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Tempero-Mandibular Joint–Age Changes and Imaging

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The Temperomandibular Joint (TMJ) is sited at the base of the skull and is formed by parts of the mandible and the temporal bone with two compartments consisting of two articulating surfaces and an intra articular disk [1]. The anatomic components of the TMJ include the mandibular condyle, the mandibular fossa, articular eminences of the temporal bone, and the soft tissue components of the articular disk, its attachments, and the joint cavity [1]. It is one of the most complex articulations of the human body working bilaterally and simultaneously connecting the mandible to the cranium referred to as craniomandibular Articulation/ginglymoarthrodial joint [2].

The features that differentiate and make this joint unique are its articular surface covered by fibrocartilage instead of hyaline cartilage. It is believed that TMJ growth is affected by ageing, state of occlusion, functional jaw movement during opening and closing the mouth. The study of TMJ is of great interest to the clinicians. This interest stems from the standpoints of its structure, function, adaptability, symptomatology, pathology, and imaging [3].

Morphological changes in TMJ occurs as a physiologic process that aims to adapt the structure of the TMJ to meet the functional demands. It is based on an interaction between the mechanical forces sustained by the TMJ and the adaptive capacities of the condyle [4].

These morphologic changes may occur on the basis of simple developmental variability as well as pathologies or also due to loss of occlusal support. Disc displacement, perforation, deformation and arthrosis all seems to increase with age which in turn affects the width of articular disc space and the thickness of the roof of Glenoid fossa [5].

When superior and inferior joint surfaces were divided into medial, anterior and lateral thirds, morphological changes were observed most common in the lateral third of the joint. The appearance of the mandibular condyle varies greatly among different age groups and individuals. These variations like flattening, osteophyte, erosion, sclerosis, ely's cyst (sub cortical cyst) have been reported in symptomatic as well as asymptomatic patients [6].

Imaging modalities of the TMJ have continued to evolve during the past decade. The goals for TMJ imaging include evaluating the integrity of the structures when the disease is suspected, determining the extent of the disease present and evaluating the effects of treatment. Several radiographic methods are used to assess degenerative bone changes that affect the TMJ.

It is essential to obtain a clear and precise image of the region, but this can be difficult owing to the superimposition of adjacent structures, different angulations of the condyle, limitation of mouth opening in some patients, presence of artifacts and mandibular movements during the examination. Conventional radiographic TMJ projections like transpharyngeal, transcranial, submentovertex and digital panoramic view (OPG) views may be adequate in a number of clinical situations. Also advanced imaging modalities like Magnetic Resonance Imaging (MRI), arthrography, computed tomography (CT), and cone beam computed tomography (CBCT) are being used as an imaging modality for TMJ. Though CT and MRI are available, several barriers preclude their widespread use in evaluating TMJ disorders owing to their high costs, high radiation exposure and difficulties in accessing imaging centers [7].

Digital panoramic radiography is used for TMJ screening when the clinical examination suggests some form of joint pathology [1], and also for determining gross bony changes in the condyle [5].

It is a simple, low-cost method to evaluate the bony structures of the TMJ and is one of the most commonly used techniques by dentists and dental specialists [4]. The use of digital imaging in TMJ helps in easy acquiring, storing, retrieving and display images. In addition, digital intraoral receptors require less radiation than film, thus lowering the patient absorbed dose [8].

Digital radiographs can be calibrated to a specific dimension, unlike the need for manual tracing of the conventional film. It has also been shown that there is consistency and accuracy with digital radiographs of the condylar area. Although the use of TMJ conventional radiographic imaging has decreased, it is still advisable to use Digital Panoramic Radiography, with the help of measuring softwares can give an idea on the changes of the mandibular condyle and its associations with asymptomatic TMJs [9].

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