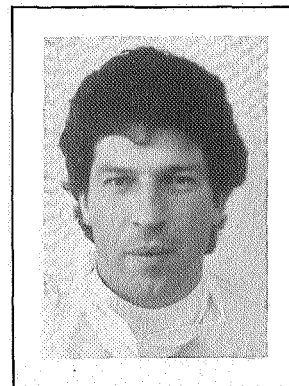


TMJ — the diagnostic dilemma

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Abstract: The diagnosis of temporo-mandibular joint and muscle dysfunction problems is based on the patient's symptoms, their history, the clinical and radiological examination and the clinician's experience. The accuracy of the diagnosis determined from this data is questionable and causes the diagnostic dilemma.

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INTRODUCTION

The diagnosis of TMJ and muscle dysfunction is based on patients' symptoms and history, the clinical and radiological examination, and the clinician's experience or expertise. Some of these factors can be most unreliable and lead to the 'diagnostic dilemma'. Just how reliable is the data on which we base our treatment? Is the pain real, imaginary, or referred? What is the clicking TMJ due to? Is its resolution a positive or a negative result? What do radiographs really tell us? The understanding of the fundamentals of anatomy, radiology and clinical investigation must be the basis of our diagnosis.

Anatomy

The crucial factors to be considered are the variability of disc morphology and condylar shape and its long axis angulation.

1. The disc is basically biconcave ovoid (Rees 1952). There is a wide variation in the dimensions of the normal range and more so in the pathological state. Hansen et al. (1977) showed the variation in disc dimensions to be in the range of 2.06 ± 0.47 mm anteriorly; 1.06 ± 0.39 mm centrally and 2.90 ± 0.58 mm posteriorly (Figures 1 and 2). Scapino (1983) showed a wide range of changes in morphologically altered discs.

2. Condylar shape and long axis angulation have a wide range of normals. Yale (1966) showed a wide variation of both shapes of condylar heads and their long axis angulation and further condylar shapes varied both inter-individually and intra-individually.

The long axis angulation could vary from 0-30° in the frontal plane and from -45° to +35° in the horizontal plane. These factors must be carefully considered in interpreting plain films.

Radiology

The basis of understanding radiology is knowing the normal range of shapes and angulation; and using correct projection angles when taking films. Omnell and Peterson (1976) and Lindberg and Welander (1970) have claimed that a 5° error in angulation in transcranial projection can lead to incorrect diagnosis. These authors further claimed that individualised transcranials are essential; but corrected tomography is more accurate.

The illustrations show the effect of 10° angulation changes in transcranial projections (Figures 3, 4 and 5).

In order to take individualised radiographs the angulation of the long axis of the condyle in both the vertical and horizontal planes must be determined. The horizontal plane angulation is determined by the basal view. However the vertical plane angulation cannot be obtained by a simple antero-posterior projection due to superimposition of the mastoid processes. A view of the condyle in the frontal plane can be obtained if the antero-posterior view is taken with the mandible in the open position. However this induces an error in the range of 5-10° due to the rotational effect of the mandible and the head tilt which still may be necessary to clear the mastoid processes (Kozeniauskas 1988).

Arthrography

Arthrography is the radiological investigation of the TMJ following the injection of a radio-opaque contrast solution into the generally more accessible inferior joint cavity. The individualised transcranial projection is used; and repeated mandibular movements are viewed on a fluoroscope (video projector) thus enabling immediate angulation corrections and diagnosis.



Figure 1. Normal disc — 'thin'

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Figure 2. Normal disc — 'thick'



Figure 3. Condyle with radiographic markers

Many clinical studies have shown arthrographic results to correlate extremely accurately with surgical findings. Norgaard (1947); Toller (1974); Wilkes (1978); Lynch and Chase (1978). The author's arthrography studies have highlighted the following major dilemmas.

1. Plain films, that is, transcranials, cannot be used to define disc/condyle relationships, or concentricity of the condyle within the fossa — these are concepts advocated by Farrar (1972) and Weinberg (1972). The errors in these conclusions have been clearly demonstrated in the plain film and arthrography studies by Katzberg et al. (1980) and Aquilino et al. (1985).

2. The clinical entity of the clicking TMJ, be it either heard or discovered by palpation during opening and/or closing movements, can occur in six different situations:

- (a) normal disc \ condyle relationship
- (b) anteriorly displaced disc with complete recapture
- (c) anteriorly displaced disc with partial or oblique recapture

