

ARTICLE INFORMATION

Received: September, 09, 2026

Revised: September, 29, 2026

Available online: September, 30, 2026

at: <https://e-jurnal.ipphorr.com/index.php/mhc>

Physical activity and bruxism: A rehabilitation-oriented pathway to symptom reduction

Muhammad Adib Dwi Tamma Putra^{1*}, Ade Nabilah Vania Utami², Fildzah Hashifah Taufiq², Muhammad Fadill Akbar²

¹AMA University

²Universitas Sriwijaya

Corresponding author: *E-mail: adibdwi@unsri.ac.id

Abstract

Background: Bruxism is a centrally regulated masticatory muscle behavior expressed during sleep or wakefulness and influenced by biological, psychological, behavioral, and environmental factors. Physical activity is biologically plausible as a rehabilitation strategy because it can reduce psychological distress, improve sleep, enhance physical function, and support self-regulation. However, direct reduction of bruxism by exercise has not been established.

Purpose: To synthesize evidence on whether physical activity and exercise may reduce bruxism directly or indirectly, while distinguishing recreational activity from high-load competitive sport and distinguishing bruxism frequency from bruxism-related pain and functional consequences.

Method: A structured narrative review was conducted using PubMed and supplementary publisher and bibliographic searches, with literature updated through August 6, 2026. Evidence was prioritized from randomized clinical trials, observational studies, systematic reviews, and international consensus statements. Direct bruxism outcomes were distinguished from indirect outcomes including stress, sleep, pain, function, and quality of life.

Results: The evidence indicates three main patterns. First, randomized trials of home exercise in people with bruxism reported improvements in stress, sleep, pain, quality of life, and bruxism-related questionnaire outcomes, while objective reductions in bruxism activity were not consistently established. Second, masticatory muscle stretching alone did not reduce sleep bruxism and increased bruxism bursts in one randomized trial. Third, athlete studies indicate that sport participation does not inherently protect against bruxism; psychosocial and training demands may be associated with greater vulnerability in some populations.

Conclusion: Physical activity is best positioned as an individualized rehabilitation adjunct rather than a proven direct anti-bruxism treatment. Its potential benefit is likely to depend on exercise dose, recovery, sleep, stress, pain, functional impairment, and sport context. Future prospective studies should combine objective bruxism measures with detailed exercise and psychosocial exposure assessment.

Keywords: Bruxism; Exercise Therapy; Physical Activity; Rehabilitation; Stress.

INTRODUCTION

Bruxism has evolved from a predominantly dental concept into a biopsychosocial and centrally regulated behavioural phenomenon. International consensus defines sleep bruxism as rhythmic or non-rhythmic masticatory muscle activity during sleep and awake bruxism as repetitive or sustained tooth contact and/or bracing or thrusting of the mandible during wakefulness. Importantly, bruxism in otherwise

healthy individuals should not automatically be considered a disorder; rather, it may represent a behaviour that functions as either a risk or protective factor for different clinical outcomes (Lobbezoo, Ahlberg, Raphael, Wetselaar, Glaros, Kato, Santiago, Winocur, de Laat, de Leeuw, Koyano, Lavigne, Svensson, & Manfredini, 2018). This distinction is clinically relevant because management does not

necessarily aim to eliminate all masticatory muscle activity but to address excessive or potentially harmful activity and its associated consequences, including pain, functional limitations, sleep disturbances, and other health-related problems. The prevalence of awake bruxism is substantial but varies according to the case definition and assessment method used. A systematic review reported a prevalence of approximately 16% for possible awake bruxism in population-based samples, with higher estimates observed in convenience samples, whereas another meta-analysis of adults estimated a pooled prevalence of 15.44% using stricter methodological criteria (Oliveira, Pauleto, Massignan, D'Souza, Gonçalves, Flores-Mir, & Canto, 2023; Archer, Da-Cas, Valesan, Cunha, Januzzi, Garanhani, & de Souza, 2023). These differences highlight the methodological variability in bruxism assessment and indicate that self-report, clinical examination, ecological momentary assessment, electromyography, and polysomnography should not be considered interchangeable methods. Consequently, interpretation of the prevalence and clinical characteristics of bruxism requires consideration of the assessment approach and diagnostic criteria applied.

Stress is considered one of the potentially modifiable factors associated with bruxism. A systematic review and meta-analysis reported that individuals experiencing stress had approximately twice the odds of presenting with bruxism, although the certainty of evidence was low because most included studies used cross-sectional designs (Chemelo, Né, Frazão, Souza-Rodrigues, Fagundes, Magno, & Lima, 2020). More recent evidence has also identified associations between bruxism and psychological factors, including stress, anxiety, and depression, among adults, while emphasizing substantial heterogeneity and limitations in the available observational evidence (González, Montero, Gómez Polo, & Pardo Peláez, 2025). These findings suggest that stress may be relevant to the occurrence and persistence of bruxism; however, the available evidence does not establish that stress reduction alone will prevent or eliminate bruxism.

