

## Assessment of the relationship between exercise and temporomandibular joint disorder in athletes

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### Abstract

**Background:** Temporomandibular joint is one of the most complicated joints of the body and plays an important role in the head and neck system. The aim of this study was to Assessment of the relationship between exercise and temporomandibular joint disorder in athletes

**Materials and Methods:** In this study, subjects were randomly selected. 170 were evaluated temporomandibular disorder questionnaires. clinical assessments consisted of masticatory muscles and sternocleidomastoid muscle palpation, temporomandibular joint palpation for pain and noise and its movement, and mouth opening limitations. The Chi Square test and paired t-test were used to analyze the data and the P value under 0.05 was considered significant.

**Results:** The results of this study showed that the prevalence of TMD in women than in men. There was a significant relationship between sex and TMD ( $P = 0.017$ ). There was a significant relationship between malocclusion and TMD ( $P = 0.009$ ). There was no statistically significant relationship between sport type and TMD ( $P = 0.423$ ).

**Conclusions:** There was a significant relationship between sex and TMD and between malocclusion and TMD.

There was no statistically significant relationship between sport type and TMD

**Keywords:** Relationship, exercise, temporomandibular joint disorder

### Introduction

Temporomandibular Joint is composed of mandibular bone of mandibular bone and temporal bone glenoid which is located on two sides of the skull. Although the two joints are separate from anatomy, they are considered as a unit. Temporomandibular joint disorders are abnormalities that interfere with the shape or function of the joint. These disorders include joint disruption of the articular disk, ligaments and muscles, arthritis, and developmental developmental disorders. TMJ is important because of its role in chewing, swallowing, speaking and even breathing. In addition, the TMJ is the only joint of the body that consists of the relationship between the two synchronous joints, which act in harmony. (1)

TMD is a term associated with the problems of the rodent system, such as the TMJ, the dental system, and the supporting bone. The prevalence of TMD in adults is 40-70%, while it is about 90% in children with dentinal ducts (16%) and mixed dentitions (90%).(2-5)

TMD is a multifactorial disease and the following etiologic factors are present in it:

Acquired symptoms such as: infection, injuries, surgery, radiation therapy, habits, tumors, etc.; hereditary factors; and other factors such as: Adverse occlusal disease, stress, systemic diseases and immunological factors. (5)

In order to detect TMD symptoms, a complete medical and dental history of the patient will first be taken. To discover any inherited or acquired disorder. History of trauma and pain should also be taken. Then the patient's clinical examination begins with the touch of posterior, medial and anterior temporal muscles, and ... posterior cervical muscles (5-7). Then the touch of the temporomandibular joint is necessary in the open and closed position of the mouth and side movements, attention to pain at the touch, and the presence of joint sounds, as well as the deviation and deflection, and the degree of progression and occlusion of the patient. (5) According to the research, most TMD symptoms and symptoms, pain in the touch of the muscles and TMJ, joint sounds, headaches, disturbances and deviations in jaw movements and mouth opening, wear and occlusal interactions of the teeth (9, 8, 5, and 3). It should be noted that as age increases, the incidence of TMD symptoms increases (8).

The aim of this study was to Assessment of the relationship between exercise and temporomandibular joint disorder in athletes.

### **Materials and Methods**

In this study, 170 people participated, of which 125 (73.5%) were male and 45 (26.5%) were female. Which represented 26.5% of the participants in martial arts. The molar relationship in all contributors was examined in the primary examination and the ones with class II and III molar relations were excluded from the sample groups. Occlusal contacts of teeth were examined using an articulation paper and samples with premature contacts were excluded from the study. Over-jet and Over-bite

were measured and samples with abnormal measures were excluded from the study.

In all qualified samples question papers was undertaken; a temporomandibular joint disorder test, the anxiety test. Clinical examinations of temporomandibular joint disorder signs and symptoms were performed for all participants and the following were done:

Para-functional habits including bruxism and clenching were assessed by the questionnaire and divided to the following stages: Having bruxism, having clenching, having both, and having no para-functional habits; that were number-specified with 1, 2, 3, and 4 respectively.

