The Prevalence of Temporomandibular Disorders in Patients Referred to the Prosthodontics Department of Shahid Beheshti Dental School in Fall 2010

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Abstract

Objective: Temporomandibular disorders (TMDs) are among the most common disorders of the maxillofacial region and are often characterized by pain and dysfunction of the temporomandibular joint(TMJ) and muscles of mastication. Due to the presence of several diagnostic criteria for such disorders, the reported prevalence rates for TMDs have been variable in different communities. The aim of this study was to determine the prevalence of TMDs in patients presenting to the Prosthodontics Department of Shahid Beheshti Dental School (SBDS) in fall 2010.

Methods: In this descriptive study, 150 patients presenting to the Prosthodontics Department of SBDS (86 females and 64 males) were randomly selected and evaluated by using a questionnaire (subjectively) and clinical examinations (objectively). Presence and prevalence of various symptoms of TMDs such as clicking and tenderness on palpation in the muscles of mastication and the TMJ were evaluated in patients. Statistical comparisons were carried out using chi-square test.

Results: Clicking, masticatory muscle and joint tenderness, TMDs, and limitation of mouth opening were found in 21.3%, 18.7%, 5.3%, 18.7% and 1.3% of patients, respectively. Despite the higher prevalence of TMDs in females, the difference in this regard between males and females was not statistically significant (39.3% in men versus 60.7% in women).

Conclusion: Based on the obtained results, the prevalence of TMDs and its related symptoms was 18.7% in patients presenting to the Prosthodontics Department of SBDS in fall 2010. This value was lower than the rates reported in the literature.

Key words: Prevalence, Temporomandibular disorders, Tenderness

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Introduction:

TMJ is among the most complex joints in the human body. This joint has rotational and translational movement and is capable of tolerating masticatory forces.

The term “temporomandibular disorder” or TMD is used for all disorders related to the function of human masticatory system. There is a consensus among the majority of researchers that the TMDs are multifactorial and complex in nature. Due to their prevalence, TMDs have gained the spotlight in dentistry. This disorder is associated with symptoms such as spontaneous muscle and/or joint pain or tenderness on palpation, TMJ sounds and limitation of jaw movement (1). Controversy exists about the prevalence, diagnosis and treatment of TMDs (2-7).

The epidemiological studies conducted on TMDs have been mostly descriptive. Various TMD prevalence rates (10-91%) with different clinical symptoms have been reported among Iranian (8,9) and other populations worldwide (10-16). The prevalence of TMDs has been reported to be higher among females than males and in adolescents compared to children. However, TMD prevalence rate is low in the

elderly (17). Different estimates have been provided for the prevalence of TMDs. This variability can be explained by the incomplete diagnostic and therapeutic criteria for this condition and current controversies in this regard. Thus, it is still an important priority to evaluate the prevalence of TMDs in different communities. The present study was conducted to determine the prevalence of TMDs in patients presenting to the Prosthetics Department of SBDS in fall 2010.

Methods:

In this descriptive study, a total of 150 patients presenting to the Fixed Prosthodontics Department of SBDS in fall 2010 were randomly selected. The results of clinical examinations were recorded in a pre-designed questionnaire. This questionnaire had three sections of patients' demographic information, subjective symptoms based on patients' response (self-report) and objective symptoms based on the results of clinical examinations.

Data regarding the TMD such as 1- previous history of joint disorder, 2- joint pain, 3- TMJ sounds, 4-masticatory muscle tenderness, 5- TMJ tenderness, 6- limitation of mouth opening and 7- occlusal interferences in centric relation, protrusive and non-working interferences were all recorded.

1- Previous history of joint disorders: Previous history of TMDs based on the patient's response (subjectively) such as history of pain, TMJ sounds, joint lock or dislocation, maxillofacial trauma and arthritis was taken and recorded in the questionnaire.
2- Articular (TMJ) pain: Pain characteristics namely time of onset, intensity, duration, type of pain (distinct or dull), its aggravating factors and history of previous treatments were collected and recorded in the questionnaire.
3- TMJ sounds: Assessment of TMJ sounds was done by placing the fingertips on the external surface of the joints while the patient opens and closes the mouth. If a grinding sound was heard, called crepitus, it was recorded in the questionnaire as well.
4- Masticatory muscle tenderness: Temporal, medial pterygoid, lateral pterygoid and masseter muscles were examined by palpation.