Physical activity represents a potentially relevant behavioural approach because it may influence several factors associated with bruxism, particularly psychological well-being and sleep. Exercise

interventions have been associated with improvements in depressive and anxiety symptoms across diverse populations, with evidence supporting benefits from aerobic, resistance, combined, and mind-body exercise modalities, although the optimal dose may vary according to the outcome and individual characteristics (Singh, Olds, Curtis, Dumuid, Virgara, Watson, Szeto, O'Connor, Ferguson, Eglitis, Miatke, Simpson, & Maher, 2023; Munro, Teague, Somoray, Simpson, Budden, Jackson, Rebar, & Dimmock, 2026). Physical activity may also contribute to improved sleep quality, and recent network meta-analyses have reported beneficial effects of several structured exercise modalities on sleep-related outcomes (Li, Wang, Wang, Li, Zhang, He, & Wang, 2024; Xie, Lu, Liu, Li, & Li, 2024). These findings are relevant because psychological distress and sleep disturbances may coexist with bruxism and may represent potentially modifiable components of its broader biopsychosocial context. However, the relationship between physical activity and bruxism may not be uniformly beneficial. Physical activity performed within competitive sports or excessive training environments may involve additional psychological and physiological stressors. A systematic review and meta-analysis published in 2025 estimated an overall bruxism prevalence of 34% among athletes, although substantial heterogeneity was observed across studies (Sales, Almeida, Barbosa, Raposo, Correia Júnior, Gusmão, Dias, & de Godoy, 2025). The authors discussed competition-related pressure, physical strain, and training demands as potential factors that may contribute to bruxism. Similarly, recent research on lifestyle characteristics among young adults highlights the importance of considering the context, intensity, and balance of physical activity rather than treating physical activity as a uniformly protective behaviour (Nica, Farcasiu, & Imre, 2026).

Taken together, current evidence suggests a complex relationship between bruxism, psychological stress, sleep, and physical activity. Physical activity may support psychological and sleep-related health, while excessive training, inadequate recovery, or performance-related pressure may introduce additional stressors. Therefore, examining physical activity in relation to awake bruxism requires consideration not only of whether individuals are physically active but also of the broader behavioural

Muhammad Adib Dwi Tamma Putra^{1*}, Ade Nabilah Vania Utami², Fildzah Hashifah Taufiq², Muhammad Fadill Akbar²

¹AMA University

²Universitas Sriwijaya

Corresponding author: *E-mail: adibdwi@unsri.ac.id

and psychosocial context in which physical activity occurs. Further research is needed to clarify the relationship between physical activity and awake bruxism, particularly among young adults, while accounting for relevant psychological and lifestyle factors.

RESEARCH METHOD

This study employed a structured narrative literature review design to synthesize current evidence on the relationship between physical activity, exercise, stress, sleep, bruxism, and rehabilitation. The literature search was updated through August 6, 2026. PubMed was used as the primary database, supplemented by searches of relevant publisher websites and bibliographic sources. The search strategy combined terms related to bruxism with physical activity, exercise, exercise therapy, sport, athletes, stress, anxiety, sleep, temporomandibular disorders, orofacial pain, rehabilitation, biofeedback, and behavioural management. The review prioritized international consensus statements, systematic reviews, meta-analyses, randomized clinical trials, and recent observational studies relevant to bruxism and its

potential rehabilitation pathways. Studies were considered relevant when they provided evidence concerning bruxism itself, bruxism-related pain or functional limitations, bruxism among athletes, or potentially modifiable factors and rehabilitation approaches related to physical activity, psychological distress, sleep, or behavioural management. Evidence was synthesized narratively according to the relevance of the findings to the review objectives.

The interpretation of the evidence distinguished between direct and indirect outcomes. Direct outcomes referred to objectively or clinically assessed bruxism activity, whereas indirect outcomes included stress, anxiety, sleep, pain, mandibular function, quality of life, and general physical functioning. This distinction was applied to avoid interpreting improvements in associated symptoms as evidence of reduced bruxism activity when the underlying bruxism behaviour had not been directly assessed. As this review was designed as a structured narrative synthesis rather than a systematic review or quantitative meta-analysis, no pooled effect estimates or formal risk-of-bias scores were generated. No unpublished patient data or original statistical estimates were included.