Lateral and posterior palpation for examination of pain and noise in TMJ was performed in open and closed mouth status. The following stages of results were attained: Pain anterior to right ear, pain anterior to left ear, pain anterior to both ears, pain inside right ear, pain inside left ear, pain inside both ears, without pain, and without sound; that were number-specified with 1, 2, 3, 4, 5, 6, 7, 8 and 9 respectively.

Pain in mastication muscles was evaluated by examination and questioning. The maximum opening of the mouth was measured . The following stages of results were attained: Opening between 2.5 and 4.5, opening more than 4.5 and opening less than 2.5 mm; that were number specified with 1, 2, and 3 respectively.

Deviation of jaw through opening was examined through clinical observations and the following stages of results were attained: deviation to right side, deviation to left side and having no deviation; that were number-specified with 1, 2, and 3 respectively. All collected data were statistically analyzed with SPSS software version 19.0. Chi Square test was used for the comparison of temporomandibular joint disorder between Participants in the study. Pvalue of less than 0.05 was considered statistically significance in all analyses.

**Results**

In this study, 170 people attended the 125 (5/73%) males and 45 (26.5%) were female. The average age of these patients was  $38/9 \pm 73/31$ . Also, 26.5 percent of participants were active in martial arts. Other information regarding the participants presented in detail in Table 1.

**Table 1. Participants' demographic information**

		Number	Percentage
Sex	Man	125	5/73
	Female	45	5/26
Marital status	Single	68	40
	Married	79	5/46
	Lost data	23	5/13
education	Diploma	24	1/14
	Academic	122	8/71
	Lost data	24	1/14
Occlusion	Class I	98	6/57
	Class II	30	6/17
	Class III	29	1/17
	Lost data	13	6/7
Sports type	Non martial	125	5/73
	martial	45	5/26

69 (40.6%) of the participants in the study were TMD. Also, 35.6% of martial arts and 42.4% of non-combatants were TMD (Table 2).

**Table 2. Prevalence TMD The separation of variables and their association with each other**

In Table 3, the descriptive statistics of TMD symptoms are presented in terms of TMD variability.

**Table 3 . Descriptive statistics symptoms TMD Separate variables TMD**

		does not have		has it	
		Number	Percentage	Number	Percentage
Whether or not there is joint pain in the front or the ear in the ear, in rest, in the rectum, protrusion, and chewing	does not have	99	3/67	48	7/32
	has it	2	7/8	21	3/91

		does not have		has it		P-value
		Number	Percent age	Num ber	Percent age	
Sex	Man	81	8/64	44	2/35	017 /0
	Female	20	4/44	25	6/55	
Malocclusion	Class I	58	2/59	40	8/40	009 /0
	Class II	11	7/36	19th	3/63	
	Class III	22	9/75	7	1/24	
Sports type	Non martial	72	6/57	53	4/42	423 /0
	martial	29	4/64	16	6/35	

The prevalence of TMD was higher in women than in men and there was a significant statistical relationship between sex and TMD (P = 0.017).

There was a significant relationship between malocclusion and TMD (P = 0.009).

The prevalence of TMD in class II malocclusion was 63.3% and class I and class II malocclusion was 40.8% and 24.1%, respectively. There was no statistically significant relationship between sport type and TMD (P = 0.423).