A. Temporal muscle examination: The patient was requested to clench (tightly hold the top and bottom teeth together) and asked about feeling any discomfort or pain while the examiner's fingers were placed over the patient's temples.
B. Medial pterygoid muscle examination: The index finger of the examiner was placed over the internal surface of the ramus at the retromylohyoid space to palpate the medial pterygoid muscle and the patient was asked about any feeling of pain or discomfort.
C. Lateral pterygoid muscle examination: Small finger of the examiner was placedover the facialaspect of maxillary teeth distal to thehamular notch and the patient was asked about any feeling of pain or discomfort.
D. Masseter muscle examination: Fingers of both hands were placed at the two sides over the zygomatic arch (right in front of the joint) in the path of the masseter muscle. The fingers slipped down and patient's reaction was noted.

5- Joint tenderness: Middle fingers of the examiner were placed over the external surface of condyles and the patient was asked to open and close the mouth. Joint tenderness was recorded at three different positions of closed mouth, during opening movement and open mouth. In the latter position, the examiner moved his fingers to the space posterior to the condylar prominence and palpated the area.
6- Limitation of mouth opening: To measure maximum opening, the distance between the

incisal edge of the maxillary and mandibular incisors during maximum opening was measured using a ruler. If this value was smaller than 40 mm, the patient had limitation of mouth opening.

7- Occlusal interferences in centric relation, protrusive and non-working interferences:

A. Centric relation: Using two-handed Dawson technique, the mandible was positioned into CR by the examiner. If a premature contact was noted in this state, it was recorded in the questionnaire under occlusal interferences.

B. Protrusive interferences: Patient's mandible was positioned from the maximum intercuspation to edge to edge position by the examiner. If in this path, any contact was noted between the posterior teeth (other than anterior teeth), it was recorded as protrusive interferences in the questionnaire.

C. Non-working interferences: Patient's mandible was positioned from the maximum intercuspation to the right or left side to reach the edge to edge position of canines by the examiner. If in this path, the teeth at the non-working side had a premature contact it was recorded as non-working preferences in the questionnaire.

If at least one of the symptoms of joint tenderness, muscle tenderness, maximum mouth opening less than 40 mm, protrusive movement less than 7 mm, lateral movements less than 7 mm or TMJ sounds along with one other complaint were present, the patient was diagnosed as having TMD. Due to the high prevalence of TMJ sounds and indefinite diagnosis of TMD solely based on this symptom, patients only complaining of TMJ sound with no other symptom were considered healthy in this respect. Patients with TMJ sounds along with at least one of the abovementioned symptoms were diagnosed as having TMD. Data were analyzed using SPSS version 15 software. Absolute (number) and relative (percentage) frequency of demographic variables, patients' response to TMD questions and the results of their clinical examinations were determined and reported. Chi-square test was applied for statistical analysis. Type I error (a) was considered as 0.05 and if the type II error was equal or smaller than 0.05, the difference was statistically significant.

Results:

1. History of TMDs in patients (Table 1): History of TMDs based on the symptomatic patients' response (out of 150) is presented in Table 1.

Table 1- Frequency distribution of history of TMDs based on patients' response

Variable	Number	Percentage
1. Do you experience pain or discomfort when opening your mouth or yawning?	10	6.7%
2. Do you experience pain or discomfort when chewing, moving your jaw or speaking?	15	10.0%
3. Do you feel any pain in your ears, temples or chicks?	18	12/0%
4. Do you usually suffer from headaches?	24	16.0%
5. Do you hear a noise in the TMJ during jaw movements?	14	9.3%
6. Have you experienced jaw locking or dislocation?	4	2.7%
7. Do you often clench or suffer from bruxism?	24	16.0%
8. Do you have a history of trauma to the head and neck area?	7	4.7%
9. Are you suffering from arthritis?	7	4.7%
10. Do you hear a noise in your ears when chewing?	4	4.7%

2. Articular pain (Table 2): Table 2 shows the pain characteristics in terms of time of onset, intensity, duration, type of pain (distinct or dull), its aggravating factors and history of pain treatments.

