the TMJ ankylosis are the well-known; trauma and local-systemic infection. Trauma, which is the most important etiologic factor in causing TMJ often resulting in haematoma, which eventually organizes and ossifies.[2] In this report, we present two cases of TMJ ankylosis encountered secondary to trauma.

## Clinical Report:

### Case Report 1:

A 23 year old male reported with a chief complaint of restricted mouth opening to the Department of Oral Medicine Radiology. According to his history, he had a fall from a height 15 years back subsequent to which he had an injury to the chin region for which conservative management was done. Patient didn't have any relevant records of the same. He gave a history of progressive restriction of mouth opening following the episode of trauma along with difficulty in mastication and speech problems. On extraoral examination bird like facial deformity,

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Fig 1: Extraoral and intraoral photographs of Case 1

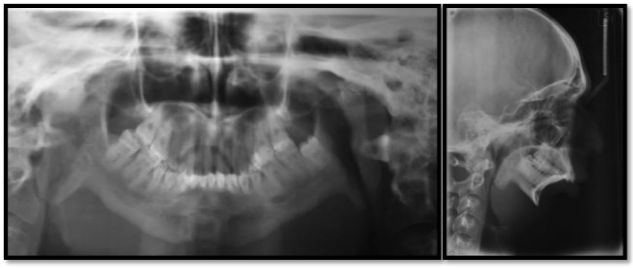

Fig 2: Orthopantomogram of the 23 year male patient showing ankylosis of the right and left condyles with prominent anti-gonial notch. Lateral cephalogram shows decrease in the vertical height of the ramus with retrognathic mandible.

underdevelopment of the mental area, retrognathic mandible was evident. The mouth opening was nil. He had skeletal and dental class-II malocclusion and a convex facial profile. His feeding was characterized by an inability to masticate food and consumed food in liquid or semisolid form.

Orthopantomogram showed that the right condyle is not visible and is overshadowed by the mass of bone attached above to the cranium and below the ramus. Joint space, articular eminence, zygomatic arch and mandibular notch are effaced by the osseous bridge.

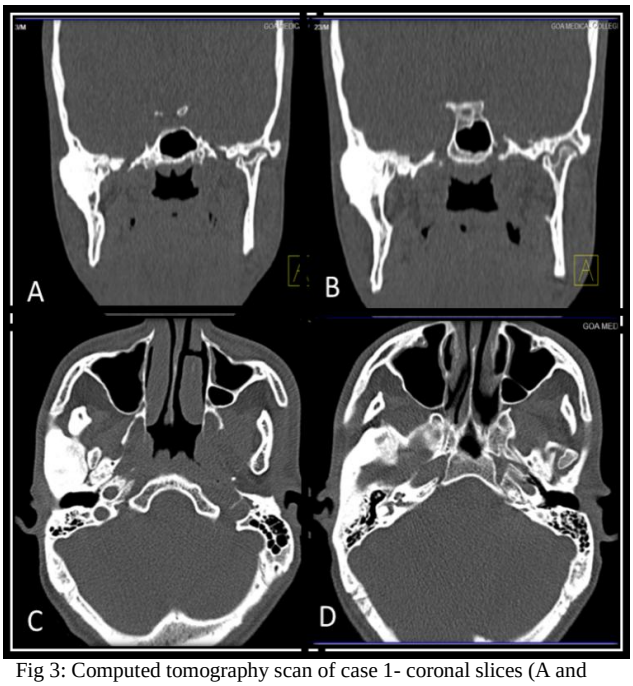


Fig 3: Computed tomography scan of case 1- coronal slices (A and B) revealing a fusion of the right mandibular condyle to the base of the skull, which is represented by a radiopaque image. It is possible to observe a joint space on the left side suggesting a fibrous ankylosis. Axial slices (C and D) revealing bone mass that involves the condyle of the mandible, temporal bone and zygomatic process suggesting osseous ankylosis of the right mandibular condyle.

