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ORIGINAL RESEARCH

PAIN PROFILE OF THE MASTICATORY MUSCLES AND TEMPOROMANDIBULAR JOINT IN PATIENTS WITH BRUXISM

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ABSTRACT

Introduction: *Bruxism is a parafunctional activity commonly associated with masticatory muscle pain and temporomandibular disorders (TMD). It may compromise the function of the stomatognathic system and significantly reduce patients' quality of life.* ***Aim****: To determine the pain profile of masticatory muscles and temporomandibular joint (TMJ) in patients with bruxism in relation to the location and type of the pain.* ***Methods****: This was a retrospective study using secondary data from the medical records of 30 bruxism patients treated at Prosthodontics Clinic Dental and Oral Hospital of Universitas Padjadjaran between 2023 and 2025. Inclusion criteria included patients with a complete diagnosis of bruxism. Exclusion criteria included medical records without the Diagnostic Criteria for Temporomandibular Disorders (DC/TMD) examination. Data were analyzed using quantitative descriptive analysis to identify the location and characteristics of muscle pain.* ***Results:*** *Data obtained from 30 medical records that met the inclusion and exclusion criteria showed that masticatory muscle pain frequently occurred in the masseter (70%), temporalis (56,67%), pterygoid lateral (46,67%), pterygoid medial (3,33%), and other muscles (13,33%). Pain in the temporomandibular joint (TMJ) was also found (63.33%). The types of muscle pain consisted of local myalgia (63.33%), myofascial muscle pain (20%), and no pain (16,67%).* ***Conclusion****: The most common site of masticatory muscle pain in patients with bruxism was the masseter muscle, followed by the TMJ. The most common type of muscle pain was local myalgia.*

Keywords: *bruxism, DC/TMD, local myalgia, masticatory muscle pain, temporomandibular joint disorders.*

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INTRODUCTION

Bruxism is a parafunctional condition characterized by the habit of grinding, clenching, and/or repeatedly clenching or thrusting the mandible, resulting in unconscious and repeated friction between the upper and lower teeth. This activity differs from normal masticatory function and can cause various problems, such as tooth wear and masticatory muscle pain.[1,2] Bruxism has become a daily phenomenon. The prevalence of bruxism is quite high globally at 22.22%.[3]

The etiology of bruxism is multifactorial, but there are two main factors: central and peripheral factors. Central factors can result from disturbances in neurotransmitters and the basal ganglia. Changes in stimulation are the basis for the mechanism of bruxism formation and persist even after motor activity has ceased.[5] Peripheral factors include psychological and genetic factors. Psychological factors such as emotional stress can influence bruxing. The level of nocturnal bruxing activity indicates that the increase in stress experienced by sufferers is in line with the increase in nocturnal masseter muscle activity, thus causing increased pain in the muscles.[5,6]

Masticatory muscle pain is the most common symptom found in people with bruxism, as part of the temporomandibular joint (TMD) disorder.[7] This condition involves abnormalities in the muscles involved in chewing, more often than disorders of the temporomandibular joint itself.[8]

Bruxism can impact a person's social life, especially if the symptoms cause emotional disturbances such as increased irritability, fatigue, or difficulty concentrating.[5] The impact of bruxism also reduces the sufferer's quality of life due to discomfort or pain upon awakening caused by excessive activity of the masticatory muscles.[5,6]

There are still a few researchers who specifically link the pain of the masticatory muscle and TMJ to bruxism. Therefore, this study aimed to describe the pain profile of the masticatory muscles and temporomandibular joint in patients with bruxism at the Padjadjaran University Dental and Oral Hospital, thus providing a first step toward a deeper understanding of the impact of bruxism on masticatory muscle conditions and TMJ, and hopefully, it can be a reference in preparing a treatment plan for bruxism patients.

MATERIAL AND METHODS

Sample Collection

This research was a retrospective analysis study with a cross-sectional approach. The secondary data source was obtained from medical records of bruxism patients who came to the Prosthodontics Clinic Dental and Oral Hospital of Universitas Padjadjaran from 2023 to 2025. The study was conducted from March 2025 to May 2025. Total sampling was used, with sample size based on data availability and inclusion criteria. This study has received ethical approval under the license number 260/UN6.KEP/ EC/2025.

Data Collection

This retrospective study used data from the medical records of 30 patients who met the inclusion and exclusion criteria.The inclusion criteria were: patients with temporomandibular joint disorders (TMDs) who had bruxism in the Prosthodontics Clinic Dental and Oral Hospital of Universitas Padjadjaran between 2023 and 2025. The exclusion criteria were: patient medical records that did not include the Diagnostic Criteria for Temporomandibular Disorder (DC/TMD) examination.

Instruments

This research sample must include the Diagnostic Criteria for Temporomandibular Disorders (DC/TMD) examination, which is a

comprehensive evaluation instrument. The DC/TMD includes a clinical examination and a questionnaire that allows for the identification of bruxism and TMD symptoms.

Data Processing

Once all required data had been collected, they were processed. Quantitative descriptive analysis was performed, and the results were presented in tabular form using Microsoft Excel.

