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Bruxism and Tooth Clenching in Athletes: Prevalence, Risk Factors and Oral Health Consequences - A Narrative Review

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Abstract

Background. Bruxism a repetitive masticatory muscle activity characterized by teeth grinding and clenching. There are two forms of bruxism: sleep bruxism and awake bruxism. Although bruxism has been studied in athletes, there is still a lack of precise data regarding its consequences for both health and athletic performance, as well as regarding treatment methods.

Aim. The aim of this narrative review was to summarize current research on bruxism in athletes and its prevalence, potential risk factors, oral and musculoskeletal consequences, implications for athletic performance, and available prevention and management strategies

Material and methods. A narrative review was conducted using PubMed and Google Scholar. English language publications from 2016–2026 and selected earlier studies were considered. Findings were synthesized narratively.

Results. The literature indicates that bruxism is a significant issue among athletes, although reported prevalence rates vary considerably across studies. Bruxism has been linked to psychological stress, oral and musculoskeletal health symptoms, and certain aspects of athletic performance. Nevertheless, differences in assessment methods and the limited number of studies conducted on athletes reduce the certainty of these findings. Evidence regarding the efficacy of available treatment methods remains inconclusive**.**

Conclusions. Bruxism appears to be relatively common among athletes, although its prevalence and clinical significance remain incompletely established. Evidence regarding its impact on athletic performance and the effectiveness of available treatment methods remains limited and inconsistent. Further research is needed to clarify its consequences in athletes and identify effective strategies for prevention and management.

Key words: awake bruxism; sleep bruxism; oral health; sports medicine; temporomandibular disorders, bruxism, athletes, bruxism treatment, TMD, tooth wear

1. Introduction

Bruxism is currently defined as “a repetitive masticatory muscle activity that is characterized by clenching or grinding of the teeth and/ or by bracing or thrusting of the mandible and that is specified as either sleep bruxism or awake bruxism, depending on its circadian phenotype.”(Bronkhorst et al., 2024) Commonly there are two types of bruxism-sleep bruxism and awake bruxism. Sleep bruxism by a definition is a masticatory muscle activity during sleep

that is characterised as rhythmic (phasic) or non-rhythmic (tonic) and is not a movement disorder or a sleep disorder. Awake bruxism is a masticatory muscle activity during wakefulness that is characterised by repetitive or sustained tooth contact and/or by bracing or thrusting of the mandible and is not a movement disorder.(Verhoeff et al., 2025) The etiology of bruxism is multifactorial and remains incompletely understood. It involves complex interactions between biological, psychological, and behavioral factors. (Belenda González et al., 2025) Psychological factors, particularly anxiety and psychological stress, are recognized as significant factors contributing to the onset and exacerbation of bruxism. (Daby et al., 2025) Therefore, athletes may constitute a population at increased risk of bruxism due to their greater exposure to high-intensity training, psychological stress associated with competitive performance, and substantial physical and muscular demands during training. (Daby et al., 2025) Reported prevalence rates of bruxism among athletes vary considerably, ranging from 34% to 70%, with a pooled estimate of 38%. (Okshah et al., 2025) Bruxism has been associated with a range of oral and musculoskeletal consequences, including tooth wear, tooth fractures, dental hypersensitivity, masticatory muscle symptoms, and temporomandibular disorders (TMDs). (Mortazavi et al., 2023)(Bronkhorst et al., 2024) The aim of this narrative review is to synthesize the current evidence on bruxism in athletes and its implication for oral health. We summarize the current approaches to prevention and management of the problem.

Research Objective. The aim of this study was to analyse available data regarding bruxism in athletes, the scale of the problem, its underlying mechanisms, causes, and available treatment methods.

2. Research materials and methods

2.1. Literature Review

A narrative literature review was conducted to summarize available data on bruxism in athletes, with particular emphasis on its prevalence, potential risk factors and etiological mechanisms, oral and musculoskeletal consequences, possible impact on athletic performance, and prevention and management strategies.

The literature review was conducted primarily using the PubMed database, supplemented by searches on Google Scholar and Elsevier. The focus was on publications from the years 2016–2026; although, selected earlier works were also included if they provided relevant background information or contributed significantly to the understanding of bruxism.