Fig 4: Post-operative intraoral photograph showing increase in the mouth opening to 2.6 cms

Fig 5: Post-Operative Orthopantomogram of Case 1

There is loss of normal shape of condyle on left side with irregularity seen in the articulating surface of left condyle and glenoid fossa. Compensatory progressive elongation of the coronoid process is seen bilaterally extending beyond the level of zygomatic arch. Lateral cephalogram shows irregular contour of the mandible at the gonial angles. Accentuated antegonial notch with decrease in the vertical height of the ramus. Chin is inclined with the inferior border well posterior to the alveolar crest.

Axial slices of the CT scan revealed that the condyle is bridged with the temporal bone and the osseous mass is seen involving the condyle, temporal bone, sigmoid notch, posterior aspect of zygomatic arch. The left condyle shows an alteration in its shape with flattening and erosion of the articulating surface of condyle. The joint space is preserved suggesting fibrous ankylosis on the left side. Thorough clinical and radiographic examination revealed the case of bilateral TMJ ankylosis. Gap arthroplasty through a periauricular approach with coronoidectomy was done bilaterally. Temporal fascia was used to cover the joint space. Orthodontic treatment and orthognathic surgery has been scheduled at a later date. At his most recent follow up, he had a vertical opening of 26 mm with stable occlusion.

**Case report 2:**

A 10 year old female patient reported with a chief complaint of restricted mouth opening. According to the history, she was hit by a four wheeler 5 years back and since then she had progressive restricted mouth opening. Patient was managed conservatively at that time and she didn't have any relevant records of the treatment. Extraoral assessment revealed gross facial asymmetry with only 1 mm interincisal distance on

Fig 6: Extraoral photograph of Case 2

Fig 7: Orthopantomogram showing ankylosis of the left condyle with prominent anti-gonial notch and reduced vertical height of ramus on left side


Fig 8: **CT scan -** Axial slice revealing bone mass that involves the left condyle of the mandible attached to the skull base

mouth opening. Deviation of mandible towards the left side (affected side), flattening of the right side of the face and fullness on the affected side was seen. Facial profile was convex and she had a skeletal class II relationship.

Orthopantomogram revealed gross radiopaque mass in place of left condyle. Complete obliteration of the joint space was noted with coronoid hyperplasia. Deepening

**Fig 9:** Post-Operative Orthopantomogram of Case 2

of the antegonial notch with reduced vertical height of the ramus was seen. Right condyle didn't show any gross deformity. Axial slices of the CT scan revealed bony fusion of the left condyle and temporal bone. Clinical and radiographic examination confirmed it as a case unilateral TMJ ankylosis. Gap arthroplasty through a pre-auricular approach was done. She was started on an exercise program involving the use of tongue blade to stretch the mouth maximally. At her most recent follow up, she had good range of motion with vertical opening of 24 mm.

**Discussion:**

Ankylosis can be ''true'' ankylosis of the TMJ, i.e. poor or non-function of the joint due to fibrous or bony fusion of the mandibular head to the temporal fossa and ''false'' ankyloses, i.e. other pathological mechanisms leading to inhibition of opening the mouth: e.g., there is fusion of the coronoid process with the temporal bone or with the zygoma. The other pathogenetic mechanisms are due to a variety of soft tissue disorders like myositis ossificans or scarring of the masticatory muscles, e.g. following radiotherapy.[3] Ankylosis of the TMJ usually develops before the age of 10 but could be found at any age, the usual range being 20–30 years. Unilateral ankylosis has been reported to be commoner than bilateral, the ratio being 1.5:1.[1]

The notching at the antegonion and the apparent distortion of the mandibular structure (which is pathognomonic of the condylar growth arrest) are thought to be caused by continuous growth at the angle of the mandible as a result of subperiosteal apposition. Because of a failure of growth at the condyle, forward and downward movement of the body of the mandible does not occur, and a localised thickening of the bone at the angle accentuates the antegonion. This, coupled with the obtuse angle formed between the cranial base and the lower border of the mandible, is responsible for the characteristic "warping".[4]

