



CASE REPORT

BILATERAL TEMPOROMANDIBULAR JOINT ANKYLOSIS: A RARE RADIOGRAPHIC PRESENTATION

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ABSTRACT

Temporomandibular joint (TMJ) ankylosis is a disabling condition of mastication. Hypomobility affects the surrounding structures as well as the function of digestion, speech, appearance and hygiene. The condition also has an impact on the psychological development of the patient. It results from trauma, infection and inadequate surgical treatment of the condylar fracture area. Trauma is the most important etiologic factor in causing TMJ ankylosis often resulting in haematoma, which eventually organizes and ossifies. With this background we report a case of bilateral TMJ ankylosis in 35 year old male patient who came with a chief complaint of pain in his lower right back tooth region and restricted mouth opening. The patient reported with history of road traffic accident resulted in trauma to the face. Patient was treated previously for mandibular angle fracture 20 years back. The clinical features and radiographic investigations confirmed the diagnosis as TMJ ankylosis. Surgical treatment was proposed through condylectomy with interpositional gap arthroplasty. Thus, in the present case, TMJ ankylosis may have been developed as a sequel of the mandibular fractures and in adequate surgical treatment of the condylar area.

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INTRODUCTION

The American Academy of Orofacial Pain (AAOP) defines ankylosis of the temporomandibular joint (TMJ) as a restriction of movements due to intracapsular fibrous adhesions, fibrous changes in capsular ligaments (fibrous ankylosis) and osseous mass formation resulting in the fusion of the articular components (osseous ankylosis). TMJ ankylosis impairs functions such as speech, chewing and mouth opening. Limited jaw opening and decreased translation movement characterizes ankylosis in adults, and it is classified according to the location (intra-articular *versus* extra-articular), type of involved tissue (bony, fibrous or mixed) and fusion extent (complete *versus* incomplete).^{1,2} The disease also has an impact on the psychological development of the patient.³ It results from trauma, infection and inadequate surgical treatment of the condylar area. Trauma is the most important etiologic factor in causing TMJ ankylosis often resulting in haematoma, which eventually organizes and ossifies. The infection in this area can be secondary to otitis media or mastoiditis, and haematogenous infections. The other etiologic factors are rheumatoid arthritis, paget's disease, ankylosing spondylitis, psoriasis and bums.⁴

CASE REPORT

A 35-year-old male patient, reported to the department of oral medicine and radiology, with a chief complaint of pain in the lower right back tooth region since one week and restricted mouth opening since 20 years. Pain was insidious in onset, throbbing type and moderate in intensity, aggravated on eating food. Patient gave a history of trauma to the face 20 years back due to a road traffic accident. Records of patient revealed a history of mandibular angle fracture with bilateral condylar fracture and he was treated for angle fracture and untreated condylar fractures. Followed by the surgery patient developed limited mouth opened over a period of time. On general examination, patient was moderately built and nourished, appeared apprehensive while being co-operative and all vital signs were within normal limits. Extraoral examination revealed gross asymmetry of the face; the lips were incompetent, restricted mouth opening and associated with presence of scars over the neck (figure 1 and 2). On palpation no condylar movements were noticed but the condyle was more prominent on the left side and was non tender.



Figure 1: Extra oral frontal view



Figure 2: Extra oral lateral view



Figure 3: Intra oral view

Intraoral examination revealed deranged occlusion on right side, root stumps in relation to 11, 21 and 22, extensive dental caries in relation to 16, 18 and 23 and missing teeth in relation to 25,26,27 36, and 37,

complete intraoral examination could not be performed because of limited mouth opening (figure 3). On palpation, vestibular tenderness was present in relation to 46, 47, 48 region. Based on the patient's history and clinical examination a provisional diagnosis of bilateral ankylosis of the temporomandibular joint was made. The patient was subjected to radiological and routine normal blood investigations. Digital panoramic radiograph and temporomandibular joint (TMJ) projections were advised. Panoramic radiograph (figure 4) revealed presence of a radiopaque mass around left condylar neck and condylar head region.



Figure 4. Orthopantomograph showing ankylosis of temporomandibular joint

Increased radiodensity near the condylar neck on right side with displaced fractured fragment. Presence of a metal plate with screws along the right body of the mandible, root stump was present in relation to 48. Presence of impacted 38 with a well defined radiolucency around the crown of the tooth arising from the level of cemento-enamel junction on the mesial aspect and encircles the tooth and joins the distal aspect of the crown. The radiolucency measures about 2.5-5 mm suggestive of Hyperplastic Follicular space/Dentigerous Cyst. TMJ view (figure 5) revealed a radiopaque mass extending from the condylar neck fused to the zygomatic arch and glenoid fossa on left side.

