

**THE ROLE OF COMPUTED TOMOGRAPHY IN
TEMPORO-MANDIBULAR JOINT DISEASES**

**THESIS
SUBMITTED IN PARTIAL FULFILLMENT**

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قال تعالى :

﴿ قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا إِلَّا مَا عَلَّمْتَنَا إِنَّكَ أَنْتَ الْعَلِيمُ الْحَكِيمُ ﴾

صدق الله العظيم

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DEDICATION



**INTRODUCTION AND
AIM OF THE WORK**

INTRODUCTION AND AIM OF THE WORK

Frequently, the dentist is the initial health practitioner confronted by a patient with pain or dysfunction in the T.M.J. . Radiographs of the T.M.J. have been used as an important part of the clinical evaluation since the 1930s (Cohen et al., 1985). Many devices and techniques have been advocated for use and these frequently provide excellent screening radiographs. However, they are often limited by overlap of structures and distortions.

To overcome this, linear tomography of the T.M.J. was introduced during the late 1930s (Moore, 1936 and Petrilli, 1939). Tomography provides better definition than conventional radiographs by "blurring out " structures that are not in the plane of interest.

During the 1960s, a complex motion tomography became available which operated on the same principle but gave even greater definition.

Unfortunately, these methods were able to define only bony structures (Cohen et al., 1985).

In the 1940s, arthrography was introduced with the advantage that soft tissues in the T.M.J. could be analyzed and abnormalities of the articular disc could be seen for the first time. It provided excellent insight into the functional relationships of the articular disc- condyle complex. Unfortunately, T.M.J. arthrography was time consuming, required greater operator skill, had some danger associated with it, and was frequently painful.

In the 1970s, Computed Tomography (C.T.) was introduced (Hounsfield, 1973). Because, this system has the capability to

differentiate subtle tissue density, non-osseous structures of the T.M.J. can be seen radiographically without dye injection. Soft tissue and bone images are made from one exposure by computer manipulation without additional radiation to the patient. The good spatial resolution allows delineation of bone data, excellent contrast resolution allows the articular disc tissue to be differentiated from muscle and fat.

The aim of this study, is to emphasize the role of C.T. in the diagnosis of temporo-mandibular joint (T.M.J.) diseases.

*To
My
Parents*

**FUNCTIONAL
ANATOMY OF T.M.J.**

FUNCTIONAL ANATOMY

The mandible articulates with the base of the cranium by two joints, the temporomandibular joints (T.M.Js). Because, a harmony of one joint in respect to the other is necessary the mandible is considered to have one functional joint (El-Beialy, 1988).

The T.M.J. is unique in that it does not have a cartilagenous tissue covering the articulating surface. Instead, a fibrous tissue of considerable thickness covers the condylar head, the articular fossa and eminence.

Although, the cartilagenous covering of a joint surface facilitates its action by virtue of its intrinsic smoothness of its surface, and is greatly resistant to forces of compression, however, during lateral movement of the mandible from one side to another a considerable components of shear and twisting are usually imposed on joint surfaces. Cartilage is not very resistant to shear. While, the fibrous tissue particularly withstand this type of force (Kruger, 1979).

THE COMPONENTS OF THE T.M.J. ARE :-

1. The mandibular condyle.
2. The articular fossa and eminence.
3. The disc (meniscus).
4. The T.M.J. ligament and synovial lining.

1. THE MANDIBULAR CONDYLE:-

The length of the mandibular condyle varies from 13-25 mm. and its width is 10 mm. approximately.

The shape of the mandibular condyle varies greatly from one individual to another. The superior outline also varies greatly, however, four basic types are generally recognized as:- (Fig.1).

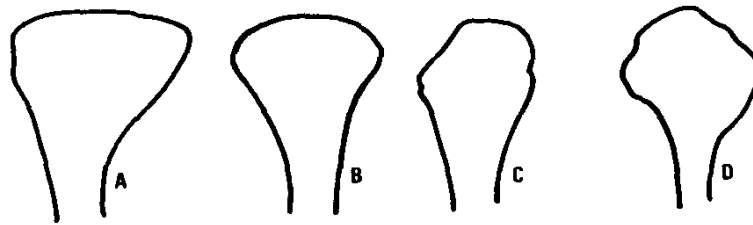


Fig.(1):- The common types of mandibular condyles:-
 A. Flat B. Convex
 C. Angled D. Rouded
 After (El-Beialy, 1988).

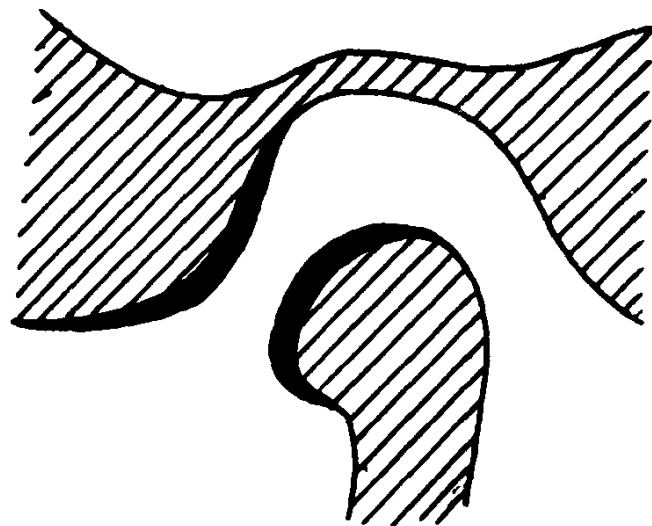


Fig.(2):-Diagrammatic representation of human T.M.J. The areas in solid black are the functional surfaces of the head of the condyle and articular eminence which are covered by a distinctly thick fibrous tissue. After (El-Beialy, 1988).

- A. Superior surface flattened.
- B. Superior surface convex.
- C. Superior surface angled.
- D. Superior surface rounded (Bergerson, 1984).

The size and extent of the articular surface depends on the site of attachment of the capsule. The articular surface in adults extends anteriorly for approximately 7mm., and posterior 9mm. inferior to the highest point of the condyle. The greater extension of the articular surface posteriorly than anteriorly allows more extensive rotation of the disc posteriorly than anteriorly.

A roughened area is present in the lateral and medial walls of the condyle. These are known as the lateral and medial poles which serve for attachment of the disc and T.M.J. ligament.

In contradistinction to other joints, the articular surface is composed of dense collagenous, non-vascular, non-innervated connective tissue. Because, the functional load is particularly concentrated on the antero-superior aspect of the condyle, this particular zone is covered by a distinctly thick fibrous tissue (Fig.2).

Deeper to the proliferative zone lies the condylar cartilage "growth zone" which plays a role in the normal development of the joint and mandible.

The growth cartilage in the mandibular condyle is on the surface of the bone just underneath the fibrous articular surface, (El-Beialy, 1988).

2. THE ARTICULAR FOSSA AND EMINENCE:-

The receptacle for the condyle is the articular fossa, which is