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Evaluating the Most Common Etiologic Factors in Patients with Temporomandibular Disorders: A Case Control Study

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Abstract: The aim of this study was to evaluate the prevalence of the most common etiologic factors of TMD in patients suffering from the disease. In a case-control study 56 patients referring to oral medicine and TMJ Department of Tehran University Dental School were recruited. Patients were divided into two groups based on signs and symptoms of TMD. The case group manifested at least three of the most frequent symptoms of TMD while the control group did not have any of the signs and symptoms of the disease. A questionnaire was filled for each patient evaluating anxiety and depression. The results of this study indicated that occlusal interferences was significantly more common in TMD group than the control group ($p = 0.016$). More studies are needed to evaluate and confirm the role of occlusal interferences in the etiology of TMD. Occlusal interferences should be in mind as a causative factor in the treatment of patients with TMD.

Key words: TMJ problem, anxiety, depression, occlusal interferences

INTRODUCTION

The term temporomandibular disorders (TMD) is a collective term embracing a number of clinical problems that involve the masticatory musculature, the temporomandibular joint (TMJ) and associated structures, or both. These disorders are characterized by: facial pain in the region of TMJ and/or the muscles of mastication, limitation or deviation in the mandibular rang of motion and TMJ sounds during join movement and function (Martin and Glick, 2003).

Between 65 and 85% of people in the United States experience some symptoms of TMD during their lives and approximately 12% experience prolonged pain or disability that results in chronic symptoms. Only about 5 to 7% have symptoms severe enough to need treatment.

The etiology of TMD is unknown. Two hypothesis, occlusal disharmony and psychological distress have dominated the literature but neither has been supported by the literature.

The lack of a clear single cause has resulted in the proposal of a multifactorial etiology (Martin and Glick, 2003).

Some etiologic factors have been mentioned as being responsible in the etiology of TMD.

How (2004) review of 960 articles on association between temporomandibular disorders and orthrodontic treatment showed that no study indicated that traditional orthodontic treatment or the use of a single specific appliance increased the prevalence of TMD except for mild or transient signs. Only one article showed that extraction during orthodontic treatment changed the prevalence of TMD.

In the context of association between TMD and systemic diseases it has been shown that infectious arthritis, traumatic arthritis, osteoarthritis, rheumatoid arthritis and secondary degenerative arthritis can affect the TMJ (Beers).

Barbosa *et al.* (2008) reviewed about the relationship between bruxism and TMD showed that if the relation exists at all, it seems to be unclear and controversial.

Statistically significant risk factors for precipitating TMD symptoms were lip biting for TMJ pain and trauma for limitation of mouth opening and statistically significant risk factors for perpetuating TMD symptoms were female sex for TMJ pain and TMJ noise (Yatani *et al.*, 2002). Wang *et al.* (2007) showed that age, number of lost teeth, joint asymmetry or osseous changes had no effect on the incidence of TMD. The tightly locked occlusion was associated with signs and symptoms of TMD.

Johansson *et al.* (2006) showed that striking differences in demographic, occupational, general and oral health conditions were found between the groups with and without TMD symptoms. The strongest risk indicator for both pain and dysfunction was reported to be bruxism.

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Individuals with reported TMD symptoms differed significantly from those without TMD symptoms in socio-economic attributes, general and oral heath, dental conditions and satisfaction with their teeth (Johansson *et al*., 2006).

According to the fact that several researches have worked on the etiology of TMD in several case-control and cohort studies, there are still no obvious and clear etiology for this ominous disease.

Lack of similar studies in Iranian population mainly on the subject of etiologic factors involved in TMD made us to design a case- control study in order to evaluate and confirm such relations if they exist at all.

The aim of this study was to evaluate the role of some well known etiologic factors in the etiology of TMD and to determine of they can have any causative effect regarding signs and symptoms of TMD.