Searches were conducted in English and. Keywords included: awake bruxism, sleep bruxism, oral health, sports medicine, temporomandibular disorders, bruxism, athletes, bruxism treatment, TMD, tooth wear. The review also covered related topics relevant to the study's objectives, including potential risk factors, clinical consequences, and the relationship between bruxism and athletic performance.

2.2. Scope of the Review

Publications addressing at least one of the following topics were considered relevant: the prevalence of bruxism in athletes, potential psychological or neurophysiological factors associated with bruxism, oral and musculoskeletal consequences, the possible impact on athletic performance, and methods of prevention and management. The review included original research articles, systematic reviews, meta-analyses, and relevant narrative and clinical reviews.

2.3. Narrative synthesis

The gathered literature underwent narrative synthesis and was organized according to the review's main themes. Where possible, findings from studies involving athletes were distinguished from data concerning the general population. Particular attention was paid to differences in definitions of bruxism and assessment methods, limitations of the available scientific evidence, and the distinction between observed associations and cause-and-effect relationships.

2.4. Statement on the Use of Artificial Intelligence

Artificial intelligence (AI) was used as an auxiliary tool in the preparation of this literature review for two primary purposes: to assist in the initial identification and organization of relevant scientific literature, and to refine the English language (including grammar, style, clarity, and textual coherence). AI-generated suggestions were verified by the author, who bears full responsibility for the substantive accuracy of the content, the verification of cited literature, the interpretation of available data, and the final conclusions drawn. AI tools supported the writing process but did not replace the author's scholarly judgment.

3.Bruxism in Athletes

3.1 Prevalence

There is no definitive figure regarding the proportion of the population affected by bruxism. Studies are inconsistent on this matter, suggesting that bruxism may affect anywhere from 32% to as much as 70% of the population. (Oliveira et al., 2023) (Pavlou et al., 2024) Studies indicate that, in the general population, the prevalence of bruxism is slightly higher among women (approximately 32%) than among men (approximately 30%).(Oliveira et al., 2023) Interestingly, only one in four people—both men and women—are aware of this condition. (Pavlou et al., 2024). Studies also indicate that the risk of bruxism decreases in elderly people. (Manfredini et al., 2013)The situation is somewhat different among athletes. Here, too, the data is inconclusive, with studies indicating that the prevalence of bruxism in the athlete population ranges from 34% to as high as 70%.(Daby et al., 2025) (Okshah et al., 2025) Interestingly, these figures vary depending on the sport. High prevalence of the condition is found among athletes involved in combat sports, affecting 58% of respondents and weightlifting, where 50% reported the issue. However, these studies do not present separate data for sleep bruxism and awake bruxism. (Okshah et al., 2025) Such detailed studies were conducted in 2019 on a group of climbers, among whom the prevalence of bruxism is also high. As many as 51.1% of the athletes in this group suffer from daytime bruxism, a figure that is very similar for both women (51.2%) and men (51.1%). A significantly smaller number of climbers reported sleep bruxism (just 22.7%); however, the majority of those affected were women (34.1%), compared to 12.8% of men. (Zięba & Byś, 2019) Bruxism also occurs in the world of e-sports and poses a problem, as 89.1% of players report behaviors associated with daytime bruxism. In a multivariate model, higher scores on the nomophobia ‘no mobile phone phobia’ scale were independently associated with higher frequency categories of awake bruxism. (Quadras et al., 2026)

3.2 Risk factors and mechanisms

Bruxism is a multifactorial phenomenon, due to a fact its etiology and mechanism are still being examined.(Lobbezoo & Naeije, 2001) Risk factors for bruxism include lifestyle as well as psychological, and- as some studies indicate-even genetics aspects. (Lobbezoo et al., 2014) In 2011, Smith conducted a study linking temporomandibular joint disorders-including bruxism-to certain genes. It was an innovative study; but, further research would be required to confirm his theory. (Smith et al., 2011) The best known cause of bruxism is stress. Studies show that

the mechanisms of the central nervous system influence the activity of the masseter muscles.Neural connections between brain regions involved in stress and anxiety processing and the trigeminal system may contribute to the regulation of masticatory muscle activity. Chronic stress can also contribute to a bidirectional relationship in which stress-induced bruxism and its associated symptom, such as pain and discomfort, further exacerbate psychological distress. Additionally, the pathophysiology of bruxism implicates alterations in serotonergic and dopaminergic signaling, although the full mechanisms underlying this process are not yet fully understood. (Pavlou et al., 2024) (Kuang et al., 2021)