Table 2- Frequency distribution of pain characteristics namely the time of onset, intensity, duration, type (distinct or dull), its aggravating factors and history of pain treatments

Pain characteristics		Number	Percentage
Time of onset	1 year ago	1	0.7%
	2 years ago	6	4.0%
	3 years ago	1	0.7%
	4 years ago	3	2.0%
	5 years ago	3	2.0%
	6 years ago	1	0.7%
	8 years ago	1	0.7%
Pain intensity	Low	5	3.3%
	Moderate	12	8.0%
	Severe	1	0.7%
Duration of pain	Constant	0	0%
	Occasional	18	12.0%
Type of pain(dull or distinct)	Distinct and localized	4	2.7%
	Disseminated and dull	14	9.3%
History of pain treatments	Yes	1	0.7%
	No	17	11.3%
Pain aggravating factors	Stress	6	4.0%
	Chewing hard food	14	9.3%
	Yawning	11	7.3%
	Too much talking	11	7.3%
	Others	1	0.7%

3. TMJ sound: Clinical TMJ examinations revealed that 32 patients (21.3%) had clicking but crepitus was not observed in any of the patients.
4. Tenderness (Table 3): Tenderness of the right and left temporal, masseter, medial pterygoid and lateral pterygoid muscles is presented in Table 3. SCM and trapezius muscles were not tender during palpation.

Table 3- Frequency distribution of tenderness of the right and left temporal, masseter, medial and lateral pterygoid muscles

Muscles	Side	Number	Percentage
Temporal	Right	2	1.3%
	Left	1	0.7%
Masseter	Right	17	11.3%
	Left	13	8.7%
M. Pterygoid	Right	21	14.0%
	Left	14	9.3%
L. Pterygoid	Right	14	9.3%
	Left	13	8.7%

5. The frequency distribution of joint tenderness is presented in Table 4.
6. Limitation of mouth opening: Limitation of jaw movement, jaw deviation when opening the mouth and returning to its normal position, and jaw deviation when opening the mouth without returning to its normal position (deflection)were found in 2 (1.3%), 19 (12.7%) and 2 (1.3%) subjects, respectively.
7. Evaluation of occlusal interferences at CR, protrusive and non-working interferences: The prevalence of occlusal interferences at CR, protrusive interferences and non-working interferences was 100%, 65.3% (98 subjects)

and 86% (129 subjects), respectively. However, no limitation was observed in protrusive or lateral movements. Of 28 patients with TMDs, 11 (39.3%) were males and 17 (6.7%) were females. Chi square test showed no significant difference between them in this regard (p<0.69). All patients had muscle tenderness (p<0.006), 3 (10.7%) had limitation of mouth opening (p<0.0001) and 8 (28.6%) had joint tenderness (p<0.0001). Thus, limitation of mouth opening and muscle and joint tenderness were significantly correlated with the diagnosis of TMD. In evaluation of the relationship of clicking and TMD symptoms, it was demonstrated that clicking was associated with muscle tenderness, joint tenderness and limitation of mouth opening in 9 (36.1%, p<0.13), 2 (25%, p<0.67) and 100% of cases (p<0.0006), respectively. No significant correlation was detected between the TMD symptoms and protrusive or non-working interferences. Also, TMD was diagnosed during clinical examination in 33% of patients who did not mark any of TMD symptoms in the questionnaire (p=0.0001).

Table 4- Frequency distribution of TMJ tenderness

Joint	Side	Number	Percentage
TMJ tenderness (closed mouth)	Right	2	1.3%
TMJ tenderness	Left	3	2.0%
(open and closed mouth)			
TMJ tenderness	Right	2	1.3%
(maximum opening)	Left	3	2.0%
TMJ tenderness (closed mouth)			
TMJ tenderness	Right	7	4.7%
(open and closed mouth)	Left	5	3.3%

Discussion:

