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Research Article

Evaluation of Temporomandibular Disorders with Research Diagnostic Criteria; In A Turkish Patient Population

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Abstract

Objective: The objective of this study is to investigate the frequency of signs and symptoms of Temporomandibular Disorders (TMD) on patients who have referred to the Eskisehir Osman Gazi University Faculty of Dentistry Department of Prosthodontics.

Materials and Methods: After our patients answered the questionnaire, the symptoms and signs of Temporomandibular Disorders were assessed according to clinical and occlusal examination and Research Diagnostic Criteria for Temporomandibular Disorders (TMD/RDC).

Results: A total of 173 men and 43 women were included in the study, with a mean age of 31.1 ± 11 years. The number of patients who applied to our clinic with pain was 142 (82.1%). In the 54.3% of the patients, clicking was detected during the function. The most common type of parafunctional habits is clenching / bruxism with a rate of 34.7%. In the study group, the mean value of the maximum unassisted mouth opening amount was calculated as 37 ± 6.1mm. The average of the highest pain intensity experienced during the last 6 months was 6.29 out of 10 according to the Visual Analogue Scale (VAS). According to the Angle classification, 151 patients were classified as Class 1, 14 as Class 2, and 8 as Class 3.

Conclusion: The rate of women in the group of patients who were referred with TMD was significantly higher. The most obvious symptoms are; pain, limitation in mandibular functions, and joint sounds. The frequency of TMD symptoms and findings was found to be quite high in our study. When the etiology of TMD is thought to be multifactorial, more work is needed to prevent TMD formation, to identify risk factors, and to determine the effectiveness of treatment modalities.

Keywords: Temporomandibular Joint; Temporomandibular Disorders; Research Diagnostic Criteria for Temporomandibular Disorders (TMD/RDC)

Abbreviations

TMD: Temporomandibular Disorders; TMD/RDC: Research Diagnostic Criteria for Temporomandibular Disorders; VAS: Visual Analogue Scale; TMJ: Temporomandibular Joint; SPSS: Statistical Package for Social Science

Introduction

Temporomandibular joint (TMJ) is one of the joints with the most complex structure in both morphological and functional aspects of the body [1]. Diseases and treatments of this complex structure have been debated for many years, and these disorders

have been described in many different names over time. It is estimated that between 50% and 70% of the general population is affected from various disorders caused by the jaw joint region during a certain period of their lives [2].

Temporomandibular Disorders usually manifest with pain, joint sounds, limitation in mandibular movements and loss of function. In addition to these signs and symptoms, tenderness in chewing muscles, pain in adjacent anatomical regions of the jaw joint, earache, hearing loss, headache, dizziness can be seen in patients refereed to physicians [3-5].The complex relationship of the temporomandibular joint with other anatomical structures in the head and neck region and the diversity of symptoms in this region make it difficult for physicians to diagnose dysfunctions in joint disorders [6,7].

Despite the many hypotheses on the causes of TMD, De Boever's multifactorial etiologic approach maintains its validity because of the lack of scientific resources to support them [8]. Joint hypermobility, occlusal abnormalities, trauma, bruxism, abnormal body posture, working in the wrong position and reading habits, stress, orthodontic treatment, dental procedures that will cause the mouth to remain open for a long time are among the factors that increase the susceptibility to these disorders [9,10]. Successful management of the TMD depends on identifying and controlling these factors [11].

Corresponding with temporomandibular joint disorders, many researchers have made very different classifications of each other, from the past to the present day, taking into account the etiological factors. The classification system established by Wilkes in 1989 and Bell in 1982 and modified by Okeson in 1998 is now widely known and used [12].

A detailed clinical examination for the correct diagnosis and treatment of temporomandibular disorders requires questioning of the etiologic factors that cause the disease. For this purpose, the use of reliable and valid questionnaires is important in order to determine the risk factors of the disease and to observe the change of the symptoms of the disease by storing it for long term [3,13]. In our study, we used the TMD / RDC form created in the lead of Samuel F. Dworkin and Linda Le Reche.

Our study was based on the examination of the results obtained by collecting and evaluating the data related to anamnesis, clinical findings, complaints and diagnoses of the patients who applied our clinic with Temporomandibular Disorders.

Material and Method

Patients included in our study were selected from among those over 18 years old who applied to Eskisehir Osman gazi University Faculty of Dentistry with complaints of Temporomandibular Disorder. After our work was planned, the application was done to Eskisehir Osman Gazi University Non-Interventional Clinical Research Ethics Committee Presidency and it was confirmed with ethical approval of the date 03.01.2016 with Decision No: 15.

