

# Malocclusions in Iraqi Temporomandibular Disorder (TMD) Patients

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**Abstract:** This study was achieved to estimate the association between unpreferable occlusal relation and the development of temporomandibular disorders. The study was applied on 84 patients 47 females and 37 male with mean age of 34.7 years (range 13-64) years. All patients were evaluated clinically for signs and symptoms of temporomandibular disorder. The results showed that temporomandibular disorder developed in patients with defective occlusal contact regardless of their type of Angle's classification and most patients have normal class I relation (78.6%). The main occlusal discrepancies which are blamed as play a causal role in the development of temporomandibular disorder were deep over bite (10.5%), followed by single tooth cross bit (5.8%), then anterior open bite, posterior open bite and posterior cross bite which show the same percentage of (3.5%). In conclusion, temporomandibular disorders seem to be related to dental malocclusion rather than abnormal arch relation and more evident in the vertical mandibular discrepancy than horizontal.

**Keywords:** temporomandibular –joint –dysfunction - malocclusion

## 1. Introduction

Temporomandibular disorder (TMD) refers to a group of medical and dental conditions affecting the temporomandibular joint (TMJ) and/or the muscles of mastication, as well as adjacent tissues. Certain conditions such as degenerative arthritis and trauma underlie some TMD, these conditions have no common etiology or biologic explanation and comprise a variant group of health problems whose signs and symptoms are overlapping and not specific [1].

There is a controversy about the self-evident truth, is that un–preferable occlusal contacts are a risk to oral health and may be associated with temporomandibular disorders.

In general, many clinical and experimental studies on the relationship of occlusion to TMD have been previously performed to identify possible causal association [2].Thompson was the earliest orthodontist, who noted that patient with disturbances in the vertical dimension appeared to be more liable to temporomandibular joint (TMJ) problem [3]. Another early clinical study were conducted by Ricketts (1969) [4]who developed a cephalometric laminographic technique to evaluate the temporomandibular articulation. In addition, experimentally introduced occlusal discrepancies in centric occlusion with altered contact seem to cause temporomandibular joint dysfunction [5], and muscular pain seems to be dependent on the presence of occlusal risk [6]. However, several controlled clinical trials have failed to refute the etiologic role of occlusion in TMDs [7].

This study was applied to estimate the relative risk from several occlusal features and their causal role in TMD development.

## 2. Patients and Method

This study was based on a sample of 84 Iraqi patients, 47 females and 37 males with mean age of 34.7 years (range

13-64) years. The patients were attending oral medicine clinic of Baghdad Dental College Hospital, were seeking treatment for their complain of signs & symptoms of temporomandibular joint disorder (TMD).

The TMJ examination chart of the previously mentioned center was used in this study to record patient's data, *general* history, which includes medical history, past hospitalization, past surgical operations, allergy, medication used, also psychological, occupational, social and family background, in addition to *specific* history which related to the history of present illness.

All patients were subjected to extraoral clinical examination for TMJ [8]. Patients with positive TMD findings, were subjected to precise intraoral examination for dental relations and presence of malocclusions analyzed for static and dynamic occlusion [9].

### 1. Extraoral examination includes:

- Routine regional head and neck examination.
- Facial asymmetry.
- Measurements of maximum interincisal distance.
- Evaluation of mandibular deviation.
- Palpation of pretragus area.
- Intra-auricular palpation.
- Regional muscle examination.

### 2. Intraoral examination includes:

- Evaluation of missing teeth.
- Occlusion classification.
- Occlusal interference.
- Periodontal and decay status.
- Integrity of fixed and removable prosthesis.
- Evidence of oral habits, such as wear facets.

Radiologic investigation supported the diagnosis if indicated. All patients received dental treatment according to their need. The data was analyzed statistically by using Chi-square test.

### 3. Results

Most of TMDs recognized in this study were distributed between extracapsular disorders as muscle disorder, occlusal disharmony, dental irritation and intracapsular disorders as degenerative, inflammatory and traumatic disorders. The results showed that females were more affected by TMD than males. The predominant age group was (21-30) years, table- 1.

**Table 1:** Patients Distribution According to Age and Gender

Age groups	Male	Female	Total
11-20	2	5	7
21-30	20	21	41
31-40	3	10	13
41-50	8	5	13
51-60	1	6	7
61-70	3	-	3
Total	37	47	84

Sum.= 2923

Mean = 34.7

Standard deviation = 12.4

The majority of TMD patients showed class I angle classification, followed by class II division (1), class III and finally class II division (2), table –2.

