Contemporary Orofacial Sciences (2024) 1(4): 14-20
DOI: 10.30486/COFS.2024.904440

ORIGINAL RESEARCH

Investigating temporomandibular joint disorder and relating symptoms among students at Isfahan Azad Dental School

Mohammad Amin Momenzadeh[1], Mehdi Abrishami[2]*, Atousa Aminzadeh[3], Nima Barati[4]

Received: 2024-01-25 / Accepted: 2024-04-25 / First publication date: 2024-07-10

© The Author(s) 2024

Abstract

Background: Temporomandibular joint disorders (TMJD) can cause joint pain, trismus, and headaches, which negatively impact people's quality of life and may lead to a decrease in educational level among students. Thus, this study aimed to investigate the symptoms of TMJD among students at Isfahan Azad Dental Faculty.

Materials and methods: This descriptive-analytic study involved 62 students from Isfahan Azad Faculty of Dentistry. Pain intensity (cephalic, joint, muscle) was evaluated using the VAS scale. After completing the evaluation of the students and registering the information in the relative checklist, data were analysed using Exact Fisher and chi-square statistical tests(α=0.05).

Results: The study found that students with headaches did not have a higher incidence of restriction in opening their mouth and joint pain. However, students with headache had lower rates of joint noise (p = 0.04). The age of students was not related to TMD (p>0.05), and gender was not related to joint noise (p= 1.00) and joint pain (p= 0.70). The malocclusion status of students was not related to TMD. Parafunctional habits were related to headaches among students (p< 0.001).

Conclusion: Severe headaches were common among studied students which could be related to temporomandibular joint disfunction as it was related to parafunctional habits. TMD symptoms were not related to age, gender (except for mouth opening restriction) and occlusion class type

Keywords: Temporomandibular Joint Disorders; Headache; Students, Dental

Introduction

Temporomandibular disorders (TMD) are a collection of clinical signs and symptoms that affect the muscles, temporomandibular joint, and teeth. It is one of the most common problems our dental patients experience after toothache, with approximately 40-60% of the population having at least one significant symptom of this disorder (1, 2). Women between the ages of 20-40 are more prone to this disorder (3). Several factors can contribute to the occurrence of TMD, which includes trauma, systemic diseases, occlusion disorders, stress, parafunctional habits, posterior edentulism, and orthodontic treatment (4-6). Understanding these factors can lead to a proper diagnosis, which can reduce the need for extensive and expensive treatments (1). Symptoms of this disorder include muscle pain and dysfunction, temporomandibular joint pain and dysfunction, limited mouth opening, and teeth problems.

Temporomandibular joint disorders (TMD) are a common cause of facial pain, which often prompts patients to seek dental diagnosis and treatment. The chronic form of TMD pain can lead to a loss or reduction in daily activities, social connections, and work performance, ultimately affecting the overall quality of life (7). Headaches are a common complaint among TMD patients, and in some cases, headache is the only symptom. Therefore, it is recommended to

Corresponding author: Dr. Mehdi Abrishami
Department of oral & maxillofacial surgery, Faculty of dentistry, Isfahan (Khorasgan) branch, Islamic Azad University, Isfahan, Iran
Email: mehdiabrishami00@gmail.com

[1]Faculty of dentistry, Isfahan (Khorasgan) branch, Islamic Azad University, Isfahan, Iran
[2]Department of oral & maxillofacial surgery, Faculty of dentistry, Isfahan (Khorasgan) branch, Islamic Azad University, Isfahan, Iran
[3]Department of oral & maxillofacial pathology, Faculty of dentistry, Isfahan (Khorasgan) branch, Islamic Azad University, Isfahan, Iran
[4]Department of oral & maxillofacial surgery, Faculty of dentistry, Isfahan (Khorasgan) branch, Islamic Azad University, Isfahan, Iran

[Downloaded from cofs.khuisf.ac.ir on 2026-06-13]

[DOI: 10.30486/COFS.2024.904440]

examine temporomandibular joint problems in patients with headaches (8). Studies have found that all types of headaches are more prevalent among people with TMD than those without it. Additionally, people with headaches are more likely to have parafunctional habits and bruxism (9). It is worth noting that bruxism alone does not increase the risk of primary headaches. However, when combined with TMD, the likelihood of experiencing headaches increases (10).