In the clinical examination and evaluation stages of patients, the Turkish translation of the questionnaire, Temporomandibular Disorders / Research Diagnostic Criteria (TMD / RDC) form, prepared by Dworkin., *et al*. [14] was used. Anamnesis and examination forms used in our research, was taken from Dr. Pınar Kursoğlu's doctoral thesis entitled "Frequency and Distribution of Temporomandibular Disorders in Young Population" performedin 1999 at Istanbul University Health Sciences Institute, Prosthetic Dentistry Department [3].

Gender, age and education status of patients were also recorded in order to evaluate the demographic structure and social status of the group examined in our study. While assessing the pain in the temporomandibular region, the pain experienced is graded by the patient using the Visual Analogue Scale (VAS). During the clinical examination, the mouth opening way was detected and recorded as flat, deviated or deflected. The mouth opening capacities of the patients were obtained in mm by measuring with a caliper between the upper and lower cutters. Afterwards, by adding the amount of overbite to these values, painless unassisted mouth opening, maximum unassisted mouth opening and maximum assisted mouth opening amounts were calculated. (Figure 1 and 2) Eccentric jaw movements were also measured. (Figure 3) Temporal muscle, masseter muscle and joint area were evaluated by double-sided palpation and the patients were asked to rate the discomfort they felt from 0 to 3, 0: no, 1: slight, 2: moderate, 3: high. During the function or when the mouth is opened and closed, the presence of joint sounds is examined as 0: no sound, 1: click, 2: crepitation. Occlusal examination was performed to assess the group of patients according to Angle classification, teeth missing, teeth closing at the posterior region, and functioning side contacts.

Figure 1: Overbite marking.

Figure 2: Measurement of mouth opening.

Figure 3: Measurement of lateral movements of the lower jaw.

Analysis of the data was made using Statistical Package for Social Science (SPSS) for Windows 21 package program. Descriptive statistical analyzes are shown as mean for continuous and intermittent numerical variables, standard deviation, median, minimum and maximum values. It was investigated by Shapiro Wilk test that continuous numerical variables from collected data exhibited normal distribution. In the variables that occurring normal distribution assumption, independent sample t-test was performed for comparison of independent binary groups and single direction variance analysis was performed for comparison of three or more independent groups. In the variables that are not occurring normal distribution assumption, Mann-Whitney-U was performed for comparison of independent binary groups and Kruskal Wallis analysis was performed for comparison of three independent groups. While examining qualitative data; the Fisher's Exact Test when the minimum expected value (tij) in the comparison of the independent two groups is smaller than 5, the Continuity Correction test when $5 < tij < 25$, and the Pearson Chi-Square test when $tij > 25$ was used.

Statistical significance level was evaluated as $p < 0.05$.

Results

Of the 173 patients who constituted our study group, 130 (75.1%) were female and 43 (24.9%) were male and ages ranged between 18 and 74. The mean age of the women was 31.01 (18-74) while the mean age of the men was 31.41 (18 - 63), The mean age of all patients was 31.11 (Figure 4 and Table 1). 142 (82.1%) of the patients reported pain in the joint area during the last month. The mean of the highest pain intensity experienced during the last 6 months was 6.29 out of 10 according to the VAS scale. (Figure 5)102 (78.5%) of the females and 31 (72.1%) of the males complained of sound from the jaw joints during functioning. However, this does not make a statistically significant difference between the genders. ($p= 0.71$) 125 people reported lock or stuck that prevented them from opening the jaws fully. Among those who have stucking and locking problems, the proportion of women is very high and the difference between genders is statistically significant. ($p = 0.029$) (Table 2).

Of the 173 patients included in the study, 113 (65.3%) were reported to have a clenching/ bruxism habit, while 12 (6.9%) were recently exposed to physical trauma as a result of an injury on their face or jaw. 8 (6.2%) of the patients that exposed to that kind of injury were women and 4 (9.3%) were men. Women are more likely to be exposed to an impact than men. However, the difference between the genders in terms of trauma was not statistically significant. ($p = 0.72$).

Figure 4: Distribution of Patients in the Research Group by Gender.