The presence or absence of click sound and Cripitos, Hussein opening the mouth, side movements, advancement and chewing	does not have	100	9/76	30	1/23
	has it	1	5/2	39	5/97
	does not have	one hundred and one	7/62	60	3/37
Deviation in mouth opening ( Deflection (Moving the jaw down from the midline and then towards the middle of the face )	has it	0	0	9	100
	does not have	one hundred and one	5/60	66	5/39
	has it	0	0	3	100
Deviation in mouth opening ( Deviation ( Fixed mandibular movement far from the midline of the face )	does not have	99	1/65	53	9/34
	has it	2	1/11	16	9/88
	does not have	one hundred and one	1/63	59	9/36
Touch the muscle with two fingers from below the arched zygomatic to the lower mandibular area.	has it	0	0	10	100
	does not have	one hundred and one	62	62	38
	has it	0	0	7	100
Touching the temporal muscle out of the mouth with your finger	does not have	one hundred and one	1/63	59	9/36
	has it	0	0	10	100
	does not have	one hundred and one	62	62	38
Touch of the temporal tendon in the mouth (thefinger moves to the posterior side of the mouth and the touch of the coronoid appendage in the opposite direction )	has it	0	0	7	100
	does not have	one hundred and one	1/63	59	9/36
	has it	0	0	10	100
Touch the inner patrigoid muscle (the end of this muscle is touched slightly below the angle of the jaw )	does not have	one hundred and one	7/62	60	3/37
	has it	0	0	9	100
	does not have	one hundred and one	5/60	66	5/39
Control of pain in the muscle of the arthropod tetracycline is counteracting muscle function . (While the chin is pressed with the hand inward, the patient is asked to pull his jaw )	has it	0	0	9	100
	does not have	one hundred and one	5/60	66	5/39
	has it	0	0	3	100
Touching the attachment of this muscle to the lower edge of the mandible near Midline oversimplified in order to touch the Digestar muscle	does not have	one hundred and one	6/60	65	4/39
	has it	1	20	4	80
	does not have	93	3/63	54	7/36
The touch of the sternocliquesomostoid muscle in the opposite direction to the opposite side	has it	8	8/34	15	2/65
	does not have	93	3/63	54	7/36
	has it	8	8/34	15	2/65
Having or not having Brachy Cysts	has it	8	8/34	15	2/65

The presence of ecological problems (cloudiness, asthma, etc.)	does not have	89	8/61	55	2/38
	has it	11	44	14	56

**Discussion**

Temporomandibular disorders (TMD) are a set of joint and muscular dysfunctions of the cranio-orofacial area. They are primarily characterized by joint and/or muscular pain, noise in the temporomandibular joints (TMJ), and limited or irregular mandibular function. TMD can considerably affect quality of life (9)

Many studies have reported that symptoms of masticatory system disorders are more frequent in females than in males(10), possibly due to biological differences, including hormonal and psychosocial factors (11,12).

LeResche et al. (13), who studied pubertal stages and TMD pain, observed an increase in TMD pain in adolescents with advancing of pubertal stage.

Several studies indicate a high level of trauma in athletes. Sport accidents were responsible for six times as many facial injuries compared with work accidents and accounted for three times more injuries than violence or traffic accidents (13). The significant force that is transmitted to the temporomandibular disc and supporting structures in these cases may result in severe injuries (14).

In this research, the lack of statistical difference among athletes and non-athletes regarding signs and symptoms of TMD could be due to the size of the sample. A study by Lima et al. in 2001 (15) found a significant higher level of testosterone in male adolescent athletes involved in high impact sports (gymnastics, athletics and basketball) than in the group of low impact sports (swimming and water polo). This finding is important, since Flake et al(16). Concluded that there is a sex difference in both resting and inflammation-induced increases in TMJ plasma extravasations (PE) that appeared to reflect a testosterone

mediated facilitation of PE in males and estrogen-mediated suppression of PE in females. On knowing that there is an inverse relationship between PE and joint damage, their results suggest that testosterone may mitigate, but estrogen may exacerbate TMJ damage, particularly in the presence of overt inflammation.

Perhaps the lack of statistical difference in our study may be due to the protective action of the testosterone level in the athletes. It is important to point out that clinical signs and symptoms should be evaluated in combination (16). The athletes are obviously more exposed to facial traumas and this fact can intensify the signs and symptoms present and create others. Furthermore athletes should be encouraged to wear mouth guards.

**Conclusion**

The results of this study showed that the prevalence of TMD in women than in men and There was a significant relationship between sex and TMD. There was a significant relationship between malocclusion and TMD. There was no statistically significant relationship between sport type and TMD

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