Recent studies have found a connection between headaches and temporomandibular disorders (TMD). These studies have examined both issues separately, with one potentially aggravating the other. Researchers believe there is a relationship between bruxism (teeth grinding), TMD, and headaches. This suggests that dentists could play a crucial role in diagnosing the source of headache and treat and its proper treatment (11).

Behavioral interventions such as self-management techniques are considered the first line of treatment for TMD patients. They are conservative, cheap, and effective methods that accordingly can also be used to treat headaches (10).

Understanding the relationship between headaches and TMD is essential for both clinical and social outcomes. While some studies have suggested a link between the two, it is difficult to establish a hypothetical cause-and-effect relationship (12-15).

The correlation between temporomandibular joint disorders and headaches is still a topic that remains widely debated and not yet fully understood. Nonetheless, it is crucial to recognize the importance of the temporomandibular joint and the prevalence of associated disorders, as well as the potential complications they may cause. By gaining a comprehensive understanding of the incidence of temporomandibular joint disorders and the factors that contribute to them, it is possible to prevent many of the issues and complications associated with this disorder. Unfortunately, conflicting opinions and research findings have made it difficult to achieve this goal. In response, a study was conducted to investigate the relationship between temporomandibular joint disorders and headaches amongst students at Isfahan Azad Dental School.

Materials and Methods

In this descriptive analytic cross-sectional study, 62 dental students) n=30 men and n=32 women) from Isfahan Azad Faculty of Dentistry were randomly selected. The participants were between 20 to 30 years old. The main criteria for selection were the willingness to participate in the study and to spend at least one academic semester in the faculty. Visiting students and those with chronic headaches were excluded from the study. Temporomandibular joint clicking, jaw stiffness or fatigue, difficulty in opening or closing the mouth, facial and jaw pain and pain in mandibular movements were clinically evaluated in each participant and data was recorded.

The intensity of pain was determined using VAS (Visual Analogue Scale) VAS is a scale that measures the level of pain felt by patients on a scale from 0 to 10. In this scoring system, the patient can choose from 0 (no pain), 1 (mild pain), 2 (moderate pain), 3 (severe pain) and 4 (very severe pain) (16).

The clinical examination and questioning technique used to evaluate temporomandibular disorders (TMD) in students were based on Helkimo's (17, 18) and Agerberg and Helkimo's (19) seminal works. These studies provided a comprehensive set of questions that focused on TMD-related issues and were tailored to suit the research objectives. The students were subjected to a detailed assessment that involved a related physical examination as well as a series of questions that sought to establish the nature and extent of their TMD symptoms. The information gathered was then recorded in a detailed form. The data were analysed with Exact Fisher and chi-square test statistical tests in SPSS software version 25, and a statistically level of 0.05 was considered significant.

Results

Based on the occlusion status, 82.3% students were class I, 14.5% were class II and 3.2% were class III. For headaches results showed the intensity of pain was weak in 7.1%, moderate in 35.7%, sever in 42.9% and very severe in 14.3% very severe.

Among students with TMD symptoms, there was no statistically significant relationship with age. In examining the relationship between gender and TMD symptoms, Fisher's exact test showed that limitations in mouth opening was reported mainly in men (P = 0.04).

But gender had no significant relationship with joint noise (p = 1.00), pain (p = 0.70) and headache (p = 1.00). (Table 1).

[Downloaded from cofs.khuisf.ac.ir on 2026-06-13]

[DOI: 10.30486/COFS.2024.904440]

Table1. Relationship between gender and TMD symptoms

TMD symptoms		Men	Female	P value
		No (%)	No (%)	
Restriction in mouth opening	Yes	6 (20.0)	1(3.1)	0.04
	No	24(80.0)	31 (96.9)	
Joint noise	Yes	4(13.3)	4(12.5)	1.00
	No	26(86.7)	28 (87.5)	
Joint pain	Yes	4(13.2)	3(9.4)	0.70
	No	26 (86.7)	29 (90.6)	
Headache	Yes	7(23.3)	7(21.9)	1.00
	No	23(76.7)	25 (78.1)	