3.3 Oral consequences

There are several consequences of bruxism related to oral health. These include tooth wear, damage to the mucous membranes, and joint and head pain. Research does not directly link bruxism to headaches; however, when it co-occurs with TMD, studies indicate an exacerbation of pre-existing headaches. Researchers highlight differences between sleep bruxism and awake bruxism regarding their impact on headaches. Studies suggest a correlation between awake bruxism and tension-type headaches. Nevertheless, drawing definitive conclusions remains difficult due to the limited number of studies conducted to date.(Voß et al., 2024) (Nascimento et al., 2024) Other studies suggest that bruxism can lead to TMD, which in turn can lead to headaches.(Ferreira et al., 2018) Surprisingly, no direct, strong evidence of pathological tooth wear caused by bruxism was detected either. What was found was a link between bruxism and cervical non-caries tooth lesions.(Bronkhorst et al., 2024) The literature most frequently describes three relationships between bruxism and tooth wear. Studies show that tooth wear can be a cause of bruxism, a diagnostic indicator of the condition, and a consequence of bruxism.(Wetselaar et al., 2019)Bruxism also has a negative impact on the soft tissues of the oral cavity, leading to the formation of the so-called linea alba, scalloping of the tongue margins, and traumatic lesions.(Bracci et al., 2022)

3.4 Musculoskeletal consequences

Most studies focus on the issue of TMD rather than bruxism itself. The available literature still does not establish a linear, unequivocal link between bruxism and musculoskeletal symptoms. This is because the relationship is complex and influenced by numerous factors, such as age and the differences between sleep bruxism and awake bruxism. Pain is the most frequently

reported symptom in individuals with bruxism; yet, there is a lack of research investigating non-pain-related musculoskeletal symptoms.. (Baad-Hansen et al., 2019) A systematic review and meta-analysis by Mortazavi et al. (2023) identified 1,651 records, of which 20 studies were included in the meta-analysis. The findings showed an association between bruxism and TMD, with higher odds of TMD among individuals with bruxism overall (OR = 2.25, 95% CI: 1.94–2.56). In subgroup analyses, awake bruxism was associated with higher odds of TMD (OR = 2.51, 95% CI: 2.02–2.99), as was sleep bruxism (OR = 2.06, 95% CI: 1.82–2.30) [8].
.(Mortazavi et al., 2023) Studies indicate the presence of temporomandibular disorder (TMD) among athlete manifesting as myofascial pain, clicking sounds, and musculoskeletal symptom, though these studies focus on TMD itself rather than directly addressing issues stemming from bruxism. This research has established that the nature of TMD issues within the sports community varies depending on the specific discipline practiced.(Saini et al., 2025) There is a need for broader research into the problem of bruxism and its consequences among athletes.

3.5 Implications for athletic performance

Many athletes frequently report experiencing psychological stress and anxiety. Intense pressure to perform may be a contributing factor; some studies suggest that this can lead to daytime bruxism as a coping mechanism.(Różak et al., 2026)(Manfredini et al., 2004) This condition can impact the performance of athletes suffering from bruxism. It may lead to reduced strength, endurance, and coordination, and even slower reaction times. Athletes with bruxism exhibit elevated anxiety levels, poorer sleep quality, and up to a 2.5 times higher risk of injury. Further research focusing on this issue among athletes and its prevalence is warranted, as it represents a significant challenge that can affect athletic performance.(Okshah et al., 2025a)

