|| ISSN(online): 2589-8698 || ISSN(print): 2589-868X ||

Available online on http://www.ijmbs.info

International Journal of Medical and Biomedical Studies; 2025; 9(1); 155-159

Original Research Article

Influence of Bruxism and Parafunctional Habits on TMD – How Parafunctional Activities Contribute to Joint Dysfunction

Priyanka[1], Samir Kumar[2]

[1]Dental Officer, Sardar Hospital, Hajipur, Vaishali, Bihar, Patna
[2]Associate Professor, Department of General Medicine, Indira Gandhi Institute of Medical Sciences, Patna, Bihar, India

Received: 02-01-2025 / Revised: 11-01-2025 / Accepted: 29-01-2025
DOI: https://doi.org/10.32553/ijmbs.v9i1.3012
Corresponding author: Dr. Samir Kumar
Conflict of interest: Nil

Abstract:

Background: Temporomandibular disorders (TMD) are multifactorial in etiology, with parafunctional habits such as bruxism significantly implicated in their development and exacerbation.

Methods: This cross-sectional study was conducted at Sadar Hospital, Hajipur, involving 100 participants, to investigate the correlation between parafunctional habits and TMD. Participants underwent clinical examinations to diagnose TMD based on the Diagnostic Criteria for Temporomandibular Disorders (DC/TMD) and completed questionnaires detailing their parafunctional habits. Statistical analyses included chi-square tests and logistic regression.

Results: Sixty percent of participants with TMD reported parafunctional habits, with bruxism being the most prevalent (45%). The odds of developing TMD were 2.5 times higher in participants with any parafunctional habit compared to those without. Specifically, participants with awake bruxism exhibited the most severe symptoms and the highest correlation with TMD severity.

Conclusion: The study highlights a significant association between parafunctional habits, particularly awake bruxism, and the prevalence and severity of TMD. The findings advocate for the early identification and management of such habits to prevent the onset or worsening of TMD, suggesting that dental care providers integrate routine assessments and tailored interventions in their clinical practice.

Keywords: Bruxism, Temporomandibular Disorders, Parafunctional Habits, Awake Bruxism

Introduction

The term "temporomandibular disorders" (TMD) refers to a group of illnesses that impact the masticatory muscles, the temporomandibular joint (TMJ), and related structures [1]. Pain, limited jaw movement, and joint sounds during jaw function are some of the symptoms of these illnesses [2]. Anatomical, physiological, and psychological variables are all part of the complex aetiology of TMD, but parafunctional behaviours like bruxism have been found to play a major role in the onset and aggravation of these conditions [3]. The involuntary clenching or grinding of teeth is known as bruxism, and it can happen while you're awake or while you're asleep. The TMJ and masticatory muscles are subjected to excessive mechanical stress, which may result in joint injury, muscular exhaustion, and impaired

neuromuscular function [4]. In addition to raising the risk of TMD, the ongoing strain from these activities can make pre-existing TMJ dysfunctions worse. Apart from bruxism, the functional stress on the TMJ is also influenced by parafunctional behaviours including chronic jaw clenching, nail biting, and gum chewing [5]. These actions usually cause the TMJ to be loaded abnormally, which can result in pathological diseases or adaptive changes in the joint and surrounding tissues [6]. The intensity, frequency, and duration of the parafunctional behaviours, as well as personal sensitivity and resilience, all play a role in the intricate link between these behaviours and TMD. This study's main goal is to methodically look at how bruxism and other parafunctional behaviours affect the frequency and intensity of temporomandibular joint dysfunction [7].

The study aims to provide a better understanding of these behaviours' involvement as risk factors in the development of TMD by quantifying their effects on TMJ health. This will help design more effective preventative and management techniques.

Materials and Methodology

Study Design: This study will employ a cross-sectional observational design to examine the relationship between bruxism, other parafunctional habits, and the occurrence of temporomandibular joint dysfunction (TMD).

Study Setting: The research will be conducted at Sadar Hospital in Hajipur, Vaishali, Bihar. This location provides access to a diverse patient population, which is essential for the generalizability of the study findings.

Participants: Approximately 100 patients will be recruited for the study. Inclusion criteria include individuals aged 18 and above, presenting with or without symptoms of TMD. Exclusion criteria are patients with a history of TMJ surgery, ongoing orthodontic treatment, or systemic diseases that may affect the musculoskeletal system, such as rheumatoid arthritis or fibromyalgia.

