

Prevalence of signs and symptoms of temporomandibular disorders in different malocclusion groups

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Abstract

Introduction: Temporomandibular disorders (TMD) have a multifactorial etiology. Specific morphological malocclusions have been related to a greater incidence of TMD's. A keen interest still remains on identifying whether or not a connection exists. Hence the objective of this study was to evaluate the signs and symptoms of TMD utilizing the Research Diagnostic Criteria for temporomandibular disorders (RDC/TMD) seen in patients with different malocclusions presenting at Altamash Institute of Dental Medicine.

Material and Methods: The RDC/TMD was used to record signs and symptoms of joint dysfunction i.e. clicking, crepitus and tenderness to palpation, mouth opening and lateral excursions. Subjects' psychological status was also evaluated to determine links between depression and somatization.

Results: The sample comprised of 200 patients. It consisted of 29% males and 71% females (ages 10-45 years / mean 19.78 years). The sample was divided into different malocclusion groups i.e. class I (47.5%), class II (46%) and class III (6%). 84.5% of patients had no TMD symptoms in the past six months. No significant association was noted between TMD pain and dental classification ($P=0.770$). Patients psychological evaluation showed that patients, which suffered from depression had a significant association with tenderness ($p=0.000$). Patients with self-reported clenching also had a positive correlation with depression ($p=0.001$) and with headaches ($p=0.000$).

Conclusions: No clinical significance was noted amongst malocclusion, gender and TMD pain. However, disk displacement disorders and Class III malocclusion did show a significant correlation. TMD pain is most likely a consequence of emotional tension and malocclusion can be a precipitating factor.

Keywords: Temporomandibular Disorders, RDC/TMD, Functional Malocclusion

Introduction

TMD is a collective term involving the pathology of the temporomandibular joint, masticatory muscles and malocclusion.² TMD may present with a number of signs and symptoms, the most important of these being pain which is of non-dental origin. This pain may be localized to the temporomandibular joints or it may be more diffused when it involves the jaw muscles or experienced upon mandibular movement. There may also be joint sounds, locking/luxation of joints and

restricted mandibular movement.⁶ TMD has been known to be caused by a number of factors. Malocclusion, stress and other psychological factors, trauma, genetic predisposition, ethnicity, and social class are the most common reported causes.⁶ Evidence supports that women have a greater tendency to experience pain,⁸ therefore they are more likely to approach a healthcare professional for help in this regard.

Numerous studies have been conducted in the past to correlate TMD and malocclusion. Most of the studies have not found a significant association amongst the various types of malocclusions and TMD, whereas a few indicate vice versa keen interest still remains on identifying whether or not a connection does exist. In order to establish a connection between malocclusion and TMD, it is necessary to define malocclusion. Luther⁵

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mentions a definition of malocclusion as the deviation from the ideal that is not aesthetically or functionally satisfactory. Morphological malocclusion has been divided into three classes; I, II, and III. Another type of malocclusion is the functional malocclusion. This refers to the loss of harmony in the occlusion or relationship between the two dental arches so that during movement, cuspal interferences may cause disturbance during function of the masticatory apparatus. Birgit Thilander, Guillermo Rubio, Lucia Pena and Clara De Mayorga⁹ evaluated the prevalence of Temporomandibular Dysfunction and its association with malocclusion in children and adolescents. They concluded that TMD was generally more common in females and that it had a significant association with certain functional malocclusions such as posterior cross bite, anterior open bite and extreme maxillary over jet. They also found that the morphological class III malocclusion was also associated with TMD.

Material and Methods

Data was collected over 9 months in a cross-sectional manner at Altamash Institute of Dental Medicine, Karachi, Pakistan. The sample comprised of 200 patients with random sampling methodology. These patients were then grouped into dental class I, II and III (Table I).

Table I

Dental Classification	No. Of Subjects
Class I Malocclusion	96
Class II Malocclusion	93
Class III	6

Table II

Joint Dysfunction	Total No. of Subjects
Myofacial Pain Dysfunction	3
Disk Displacement Disorders	6
Joint Pathosis	3

The RDC/TMD index was utilized to assess these patients. The RDC/TMD index consists of two parts (axis I and axis II) Axis I is comprised of a history questionnaire along with the signs and symptoms of TMD. Axis I also assesses whether the patient suffers from chronic pain. A clinical examination of the TMJ, masticatory muscles palpation, mandibular range of motion, and joint noises such as clicking or crepitus are noted. The TMD algorithm supplemented by the RDC/TMD helped diagnose if the patient is suffering from either Group I: Muscle Disorders, Group II: Disc Displacement, or Group III: Joint Pathosis.

