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1. Introduction

Temporomandibular joint (TMJ) ankylosis is one of the most challenging TMJ disorders that can negatively affect oral related daily functions like mastication, speech and hygiene [1,2]. The accepted definition of ankylosis is the bony or fibrous tissue fusion between articular surfaces including the meniscus, glenoid fossa and condylar heads [3]. Consequently, jaw functions like the maximal incisal opening (MIO) and lateral excursive movements progressively decrease. This chapter describes the most important issues of early and late management of TMJ ankylosis in both children and adults.

2. Etiology and pathogenesis of TMJ ankylosis

Trauma to the TMJ has been cited as the most common underlying reason responsible for ankylosis; however, local infections (e.g. otitis media) and systemic disorders (e.g. rheumatoid arthritis) also can also cause unilateral or bilateral TMJ ankylosis in some cases [4-7]. By improving the immediate management protocol of condylar fracture and proper application of antibiotics to fully address ear infections, the prevalence of ankylosis has decreased significantly in recent years. In addition to the common etiologic factors of TMJ condylar ankylosis, some affected infants with unknown etiological factors have been reported in the literature (Figure 1 a-c) [8].

The pathogenesis of the TMJ ankylosis is described by a sequence of events. The increased intra-articular vascular supply at the traumatized joint develops fibrosis and ultimately
excessive localized bone formation [4]. Most of the animal studies consider intra-capsular hematoma as the main underlying reason for development of the ankylotic mass following trauma. Observed hemorrhage contains different cellular pathways activated by bone morphogenic proteins (BMPs) and tumoral growth factors (TGFs) [9]. However, a study on human subjects, revealed that hematoma in the joint space does not always result in bony ankyllosis [2]. This excessive bone mass does not have a neoplastic nature, but has the potential of continual growth [10]. The presence of abnormal bony mass may restrict mandibular movement, which subsequently may lead in loss of the functional matrix of bone and muscle interaction, and consequently result in growth failure [11]. Inadequately treated or excessive treatment of condylar fractures may lead to growth retardation or growth excess, respectively [3]. Therefore, the best treatment steps for post-traumatic ankylosis and resulting growth abnormality is prevention.

3. Diagnosis and clinical features of TMJ ankylosis

Maximum mouth opening in the presence of pain or without it is a clinical indicator of traumatized condyles [12]. In addition to routine extra and intraoral photographs, supplemental diagnostic records may be needed for complete diagnosis of each case. Towne’s projection, posteroanterior and cone beam CT (3D) radiographs are commonly used for this purpose (Figure 2 a, b).

Due to the flexibility of bone, it is possible to open the mandible to some extent, particularly in unilateral ankylotic cases [13]. Long-standing TMJ ankylosis can result in functional loss and facial deformity of affected individuals. In growing patients (mostly under 15 years) lack of adequate growth at the condyles, which are the main growth centers of the mandible, forward and downward movement of the mandible does not occur [13]. This growth retardation can result in a distorted mandibular structure in all three dimensions, highlighted mostly on sagittal views. Furthermore, deepening of the antegonial notch following continuous subperiosteal bone formation at the angles may be seen in most of the affected. However,
overcome this problem (Figure 20 a-d). If the patient cannot comply with these techniques, the surgeon should help them by initiating physiotherapy under local anesthesia.

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significant restriction on full range of anterior and transverse jaw motion, with deviation upon opening. The treatment plan was to remove the condylar overgrowth through a preauricular incision (Figure 21 f, g). Postoperative facial photography and panoramic view showed significant improvement in facial symmetry at 18 month follow up (Figure 21 h-k).

Figure 21. Male aged 29 years, a,b) severe facial asymmetry secondary to right condylar overgrowth is apparent, c-e) 3D computed tomography, posteroanterior and panoramic radiographs of the patient before surgical procedure, f) intra-operative view of the right condylar overgrowth mass, g) excess part of overgrowth of the condyle. h,i) postoperative clinical appearance of the patient after surgical removal of condylar overgrowth mass, j,k) Final posteroanterior and panoramic radiographs of the patient following 18 months follow up.
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Author details

Hossein Behnia¹*, Azita Tehranchi² and Farnaz Younessian³

*Address all correspondence to: behnia_h@hotmail.com

1 Dentofacial Deformity Research Center, Research Institute of Dental Sciences, Department of Oral and Maxillofacial Surgery, School of Dentistry, Shahid Beheshti University of Medical Sciences, Tehran, Iran

2 Dental Research Center, Research Institute of Dental Sciences, Department of Orthodontics, School of Dentistry, Shahid Beheshti University of Medical Sciences, Tehran, Iran

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