Muhammad Adib Dwi Tamma Putra^{1*}, Ade Nabilah Vania Utami², Fildzah Hashifah Taufiq², Muhammad Fadill Akbar²

¹AMA University

²Universitas Sriwijaya

Corresponding author: *E-mail: adibdwi@unsri.ac.id

RESEARCH RESULTS

Table 1. Selected Evidence Relevant to Physical Activity, Bruxism, And Rehabilitation

(Author, Year) (Country)	Population/Design	Main Finding	Rehabilitation Interpretation
(Kadioğlu et al., 2024)	30 young adults; randomized trial	Home exercise improved stress, sleep, pain, QoL and bruxism-related questionnaire outcomes.	Supports symptom-oriented exercise; objective bruxism reduction not established.
(Gouw et al., 2018)	24 pain-free sleep-bruxism participants; randomized trial	Masticatory stretching improved MMO/PPT but did not reduce sleep bruxism; bursts increased.	Local stretching should not be assumed to suppress bruxism.
(Sales et al., 2025)	23 studies; 2,805 athletes; systematic review/meta-analysis	Pooled athlete bruxism prevalence ≈34%; substantial heterogeneity.	Sport exposure can coexist with or amplify bruxism risk.
(Chemelo et al., 2020)	6 observational studies; systematic review/meta-analysis	Stress associated with higher odds of bruxism; certainty low.	Stress is a plausible treatment pathway, not a proven causal mediator.
(Idáñez-Robles et al., 2023)	16 RCTs; 812 TMD participants	Exercise reduced pain and improved pressure threshold and mouth opening.	Exercise can address bruxism-related musculoskeletal consequences.
(Graham et al., 2026)	9 clinical studies; 165 participants; systematic review	Behavioural approaches showed potential benefit for awake bruxism.	Exercise may be stronger when paired with awareness/self-management.

Muhammad Adib Dwi Tamma Putra^{1*}, Ade Nabilah Vania Utami², Fildzah Hashifah Taufiq², Muhammad Fadill Akbar²

¹AMA University

²Universitas Sriwijaya

Corresponding author: *E-mail: adibdwi@unsri.ac.id

DOI: <https://doi.org/10.56922/mhc.v5i6.4502>

Physical activity and bruxism: A rehabilitation-oriented pathway to symptom reduction

(Bayhan et al., 2026)	30 adults with probable bruxism; randomized trial	Home exercise and manual therapy improved clinical and muscle-related outcomes; no clear overall superiority.	Supports exercise as a symptom/function-oriented adjunct; direct anti-bruxism effect remains uncertain.
(Nica et al., 2026)	301 young adults; cross-sectional study	Sport participation and lifestyle factors were associated with self-reported bruxism indicators.	Supports a context-dependent association; self-report and cross-sectional design limit causal inference.
(Ribeiro et al., 2024)	57 CrossFit practitioners; observational study	Frequent oral parafunction during training; no simple association between clinical signs and exercise intensity.	Reinforces that training context and intensity should not be treated as equivalent to therapeutic exercise.
(Riyaz et al., 2025)	272 professional weightlifters; cross-sectional study	High prevalence of self-reported awake bruxism was observed.	Highlights the need to assess clenching and recovery demands in high-load strength training.

Muhammad Adib Dwi Tamma Putra^{1*}, Ade Nabilah Vania Utami², Fildzah Hashifah Taufiq², Muhammad Fadill Akbar²

¹AMA University

²Universitas Sriwijaya

Corresponding author: *E-mail: adibdwi@unsri.ac.id

DOI: <https://doi.org/10.56922/mhc.v5i6.4502>

DISCUSSION

The available clinical evidence suggests that physical exercise may have a relevant role in the rehabilitation of individuals with bruxism, although its effects should be interpreted according to the specific outcomes assessed. Randomized 30 young adults with bruxism to manual therapy or an eight-week home exercise programme. Both interventions were associated with improvements in perceived stress, sleep quality, pain, quality of life, and bruxism-related questionnaire outcomes; however, the study did not demonstrate an objective reduction in bruxism activity (Kadioğlu, Sezer, & Elbasan, 2024). Similarly, who evaluated 30 participants with probable bruxism using clinical assessment, ultrasonography, shear-wave elastography, and electromyography, reported improvements in several clinical and muscle-related outcomes following manual therapy and home exercise, without demonstrating clear overall superiority of either intervention (Bayhan, Kadioğlu, Evli, Akat, Kadioğlu, Orhan, & Elbasan, 2026). These findings suggest that exercise may contribute to functional and symptom-related improvement, but improvement in these outcomes should not automatically be interpreted as suppression of the underlying bruxism behaviour.

Evidence from masticatory muscle exercise further supports the importance of distinguishing functional improvement from changes in bruxism activity. In a randomized trial involving 24 pain-free individuals with sleep bruxism, 10 days of static masticatory muscle stretching improved maximum mouth opening and masseter pressure pain threshold but did not reduce sleep bruxism. Instead, bruxism bursts increased in the intervention group (Gouw, de Wijer, Kalaykova, & Creugers, 2018). This finding indicates that improvement in musculoskeletal parameters does not necessarily correspond to a reduction in the primary bruxism behaviour. Accordingly, exercise prescription should be directed toward the individual's functional limitations and clinical phenotype rather than assuming that direct exercise of the masticatory muscles will suppress bruxism.

