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BRUXISM IN HIGH PSYCHOPHYSICAL LOAD POPULATIONS: THE ROLE OF DIGITAL DIAGNOSTIC TECHNOLOGIES IN ATHLETES AND DANCERS - A NARRATIVE REVIEW

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ABSTRACT

Background and Objective: Professional athletes and dancers operate under extreme psychosocial and physical demands, predisposing them to stress-related motor behaviors, notably awake and sleep bruxism. This review explores the neurobiological and epidemiological links between high-stress environments and bruxism, evaluating how innovative diagnostic technologies can bridge existing gaps in real-world clinical and ecological assessment.
Methods: A narrative review of recent literature (2020-2026) was conducted using databases such as PubMed, Scopus, and Google Scholar. The analysis included systematic reviews, meta-analyses, observational studies, and research on technological innovations, with particular emphasis on electromyography (EMG), ecological momentary assessment (EMA), and machine learning-based diagnostic systems.
Key Findings: Evidence demonstrates that stress acts as a primary neurobiological trigger for bruxism, significantly affecting athletic performance and, potentially, dancer well-being while contributing to craniofacial pain and physical injuries. While direct literature isolating dancers is an emerging niche, clear parallels with elite athletes may represent the high-risk nature of these professions. Crucially, the adoption of Ecological Momentary Assessment (EMA) and AI-enhanced wearable sensors (EMG) has significantly enhanced patient-reported and instrumental diagnostics, offering continuous, non-invasive data collection that captures real-world behavioral patterns and daily psychophysical load.
Conclusions: Because bruxism heavily impacts high-load populations, leveraging smartphone-based diaries and smart wearable systems is essential. These innovative technologies not only enhance diagnostic accuracy but also empower healthcare providers and coaches to deploy timely psychological and physical interventions, safeguarding performers' holistic health. Furthermore, this synthesis has broader implications for public health strategies and digital health integration in high-performance populations.

KEYWORDS

Bruxism, Athletes, Dancers, Digital Health, Ecological Momentary Assessment, Wearable Technology

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1. Introduction

Bruxism is a repetitive jaw-muscle activity characterized by the clenching or grinding of teeth, broadly classified into two distinct circadian manifestations: sleep bruxism (SB) and awake bruxism (AB). Recent global epidemiological data highlight a significant prevalence of both AB and SB across adult and pediatric populations, underscoring its significance as a growing public health concern (Zieliński et al., 2024). The clinical consequences of untreated bruxism are profound, frequently manifesting as severe tooth wear, temporomandibular disorders (TMD), craniofacial pain, and chronic headaches (Bronkhorst et al., 2024; Nascimento et al., 2024).

While the etiology of bruxism is highly multifactorial, contemporary research strongly emphasizes the role of central nervous system mechanisms, particularly in response to psychological and emotional stress. The neurobiological pathways linking psychosocial anxiety to increased masticatory muscle activity demonstrate that bruxism often serves as a somatic manifestation of high psychophysical load (Pavlou et al., 2024). Systematic reviews further confirm a significant association between elevated stress levels, specific lifestyle factors, and the frequency of both awake and sleep bruxism episodes (Paranhos et al., 2020; Fluerasu et al., 2022).

Individuals operating under extreme psychosocial and physical demands, such as elite athletes and potentially professional dancers, are particularly susceptible to these stress-related motor behaviors. In sports, intense training loads, performance anxiety, and competitive pressure contribute to a heightened prevalence of bruxism, which in turn can negatively impact overall athletic performance and recovery (Daby et al., 2025; Okshah et al., 2025). Similarly, professional dancers face severe occupational stress, characterized by rigorous physical demands, aesthetic pressures, psychological interventions, and high injury rates (De Las Heras-Fernández et al., 2023; Zhang et al., 2025). Although dancers experience comparable or even greater psychophysical loads than traditional athletes, their specific susceptibility to bruxism remains significantly underexplored, representing a critical gap in current research.