In examining the relationship between headache and TMD symptoms**,** Fisher's exact test showed that people who had joint noise were less involved with headache (P = 0.04). But headache had no significant relationship with restriction in opening the mouth (P = 0.18) and pain (P = 0.18). (Table 2**)**

Table 2. Relationship between headache and TMD symptoms

TMD symptoms		With Headache	Without headache	P value
		No (%)	No (%)	
Restriction in mouth opening	Yes	3 (42.9)	4(57.1)	0.18
	No	11(20.2)	44(80.0)	
Joint noise	Yes	4(50.0)	4(50.0)	0.04
	No	10(18.5)	44(81.5)	
Joint pain	Yes	3(42.9)	4(57.1)	0.18
	No	11(20.0)	44(80.0)	

In examining the relationship between types of occlusions and TMD no significant relationship was shown between class of occlusion and restriction in opening the mouth (P = 0.26), noise (P = 0.21), pain (P = 1) and headache. (P=0.11). (Table 3)

Table 3. The relationship between occlusion types and TMD symptoms

TMD symptoms		Class I	Class II	Class III	P value
		No (%)	No (%)	No (%)	
Restriction in mouth opening	Yes	5(9.8)	1(11.1)	1(50.0)	0.26
	No	46(90.2)	8(88.9	1(50.0)	
Joint noise	Yes	7(13.7)	0(0.0)	1(50.0)	0.21
	No	44(86.3)	9(100.0)	1(50.0)	
Joint pain	Yes	6(11.8)	1(11.1)	0(0.0)	1.00
	No	45(88.2)	8(88.9)	2(100.0)	
Headache	Yes	13(25.5)	0(0.0)	1(50.0)	0.12
	No	38(74.5)	9(100.0)	1(50.0)	

In examining the relationship between parafunctional habits and TMD, Fisher's exact test showed that in people who had parafunctional habits, there was a significant increase in mouth opening restrictions, joint noise and headaches (P = 0.001).
However, parafunction habits had no significant relationship with jaw pain (P = 0.09). (Table 4)

[Downloaded from cofs.khuisf.ac.ir on 2026-06-13]

[DOI: 10.30486/COFS.2024.904440]

Table 4. The relationship between parafunctional habits and TMD symptoms

TMD symptoms		Parafunctional habits	No parafunctional habits	P value
		No (%)	No (%)	
Restriction in mouth opening	Yes	5(45.5)	2(3.9)	0.001
	No	6(54.5)	49(96.1)	
Joint noise	Yes	6(54.5)	2(3.9)	0.001
	No	5(45.5)	49(96.1)	
Joint pain	Yes	3(3027)	4(8.7)	0.099
	No	8(7.72)	47(2.92)	
Headache	Yes	7(63.6)	7(13.7)	0.001
	No	4(36.4)	44(86.3)	

In examining the relationship between mouth opening restriction and TMD, Fisher's exact test showed no relationship between trismus, jaw noise and headache (Table 5).

Table 5. The relationship between mouth opening restriction and TMD symptoms

TMD symptoms		trismus	no trismus	P value
		No (%)	No (%)	
Joint noise	Yes	3(60.0)	51(89.5)	0.12
	No	5(100.0)	57(100.0)	
Headache	Yes	2(40.0)	12(21.1)	0.31
	No	3(60.0)	45(78.9)	

Discussion

According to the results of our study, among the studied students with TMD, the most frequent symptom was severe of headache

In a study by Bertoli et al. (20), the most reported symptom were headache and neck pain (20.9%) In the study of Feteih (21), the most common symptom associated with TMD was headache, and the prevalence rate of TMJ-related headache was 22%, which is in accordance to the results of the present study and other studies (22-25).

In a study conducted by Ebrahimi Saravi et al. (26), the prevalence of headaches was found to be 9%, which is lower than the prevalence reported in the present study. The difference in prevalence may be due to the difference in the sample population. In Ebrahimi Saravi's study, the prevalence of headaches in patients visiting a dental clinic was investigated, whereas in the present study, the prevalence of headaches in dental students was examined. Therefore, the comparison of the results of the present study with that of Ebrahimi Saravi et al. (26) suggests that dental students may experience headaches more frequently than other individuals.