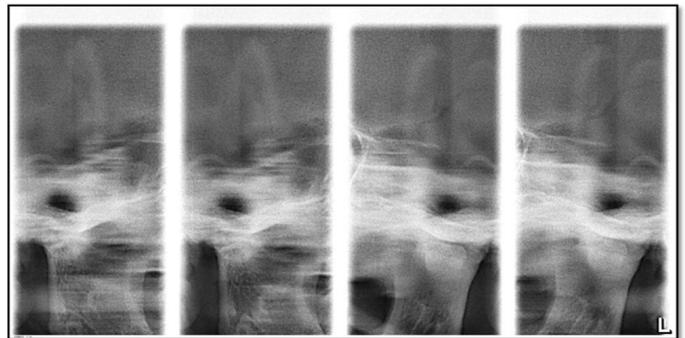


Figure 5. TMJ view showing ankylosis of temporomandibular joint

On right side there was an increased radiodensity near the condylar neck region. Based on these findings a radiographic differential diagnosis of bilateral TMJ ankylosis, condylar hyperplasia and benign condylar tumors were considered and patient was subjected to CBCT of TMJ to evaluate further extension and nature of lesion. CBCT (figure 6) revealed a bilaterally deformed condyle suggestive of previous subcondylar fracture with malunion. The right TMJ reveals presence of deformed condyle with a thin radiolucent articular space throughout separating the condyle from the glenoid fossa thus it suggested fibrous ankylosis of right condyle. A small lateral spicule like extension of the condyle was seen outside the glenoid space which was projecting superiorly. The left condylar process was thickened from the neck and superiorly to involve the head of condyle. Additional finding revealed that the head of condyle appeared as a large well circumscribed, round mass that has fused with the lateral surface of the zygomatic process and glenoid fossa thus suggestive of bilaterally malformed condyle with severe bony ankylosis of the left condyle.

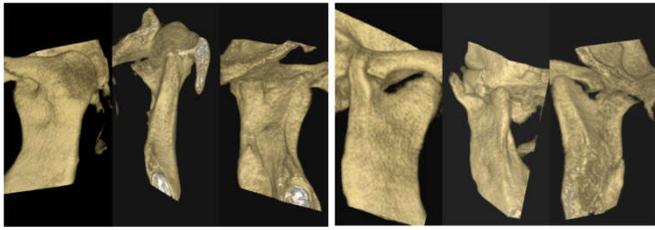


Figure 6: 3D reconstructed images showing ankylosis of temporomandibular joint



Figure 7: Excised condylar mass

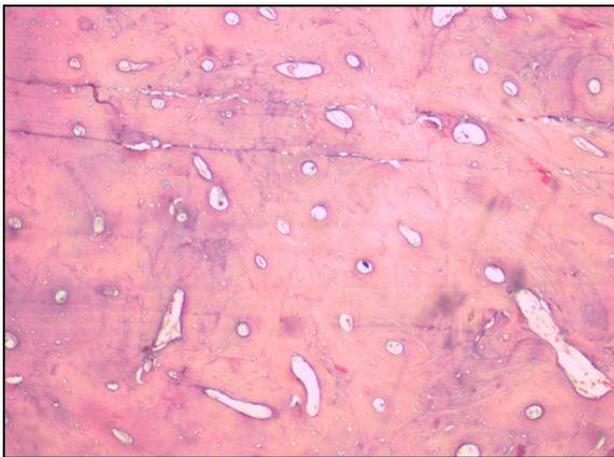


Figure 8: Histopathological picture showing presence of compact bone with osteocyte formation with minimum amount of fibrous tissue

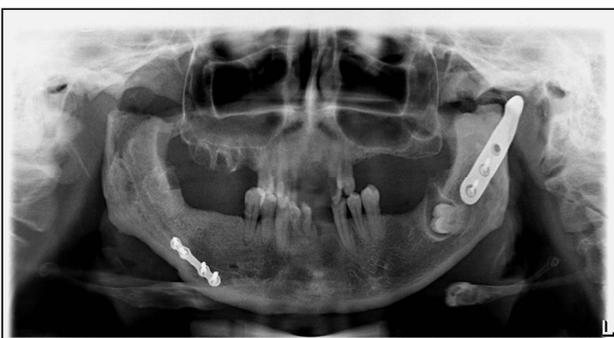


Figure 9: Post operative Orthopantomograph

Based on all imaging findings, a radiographic diagnosis of bilateral condylar ankylosis was made. The blood investigation findings were within normal limits. The patient was referred to department of oral & maxillofacial surgery. Condylectomy and coronoidectomy with

interpositional gap arthroplasty was planned and carried out under general anesthesia. Temporalis flap was used as interpositional material and reconstruction with costochondral rib graft was done which was harvested from 5th rib. The specimen (figure 7) was sent for histopathological examination, which revealed presence of compact bone with osteocyte formation with minimum amount of fibrous tissue (figure 8) confirming the diagnosis bilateral temporomandibular joint ankylosis.