RESULTS

The results of this study found that muscle pain in bruxism patients at the Prosthodontics Clinic Dental and Oral Hospital of Universitas Padjadjaran was predominantly experienced by women, with a percentage of 53.33% (Table 1).

Table 1. Distribution of research samples by gender

Gender	n	%
Man	14	46,67%
Woman	16	53,33%
Total	**30**	**100%**

Masseter muscle pain, which is commonly reported in patients with bruxism, was the most frequently observed pain location in this study. As shown in Table 2, pain in the masseter muscle was reported by 21 subjects (70%), with a higher proportion in women (40%) compared to men (30%). Pain in the temporalis muscle was reported by 17 subjects (56.67%), consisting of 11 women (36.67%) and 7 men (23.33%).

Pain in the lateral pterygoid muscle was found in 14 subjects (46.67%), equally distributed between men and women (23.33% each). Meanwhile, pain in the medial pterygoid muscle was rarely observed, occurring in only 1 subject (3.33%), and was found only in male participants. Other muscle locations were reported in 4 subjects (13.33%), with an equal distribution between men and women.

In addition to muscle pain, temporomandibular joint (TMJ) pain was also frequently reported, occurring in 19 subjects (63.33%). Of these, 10 cases (33.33%) were observed in women and 9 cases (30%) in men. Overall, the findings indicate that muscle pain, particularly in the masseter muscle, and TMJ pain were common among bruxism patients, with a higher prevalence observed in women.

Table 2. Location of the pain

Location	Total n (%)	Man n (%)	Woman n (%)
Temporalis	17 (56,67%)	7 (23,33%)	11 (36,67%)
Maseter	21 (70%)	9 (30%)	12 (40%)
Pterigoid Lateral	14 (46,67%)	7 (23,33%)	7 (23,33%)
Pterigoid Medial	1 (3,33%)	1 (3,33%)	-
Other Muscles	4 (13,33%0	2 (6,67%)	2 (6,67%)
Locations other than muscles (TMJ)	19 (63,33%)	9 (30%)	10 (33,33%)

Table 3 shows the distribution of pain types among bruxism patients. The most common type of muscle pain observed was local myalgia, which occurred in 19 subjects (63.33%). Of these, 10 cases (33.33%) were reported in men and 9 cases (30%) in women.

Table 3. Type of the pain

Muscle Pain	Total n(%)	Man n(%)	Woman n(%)
No Pain	5 (16,67%)	2 (6,67%)	3 (10%)
Local Myalgia	19 (63,33%)	10 (33,33%)	9 (30%)
Myofacial Pain	6 (20%)	2 (6,67%)	4 (13,33%)
Arthralgia	18 (63,33%)	9 (30%)	9 (30%)

Myofascial pain was reported in 6 subjects (20%), consisting of 2 men (6.67%) and 4 women (13.33%). Meanwhile, arthralgia was also frequently observed, occurring in 19 subjects (63.33%). This condition was relatively equally

distributed between men and women, with 9 cases (30%) reported in each group.

In contrast, 5 subjects (16.67%) did not report any pain, including 2 men (6.67%) and 3 women (10%). Overall, the findings indicate that local myalgia and arthralgia were the most common types of pain among bruxism patients in this study.

DISCUSSION

The results of this study show that bruxirm is more common in woman than in man. The dominant masticatory muscle pain was found in the masseter and temporalis muscles in woman than in man. These results are consistent with with previous findings by Rubin et al.[9] and Rahmad et al.[10] which linked the higher prevalence of bruxism in the female population compared to male. These results most likely related with the condition of female patients experienced stress symptoms, supported by a report by the American Psychological Association[11] regarding the influence of estrogen and progesterone hormone fluctuations during the female reproductive cycle increasing sensitivity to stress, which can then trigger bruxism. This finding is also related to the research by Lee et al.[12] and Koruyucu et al.[13] which based on ultrasound reported that although men have greater thickness of masseter and temporalis muscles, women more often experience bruxism muscle pain.[12,13] This phenomenon can be explained by the research of Garip et al.[14] that decreased muscle thickness is negatively correlated with pain intensity, indicating that the thickness of masticatory muscles can increase pain perception. This difference in pain perception is supported by the research of Packiasabapathy et al.[15] which found that women are more sensitive to pain due to hormonal influences (estradiol), genetic variations, and psychological factors.

Koecklin et al.[16] who conducted neurological observations, stated that this mechanism involves hyperactivation of the sympathetic nervous system and increased cortisol, which causes increased masticatory muscle tone. Research by Lobbezoo et al.[17] found that other factors such as stimulant consumption, sleep disturbances, and the use of Selective Serotonin Reuptake Inhibitors (SSRIs) play a role in the etiology of bruxism. However according to Okeson et al.[6] occlusal factors did not show a significant influence. Manfredini et al.[18] in their study reported that the clinical impact of bruxism varies from dental damage to complex musculoskeletal disorders of the temporomandibular joint, with a global prevalence ranging from 8-31% depending on the diagnostic criteria used. The social impact of bruxism can be accompanied by disturbed sleep quality for partners or roommates.[5] The results of research by Koecklin et al.[16] and Lobbezoo et al.[17] prove that the factors that cause bruxism can be influenced by neurological and psychological factors of the sufferer.