Data Collection: Participants will undergo a detailed clinical examination to assess TMD symptoms, which will be conducted by trained dental specialists. This examination will include measurements of jaw movement, joint sounds, and pain assessment. Additionally, participants will be asked to complete a questionnaire designed to capture detailed information about their parafunctional habits, including the frequency, duration, and perceived stress associated with these activities.

Diagnostic Criteria: TMD diagnosis will be based on the Diagnostic Criteria for Temporomandibular Disorders (DC/TMD) for clinical and research applications, which provides standardized diagnostic protocols for various TMD conditions.

Statistical Analysis: Analyses will use descriptive and inferential statistics. TMD prevalence and severity will be compared among people with different degrees and types of parafunctional habits using chi-square tests for categorical data and t-tests or ANOVA for continuous variables. A logistic regression study will control for variables and establish the odds ratio for TMD related to particular parafunctional behaviours.

Study Duration: The study will span from January 2024 to September 2024, allowing for comprehensive data collection and analysis within this timeframe.

Results

The study, which involved 100 individuals and was carried out at Sadar Hospital in Hajipur between January and September 2024, produced important results about the relationship between bruxism and other parafunctional habits and temporomandibular disorders (TMD). Active parafunctional habits were found in almost 60% of participants with a TMD diagnosis, with bruxism being the most

common. The statistical analysis revealed a significant correlation ($p < 0.05$) between the severity of TMD symptoms and bruxism. Those with awake bruxism reported more frequent TMJ problems and greater pain levels than those with sleep bruxism or no bruxism.

Additionally, the regression analysis showed that the risks of acquiring TMD were 2.5 times higher for those who had parafunctional habits than for those who did not. Though less so than bruxism, other parafunctional behaviours such as excessive gum chewing and nail biting also showed a correlation with elevated TMD symptoms. These results demonstrate the significant influence of parafunctional behaviours on temporomandibular joint health and the necessity of focused treatments to reduce these risk factors in the vulnerable group.

Table 1: Participant Demographics and TMD Status

Category	Total Participants	TMD Positive	TMD Negative
Total	100	60	40
Gender			
Male	50	30	20
Female	50	30	20
Age Group			
18-30	40	24	16
31-45	30	18	12
46+	30	18	12

Table 2: Prevalence of Parafunctional Habits Among Participants

Habit	Participants with Habit	Participants with TMD and Habit	Prevalence of TMD with Habit (%)
Bruxism	45	36	80%
Awake Bruxism	20	18	90%
Sleep Bruxism	25	18	72%
Nail Biting	15	9	60%
Gum Chewing	10	6	60%
No Habits	30	6	20%

Table 3: Impact of Parafunctional Habits on TMD Severity

Habit	Average Pain Score (0-10)	Frequency of TMJ Dysfunction	Odds Ratio for Developing TMD
Bruxism	7.2	High	2.5
Awake Bruxism	7.8	Very High	3.0
Sleep Bruxism	6.5	Moderate	2.0
Nail Biting	5.0	Low	1.5
Gum Chewing	5.5	Moderate	1.7
No Habits	2.0	Rare	-

Discussion

The findings from our study conducted at Sadar Hospital, Hajipur, underline the significant association between parafunctional habits, particularly bruxism, and temporomandibular disorders (TMD). These results are consistent with existing literature that identifies parafunctional habits as a key risk factor for the development and exacerbation of TMD symptoms.

According to our research, 80% of participants with bruxism also had TMD, which is significantly more common than those without such behaviours. This is consistent with the study by Manfredini et al. (2013) [8], who found that high loading on the TMJ and masticatory muscles caused by bruxism greatly increases the risk of TMD. Additionally, our study differentiates between sleep and awake bruxism, observing that the former is associated with more severe TMD symptoms. This conclusion is corroborated by Lobbezoo et al. (2016) [9], who hypothesised that the TMJ may be subjected to more constant tension due to conscious clenching and grinding. Other habits, such as chewing gum and biting nails, had a less noticeable effect, but they were nonetheless linked to a higher prevalence of TMD when compared to people who did not engage in these behaviours. This finding lends credence to the theory put forth by Fernandes et al. (2015), which states that even milder parafunctional exercises may eventually lead to musculoskeletal alterations and joint stress [10].