Evidence from temporomandibular disorder (TMD) rehabilitation provides additional support for the potential role of exercise in managing conditions that may coexist with bruxism. Multimodal cervical, behavioural, aerobic, and therapeutic exercise

approaches have been investigated in TMD populations (Reynolds, Puentedura, Kolber, & Cleland, 2020; Dantony, Romero-Rodriguez, Perez-Guillen, Cabanillas-Barea, Yogi, Blanco, & Carrasco-Uribarren, 2024; Gębska, Dalewski, Palka, & Kołodziej, 2023; Oliveira-Souza, Sales, Coutinho, Oliveira, & Armijo-Olivo, 2024; Tabrizi, Shourmaej, Pourdanesh, Shafiei, & Moslemi, 2024). A meta-analysis of 16 randomized trials involving 812 participants found that therapeutic exercise was associated with reduced pain and improved pressure pain threshold and mandibular opening among individuals with TMD (Idáñez-Robles, Obrero-Gaitán, Lomas-Vega, Osuna-Pérez, Cortés-Pérez, & Zagalaz-Anula, 2023). These findings support the use of exercise for functional consequences that may accompany bruxism, but they should not be considered direct evidence that exercise suppresses bruxism activity itself.

The relationship between physical activity and bruxism becomes more complex in athletic populations. Synthesized 23 studies and estimated a pooled bruxism prevalence of 34% among athletes and para-athletes, although substantial heterogeneity was reported (Sales et al., 2025). Competitive athletes may experience competition-related stress, high physical workloads, recovery constraints, and performance expectations, which may coexist with greater susceptibility to bruxism. High levels of perceived stress and bruxism among university students and athletes during the COVID-19 period. However, the cross-sectional design and convenience sampling of that study limit causal interpretation (Mendiburu-Zavala, Collí-González, Lugo-Ancona, & Peñaloza-Cuevas, 2022).

Recent athlete-specific studies further indicate that the relationship between physical activity and bruxism is context dependent. Studies among Brazilian para-athletes have documented bruxism across populations with diverse training and disability profiles, indicating that participation in sport does not eliminate susceptibility to oral parafunctions (Brancher, Morodome, Madalena, Reis, Von Held, Antunes, & Antunes, 2021; Storrer, Costa, Scariot, Petinati, Winckler, Deliberador, Küchler, & Brancher, 2021). Research involving high-performance athletes and esports players has also reported relationships between performance-related or psychosocial

Muhammad Adib Dwi Tamma Putra^{1*}, Ade Nabilah Vania Utami², Fildzah Hashifah Taufiq², Muhammad Fadill Akbar²

¹AMA University

²Universitas Sriwijaya

Corresponding author: *E-mail: adibdwi@unsri.ac.id

demands and bruxism-related behaviours (Babiuc, Minescu, Tănase, Bodnar, Ionescu, Dina, Burlibasa, Marcov, Voinescu, David, Malița, Burcea, Stănescu, Mihai, Oancea, & Marcov, 2019; Quadras, Stuginski-Barbosa, Ignácio, Brancher, Andreis, Nascimento, Tanaka, Garanhani, & Camargo, 2026; Souza, Spadon-Brito, Calças, Matoso-Filho, Castaldi, Melchior, Lopes-Olhê, Magri, & Mazzi-Chaves, 2026). These findings highlight the importance of distinguishing recreational physical activity, therapeutic exercise, and competitive sport, including exposure to sport-specific oral loading (Macêdo-Filho, Leal, Cardoso, Sarmiento, Verli, & Marinho, 2019).

Behavioural interventions provide an important context for understanding the potential role of exercise. Electromyographic biofeedback has been associated with reductions in tonic clenching events. A 2026 systematic review of awake bruxism management reported generally favourable, although limited, evidence for behavioural approaches, including biofeedback, habit reversal, guided music, reminder prompts, counselling, and self-management (Graham, Lövgren, Häggman-Henrikson, Peck, Manfredini, & Saracutu, 2026). In addition, a randomized clinical trial comparing electromyography-based biofeedback with botulinum toxin reported reductions in sustained tooth contact and ecological momentary assessment measures within the biofeedback group, although between-group differences were not consistently significant (Foscaldo, Belo Junior, Ribeiro, de Proença, De la Torre Canales, & Senna, 2025). These findings suggest that awareness and self-regulation may represent more immediate behavioural targets for awake bruxism than general physical fitness alone.

Sleep-related interventions also provide relevant evidence for the assessment of bruxism outcomes. A randomized trial of a full-occlusion biofeedback splint reported reductions in the frequency and duration of sleep-bruxism bursts together with improvements in selected pain and well-being outcomes (Bergmann, Edelhoff, Schubert, Erdelt, & Pho Duc, 2020). Although this study did not evaluate exercise, it demonstrates the importance of objectively assessing bruxism frequency and duration rather than relying exclusively on symptom-based questionnaires. Taken together, the available evidence supports positioning physical activity as an adjunctive strategy that may

address modifiable factors and functional consequences associated with bruxism rather than as a stand-alone intervention that directly eliminates bruxism.