In a study conducted by Al-Khotani et al. (27), it was found that 34% of Saudi Arabian students suffered from headaches related to TMD. However, these results contradict the findings of the present study. The difference in educational level, age, and gender of the students could be a reason for this discrepancy. It is essential to investigate the amount of pain caused by TMD since it can have psychological implications. If left untreated, TMD can lead to the loss of social relationships, difficulty in performing daily tasks, and even academic failure.

Nilsson and List (28) have concluded that during puberty, the risk of Temporomandibular Disorder (TMD) pain triples in adults, and persistent TMD can increase chronic pain and psychosocial distress. Additionally, Osiewicz et al. (29) have stated that there is a significant relationship between depression and the occurrence of TMD.

In the present study, it was found that gender was related to restriction in opening the mouth, as men had more trismus. However, in cases such as TMJ noise, TMJ pain, and headache, gender was not related. It is worth noting that in other studies, TMJ-related headaches were much more common in women than in men (30-32), which contrasts with the results of the present study.

The reason for this difference can be due to the personality differences of people in different societies. In the study of Feteih (21), the limitation in opening

[Downloaded from cofs.khuisf.ac.ir on 2026-06-13]

[DOI: 10.30486/COFS.2024.904440]

the mouth was more in men, but no significant relationship between gender and the limitation in opening the mouth was observed.

The present study found that headache and other factors related to temporomandibular joint (TMJ) disorders were equally prevalent among both genders. In the present study, the amount of temporomandibular joint symptoms and disorders was higher in class I students and students with class III malocclusion. However, there was no significant relationship between the occlusion status of the students studied and TMJ disorders. This is consistent with the findings of Basafa and Shahabee's study (33), which also found no statistically significant relationship between malocclusion and TMD among students with different types of malocclusions although class II malocclusion had the highest rate of TMD, and the lowest correlation was between TMJ discomfort and class III abnormality.

Lasemi et al. (34) also stated that there was no significant difference between the type of occlusion and TMD

The higher prevalence of headaches among dental students can be due to the occurrence of stress, anxiety, and depression.

There have been many reports of significant observed symptoms of stress in dental students, and in general, students in this field are more anxious than students in other fields of study.

In Greene's study (7), it was observed that the first-year students of the clinic had a high level of stress and mental disturbance, and if environmental stressors remain for a long time, they lead to physical and mental problems such as anxiety, depression, fear, cardiovascular symptoms, digestive problems, insomnia, headache, lymphadenopathy, and excessive sweating of the palms (22).

Parafunctional habits such as bruxism can be an effective factor in the occurrence and exacerbation of temporomandibular joint symptoms and disorders.

In the present study, mouth opening restriction, TMJ noise, and headache were far more in students who had parafunctional habits than other students, but joint pain was the same between studied groups.

According to a study by Jahandideh et al. (35), temporomandibular disorder (TMD) is significantly more common in individuals with oral parafunctional habits. Lasemi et al. (34) also linked parafunctional habits with temporomandibular joint disorders. Shirani and Maleki (36) examined nine parafunctional habits, including bruxism, clenching, chewing foreign objects such as pencils, chewing gum, chewing nails, sleeping on one side, chewing on one side, habitual chewing of the tongue, lip or cheek, and placing the hand under the chin. They found that the most common parafunctional habit was chewing gum (58.5%) and sleeping on one side (54.5%). Furthermore, they noted that the most prevalent symptom of temporomandibular disorders was TMJ clicking. Reiter et al. (37) have also confirmed the relationship between depression and temporomandibular joint disorder and parafunctional symptoms. It is generally believed that temporomandibular joint disorders are the result of multiple factors, including psychological factors such as stress and anxiety. Therefore, studies should be planned to investigate the role of such factors in the occurrence or exacerbation of these disorders. Furthermore, considering that there is no connection between gender, age, marital status, and place of residence of students with temporomandibular joint disorders, it is essential to examine other factors that can affect students' mental health to reach a definite conclusion.

Conclusion

Severe headaches were common among studied students which could be related to temporomandibular joint disfunction as it was related to parafunctional habits. TMD symptoms were not related to age, gender (except for mouth opening restriction) and occlusion class type.

Conflict of Interests: The authors of this manuscript declare that they have no conflicts of interest, real or perceived, financial or non-financial in this article.