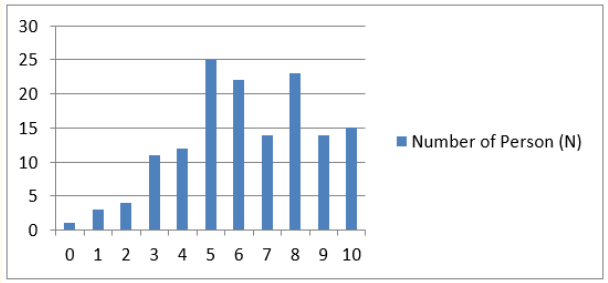

Figure 5: Distribution of the Severity of Pain in the Last 6 Months According to the VAS Scale.

Gender	Number of Individuals	Average	Standarddeviation	StandardError	Minimum	Maximum
Female	130	31.0154	11.35132	0.99	18	74
Male	43	31.4186	10.46589	1.59	18	63
Total	173	31.1156	11.10931	0.84	18	74

Table 1: Distribution of Patients in the Research Group by Age.

	Number of Persons (N) /Percent (%)	
	Yes	No
Female	100 76.9%	30 23.1%
Male	25 58.1%	18 41.9%
Total	125 72.3%	48 27.7%

Table 2: TMJ locking problems of Distribution according to gender.

During the clinical examination, 133 patients (76.9%) were able to open their mouths without deviation in the way of the mouth opening, 27 patients (15.6%) deviated and 13 patients (7.5%) had deflections.

In the group of patients examined, the mean value of painless unassisted mouth opening was 30 ± 6.1mm, the mean value of maximum unassisted mouth opening average was 37 ± 6.1mm and the mean maximum assisted mouth opening amount was 41 ± 6.1mm. And when the mouth opening amounts are evaluated between the genders; it was seen that men had more mouth opening capacities than women with a statistically significant difference. (p = 0.57) The mean amount of lateral movement in the community was measured as 6.8 ± 1.2mm for the right side, 6.9 ± 1.3mm for the left side and 4.9 ± 1.6mm for the protrusion movement.

According to Angle classification, 151 (87.3%) of the patients were Class 1, 14 (8.1%) and Class 2, 8 (4.6%) were Class 3. (Figure 6) According to the occlusion guidance observed during lateral movements, 91 patients had canin-protective occlusion, 79 had group-function occlusion, and 3 had an occlusion other than these definitions. The distribution of teeth lost in the community is as shown in Table 3. Although the loss of teeth in the posterior region was thought to cause impairment of occlusal stability, the relationship between dental closing in the posterior region and pain felt in the face region was not found to be statistically significant. (p = 0.75)

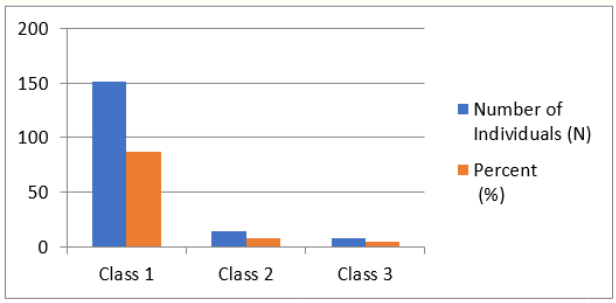

Figure 6: Distribution Chart According to Angle Classification.

	Mini-mum	Maxi-mum	Average	Standard Deviation
MissingTooth-Number	0	8	0.26	1.149
Number of MissingTeeth in AnteriorRegion	0	13	1.40	2.493
Number of MissingTeeth in PosteriorRegion	0	21	1.66	3.262

Table 3: Distribution According toTooth Deficiencies.

Discussion

Temporomandibular disorders; including temporomandibular joints, chewing muscles and many structures related to the anatomy of this region, a disorder causing jaw functions such as speech, eating-drinking, stretching, and chronic pain in the head and neck region [15-18].

The TMD / RDC form is based on the research systems used in the past, and takes its power from long-term epidemiological studies. Since 1992, many studies have been done on the validity and reliability of the TMD / RDC, and the efficiency and reliability in the recording of the patient group established has also been proved by other studies [13].

Studies of epidemiology of temporomandibular disorders have shown that symptoms occur more frequently in women than in men and most often in the period between the ages of 20 and 40 [19-22]. In parallel with the researches in the literature, the average age of the patients in our study is between 30-35 and the majority of the patients are women. Although it is said that the use of oral contraceptives and the use of exogenous estrogen in menopause do not affect temporomandibular joint dysfunction [23], some researchers have found that the reason for the high TMD findings in women compared with men is connected to hormonal changes, physiological reasons, connective tissue and muscle structure [24,25].