The ankylotic bone may be considered as a reparative process similar to that of an exuberant callus, typical of fractures in children or of inadequately immobilized fractures. In the case of cranio-mandibular ankylosis however, the process of remodeling, which gradually results in the elimination of the callus, fails to occur and the typical ankylotic mass bridging the articulation becomes established. This mass is usually surrounded by very dense scar tissue particularly on its medial aspect, which further limits mandibular movements.[5]

If the process of ankylosis begins before the completion of jaw growth or the calcification of cortical bone of the TMJ, extensive ankylosis of the joint area can occur, and characteristic changes in the morphology of the face due to inadequate growth in the joint area will result. ***Mitarashi et al*** suggested that the increase in the degree of antegonal notching in their case was not caused by hyperergasia of the masseter muscle but rather was due to the continued downward growth of the mandibular angle combined with a failure of anterior growth. The ankylosis developed after the commencement of anterior development rendering the application of the masticatory force to the mandible impossible and

therefore prevented resorption in the areas of muscular attachment. Resorption then took place in the anterior area of the angle outside the area of attachment, producing the abnormal antegonal notch.[6]

***Classification of ankylosis (Sawhney, 1986):***

**Type I:** The condylar head present but deformed. Fibrous adhesions make movement impossible.

**Type II:** Bony fusion of misshaped head and articular surface, mainly concentrated on outer edge of articular surface either anteriorly or posteriorly. The medially located pole of the TMJ remained undamaged.

**Type III:** A bony block bridging from ascending ramus of the mandible to the zygomatic arch. Medially atrophic and dislocated fragment of the former head of the condyle still to be found. The upper articular surface and, in rare cases, the articular disc were intact medially.

**Type IV:** Regular anatomy of TMJ totally destroyed by an expanded bony block between ramus and skull base.[7]

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) prior to surgery has been advocated.[8] A new classification of TMJ ankylosis based on the CT findings was proposed by ***El-Hakim et al.***

Class I: Includes unilateral and bilateral fibrous ankylosis. The condyle and glenoid fossa retain their original shape, and the maxillary artery is in normal anatomical relation to the ankylosed mass.

Class II: There is unilateral or bilateral bony fusion between the condyle and the temporal bone. The maxillary artery lies in normal anatomical relation to the ankylosed mass.

Class III: The distance between the maxillary artery and the medial pole of the mandibular condyle is less on the ankylosed than in the normal side or the maxillary artery runs within the ankylotic bony mass.

Class IV: the ankylosed mass appeared fused to the base of the skull and there is extensive bone formation, especially from the medial aspect of the condyle to the extent that the ankylosed bony mass is in close relationship to the vital structures at the base of the skull such as the pterygoid plates, the carotid and jugular foramina and foramen spinosum and no joint anatomy can be defined from the radiograph.

This new classification gives the surgeon the opportunity for careful surgical planning and achieves better surgical results with minimum operative complications.[8] Treatment usually is surgical and various techniques have been described. ***Kaban et al*** described a protocol for the treatment of TMJ ankylosis in 14 patients with a 1-year follow-up, consisting of complete resection of the ankylotic block, ipsilateral coronoidectomy and muscle stripping, contralateral coronoidectomy and muscle stripping if indicated, interposition with temporalis fascia, or cartilage reconstruction of the ramus with a costochondral graft followed by aggressive physical therapy in the shortest time possible. This protocol has been accepted by most researchers.[9] TMJ ankylosis impacts facial and head features differently, resulting in differences in both appearances and speech. Management of the psychosocial adjustment of patient with poor facial appearances has moved from development of adaptation towards the optimum results deserved by the patient from the possible team approach. Biggest advantage of multidisciplinary team

care is achieving the goal of functional efficiency, structural stability, esthetic harmony, and psychosocial competency.[10]

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