Mandibular Range of Motion was measured with a millimeter ruler from upper central to the lower central incisors (<40 mm being restricted opening). Lateral excursions were measured from upper midline to lower midline (<10 mm being restricted excursive movements).

Axis II is a behavioral assessment and determines if the subject suffers from a depressed psychological state. A chronic pain questionnaire was also filled by the subjects and whether the subject had been suffering from pain. The behavioral assessment included questions that were related to depression, non specific physical symptoms with pain and nonspecific symptoms without pain. The graded chronic pain scale classified the patients as follows:

Grade 0: No TMD pain in the last 6 months

Grade I: Low Intensity

Grade II: High Intensity

Grade III: Moderately Limiting

Grade IV: Severely Limiting

This study included all patients presenting at AIDM for dental procedures with any dental classification, all ages, without any congenital abnormalities and without history of oro-facial trauma. Patients with congenital abnormalities e.g. cleft lip and palate, missing teeth, Orofacial trauma were excluded. The data was analyzed with SPSS version 17.0. Descriptives such as counts were used to

determine the incidence of gender, age, class of dental malocclusion, parafunctional habits (bruxism, clenching), measurement of mouth opening, lateral excursions, joint, muscle tenderness and joint sounds in the sample. These variables were then cross-tabulated with the type of joint dysfunction, depression score and graded chronic pain score according to RDC/TMD. The chi-square test was then used to determine the level of significance ($p \leq 0.05$) of different variables.

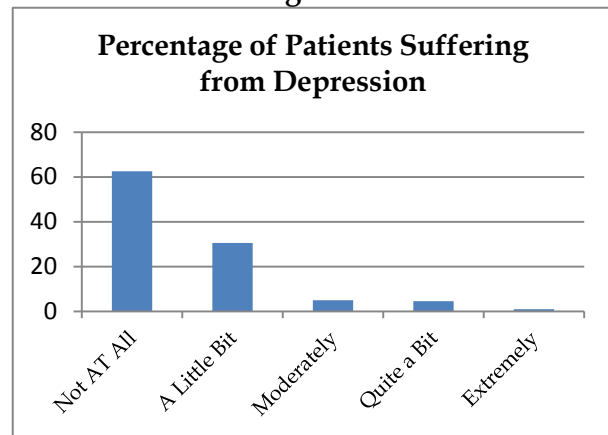
Results

The mean mouth opening was 43.27 mm. 28% had restricted mouth opening (<40mm). The restriction in mouth opening did not show a significant association with the dental classification ($p = 0.658$) or with pain ($p = 0.837$) and neither did lateral excursive movements show a significant association with pain ($p = 0.475$). 8% patients with class I malocclusion, 6.5% of class II patients and 0.5% of class III had palpable joint sounds respectively. Class III malocclusion was significantly associated with joint dysfunction ($p = 0.018$, Table II). There was no association between pain and the type of joint dysfunction. Functional factors such as overbite and over jet showed no significant association with chronic pain.

84.5% of patients had no TMD symptoms in the past six months. No significant association was noted between TMD pain and dental classification ($P = 0.770$). 82% did not experience clenching and ($p = 0.038$) against the dental classification. 85% did not suffer from bruxism and was insignificantly linked with TMD pain ($p = 0.482$). It was found that 30% of the sample gave a history of headaches in the past six months. A positive correlation was found between headaches and tenderness. Patients psychological evaluation showed that patients which suffered from depression had a significant association with tenderness ($p = 0.000$). Patients with self-reported clenching also had a positive correlation with depression ($p = 0.001$, Fig. 1) and with

headaches ($p = 0.000$). However, there was no significant association with bruxism.

Figure 1



Discussion

Temporomandibular disorders have a large number of etiological factors. Vjekoslav Jerolimov,²⁶ identified a number of factors contributing towards TMD's. Morphological and functional malocclusion has previously been proposed by many as the two important causes of TMD. With increasing surge of evidence, there is now a decreased role of malocclusion proposed in causing TMD's. Many studies²⁸ have tried establishing a relationship between malocclusion and TMD's, but no definite link has yet been identified. Malocclusion is still believed to be a co-factor in causing this problem. Bourzgui, Sebbar, Nadour, and Hamza²² found a significant correlation between Angle's molar classification and TMD signs and symptoms. Birgit Thilander, Guillerma Rubio, Lucia Pena, Clara de Mayorga⁹ found class III malocclusion to play a significant role in TMD's. Bales and Epstein²³ investigated the role of malocclusion in TMD and found no evidence for occlusal factors other than posterior occlusal support and anterior open bite. Bengt Mohlin et al conducted a comprehensive review and concluded that there was no definite finding linking malocclusion and TMD. Deitmar Gesch et al¹¹ tried to substantiate an association between malocclusion and functional occlusion with

TMD, but did not find any correlation between them. In this study, we found that class III malocclusion showed a significant association with the joint dysfunction.