**Table 2:** Distribution and Percentage of TMD Patients According to their Angle's Classification

Angle's Classification	Number of Patients			Percentage
	Male	Female	Both	
Class I	30	36	66	78.6
Class II	4	7	11	13.1
• Division (1)	3	7	10	
• Division (2)	1	0	1	
Class III	3	4	7	8.3
Total	37	47	84	100.0

Chi-square = 0.32; d.f. = 2; p< 0.01

In general, most TMD patients had a normal occlusal relationship (48.8%), but in respect of malocclusion, the most frequent malocclusion among those patients are deep over bite (10.5%), single tooth cross bite (5.8%), then anterior open bite, posterior open bite and posterior cross bite (3.5%), table –3.

**Table 3:** Frequency and Percentages of Occlusal Nature in TMD Patients Sample

Nature of occlusion	No. of patients	Percentages
Normal intercuspation	42	48.8
Acute malocclusion	2	2.3
Decreased vertical dimension		
-Deep over bite	9	10.5
-Posterior bite collapse	8	9.3
-Teeth wear	9	10.5
Open bite		
-Anterior open bite	3	3.5
-Posterior open bite	3	3.5
Cross bite		
- Anterior cross bite	2	2.3
- Posterior cross bite	3	3.5
- Single tooth cross bite	5	5.8
Total	86	100.0

\*2 patients have double occlusal problems.

For all studied occlusal discrepancies, their occurrence was more predominant in patients having class I angle classification, except for anterior cross bite which is usually limited in class III, table –4.

**Table 4:** Distribution of Dental Malocclusions According to Patients Angle's Classification

Dental Malocclusion	Class I patients	Class II patients	Class III patients	Total
Deep over bite	6	3	1	10
Anterior open bite	3	0	0	3
Posterior open bite	2	0	1	3
Anterior cross bite	0	0	2	2
Posterior cross bite	2	1	0	3
Single tooth cross bite	5	0	0	5

Chi-square = 21.49, d.f. = 10 ; p < 0.01

### 4. Discussion

The relationship between orthodontic treatment and temporomandibular disorders (TMDs) is an old interest in clinical orthodontic, but since 1980 many clinical studies has been dealt with this association. This concept increased the need for determination if orthodontic intervention is cause or result in TMD patients.

This study confirms other previous TMJ studies regarding the age and sex predominance, and the distribution of Angle's classification in TMD patients which follows its distribution & predominance in general population. In another word, the majority of TMD patients showed class I relation, which indicates that TMD is not a consequent of an Angle's classification, if the normal dental relation was established and no interference with a normal mandibular movement was developed.

This finding corroborates the results of [10] who found the incidence of internal derangement was higher in asymmetrical class III patients compared to symmetrical mandibular prognathism, and this difference was associated with a difference in TMJ morphology of both sides.

This may be related to the adaptive processes associated with temporomandibular disorders (TMDs) which brought about by the shifting equilibrium between form and function [11]. This has been confirmed by Nebba (2000) [12] who suggested that disc displacements occur frequently in pre-orthodontic adolescents. Another study showed that signs & symptoms of TMD are fluctuating during treatment with an unpredictable pattern [13].

The result in this study indicates that patients with deep over bite are more prone to be affected by TMJ problem, mostly because such dental relationship obligate the condylar head to occupy the most posterosuperior position in the glenoid fossa. Consequently, the disc will be displaced from its normal position in the joint space and internal derangement will be developed [14]. This supports the result of Trpkova (2000) [15] which indicate that a female orthodontic patient with bilateral TMJ internal derangement or unilateral right

TMJ internal derangement may present with or develop a vertical mandibular discrepancy.

In this study, the single tooth cross bite was a second common occlusal problem among TMD patients. This interfering occlusal contact in the “free way space” envelope of mandibular movement, guides the mandible laterally and protrusively as it continues the cycle of closure. This creates a guide for the mandible and initiates a big resistance between the teeth and the musculature, as the patient closes into a habitual comfortable relationship [16].

The presence of posterior cross bite in a percentage of TMD patients in the study group, may be explained by the findings of [17] who revealed that the eccentric clenching gave rise to three – dimensional deviation of the mandible even when the mandible near the rest position.

Although there is little evidence that orthodontic treatment prevents TMD, the role of unilateral posterior cross bite correction in children [18], may justify further investigation. This study suggests that TMDs are more evident in anterior open bite and posterior open bite, which concurs with [19], [20] who supported the relationship between anterior open bite and TMD.

In conclusion of this study, the type of Angle’s classification which reflects the *arch relation* don’t act as a risk factor for predisposing TMD unless there is interference with normal condylar path, while the presence of occlusal discrepancy which reflect abnormal *dental relation* and subsequent joint dysfunction plays a major role in developing TMD.

Further studies should be achieved by team work using recent technology through a number of fields involving basic, applied science and practical research. Professional expert is, also, needed to ensure precise diagnosis and a proper treatment plan of TMJ. Irreversible treatment should be postponed as much as possible especially in acute cases and in preadolescent age, regarding the pharmacologic, surgical and behavioral approaches is necessary.

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