References

1. Abe S, Kawano F, Matsuka Y, Masuda T, Okawa T, Tanaka E. Relationship between Oral Parafunctional and Postural Habits and the Symptoms of Temporomandibular Disorders: A Survey-Based Cross-Sectional Cohort Study Using Propensity Score Matching Analysis. *Journal of Clinical Medicine.* 2022; 11(21):6396.
2. Gonçalves DA, Dal Fabbro AL, Campos JA, Bigal ME, Speciali JG. Symptoms of temporomandibular disorders in the population: an epidemiological study. J Orofac Pain. 2010;24(3):270-8.
3. Ferneini EM. Temporomandibular Joint Disorders (TMD). J Oral Maxillofac Surg. 2021;79(10):2171-2172.

[Downloaded from cofs.khuisf.ac.ir on 2026-06-13]

[DOI: 10.30486/COFS.2024.904440]

4. Okeson J. Management of temporomandibular and occlusion. 7th ed. St. Louis: Elsevier, 2013. P. 149-92,245-91,321-59.
5. Glick M, Greenberg M, Lockhart PB, Challacombe SJ. Burket's oral medicine. 13th ed. Hoboken: Wiley-Blackwell, 2021, P:279
6. Howard JA. Temporomandibular joint disorders in children. Dent Clin North Am. 2013 Jan;57(1):99-127.
7. Greene CS; American Association for Dental Research. Diagnosis and treatment of temporomandibular disorders: emergence of a new care guidelines statement. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2010;110(2):137-9
8. Lupoli TA, Lockey RF. Temporomandibular dysfunction: an often-overlooked cause of chronic headaches. Ann Allergy Asthma Immunol. 2007;99(4):314-8.
9. da Silva A Jr, Costa EC, Gomes JB, Leite FM, Gomez RS, Vasconcelos LP, Krymchantowski A, Moreira P, Teixeira AL. Chronic headache, and comorbidities: a two-phase, population-based, cross-sectional study. Headache. 2010;50(8):1306-12.
10. Aghahosseini F, Sheykhbahaei N. Evaluation relationship between temporomandibular joint disorder and headache: A review literature. Journal of Dental Medicine-Tehran University of Medical Sciences. 2017; 30(3):173-82.
11. Fernandes G, Franco AL, Gonçalves DA, Speciali JG, Bigal ME, Camparis CM. Temporomandibular disorders, sleep bruxism, and primary headaches are mutually associated. J Orofac Pain. 2013;27(1):14-20.
12. Memmedova F, Emre U, Yalın OÖ, Doğan OC. Evaluation of temporomandibular joint disorder in headache patients. Neurol Sci. 2021;42(11):4503-4509.
13. Réus JC, Polmann H, Souza BDM, Flores-Mir C, Gonçalves DAG, de Queiroz LP, Okeson J, De Luca Canto G. Association between primary headaches and temporomandibular disorders: A systematic review and meta-analysis. J Am Dent Assoc. 2022;153(2):120-131.e6.
14. Schokker RP, Hansson TL, Ansink BJ. Craniomandibular disorders in patients with different types of headaches. J Craniomandib Disord. 1990;4(1):47-51.
15. Bender SD. Temporomandibular disorders, facial pain, and headaches. Headache. 2012;52 Suppl 1:22-5
16. Alinejhad D, Bahrololoomi Z, Navabazam A, Asayesh MA. Comparison of Visual Analog Scale Scores in Pain Assessment during Pulpotomy using Different Injection Materials in Children Aged 6 to 8 and 8 to 10 Years. J Contemp Dent Pract. 2018;19(3):313-317.
17. Helkimo M. Studies on function and dysfunction of the masticatory system. I. An epidemiological investigation of symptoms of dysfunction in Lapps in the north of Finland. Proc Finn Dent Soc. 1974;70(2):37-49.
18. Helkimo M. Studies on function and dysfunction of the masticatory system. II. Index for anamnestic and clinical dysfunction and occlusal state. Sven Tandlak Tidskr. 1974;67(2):101-21.
19. Agerberg G, Helkimo M. Symptomatology of patients referred for mandibular dysfunction: evaluation with the aid of a questionnaire. Cranio. 1987;5(2):157-63.
20. Bertoli FMP, Bruzamolin CD, Pizzatto E, Losso EM, Brancher JA, de Souza JF. Prevalence of diagnosed temporomandibular disorders: A cross-sectional study in Brazilian adolescents. 2018;13(2): e0192254.
21. Feteih RM. Signs and symptoms of temporomandibular disorders and oral parafunctions in urban Saudi Arabian adolescents: a research report. Head & face medicine. 2006;2:1-7.
22. Farsi NM: Symptoms and signs of temporomandibular disorders and oral parafunctions among Saudi children. J Oral Rehabil 2003, 30:1200-1208.
23. Nilner M: Prevalence of functional disturbances and diseases of the stomatognathic system in 15–18 year olds. Swed Dent J 1981, 5:189-197.
24. Widmalm SE, Christiansen RL, Gunn SM, Hawley LM. Prevalence of signs and symptoms of craniomandibular disorders and orofacial parafunction in 4-6-year-old African American and Caucasian children. J Oral Rehabil 1995, 22:87-93.
25. Yakkaphan P, Smith JG, Chana P, Renton T, Lambru G. Temporomandibular disorder, and headache prevalence: A systematic review and meta-analysis. Cephalalgia Reports. 2022;5:1-18
26. Ebrahimi Saravi M, Khalilian A, Ronaghi H. Prevalence of Temporomandibular Disorders (TMD) and its Signs and Symptoms in Sari Dental School Clinic. J Mazandaran Univ Med Sci 2016; 26 (143) :120-128
27. Al-Khotani A, Naimi-Akbar A, Albadawi E, Ernberg M, Hedenberg-Magnusson B, Christidis N. Prevalence of diagnosed temporomandibular disorders among Saudi Arabian children and adolescents. J Headache Pain. 2016;17:41.
28. Nilsson IM, List T. Does adolescent self-reported TMD pain persist into early adulthood? A longitudinal study. Acta Odontol Scand. 2020;78(5):377-383.
29. Osiewicz M, Lobbezoo F, Ciapała B, Pytko-Polończyk J, Manfredini D. Pain Predictors in a Population of Temporomandibular Disorders Patients. J Clin Med. 2020;9(2):452.
30. Greene CS. The etiology of temporomandibular disorders: implications for treatment. J Orofac Pain. 2001;15(2):93-105; discussion 106-16.
31. Morais AA, Gil D. Tinnitus in individuals without hearing loss and its relationship with temporomandibular dysfunction. Braz J Otorhinolaryngol 2012; 78(2): 59-65.
32. Velly AM, Schiffman EL, Rindal DB, Cunha-Cruz J, Gilbert GH, Lehmann M, et al. The feasibility of a clinical trial of pain related to temporomandibular