Overall, the relationship between physical activity and bruxism cannot be adequately represented by a simple protective-versus-harmful framework. A more appropriate interpretation is a context- and dose-dependent model. Physical activity may contribute to improvements in stress, anxiety, sleep, pain, physical capacity, and participation, potentially reducing the functional burden associated with bruxism. Conversely, high training loads, competition-related stress, performance anxiety, inadequate recovery, and sport-specific demands may coexist with increased bruxism vulnerability. Therefore, the same level or type of physical activity may have different clinical implications depending on the individual's circumstances.

This interpretation is consistent with the contemporary understanding of bruxism as a centrally regulated behaviour rather than solely a peripheral dental condition. If bruxism is influenced by arousal, emotional regulation, sleep, and behavioural states, general physical activity may be more appropriately considered an upstream modifier than a direct mechanical treatment. Clinical management should therefore be individualized according to the patient's bruxism phenotype and associated clinical characteristics, including awake or sleep bruxism, pain, fatigue, TMD symptoms, sleep disturbance, anxiety or stress, physical activity level, exercise tolerance, and relevant environmental or behavioural triggers.

An important finding across the literature is that symptom improvement and reduction in bruxism activity represent different outcomes. The randomized trial by provides evidence that home exercise may improve several clinically meaningful outcomes among individuals with bruxism, but it did not establish a reduction in objectively recorded masticatory muscle activity (Kadioğlu et al., 2024). Masticatory stretching could improve range of motion and pressure pain threshold without reducing sleep-bruxism activity (Gouw et al., 2018). Therefore, pain reduction, improved mandibular movement, or enhanced physical function should not be used as

Muhammad Adib Dwi Tamma Putra^{1*}, Ade Nabilah Vania Utami², Fildzah Hashifah Taufiq², Muhammad Fadill Akbar²

¹AMA University

²Universitas Sriwijaya

Corresponding author: *E-mail: adibdwi@unsri.ac.id

surrogate evidence of bruxism suppression unless changes in bruxism activity are directly assessed.

From a Physical Medicine and Rehabilitation perspective, these findings support a multidisciplinary approach in which exercise is integrated with behavioural, sleep, musculoskeletal, and dental management rather than used as an isolated treatment. A layered rehabilitation approach may begin with assessment of the bruxism phenotype, pain, TMD-related impairment, sleep quality, stress, anxiety, physical activity level, training load, medication or stimulant exposure, and relevant dental consequences. This may be followed by graded physical activity aimed at improving general fitness and psychological regulation while avoiding excessive fatigue or performance-related stress. Specific musculoskeletal rehabilitation may be indicated when pain, movement restriction, cervical dysfunction, or jaw-related impairment is present, whereas behavioural management, including awareness training, habit reversal, biofeedback, and self-monitoring, may be particularly relevant when awake bruxism is prominent. Dental assessment remains important when tooth wear, restoration damage, or suspected sleep-related pathology is present. Exercise dose should also be considered when developing an individualized rehabilitation programme. Duration, frequency, intensity, modality, supervision, adherence, and recovery should be documented rather than reducing physical activity to a simple active-versus-inactive classification. For individuals with low physical activity, high stress, and poor sleep, regular moderate physical activity may be relevant to improving overall health and psychological well-being. Conversely, individuals exposed to high training loads, inadequate recovery, and substantial competition-related stress may require adjustment of training demands rather than simply increasing exercise. Thus, rehabilitation should focus on an appropriate and individualized training stimulus rather than prescribing greater physical activity without consideration of context.

The sport environment should similarly be considered when interpreting the evidence. The athlete meta-analysis estimated a pooled bruxism prevalence of approximately one-third, although substantial heterogeneity limits direct interpretation (Sales et al., 2025). Competitive sport, strength training, combat sports, and high-performance

environments may involve repeated jaw clenching, physiological arousal, and performance-related pressure. However, these observations do not establish that such exposures cause bruxism. Recreational physical activity, structured therapeutic exercise, and high-performance sport should therefore be considered distinct exposure contexts. A high prevalence of self-reported awake bruxism among professional weightlifters (Riyaz, Anu, Kanishkar, & Chakraborty, 2025). Rrequent oral parafunction among CrossFit practitioners without establishing a simple relationship between clinical bruxism signs and physical activity intensity (Ribeiro, Lieuthier, Ferreira, Passos, Peixoto, Nogueira, Ongaro, & Fiamengui, 2024).

Sleep represents another potentially relevant pathway. Exercise may contribute to improved sleep quality, which is clinically relevant to nocturnal bruxism and recovery from pain. However, the relationship may vary according to training characteristics and individual response. Excessive evening training, overreaching, or inadequate recovery may adversely affect sleep in susceptible individuals. Future studies should therefore assess sleep using validated instruments or objective measures rather than assuming that exercise-related fatigue necessarily produces better sleep.

