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DIRECT SAGITTAL COMPUTED TOMOGRAPHY OF TEMPOROMANDIBULAR JOINT

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SUMMARY

Direct sagittal scanning of TMJ with the help of computed tomography gives better information about the osseous alteration of mandibular condyle and temporal bone, joint space narrowing, meniscal configuration and range of movements. The use of 25 cm thick foam between the head rest and the patient's head was found to be simple, inexpensive and helpful in evaluating the various disorders of the temporo-mandibular joint.

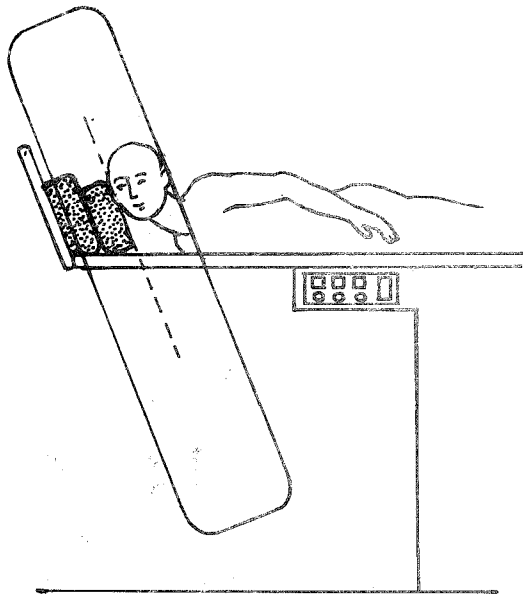
Key Words : C.T. Scan , T.M. Joint.

The temporomandibular joint is the most complex joint in the human body. Many imaging modalities have been used to evaluate TMJ disorders. Recently Computed Tomography (CT) in the sagittal plane has been found to be useful. We have conducted an investigation into the role of CT as a means of assessing the TMJ and surrounding fascia and muscles and in particular its ability to demonstrate internal derangements with the help of modified technique of direct sagittal plane tomography (Katzberg, 1981 and Manzion, 1984). The technique has obvious advantages over other CT projections and sagittal reconstruction for evaluation of TMJ problems.

Development of Method

The optimal plane for imaging the TMJ was found to be parallel to the mandibular ramus. This plane forms an angle of 20° to 25° with the true sagittal plane of the skull.

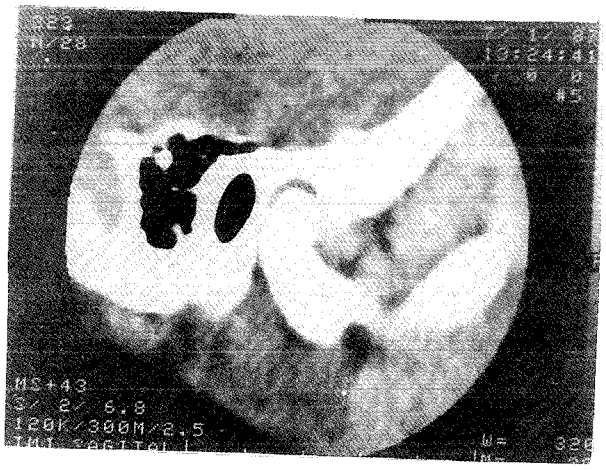
The patient was positioned on the table in a semiprone position with the head facing towards the left for right TMJ and towards right for the left TMJ. The plane was made by raising the head rest 60° to 70° depending upon the height of the neck and patient's comfort. To minimize the metallic artifacts produced by the joints of the head rest two 25 cm thick foam blocks were placed between the head rest and the patient's head. This gives comfort to the patient and minimizes the head movement. The gantry (Capability of SCT-2000T-11) was then tilted 20°, so that central X-ray will be parallel to the mid sagittal or parasagittal plane of the head. Slices of thickness 2-5 mm, were taken for the joint to be examined. (Fig. I)



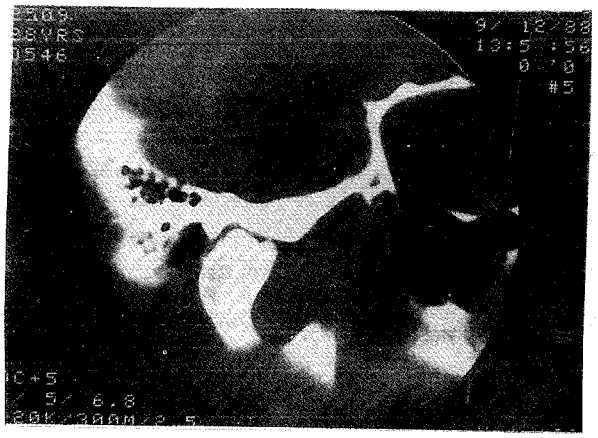
1. Patient Positioning in gantry for direct sagittal scanning of temporomandibular joint.