Otuyemi *et al*. (2000) reported the prevalence of signs and symptoms of TMDs to be 29.2% in an adult Nigerian population (18). Gesch *et al*. in 2004 found the signs and symptoms of TMDs in 49.9% of a German population (19). Furthermore, Casanova-Rosado *et al*. in 2006 mentioned the prevalence of TMDs to be 46.1% in a group of Mexican adolescents and young adults (20). Kahler *et al*. in 2009 evaluated the prevalence of signs and symptoms of TMDs in Swedish children and adolescents and confirmed that half the examined subjects were suffering from this condition (21). Eslamian and AlizadehAgha in 2001 reported the prevalence of TMDs to be 46.5% among Shahid Beheshti dental students (8). Bahrani *et al*. in 2012 reported this rate to be 80% among Shiraz University dental students (9).

The present study was conducted due to the high prevalence of TMDs. Based on the comparisons, prevalence of TMDs in the present study was lower than the rates reported in the literature. The only reported prevalence rate for TMDs in the literature that was lower than our obtained rate was the prevalence of TMDs among children and adolescents in the mixed dentition stage (14.4%)(25). In a study by Verdonck *et al*. in 1994 (23), the prevalence of TMDs was estimated as 23% among 12-15 year-old Japanese female adolescents; which is in accord with our obtained value.

Based on our study results, tenderness of the muscles of mastication was found in 18.7% of patients. The prevalence of masticatory muscle tenderness was detected to be 34% in a study by Jagger (1992) in Saudi Arabia (24), 15% in a study by Gesch *et al*. (2004) in Germany (19) and 20.9% among children and adolescents in

the mixed dentition stage (22). The frequency of limitation of mouth opening was 1.3% in our study. This value was 9% in a study by Gesch *et al*. in 2004 (19) and 1.94% in a study by Mahshid *et al*. in 2007 (25). Marked differences were noted when comparing the reported prevalence rates for TMDs by various studies. These differences may be attributed to the different understudy populations and their specific conditions. It appears that among our understudy population, not any pain was considered as a problem and the patients did not seek treatment for their random occasional pains. Only one subject mentioned seeking treatment for the TMJ pain. Despite the use of relatively similar criteria for the detection of TMDs in different studies, significant differences exist in terms of applicable definitionsfor estimation of the prevalence of TMD signs and symptoms in different studies; this issue can complicate the comparison of results. On the other hand, the available differences in the prevalence of TMDs may be due to the fact that the term TMD is rather vague and distinct and clear criteria have yet to be offered for its definite diagnosis (26). Furthermore, understudy subjects in different studies have been selected from different ethnicities and cultures and belong to varying socioeconomic states. This issue can further affect the obtained results. Also, this study is the only one evaluating patients of different age groups presenting to the Prosthodontics Department of SBDS which influences the comparison of results as well.

Based on our study results, of 28 TMD patients, 39.3% were males and 60.7% were females. Despite the high prevalence of these disorders among women, the difference in this respect between men and women was not statistically significant. In studies by Gesch *et al.* (2004) in Germany (19) and Azak (2006) in Turkey, TMDs were more prevalent among women but with no statistically significant difference. Similar results were obtained by Mahshid *et al*. in 2007. They reported the prevalence of TMDs to be 61.4% in women and 55.4% in men with no significant difference between the two groups in terms of prevalence (25).

Conclusion:

Evaluation of the prevalence of TMDs in patients presenting to the Prosthodontics Department of SBDS in fall 2010 revealed that:

- The prevalence of muscle tenderness, TMJ tenderness, TMDs, and limitation of moth opening was 18.7%, 5.3%, 18.7% and 1.3%, respectively among the examined patients.
- The prevalence of clicking, jaw deviation when opening the mouth and returning to its normal position, jaw deviation when opening the mouth without returning to its normal position (deflection), protrusive interferences, non-working interferences and pain was 21.3%, 12.7%, 1.3%, 65.3%, 86.0% and 12.0%, respectively among the understudy subjects.
- Despite the higher prevalence of TMDs in women, no statistically significant difference was observed in this respect between the two groups (39.3% in men versus 60.7% in women).

Considering the results of previous studies, our obtained prevalence rate for TMDs and related symptoms among patients presenting to the Prosthodontics Department of SBDS was lower than the values reported in the literature.

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Conflict of Interest: "None Declared"

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