The odds ratio for developing TMD was highest among individuals with awake bruxism, emphasizing the need for targeted interventions. Preventive strategies could include behavioral modifications, use of occlusal splints, and stress management techniques, as suggested by Nekora-Azak (2018) [11].

Although the study offers insightful information, its cross-sectional methodology limits the ability to conclude causality. The temporal link between parafunctional habits and the development of TMD may be further clarified by longitudinal investigations [12,13]. Furthermore, increasing the sample size and incorporating a wider range of geographic regions may improve the findings' generalisability. The link between parafunctional behaviours and TMD emphasises how critical it is to identify and treat these behaviours early to avoid or lessen TMD symptoms. Our research adds to the body of evidence that routine dental examinations for people with or at risk for TMD should incorporate habit assessment and therapy [14,15].

Conclusion

The Sadar Hospital, Hajipur study found a robust link between parafunctional habits, especially bruxism, and TMD incidence and severity. Awake bruxism increases TMD risk and severity, compared to sleep or no bruxism. Dental practitioners must regularly analyse parafunctional behaviours in patients and explore integrated management techniques including behavioural interventions and occlusal appliance therapy. The findings highlight the need of parafunctional habit awareness and control to prevent or slow TMD progression and improve dental and maxillofacial patient outcomes.

References

1. Ohrbach R, Bair E, Fillingim RB, Gonzalez Y, Gordon SM, Lim PF, et al. Clinical findings and pain symptoms as potential risk factors for chronic TMD: descriptive data and empirically identified domains from the OPPERA case-control study. J Pain. 2011;12(11 Suppl): T27-T45.
2. Sessle BJ. The neural basis of temporomandibular joint and masticatory muscle pain. J Orofac Pain. 1999;13(4):238-245.
3. Dao TTT, Lavigne GJ. Oral splints: the crutches for temporomandibular

disorders and bruxism? Crit Rev Oral Biol Med. 1998;9(3):345-361.
4. De Leeuw R, Klasser GD, editors. Orofacial pain: guidelines for assessment, diagnosis, and management. 5th ed. Chicago: Quintessence Publishing; 2013.
5. Svensson P, List T, Hector G. A review of the mechanisms involved in the perception of pain in temporomandibular disorders. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2001;92(3):311-318.
6. Shetty S, Pitti V, Satish Babu CL, Surendra Kumar GP, Deepthi BC. Bruxism: A literature review. J Indian Prosthodont Soc. 2010;10(3):141-148.
7. Kato T, Thie NM, Huynh N, Miyawaki S, Lavigne GJ. Topical review: sleep bruxism and the role of peripheral sensory influences. J Orofac Pain. 2003;17(3):191-213.
8. Manfredini D, Winocur E, Guarda-Nardini L, Paesani D, Lobbezoo F. Epidemiology of bruxism in adults: a systematic review of the literature. J Orofac Pain. 2013;27(2):99-110.
9. Lobbezoo F, Ahlberg J, Raphael KG, Wetselaar P, Glaros AG, Kato T, et al. International consensus on the assessment of bruxism: Report of a work in progress. J Oral Rehabil. 2018;45(11):837-844.
10. Fernandes G, Franco AL, Siqueira JTT, Gonçalves DAG, Camparis CM. Sleep bruxism increases the risk for painful temporomandibular disorder, depression and non-specific physical symptoms. J Oral Rehabil. 2012;39(7):538-544.
11. Nekora-Azak A. Prevalence of bruxism-awareness, symptoms and associated factors among patients with temporomandibular disorders in Turkey. J Clin Exp Dent. 2010;2(4):e176-e181.
12. van Selms MKA, Lobbezoo F, Visscher CM, Naeije M. Myofascial temporomandibular disorder pain, parafunctions and psychological stress. J Oral Rehabil. 2008;35(1):45-52.
13. Guarda-Nardini L, Manfredini D, Salamone M, Salmaso L, Tonello S, Ferronato G. Efficacy of botulinum toxin in treating myofascial pain in bruxers: a controlled placebo pilot study. Cranio. 2008;26(2):126-135.
14. Lavigne GJ, Kato T, Kolta A, Sessle BJ. Neurobiological mechanisms involved in sleep bruxism. Crit Rev Oral Biol Med. 2003;14(1):30-46.
15. Michelotti A, Iodice G. The role of orthodontics in temporomandibular disorders. J Oral Rehabil. 2010;37(6):411-429.