The current evidence also suggests that exercise may be more useful when integrated with behavioural strategies. The 2026 systematic review of awake-bruxism management identified recurring evidence for approaches involving awareness, behavioural change, and self-management. Physical activity may contribute to broader stress regulation, while behavioural interventions can directly address moment-to-moment tooth contact and jaw bracing. An integrated approach may therefore provide a more comprehensive rehabilitation strategy than exercise alone.

Several research priorities emerge from the current evidence. Future prospective studies should simultaneously assess baseline bruxism frequency, awake versus sleep phenotype, exercise modality, weekly exercise volume, intensity, adherence, training monotony, recovery, sleep quality, perceived stress, anxiety, depression, pain, TMD status, caffeine and nicotine exposure, competitive status, and social support. Outcomes should include objective electromyographic or polysomnographic measures

Muhammad Adib Dwi Tamma Putra^{1*}, Ade Nabilah Vania Utami², Fildzah Hashifah Taufiq², Muhammad Fadill Akbar²

¹AMA University

²Universitas Sriwijaya

Corresponding author: *E-mail: adibdwi@unsri.ac.id

where feasible, ecological momentary assessment for awake bruxism, and patient-reported measures of pain, fatigue, function, and quality of life. Multivariable analyses could then determine whether exercise dose is independently associated with changes in bruxism after accounting for relevant psychosocial and clinical factors.

Mediation analysis represents another potential research direction. Rather than examining only whether exercise is associated with reduced bruxism, future studies could investigate whether changes in stress, sleep, anxiety, or pain explain part of the observed relationship. Such analyses may help distinguish direct associations from indirect pathways. Dose-response studies comparing low-to-moderate recreational activity with higher training loads may also clarify whether the relationship is linear, threshold-based, or potentially nonlinear. Prospective designs of this type would provide stronger evidence than additional cross-sectional studies based solely on prevalence estimates.

From a Physical Medicine and Rehabilitation perspective, implementation also depends on access to appropriate rehabilitation services for timely assessment, education, functional intervention, and coordinated referral. Evidence from the Indonesian rehabilitation context has identified persistent accessibility challenges, emphasizing that clinically appropriate preventive and rehabilitative strategies also require feasible pathways for patients to access rehabilitation services. Broader rehabilitation literature supports trigger-oriented retraining and functional and psychosocial rehabilitation as components of individualized care (Putra & Lany, 2025; Putra, Utami, Akbar, & Endratamma, 2025; Putra, Akbar, Affaier, & Prasetya, 2026). These publications provide contextual support for the rehabilitation framework and health-service perspective rather than direct evidence that these interventions reduce bruxism.

The evidence should nevertheless be interpreted in light of several limitations. Direct exercise trials involving individuals with confirmed bruxism remain limited, sample sizes are generally small, bruxism assessment methods vary considerably, and many studies focus primarily on TMD symptoms rather than objectively assessed bruxism activity. Evidence from athletic populations is also predominantly cross-

sectional and therefore cannot establish causal relationships. Consequently, the current literature supports a clinically plausible rehabilitation framework but does not yet provide sufficient evidence for a definitive exercise prescription specifically intended to reduce bruxism activity.

CONCLUSION

Physical activity may support the rehabilitation of individuals with bruxism, particularly by improving stress, sleep, pain, physical functioning, and quality of life. However, current evidence remains insufficient to establish exercise as a direct treatment for reducing bruxism activity. Exercise should therefore be individualized according to bruxism phenotype, functional impairment, training load, and recovery, and integrated with behavioural, sleep, physiotherapy, and dental management.

REFERENCES

- Archer, A. B., Da-Cas, C. D., Valesan, L. F., Cunha, T. C. A., Januzzi, E., Garanhani, R. R., & de Souza, B. D. M. (2023). Prevalence of awake bruxism in the adult population: A systematic review and meta-analysis. *Clinical Oral Investigations*, 27(12), 7007–7018.
- Babiuc, I. U., Minescu, L., Tănase, G. A., Bodnar, T., Ionescu, C., Dina, M. N., et al. (2019). Clinical study on the incidence of bruxism throughout Romanian high-performance athletes. *Acta Medica Transilvanica*, 24(3), 103–106.
- Bayhan, M. S., Kadioğlu, M. B., Evli, C., Akat, B., Kadioğlu, M., Orhan, K., & Elbasan, B. (2026). Manual therapy versus home exercise in the treatment of bruxism: A randomized controlled trial with ultrasonographic, elastographic, and electromyographic assessment. *BMC Oral Health*.
- Bergmann, A., Edelhoff, D., Schubert, O., Erdelt, K. J., & Pho Duc, J. M. (2020). Effect of treatment with a full-occlusion biofeedback splint on sleep bruxism and TMD pain: A randomized controlled clinical trial. *Clinical Oral Investigations*, 24(11), 4005–4018.