DISCUSSION

Ankylosis of the Temporomandibular joint is a condition affecting the masticatory system that ranges from limitation to complete restriction of mouth opening. A clinical and retrospective evaluation of 42 patients treated for this disorder by Guven, showed that 89% of all patients had unilateral and only 11% had bilateral ankylosis. The highest incidence was observed in the 11-20 age group (47%) followed by the 1-10 age group (26%),⁴ as seen in our case where the patient's age during the trauma was 16 years following which bilateral ankylosis was seen. Other features in TMJ ankylosis includes retarded growth of mandible and facial asymmetry which is most commonly due to trauma, such as condylar fracture with involvement of the articular surface, trauma from obstetric forceps, infections like advanced arthritis and some systemic diseases.^{5,6} Roychoudhury *et al*, studied 50 patients and found that trauma was the cause of ankylosis in 86% of the cases.³ As trauma is the most important etiologic factor in causing TMJ ankylosis often resulting in haematoma, which eventually organizes and ossifies,⁴ as seen in our case. In some of the cases, excessive bone formation causes the bony thickening in front of the tragus. The thickness of the bony block varies with the severity of the injury.^{4,7} Interincisal opening (IO) shows the severity of the ankylosis. Less than 5 mm of IO reveals a complete ankylosis.⁴ According to Graziani, patients who have TMJ ankylosis presents with limited mouth opening of about 1 to 2 mm.⁸ A complete absence of mouth opening and recession of the chin are typical characteristics of the bilateral ankylosis.⁴ In the present case there was a bony thickening anterior to the tragus on left side and the mouth opening was completely nil. Importantly, in addition to its diagnostic benefits, imaging findings also play an important role in influencing the clinician's treatment of patients with TMD.⁹ A variety of imaging modalities have been used to evaluate the TMJ. Traditionally used two-dimensional TMJ projections have some limitations due to superimposition of the overlying structures, which compromises their ability to detect pathological TMJ changes.¹⁰ Dental panoramic tomography (DPT) is usually suggested to assess the general osseous morphology and contour of the condylar heads and necks with a view to looking for variations in shape of the mandibular condyle on the right side or an "old fracture".¹¹ Although panoramic radiographs are not a reliable method of accurately judging the shape of the mandibular condyle¹² and neither is it the best for an assessment of condylar fractures¹³ and degenerative joint disease¹⁴, the investigators felt that some preliminary information would be obtained. According to Long *et al.*, a tomographic image is the best imaging diagnostic tool to assess the type and extension of the ankylosis and to analyze the existence of a joint space.¹⁵ Diagnosis of fibrous-ankylosis is possible with the use of MRI, but the CT scan is superior in demonstrating bony pathology. CT provides adequate information about condyle, mandibular fossa, articular eminence and surrounding tissues. Switching the image slices, it is possible to evaluate the condyle medial pole and lateral pole as well as the central region. Data from sagittal and coronal slices are the most useful for studying TMJ ankylosis.⁴ Studies on autopsy specimens found CT to have a sensitivity of 75% and a specificity of 100% for detecting bony changes with a positive predictive value of 100% and a negative predictive value of 78%. However, the high cost, access to equipment and the relatively high radiation dose have limited the widespread use of CT for TMJ evaluation. With the advent of cone beam CT (CBCT), these barriers have been overcome. First, the radiation dose from CBCT examinations is typically much lower than that from medical CT units. Second, the spatial resolution of CBCT images is typically higher than that of medical CT imaging protocols.

The diagnostic efficacy of CBCT is as good as conventional CT and is superior to that of panoramic radiography and linear tomography. Recent guidelines recommend CT as the modality of choice for evaluation of TMJ osseous changes. Given the lower radiation dose and the growing availability of CBCT, this modality is becoming the modality of choice for evaluation of TMJ osseous components.¹⁰ According to Hakim And Metwalli (2002), based on CT interpretation present case falls under Type IV ankylosis where 3D-CT reveals the ankylosed mass is fused to the base of the skull with 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 (This is best visualized on axial C.T).^{16, 17} The treatment of choice for ankylosis of the TMJ is always surgical. This treatment permits the removal of all rigid bone mass that involves the articulation, creating enough space to allow the interposition or even full reconstruction of TMJ with customized prosthesis.³ The critical factor of successful treatment of TMJ ankylosis in the long term is early detection, implementation of an intensive physiotherapy program, and a good post-operative conduct. Long period of physical therapy is essential for obtaining good results in treatment. The main objective of this treatment is to prevent bone neoformation in articulations, as well as to minimize fibrosis, to prevent scar retraction, trismus, atrophy, and muscle spasms.¹⁹

CONCLUSION

TMJ ankylosis is an acquired condition in most of the cases, birth/childhood trauma are the major causative factor. Since conventional radiographs often give a blurred picture of the existing pathology, it is necessary to advise advanced imaging modalities such as CBCT, CT or MRI for the diagnosis and management of TMJ ankylosis. With the advent of newer technologies in imaging and surgical techniques it can result in primary prevention and also secondary prevention along with its successful definitive treatment.

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