While pain in the joint area was considered to be one of the most obvious and unbearable findings of the disease [26,27], it was stated that the most common TMD findings in the research were joint sounds [28-30]. Studies show that the rate of showing at least one symptom of temporomandibular disorders varies between 30-78% [28-33]. Becauseour patients referred to us with pain and voice complaints in one or more joint areas, this rate was higher in our study than in other epidemiological studies.

Locker and Slade reported on a telephone survey of adults in Toronto that 9.5% of women and 5% of men reported pain in the frontal area of the ear [34]. In our study, 142 (82.1%) of 173 patients were found to have pain in the face and frontal area of the ear in the last 1 month. The low rate of resemblance to other researches is due to our study on patients with complaints of joint pain.

It is argued that physical trauma has an initiating role in temporomandibular joint disorder, especially fracture and joint locking in the condyle area after acute trauma [35]. In our study group, 12 (6.9%) patients had a physical trauma story. By sharing the same view with the literature, we think that physical trauma can damage the anatomical structures of the joint and disrupt the regular mechanism of functioning and initiate dysfunction.

Bruxism is a parafunctional habit known as tooth grinding or clenching, which is seen in high rates in individuals with TMD, considered among the etiologic factors of temporomandibular disorders [31,36,37]. Manfredini., *et al*. reported that myofascial pain and disc displacement were seen in 87.5% of patients with TMD and that 68.9% of these patients had a teeth clenching habit [30]. Another researcher reported this rate as 33.9% among young people aged 18 - 25 [31]. Sipahi found teeth clenching in 152 and teeth grinding in 49 of 200 patients [38]. In the group of patients we examined, 34.7% reported that they have teeth clenching/ grinding habits.

Although it is an important diagnostic factor, the limitations in mouth opening have been reported to be the least common clinical finding in studies [39]. This rate was found to be 9.8% in our study.

The frequency of deviations from the way of mouth opening in the form of a deviation and deflection varies between 20% and 45% in some investigations [40,41]. Consistent with the results of other studies, this rate was found to be 23.1% in our study.

Sensitivity to pain in temporomandibular joint region and chewing muscles in temporomandibular joint disorder is characteristic [15-17,42]. Bernhardt., *et al*. reported that palpation is also a susceptibility to the chewing muscles of patients with common jaw pain [43]. In our study, high sensitivity was found in 51 (29.5) patients' masseter muscle, 9 (5.2%) patients' temporal muscle prefrontal region, 11 (6.3%) patients' pterygoid EUs lateralis muscle and 20 (11.5%) patients' pterygoid EUs medialis muscle. We think that the sensitivity of chewing muscles should be evaluated especially when the differential diagnosis of muscle-based joint disorders is made.

Factors related to the development of temporomandibular joint dysfunction include; tooth loss, deterioration of the posterior closing mechanism, alteration of the closing relationship, and thus, changes in the vertical dimension, resulting in hyperactivity in the muscles [15,39,40,44]. Sarita., *et al*. suggested that patients with partial missing tooth and especially posterior tooth loss were susceptible to temporomandibular joint disease [45]. In our study, partial missing tooth was found in 53 (% 30.6) of 173 patients and although there was no significant statistical relationship between teeth missing and the pain felt on the faces of the patients, it was observed that the teeth missing may be considered to be effective in the development of temporomandibular joint dysfunction.

Looking at the occlusal evaluations; although class II malocclusion, functional cross bite, open bite, collapsed bite, bent molar teeth, loss of centric relation do not directly active in the development of temporomandibular joint disorders, they have been suggested to increase disease symptoms by making an orthopedic effect on TMJ [40,41,46,47]. In our study, when we evaluated the closing associations in the clinical examinations of patients, TMJ was not statistically significant with the pain and voice even though there was a deep collapsed bite in 16 patients. Despite the ability to adapt and tolerate trauma in the chewing system, occlusal disturbances can cause changes in this system and reveal TMJ irregularities [2,48].

Conclusion

A detailed clinical examination for the correct diagnosis and treatment of temporomandibular disorders requires questioning of the etiologic factors that cause the disorder. For this purpose, the use of reliable and valid questionnaires is important in order to learn the risk factors of the disorder and to observe the change of the symptoms of the disorder by storing it for long term.

The adoption of a multidisciplinary approach in the treatment of temporomandibular disorders with complex etiology will enhance treatment success. Further work is needed to determine the risk factors associated with these conditions in order to prevent TMD formation and to personalize the treatment options for the patient.

Declaratıons

Ethics committee approval form

The name of the ethics committee that approved the study: Eskisehir Osman Gazi University Presidency of Non-Interventional Clinical Research Ethics Committee

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