[Downloaded from cofs.khuisf.ac.ir on 2026-06-13]

[DOI: 10.30486/COFS.2024.904440]

muscle and joint disorders: the results of a survey from the Collaboration on Networked Dental and Oral Research dental practice-based research networks. J Am Dent Assoc 2013; 144(1): e1-10.
33. Basafa M, Shahabee M. Prevalence of TMJ disorders among students and its relation to malocclusion. Iran J Otorhinolaryngol 2006;18(45):53-59
34. Lasemi E, Navi F, Basir-Shabastari S. Prevalence of Temporomandibular Disorders and it's Related Factors in Dental School of Azad University of Tehran in 2005. Journal of Mashhad Dental School. 2008;32(1):59-64.
35. Jahandideh Y, Hasan nia H, Basirat M, Tayefeh Davalloo R. Prevalence of Temporomandibular Disorders, and the Associated Factors. Journal title 2017; 26 (103) :22-29
36. Shirani A, Maleki L. Investigating the relationship between oral paraphaching habits and symptoms of temporomandibular disorders. Journal of Isfahan Dental School 2006;2(4):34-9.
37. Reiter S, Emodi-Perlman A, Goldsmith C, Friedman-Rubin P, Winocur E. Comorbidity between depression and anxiety in patients with temporomandibular disorders according to the research diagnostic criteria for temporomandibular disorders. J Oral Facial Pain Headache. 2015;29(2):135-43.

[Downloaded from cofs.khuisf.ac.ir on 2026-06-13]

[DOI: 10.30486/COFS.2024.904440]