Historically, diagnosing bruxism relied heavily on retrospective self-reporting, clinical observation of dental wear, or laboratory-based polysomnography (PSG) (Kanclerska et al., 2022). While instrumental assessment via PSG remains a gold standard for SB (Cid-Verdejo et al., 2024), it is costly, time-consuming, and impractical for continuous, real-world monitoring of active professionals. Furthermore, retrospective questionnaires are highly susceptible to recall bias. To address these limitations, emerging diagnostic technologies are significantly enhancing the field. Smartphone-based Ecological Momentary Assessment (EMA) allows for the real-time recording and monitoring of AB in natural environments (Dias et al., 2021; Colonna et al., 2025), while portable electromyography (EMG) integrated with artificial intelligence (AI) and machine learning enables precise, multi-day tracking of muscle activity across various postures (Emodi-Perlman et al., 2026; Jahan Zeb Gul et al., 2024). These advancements are particularly relevant in the context of digital health transformation, where continuous monitoring and personalized data collection are becoming integral to preventive healthcare strategies.

This narrative review synthesizes current evidence regarding the prevalence, neurobiological impact, and mechanisms of bruxism in high-performance populations, with a specific focus on athletes and dancers. Additionally, it evaluates the integration of innovative diagnostic technologies, such as Ecological Momentary Assessment (EMA) and smart wearable sensors, to address existing clinical gaps and provide reliable, ecologically valid data for improving both physical and mental outcomes in individuals exposed to high neurophysical strain.

2. Methodology

This narrative review synthesizes current literature on the prevalence, neurobiological mechanisms, and clinical implications of bruxism in high psychophysical load populations, particularly athletes and professional dancers, alongside an evaluation of emerging diagnostic technologies. A comprehensive literature search was conducted across major academic databases, including PubMed, Scopus, and Google Scholar, supplemented by digital research support tools to enhance the identification of relevant studies.

The search strategy employed combinations of keywords such as “bruxism,” “athletes,” “dancers,” “psychophysical stress,” “ecological momentary assessment (EMA),” and “portable electromyography (EMG).” The initial search yielded a broader pool of publications, which were subsequently screened for relevance based on predefined inclusion criteria.

To ensure the quality and relevance of the synthesized evidence, the review prioritized peer-reviewed articles published predominantly between 2020 and 2026. A final core library of 26 highly relevant studies was selected, including systematic reviews, meta-analyses, observational clinical studies, and research on technological innovations in bruxism diagnostics. Inclusion criteria focused on studies addressing the relationship between psychosocial stress and masticatory muscle activity, as well as those evaluating modern digital health tools such as smartphone-based applications, ecological momentary assessment (EMA), and AI-driven or wearable EMG systems. Studies not directly related to bruxism, lacking a clear connection to psychophysical stress or diagnostic methodologies, or not published in peer-reviewed sources were excluded.

Given its narrative review design, this study does not adhere to a fully systematic selection or meta-analytic framework and may be subject to selection bias. Nonetheless, efforts were undertaken to ensure a balanced and comprehensive representation of current evidence across clinical, technological, and psychosocial domains.

3. Results

3.1. Psychophysical Load and Bruxism in High-Performance Populations

The neurobiological relationship between psychosocial stress and involuntary motor behaviors, such as bruxism, is well-documented in contemporary literature. A systematic review and meta-analysis by Paranhos et al. (2020) demonstrated a significant association between these factors, revealing that individuals subjected to high stress levels have a more than twofold higher increased likelihood of exhibiting bruxism compared to healthy, low-stress populations (OR = 2.07). This connection is particularly critical for high-performance populations, namely athletes and potentially professional dancers, whose daily routines are characterized by occupational exposures to physical demands and performance anxiety.

Bruxism in Athletes: Prevalence and Impact on Performance

Elite athletes operate in highly competitive environments that significantly elevate their risk for stress-related masticatory muscle activity. Recent meta-analyses confirm a notably high prevalence of bruxism in this demographic. Daby et al. estimated the overall prevalence of bruxism among athletes at 34%, noting a higher occurrence in able-bodied athletes (36%) compared to para-athletes (27%). These findings are corroborated by Okshah et al., who reported a pooled prevalence of 38% (ranging from 15% to 70%), which is substantially higher than the 8–20% prevalence typically observed in the general population. Furthermore, the risk is heavily modulated by the type of sport, with the highest rates found in combat sports (58%) and weightlifting (50%).