3.6 Prevention and management

Treating bruxism remains a challenge, as no unequivocally effective therapeutic method has yet been developed. Current management strategies include the use of occlusal splints, cognitive-behavioral therapy (CBT), biofeedback, and pharmacological interventions. The choice of method depends on the type of bruxism, the presenting symptoms, and the presence of clinical consequences. (Minakuchi et al., 2022). Studies indicate that the use of stabilization splints tends to reduce the number of sleep bruxism episodes; however, findings are inconsistent. Research by Franco et al. suggests a reduction in nocturnal bruxism episodes, whereas researchers such as Hansen and Lukic found no significant difference between patients

using stabilization splints and those who did not. Lukic noted that the NTI-tss splint yields better treatment outcomes than the Michigan splint, even though the latter is preferred by patients. Nevertheless, a review of studies on splints indicates that the strength of evidence supporting their use as a treatment for bruxism is low or very low.(Lukic et al., 2021)(Baad-Hansen et al., 2007)(Franco et al., 2011)(Minakuchi et al., 2022)

Studies on the effectiveness of CBT for bruxism have shown a significant reduction in nocturnal bruxism and an increase in positive stress-coping strategies. These effects were modest, and the studies lack high statistical significance. Therefore, further research is needed to draw definitive conclusions. (Ommerborn et al., 2007)(Minakuchi et al., 2022) Botulinum toxin type A and its effect on bruxism are also being investigated. Studies indicate a potential reduction in pain and episodes of bruxism following its use; however, as with previous cases, further research is required to scientifically confirm the beneficial impact of botulinum toxin A on bruxism. (Coelho et al., 2025)(Minakuchi et al., 2022) Based on existing research, it can be concluded that biofeedback, particularly in the form of electrical stimulation has a beneficial effect on reducing the muscle activity associated with sleep bruxism. The long-term effects of this therapy, as well as any potential negative impact on sleep quality or dental health, have not yet been determined. Future studies should be designed and conducted in a manner that allows for a comprehensive assessment of the impact of biofeedback therapy on bruxism.(Minakuchi et al., 2022). Further research is needed to develop effective strategies for the prevention and management of bruxism, particularly the daytime form. Treatment of this condition in athletes remains an area requiring further study.

4. Discussion

This narrative review aimed to examine studies addressing bruxism in athletes, the mechanisms underlying the phenomenon, its potential consequences, and treatment methods. The review indicates that bruxism is a significant issue among athletes, affecting a substantial portion of this group. The inconclusive nature of existing research and the relatively limited number of studies suggest that this topic requires further investigation and that additional clinical studies should be conducted. The presented studies indicate that the prevalence of bruxism among athletes is high and may reach 70% of athletes.(Zieliński et al., 2024)(Verhoeff et al., 2025)(Belenda González et al., 2025)(Daby et al., 2025) This may be associated with psychological stress, competitive pressure and the intense lifestyles led by athletes.(Gałązka et al., 2026) Bruxism has negative effects extending beyond the oral cavity; it also may impacts

the temporomandibular joint and can lead to headaches. (Voß et al., 2024)(Nascimento et al., 2024)(Ferreira et al., 2018) Furthermore, some studies suggest associations between bruxism and athletic performance, including lower measures of strength, endurance, and coordination, slower reaction times, and poorer sleep quality. However, the available evidence does not establish that bruxism directly causes impaired athletic performance. [7] Consequently, finding an effective treatment method is crucial. Currently, there is no single optimal treatment; research is ongoing into various approaches, including occlusal splints, psychotherapy, biofeedback, and botulinum toxin. There is insufficient scientific evidence to compare the efficacy of these methods or to definitively endorse any single approach as effective in the majority of cases, given the multifactorial nature of the condition.(Lobbezoo & Naeije, 2001)(Minakuchi et al., 2022)

5. Conclusions

Bruxism appears to be a relevant concern among athletes, although its reported prevalence varies considerably across studies and sporting disciplines. Current management strategies include occlusal splints, psychological therapies such as cognitive-behavioral therapy (CBT), biofeedback, and pharmacological interventions, including botulinum toxin type A. Nonetheless, the available evidence remains insufficient to establish the optimal treatment approach or to confirm the consistent efficacy of these interventions, particularly in athletic populations.

Further research is needed to clarify the prevalence and consequences of bruxism in athletes, particularly its potential implications for athletic performance, and to evaluate effective prevention and management strategies. A better understanding of bruxism may contribute to improved oral health, quality of life, and well-being among athletes.

Disclossure

Author Contributions

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