MATERIALS AND METHODS

In a case control study conducted from September 2007 to July 2008, 56 patients referring to oral medicine and TMJ Departments of Tehran University Dental School were recruited. Twenty eight patients were selected as case and 28 patients as control group. The case group was those patients having at least 3 of the following TMD signs and symptoms:

- Joint click (any sound during opening and/or closing both unilateral or bilateral
- Movement limitation (pain-free unassisted mandibular opening of less than 40 mm and a maximum assisted opening of more than 5 mm greater than the pain free unassisted opening)
- Joint tenderness (unilateral and/or bilateral)
- Masticatory muscle tenderness
- Deviation on opening

The patients in the control group did not have any of the above signs and symptoms and were selected from dental students and patients with any other complaint except the TMJ dysfunction.

Questionnaires for both groups of patients were filled regarding medical history and clinical examination. The patients were also asked to answer to the questions about their anxiety and depression status (HAD scale).

Hospital Anxiety and Depression (HAD) scale, a self screening questionnaire for depression and anxiety consists of a total of 14 questions evaluating anxiety (7 questions) and depression (7 questions).

Each question is a multiple choice consisting of 4 choices having 0-3 scores. The degree of anxiety and depression was assessed by calculating the total sum of scores for each patient based on the following criteria:

Sum of scores	Degree of anxiety/depression
0-7	Normal
8-10	Mild
11-15	Moderate
16-21	Severe

Patients younger than 18 years and patients with medically diagnosed polyarthritides or history of trauma to the head, neck, shoulder or back were excluded from the study. The patients were also excluded if they reported co morbid pain or exacerbating physical conditions such as fibromyalgia, chronic low back pain or cancer.

All subjects gave informed consent prior to participating in this study.

RESULTS

In this study 56 patients (28 with TMD according to selection criteria and 28 healthy subjects) were recruited. Both groups were considered equal regarding age ($p = 0.537$) and sex ($p = 0.352$).

Sixty four percent of TMD patients in our study were between 20 to 40 years old and 82% of them were females (Table 1).

Of 28 patients with TMD, 5 had some kind of malocclusion while in the control group malocclusion was seen in 8 of 28 subjects. There was no significant difference between two groups regarding malocclusion ($p = 0.342$). In the case group, 17 patients had occlusal interferences which was significantly higher ($p = 0.016$) than the control group (8 out of 20 subjects).

In the TMD group 9 patients had parafunctional habits. Parafunction was seen in 7 out of 28 subjects in the control group ($p = 0.554$).

Of 28 patients in TMD group, 27 had cuspid rise occlusion and one had group function type of functional occlusion. All of the subjects in control group had cuspid rise occlusion ($p = 0.545$).

According to Angle classification, in TMD group 23 patients presented class I and 5 class II occlusion while in the control group 23 presented class I, 3 presented class II and 2 subjects were edentulous.

Table 1: Frequency distribution of patients with TMD and control group according to sex

	TMD			
Sex	Yes	No	Total	p-value
Male	5	3	8	0.352
Female	23	25	48	
Total	28	28	56	

Table 2: Prevalence of malocclusion in patients with TMD compared with healthy subjects

	TMD			
Malocclusion	Yes	No	Total	p-value
Yes	5	8	13	0.342
No	23	20	43	
Total	28	28	56	

Table 3: Frequency of anxiety and depression in patients with TMD compared with control group

	Anxiety/Depression				
TMD	Yes	No	Total	p-value for anxiety	p-value for depression
TMD group					
Anxiety	24	4	28	1.000	0.899
Depression	16	12	28		
Control group					
Anxiety	22	6	28		
Depression	12	16	28		

Table 4: Frequency of occlusal interferences in patients and control group

	TMD			
Occlusal interferences	Yes	No	Total	p-value
Yes	17	8	25	0.016
No	11	20	31	
Total	28	28	56	

Table 5: Frequency distribution of functional occlusion in patients with TMD compared with control group