Observations

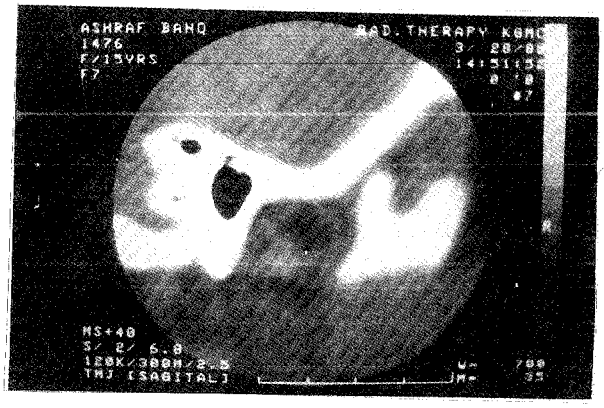
28 individuals out of which 25 had TMJ problems and 3, who acted as normal control, were examined in this study. 16% had TMJ dysfunctioning, 8% had dysplasia & 16% had condylar fractures. Different degrees of ankylosis were found, ranging from small reduction of joint space



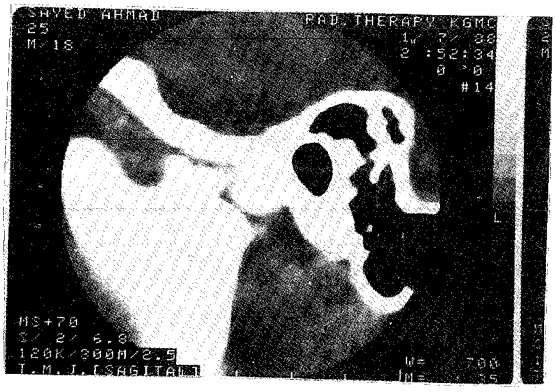
2. Mid sagittal CT Scan of a normal TMJ (closed mouth position). Meniscus visualised anterior to mandibular condyle.



3. Direct sagittal CT scan of the TMJ in closed mouth position showing hyperplasia of mandibular condyle with shallow joint space



4. C.T. scan (Right sagittal) Fractured condyle Horizontally Placed.



5. C.T. Scan (Left sagittal) deformed and Hyperplastic T.M.J..

6. C.T. Scan (Left sagittal) fractured condyle (Horizontally Placed)

with limitation of joint movements, fibrous ankylosis and complete bony ankylosis. (Fig. II, III, IV, V & VI),

Similarly in patients with subluxation, the relation of the condyle with the joint and its derangement was best visualised in sagittal cuts. Of the 2 cases of dysplasia, one was hypoplastic and the other hyperplastic. Direct sagittal cuts in these cases were very helpful to examine the extent of dysplasia.

In the cases of fractures, out of the four clinically positive cases the conventional radiology failed to detect the fractures in two, but the CT confirmed the clinical findings in all four of them.

Discussion

Three dimensional reconstruction for sagittal image from the axial section which gives an irregular image in not sufficient for a proper visualization of TMJ (Helms 1983 and Moaddab 1985).

The method evaluated by Manzion 1982, 1983 was tried by us for direct sagittal scanning by placing the patient in a stretcher placed lateral to the gantry and perpendicular to the scanner trolly We found that in this method it was dificult to maintain the patient's position, more over for each slice we had to move the patient manually which was not appropriate from the console.

The methods devised by two individual workers (Sartoris, 1984 and Simon, 1985) are expensive and difficult to fabricate and apply. They need accessory support equipments of different sizes for different makes of machines.

Our method of using simple foam block avoids the head rest joint metallic artifacts. Scanning of the joint is better and easy for both the operator and the patient. The device is inexpensive, needs no special apparatus and is less time consuming.

Conclusion

Our experience shows that direct sagittal CT by this modified technique provides valuable information about the position and function of the meniscus, the bony abnormalities like degenerative changes, changes in the condylar shape and sclerosis. Without modification any scanner with a large gantry (3rd generation) can be utilized for practicing this technique, which provides valuable information about the T.M.J. disorders.

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