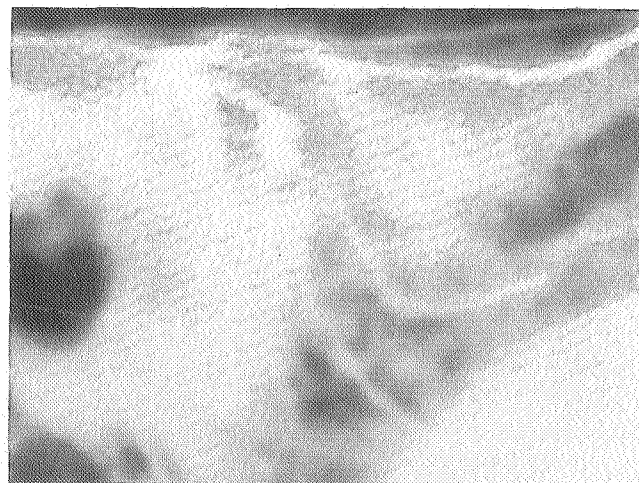


Figure 4. Transcranial projection. 15° tilt, 10° rotation

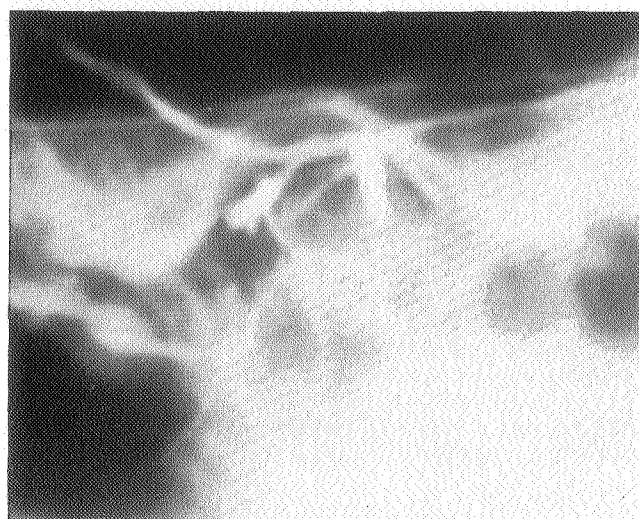


Figure 5. Transcranial projection. 15° tilt, 20° rotation

- (d) discs which have undergone morphological changes
- (e) condyle passing over torn or perforated disc tissue
- (f) osteo-arthritic condyle with no disc tissue.

However, the majority of clicks occurred in (b) and (c). Katzberg et al. (1980) has shown clicking to occur in TMJs with normal disc \ condyle relationships.

3. Treatment directed towards disc recapture is almost certain not to succeed. Even if no clicking occurs following treatment, in the majority of these cases the disc remains anteriorly displaced.

In a study by Kozeniauskas (1988) ten patients with TMJ clicking and pain agreed to pre- and post-treatment arthrograms. At the end of treatment, all patients were asymptomatic, but in nine out of the ten cases the discs were still anteriorly displaced.

Clinical Assessment

The significance of patients symptoms, clinical assessment and arthrograms, has been the basis of diagnosis. However an analyses of a cross correlation of these findings has been surprising.

MATERIALS AND METHODS

Kozeniauskas (1988) completed a control group study - using twenty patients who presented with unilateral symptoms; and cross correlated their presenting

symptoms; with the results of the clinical examination; and the results of bilateral arthrographic examination. The twenty patients were selected from a pool of over 300 TMJ patients who received treatment. The criteria for selection was that the patients presented with unilateral symptoms and no history of dysfunction or pain on the contralateral side, or any history of motor vehicle accident or trauma.

RESULTS

Tables 1 - 4 are the results of the examination and their cross correlation.

These results clearly indicate the difficulty of correlating symptoms, clinical signs and arthrographic data. For example, in considering pain: 18 patients presented with TMJ pain. Arthrography showed 38 deranged joints, while palpation of joints showed only 15 to be tender - and only 11 of these were on the symptomatic side.

The clinical entity 'clicking' - 9 patients presented with clicking, but clinical examination showed 13 joints

Table 1 Frequency of Presenting Symptoms*

Presenting symptom	No of patients	%
TMJ pain	18	90
TMJ clicking	9	45
TMJ locking	9	45
Trismus	8	40
Facial pain	7	35
Headaches	5	25
Neckaches	2	10

*N.B. Patients may present with more than one symptom

Table 2 Frequency and percentage distribution of Arthrographic findings of the 40 joints

Classification	Sympt. side	Non-sympt. side	% of 40 joint
Normal	1	1	5.0
Partial displacement	2	1	7.5
Complete displacement	17	18	87.5
Partial reduction	4	5	22.5
Complete reduction	7	7	35.0
Locked	8	7	37.5
Perforations	2	3	12.5
Adhesions	3	5	20.0
Deformation of the disc	9	11	50.0
Total disruption of the disc	-	1	2.5

Table 3 Correlating the frequency of presenting symptoms with clinical signs

Presenting Symptoms (No.) of patients	CLINICAL		SIGNS
	Clinically Positive		Clinically Negative
	Sympt.	Non-Sympt.	Sympt.
TMJ pain (18)	11	4	7
TMJ clicks (9)	7	7	2
TMJ locking (9)	3	2	6
Trismus (8)	8	-	3
Facial pain (7)	7	8	-
Headaches (5)	2	7	2
Neckaches (2)	2	3	1

'clicked' and arthrography indicated 23 joints reduced or recaptured which is indicative of 'clicking'. However of the 9 symptomatic clicks, 7 showed reduction and 2 were locked when examined arthrographically.

CONCLUSIONS

These studies confirm the belief that presenting symptoms and clinical signs are an unreliable indication of disc/con-dyle relationships; and thus the diagnosis made from these considerations. This correlates with conclusions by Manzione (34) Tallets (7) Kapp (13). Evidence presented refutes the assumption that the non-symptomatic joint must be considered normal.

Hence conclusions and treatment based on presenting symptoms, clinical examination and plain film radiological examination - when directed to TMJ pain and dysfunction - will present the clinician with a dilemma. So the question must be asked 'Is the treatment based on scientific fact or cult dogma?'

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Table 4 Correlating the frequency of clinical signs with Arthrographic findings

Clinical signs	Arthrographic results					
	Sympt.	Internal Derangement Non-Sympt.	Sympt.	Normal Non-Sympt.		
TMJ pain	11	4	11	4	-	-
TMJ clicking	7	6	13	13	-	-
Trismus	11	-	-	-	-	-
Deviation on opening to	8	0	8	8	-	-
movement to	5	4	4	5	-	-
Masseter tender	10	6	10	6	1	-
Temporalis tender	9	8	8	8	-	1

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