	TMD			
Functional occlusion	Yes	No	Total	p-value
CR	27	28	55	0.545
GF	1	0	1	
Total	28	28	56	

Table 6: Frequency distribution of angle classification in patients with TMD and control group

	TMD			
Angle	Yes	No	Total	p-value
Cl 1	23	23	46	0.392
Cl 2	5	3	8	
Cl 3	0	1	1	
Tooth less	0	1	1	
Total	28	28	56	

There was no significant difference between case and control groups regarding parafunction (p = 0.554), depression (p = 0.899) and anxiety (p = 1.000), malocclusion (p = 0.342) and functional occlusion (p = 0.545).

Occlusal interferences was significantly higher in TMD group than the control group (p = 0.016)

Table 2 to 6 describe the variables which were evaluated in both groups.

DISCUSSION

The etiology of TMD is unknown. Two hypothesis, occlusal disharmony and psychological distress have dominated the literature but none of them has been supported by sufficient studies.

The aim of this study was to evaluate the role of some well known etiologic factors in TMD and to determine of they can have any effect on signs and symptoms of TMD.

Different parameters were evaluated in both groups and are discussed here in details:

Gender: Females comprised 82% of the case group (23 out of 28) which similar to other studies it was shown that TMD is more common in females.

In other studies 75 to 84% of patients were female. The reason may be due to:

- Females are seeking medical care more than males
- The effect of hormonal and physiological factors
- Genetics and modulators of endogenic pain

Age: In this study 64% of TMD patients were between 20 to 40 years old. Pullinger in 1988 showed that most patients seeking treatment for TMD were in the same age group (20-40 years) (Pullinger *et al*., 1988).

Para function: Including clenching, bruxism, cheek and lip biting and nail biting.

The most common Para function was bruxism (25%). This was similar to the findings of Carlson (25 to 50%) (Carlson *et al*., 1999).

Also cheek biting was the second most common Para function and was seen in 15% of patients.

In some studies 100% of patients with TMD had some form of Para function but only in a few cases Para function made the patients to seek treatment.

Depression and anxiety: In this study depression and anxiety was evaluated by HAD scale. The results showed that 82% of TMD patients had anxiety and 57% of them were depressed. There was no significant difference with control group.

According to Adrian the prevalence of depressive symptoms was shown to be lower in Asian TMD patients. Psychological distress experienced by female Asian TMD patients also was comparable to their male counterparts. In another study (Bonjardim *et al*., 2005) HADS was associated with an increasing number of TMD subjective symptoms. However, only anxiety was correlated with clinical signs of TMD, primarily muscle tenderness.

Malcocclusion: In this study we could not find any correlation between TMD and malocclusion. In some other studies conducted by Almondi *et al*. (2000)

malocclusions like bimaxillary discrepancy, increased overjet, increased overbite, cross bite, open bite and edge to edge occlusion were considered to have some role in etiology of TMD.

Occlusal interferences: In this study it was revealed that occlusal interferences may have some role in the etiology of TMD. According to Dawson occlusal interferences that require displacement of the TMJs to achieve maximum intercuspation of the teeth can cause incoordination of all the masticatory neuromusculature. This is called occluso- muscle pain. It is one of the most common masticatory system disorders and the cause of the most of the so-called TMD pain.

At last we could not find any correlation between history of head trauma, the post history of rheumatoid diseases and Angle classification with TMD. Also no relation was found between functional occlusion and TMD with canine rise occlusion being the most common type of occlusion in both case and control groups.

CONCLUSION AND RECOMMENDATIONS

As a conclusion the results of this study showed that occlusal interferences are more common in TMD patients than the control group. However more studies are needed to confirm the role of occlusal interferences in etiology of TMD. Also it is recommended that occlusal interferences should be in mind as a causative factor in the treatment of patients with TMD. Occlusal adjustment should be emphasized after any operative and prosthodontic treatment.

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