Beyond oral health complications, bruxism also impairs athletic performance. Okshah et al. found that athletes suffering from bruxism experience significant physiological and psychological deficits, including reduced strength (SMD = -0.48), decreased endurance (SMD = -0.41), compromised coordination, and slower reaction times. Most notably, bruxism in this population is associated with elevated anxiety, poorer sleep quality, and a severe 2.5-fold higher risk of sustaining physical injuries (OR = 2.5).

The Psychophysical Load of Professional Dancers

While athletes have been extensively studied in the context of jaw-muscle activities, professional dancers represent an equally burdened, yet clinically underrepresented demographic. Dancers endure considerable physical training loads; a systematic review by Volkova et al. highlighted that dance hours, the most common metric for training load, reach a median of 9.5 hours weekly in measured datasets, with substantially higher loads reported during intensive rehearsal and performance periods. This physical strain is inextricably linked to severe psychological challenges. According to Zhang et al., dancers face a high prevalence of mental health issues, necessitating specific psychological interventions to manage performance anxiety, emotional regulation, and eating disorder symptoms, alongside the psychological trauma of rehabilitation from frequent injuries.

The intense pressure of live performance also triggers measurable physiological responses, heavily dependent on the dancer's level of responsibility. For instance, De Las Heras-Fernández et al. (2023) analyzed endocrine responses in professional flamenco dancers and found significant differences in testosterone production based on artistic roles. Solo dancers exhibited a significant surge in testosterone (56.11% increase) following a successful performance compared to the corps de ballet (-5.05% decrease), underscoring how individual responsibility and performance anxiety act as significant modulators of physiological arousal.

Synthesis of Vulnerability

Although direct epidemiological studies explicitly quantifying bruxism in professional dancers remain scarce, the synthesis of existing evidence creates a clinical picture of high likelihood. The overlapping occupational hazards - chronic physical exertion (Volkova et al.), severe performance anxiety (Zhang et al.), physiological arousal (De Las Heras-Fernández et al., 2023), and the established neurobiological link between emotional disorders and bruxism (Paranhos et al., 2020) - strongly indicate that professional dancers, much like elite athletes, may plausibly represent a higher-risk population for bruxism due to overlapping psychophysical stressors. This vulnerability highlights the need for advanced, unobtrusive diagnostic technologies capable of monitoring these populations in their natural, high-stress environments.

3.2. Traditional vs. Innovative Diagnostic Technologies

The Gold Standard and its Limitations

Historically, the objective assessment of sleep bruxism (SB) has relied on full-night polysomnography (PSG) conducted in controlled sleep laboratories. PSG provides detailed physiological data, allowing for the comprehensive analysis of bruxism in relation to sleep architecture and respiratory events. For instance, Kanclerska et al. (2022) utilized PSG to demonstrate that nonapneic hypertensive patients exhibited a significantly higher Bruxism Episode Index (BEI = 4.47 ± 2.55) compared to normotensives (BEI = 2.03 ± 1.24, $p < 0.001$), alongside an altered N2 sleep phase and a notable positive correlation between BEI and oxygen desaturation events. While PSG remains the reference standard due to its clinical depth, it is inherently resource-intensive, expensive, and impractical for the continuous, real-world monitoring of active populations like athletes and professional dancers.

Validation of Portable Electromyography (EMG)

To address the limitations of laboratory-based PSG, portable electromyography (EMG) devices have emerged as a viable, ecologically valid alternative. A recent systematic review and meta-analysis by Cid-Verdejo et al. (2024) evaluated the diagnostic capacity of portable EMG against PSG. The quantitative analysis indicated very good diagnostic performance with an Area Under the Curve (AUC) of 0.837. The study established an optimal diagnostic cut-off point of 7 events per hour, which yielded clinically acceptable sensitivity and specificity. This transition from the lab to portable devices is crucial for assessing performers and athletes in their natural recovery environments.

The Necessity of Multi-Day Monitoring

While portable EMG enables out-of-clinic assessment, single-night recordings are often insufficient to capture the true picture of the condition. Emodi-Perlman et al. investigated the inter-day variabilities of awake and sleep muscular activity using continuous 72-hour portable EMG recordings. Their findings revealed complex temporal patterns that differ significantly between grinding and clenching. Specifically, sleep grinding episodes demonstrated a progressive day-to-day increase across the measurement nights, whereas awake grinding showed an hourly decline throughout the waking period. Because single-day assessments may fail to capture these critical temporal dynamics and may severely underestimate the condition's severity, the authors concluded that a minimum of three consecutive days is required for a comprehensive, clinically meaningful bruxism assessment.