Some studies claim that functional malocclusion plays an important role in developing TMD. As noted by Oana Christen Almasan²⁹, large over jet, deep bite, open bite and midline shifts are greatly associated with pain, tenderness and clicking. Patients in our study had no history of extractions, no alteration of occlusion type i.e. canine guided or group function occlusion. Except for cross bite which was not evaluated in our study, we could not establish a link amongst the above mentioned functional occlusal characteristics and TMD symptoms.

The RDC/TMD proposes three possible conditions that a patient can be suffering from. These conditions can be muscles disorders, disk displacement disorders and other possible joint conditions. These conditions can either present with or without limitation in mouth opening. In this study, only 1.5% of the patients suffered from muscle disorders. Only 4% of the patients exhibited joint dysfunction and the remainder 1.5% exhibited other joint conditions. Joint sounds are elicited due to disk displacement disorders. Joint clicking is thought to be a significant factor in TMD and has been named as common symptom of the disease. Danielle Manfredini, Giuseppe Perinetti, and Luca Guarda-Nardini¹⁵ assessed the association of dental malocclusion and TMJ clicking and found no clinical relevance between the two. Danielle Manfredini and Guarda-Nardini²⁴ have assessed disk displacements on MRI investigation and agree to the findings. On the contrary, our results did find a significant correlation with class III when dental malocclusion was correlated to joint sounds. However, when it was inspected to see whether joint sounds played a role in TMD pain, we found that it was not essential that pain exist in those patients who exhibit joint clicking. Therefore,

joint clicking does not indicate TMD and the presence of this finding in patients who are not experiencing pain, is not an indication for treatment.³

Manfredini, Borella, Ferronato, and Guarda-Nardini²¹ used the RDC/TMD to assess the chronic pain severity and correlated that with the levels of depression and somatization in TMD patients. They found that TMD is significantly associated with somatization. Lajnert et al³⁰ also utilized the RDC/TMD to evaluate depression, somatization in female patients with TMD and found that TMD patients had higher levels of depression and somatization. Mohammad Ishfaq, Tanweer Hussain Bangash, and Abdul Munim²⁵ investigated the associated features of temporomandibular pain dysfunction syndrome and concluded that it is common in the female gender especially in those who are experiencing a stressful time in their life. A study also linked marriage with TMD, owing to the stress it has on females and found that unmarried women in their middle age had a greater incidence of TMD. No such observation was made in the present study. When a link was sought between depression and TMD pain in this study, a positive correlation was revealed.

Various studies^{3,14} have found different age groups to be more prone to TMD. We found no such correlation. A number of other associated symptoms have been correlated to TMD. These include parafunctional habits, headaches, and tenderness.³ Parafunctional habits in relation to stress such as clenching shows a positive correlation and a higher risk of developing TMD. Patients suffering from joint dysfunction proved to have a positive association with tenderness ($p=0.012$). The patients who reported headaches showed a significant relationship with TMD ($p=0.031$). These findings agree with other studies. Restricted mouth opening is a frequently reported symptom in TMD patients. Cynthia Caselín Martínez Pasante.¹⁶ in a similar study did not note such an association. In the present study, this feature was not proved. It

is likely that this resulted because the sample consisted of a large number of patients that presented for dental treatment. None of these patients presented for management of TMD. In the past, orthodontics was blamed to play a role in the development of TMD. Contradicting studies have questioned this hypothesis.^{7,12} The differing results of the present study when compared with the evidence might be due to a smaller sample size, cross sectional data collection and many factors such as posterior cross bite, anterior or posterior open bites and the discrepancy between retruded contact position and maximum intercuspation shown to cause TMD symptoms, not evaluated in this study.

Conclusions

Over the past several years, keen interest in determining TMD being caused by malocclusion has led to numerous studies being carried out. After reviewing the results of this study, we can establish that;

- Patients presenting with class III malocclusion are more likely to develop disk displacement disorders.
- Gender did not show a significant correlation with TMD.
- TMD pain is most likely a consequence of emotional stress.
- Signs and symptoms observed are not caused by malocclusion although it can be a precipitating factor. Morphological malocclusion has now almost been totally ruled out as an important causative agent in TMD.

Temporomandibular disorders will always require further research. Longitudinal studies consisting of large samples with a wide distribution of age and gender from different socioeconomic classes can help us better understand this disorder.

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