Muhammad Adib Dwi Tamma Putra^{1*}, Ade Nabilah Vania Utami², Fildzah Hashifah Taufiq², Muhammad Fadill Akbar²

¹AMA University

²Universitas Sriwijaya

Corresponding author: *E-mail: adibdwi@unsri.ac.id

- Brancher, J. A., Morodome, F., Madalena, I. R., Reis, C. L. B., Von Held, R., Antunes, L. A. A., & Antunes, L. S. (2021). Salivary pH and oral health of Brazilian para-athletes: Saliva and oral health of para-athletes. *Special Care in Dentistry*, 41(4), 505–511.
- Chemelo, V. D. S., Né, Y. G. D. S., Frazão, D. R., Souza-Rodrigues, R. D. D., Fagundes, N. C. F., Magno, M. B., & Lima, R. R. (2020). Is there association between stress and bruxism? A systematic review and meta-analysis. *Frontiers in Neurology*, 11, 590779.
- Dantony, F., Romero-Rodriguez, D., Perez-Guillen, S., Cabanillas-Barea, S., Yogi, K., Blanco, D., & Carrasco-Uribarren, A. (2024). Efficacy of aerobic exercise on widespread pain sensitization in patients with temporomandibular disorders: A preliminary randomized controlled study. *Applied Sciences*, 14(5), 1799.
- Foscaldo, T. F., Belo Junior, P. H. dos S., Ribeiro, G. R., et al. (2025). Comparing botulinum toxin and biofeedback therapies for awake bruxism: A randomized clinical trial. *BMC Oral Health*, 25, 1772.
- Gębska, M., Dalewski, B., Pałka, Ł., & Kołodziej, Ł. (2023). Evaluation of the efficacy of manual soft tissue therapy and therapeutic exercises in patients with pain and limited mobility TMJ: A randomized control trial. *Head & Face Medicine*, 19, 42.
- González, I. B., Montero, J., Gómez Polo, C., & Pardo Peláez, B. (2025). Evaluation of the relationship between bruxism and/or temporomandibular disorders and stress, anxiety, depression in adults: A systematic review and qualitative analysis. *Journal of Dentistry*, 156, 105707.
- Gouw, S., de Wijer, A., Kalaykova, S. I., & Creugers, N. H. J. (2018). Masticatory muscle stretching for the management of sleep bruxism: A randomised controlled trial. *Journal of Oral Rehabilitation*, 45, 770–776.
- Graham, D. A., Lövgren, A., Häggman-Henrikson, B., et al. (2026). Management of awake bruxism: A systematic review. *BMC Oral Health*, 26, 559.
- Idáñez-Robles, A. M., Obrero-Gaitán, E., Lomas-Vega, R., et al. (2023). Exercise therapy improves pain and mouth opening in temporomandibular disorders: A systematic review with meta-analysis. *Clinical Rehabilitation*, 37(4), 443–461.
- Kadioğlu, M. B., Sezer, M., & Elbasan, B. (2024). Effects of manual therapy and home exercise treatment on pain, stress, sleep, and life quality in patients with bruxism: A randomized clinical trial. *Medicina*, 60(12), 2007.
- Li, L., Wang, C., Wang, D., Li, H., Zhang, S., He, Y., & Wang, P. (2024). Optimal exercise dose and type for improving sleep quality: A systematic review and network meta-analysis of RCTs. *Frontiers in Psychology*, 15.
- Lobbezoo, F., Ahlberg, J., Raphael, K. G., et al. (2018). International consensus on the assessment of bruxism: Report of a work in progress. *Journal of Oral Rehabilitation*, 45(11), 837–844.
- Macêdo-Filho, R. A., Leal, T. R., Cardoso, A. M. R., et al. (2019). Injuries to the stomatognathic system in Brazilian Jiu-Jitsu athletes. *Scientific Reports*, 9, 8236.
- Mendiburu-Zavala, C. E., Collí-González, D. A., Lugo-Ancona, P. E., & Peñaloza-Cuevas, R. (2022). Niveles de estrés y bruxismo durante la pandemia COVID-19 en estudiantes y deportistas universitarios evaluados de manera virtual. *International Journal of Odontostomatology*, 16(3), 403–411.
- Munro, N. R., Teague, S., Somoray, K., et al. (2026). Effect of exercise on depression and anxiety symptoms: Systematic umbrella review with meta-meta-analysis. *British Journal of Sports Medicine*, 60(8), 590–599.