The results of this study are also consistent with previous research by Meidarlina and Rikmasari[19] which found that masseter and temporalis muscle pain were reported to be the main symptoms in people with temporomandibular joint disorders, which is consistent with the distribution of pain in this study.[19] The results of this study are also

supported by the findings of Ginting et al.[20] which stated that bruxism increases pressure on the masseter and temporalis muscles, thus causing disruption in the function of the muscle mechanism which can cause pain in these muscles.[20]

Based on the DC/TMD study by Noguchi et al.[21], masticatory muscle pain can be divided into local myalgia, where the pain is limited to the palpable muscle area and is more often associated with bruxism, and myofascial pain with a diffuse pain component.[21] The results of this study revealed that the diagnosis of muscle pain in bruxism sufferers is dominated by local myalgia, both in women and men. This finding shows that the majority of bruxism cases are characterized by muscle pain limited to a specific area, compared to more diffuse myofascial pain. Pathophysiologically, this phenomenon can be explained by the mechanism of sleep bruxism, where activation of the masseter and temporalis muscles induces the accumulation of inflammatory metabolites and damage to muscle microfibers without the formation of trigger points, which are pathognomonic features of myofascial pain. The data of this study are consistent with the findings of Winocur et al.[22] using DC/TMD, the prevalence of local myalgia reached 44.7% in bruxism cases, while myofascial pain was only identified in 9.7% of cases. This study used the DC/TMD instrument, which is the gold standard for evaluating masticatory muscle pain and temporomandibular joint disorders in bruxism patients, to ensure diagnostic consistency and minimize bias, especially in differentiating between local myalgia and myofascial pain, which often overlap clinically. This predominance of local myalgia reflects the direct impact of biomechanical loading, which is a pathognomonic characteristic of bruxism, where intermittent pressure on the masticatory muscles causes focal tissue damage without triggering a widespread pain pattern. [7,22]

Bruxism has been increasingly recognized as a potential contributing factor to temporomandibular joint (TMJ) arthralgia through mechanisms involving repetitive mechanical overload of the joint structures. Repeated clenching and grinding generate excessive compressive forces within the condyle–disc complex, predisposing the articular surfaces and capsular tissues to microtrauma. This biomechanical stress may initiate intra-articular inflammatory responses, characterized by synovial irritation and the release of pro-inflammatory mediators that sensitize peripheral nociceptors and amplify pain signaling. Furthermore, prolonged loading may elevate intra-articular pressure and compromise local microcirculation, promoting ischemic changes that exacerbate nociceptive input. When persistent, these processes may contribute not only to symptomatic arthralgia but also to progressive structural alterations of the TMJ.[23]

Bruxism, particularly awake bruxism, may contribute to the development of temporomandibular joint (TMJ) arthralgia through repetitive and sustained mechanical loading of the joint structures. This assumption is supported by the findings of Poluha et al.[23] who demonstrated a significant association between awake bruxism and painful TMJ clicking, characterized by disc displacement with

concomitant arthralgia. Patients presenting with painful TMJ clicking exhibited a significantly higher frequency of awake bruxism compared with both painless clicking and asymptomatic controls, suggesting that sustained parafunctional activity during wakefulness may increase intra-articular stress, promote inflammatory responses, and ultimately precipitate joint pain.

This study provides important insights into the clinical characteristics of pain in patients with bruxism, particularly regarding the distribution and type of masticatory muscle pain. By applying standardized diagnostic criteria from DC/TMD, this study offers a structured assessment of both muscle-related pain and temporomandibular joint pain among bruxism patients. The findings highlight that local myalgia and arthralgia were the most frequently reported pain conditions, with the masseter muscle being the most commonly affected site.

One of the strengths of this study lies in the detailed evaluation of pain location and type using a standardized diagnostic approach, which enhances the reliability of the clinical assessment. Furthermore, the study contributes to the limited data regarding the pattern of masticatory muscle pain among bruxism patients in clinical settings. These findings may help clinicians better understand the pain profile associated with bruxism and support more targeted diagnostic and therapeutic strategies.

However, this study has several limitations, including the relatively small sample size. Future studies with larger populations and more comprehensive analyses are needed to further explore the relationship between bruxism and temporomandibular disorders.

CONCLUSION

The most common pain locations in bruxism patients were the masseter muscle and the temporomandibular joint (TMJ), while the most frequent types of pain were local myalgia and arthralgia. These findings highlight that masticatory muscle pain, particularly involving the masseter muscle, is a common clinical feature in patients with bruxism.

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Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

Disclosure

The authors used ChatGPT (OpenAI, GPT-4 version) for language editing and grammar improvement. The authors reviewed and approved the final manuscript and take full responsibility for its content.

Conflict of Interest

There are no competing interests to declare.

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