Muhammad Adib Dwi Tamma Putra^{1*}, Ade Nabilah Vania Utami², Fildzah Hashifah Taufiq², Muhammad Fadill Akbar²

¹AMA University

²Universitas Sriwijaya

Corresponding author: *E-mail: adibdwi@unsri.ac.id

- Nica, I.-K., Farcasiu, A.-T., & Imre, M. (2026). The impact of lifestyle and physical activity on self-reported bruxism symptoms in young adults. *Maedica*, 21(1), 57–63.
- Oliveira, J. M. D. de, Pauletto, P., Massignan, C., D'Souza, N., Gonçalves, D. A. de G., Flores-Mir, C., & Canto, G. de L. (2023). Prevalence of awake bruxism: A systematic review. *Journal of Dentistry*, 138, 104715.
- Oliveira-Souza, A. I. S. de, Sales, L. R. do V., Coutinho, A. D. de F., Oliveira, D. A. de, & Armijo-Olivo, S. (2024). Effectiveness of an 8-week neck exercise training on pain, jaw function, and oral health-related quality of life in women with chronic temporomandibular disorders: A randomized controlled trial. *Journal of Oral & Facial Pain and Headache*, 38(1), 40–51.
- Putra, M. A. D., & Lany, A. (2025). Evaluating accessibility of medical rehabilitation services in Indonesia: Challenges and solution. *Research Horizon*, 5(4), 1305–1318.
- Putra, M. A. D. T., Akbar, M. F., Affaier, A., & Prasetya, M. V. (2026). Rehabilitation in recurrent ocular myokymia: Trigger, retraining, and visual ergonomics. *Iranian Rehabilitation Journal*, 24(1), 1–10.
- Putra, M. A. D. T., Utami, A. N. V., Akbar, M. F., & Endratamma, M. A. (2025). Rehabilitation after oral cancer: Functional, prosthetic, and psychosocial perspectives. *Journal of Head & Neck Physicians and Surgeons*, 13(2), 148–154.
- Quadrás, I. C. C., Stuginski-Barbosa, J., Ignácio, S. A., et al. (2026). Prevalence of awake bruxism and psychosocial and behavioural factors in esports players: A cross-sectional study. *Journal of Oral Rehabilitation*, 53(6), 1081–1090.
- Reynolds, B., Puentedura, E. J., Kolber, M. J., & Cleland, J. A. (2020). Effectiveness of cervical spine high-velocity, low-amplitude thrust added to behavioral education, soft tissue mobilization, and exercise for people with temporomandibular disorder with myalgia: A randomized clinical trial. *Journal of Orthopaedic & Sports Physical Therapy*, 50(8), 455–465.
- Ribeiro, I. F. B., Lieuthier, K. M., Ferreira, G. S., Passos, V. F., Peixoto, R. F., Nogueira, S. M. A., Ongaro, P. J., & Fiamengui, L. M. S. P. (2024). Clinical signs of bruxism in CrossFit® practitioners: Observational study. *Dental Press Journal of Orthodontics*, 29(5), e242476.
- Riyaz, M. M., Anu, V., Kanishkar, E. S., & Chakraborty, B. (2025). Awake bruxism among weightlifters in Chennai City: A cross-sectional prevalence study. *Dental Traumatology*, 42(4), 476–481.
- Sales, A. D. N. de, Almeida, R. de A. C., Barbosa, A. T. L., et al. (2025). Prevalence of bruxism in athletes: A systematic review and meta-analysis. *Journal of Oral Rehabilitation*, 52(9), 1518–1543.
- Singh, B., Olds, T., Curtis, R., et al. (2023). Effectiveness of physical activity interventions for improving depression, anxiety and distress: An overview of systematic reviews. *British Journal of Sports Medicine*, 57(18), 1203–1209.
- Souza, C. S. P., Spadon-Brito, L. G., Calças, M. A. D. P., et al. (2026). Behavioral and psychosocial correlates of awake bruxism behaviors in esports athletes: A cross-sectional study. *Scientific Reports*.
- Storrer, C. L. M., Costa, E. E., Scariot, R., et al. (2021). Bruxism and type of breathing as factors associated with oral herpes lesion in Brazilian para-athletes. *Special Care in Dentistry*, 41(6), 700–706.

Muhammad Adib Dwi Tamma Putra^{1*}, Ade Nabilah Vania Utami², Fildzah Hashifah Taufiq², Muhammad Fadill Akbar²

¹AMA University

²Universitas Sriwijaya

Corresponding author: *E-mail: adibdwi@unsri.ac.id

Tabrizi, R., Shourmaej, Y., Pourdanesh, F., Shafiei, S., & Moslemi, H. (2024). Does lifestyle modification (physical exercise and listening to music) improve symptoms in patients with a temporomandibular disorder? A randomized clinical trial. *National Journal of Maxillofacial Surgery*, 15(1), 55–58.

Xie, W., Lu, D., Liu, S., Li, J., & Li, R. (2024). The optimal exercise intervention for sleep quality in adults: A systematic review and network meta-analysis. *Preventive Medicine*, 183, 107955.

Muhammad Adib Dwi Tamma Putra^{1*}, Ade Nabilah Vania Utami², Fildzah Hashifah Taufiq², Muhammad Fadill Akbar²

¹AMA University

²Universitas Sriwijaya

Corresponding author: *E-mail: adibdwi@unsri.ac.id

DOI: <https://doi.org/10.56922/mhc.v5i6.4502>