Integration of Machine Learning and Advanced Sensing

The frontier of bruxism diagnostics is currently being shaped by the integration of artificial intelligence (AI) and advanced sensor placements. Traditionally, the masseter muscle has been the primary target for EMG-based bruxism detection, typically assessed in the supine position. However, Jahan Zeb Gul et al. (2024) challenged this paradigm by collecting EMG data across multiple anatomical sleep postures (supine, left, and right lateral recumbent) and applying six machine learning classifiers. Notably, their findings demonstrated that the temporalis muscle outperformed the masseter in bruxism detection. The Random Forest algorithm achieved the highest overall performance, reaching an accuracy of 93.33% when utilizing temporalis muscle data in the left lateral recumbent position. These results highlight that the intersection of machine learning algorithms, specific anatomical positioning, and portable EMG creates a highly accurate, non-invasive diagnostic ecosystem for high-performance populations.

3.3. Smartphone-based Ecological Momentary Assessment (EMA)

Diagnostic Validity of Mobile Health (mHealth) Applications

The transition from traditional clinical assessment to digital health solutions necessitates validation to ensure diagnostic reliability and clinical applicability. Mobile health (mHealth) applications designed to assess masticatory muscle activity and temporomandibular disorders (TMD) have demonstrated promising accuracy in this regard. A large-scale study by Hong et al. (2023), involving 500 patients, evaluated a diagnostic mobile application against specialist diagnoses supported by cone-beam computed tomography (CBCT) and magnetic resonance imaging (MRI). The application achieved a high concordance rate of 0.93 with final specialist diagnoses and 0.86 with initial clinical assessments, indicating strong diagnostic validity. These findings suggest that smartphone-based tools may support clinical decision-making and extend diagnostic capabilities beyond traditional healthcare settings.

Quantifying Bruxism in Real-Time Environments

Conventional retrospective assessment tools, such as questionnaires, are often limited by recall bias and reduced ecological validity. Ecological Momentary Assessment (EMA) addresses these limitations by prompting users at random intervals via smartphone notifications to report their current jaw condition in real time. Câmara-Souza et al. (2023) applied an EMA-based protocol to quantify awake bruxism (AB) frequency in patients with temporomandibular disorders. Their findings demonstrated significantly higher AB frequency in symptomatic individuals (62.1% ± 26.8%) compared to healthy controls (36.2% ± 27.3%, $p < 0.001$). Notably, sustained jaw muscle tension (mandibular bracing) emerged as the most prevalent behavior among symptomatic participants. This observation is particularly relevant for high-performance populations, where sustained muscular tension may occur in response to both physical exertion and psychological concentration.

Longitudinal Monitoring and Behavioral Effects

Beyond real-time data collection, EMA-based approaches may contribute to behavioral modification through increased self-awareness. Dias et al. (2021) conducted a multi-week observational study using a smartphone-based EMA protocol in a population of healthy young adults. Longitudinal analysis revealed that repeated self-monitoring improved participants' awareness of oral behaviors, including jaw bracing and teeth contact. Importantly, a gradual increase in the self-reported "relaxed" jaw state was observed over time (from 62.5% to 69.0%), suggesting a potential biofeedback-like effect. These findings indicate that EMA may serve not only as a diagnostic tool but also as a supportive mechanism for behavioral regulation.

User Experience and Practical Implementation

The successful implementation of digital health tools in high-demand environments depends on user compliance and usability. Colonna et al. (2025) evaluated patient experiences with a one-week EMA-based smartphone diary. The results indicated generally positive user acceptance, with a median score of 4 on a 5-point Likert scale. Participants reported that the primary motivation for engagement was the opportunity to gain insight into their own bruxism-related behaviors. The most commonly reported limitation was the restricted response window for answering prompts, which may affect compliance in highly dynamic daily routines.

Synthesis: Implications for High-Performance Populations

Taken together, these findings reflect a significant shift toward ecologically valid, patient-centered diagnostic approaches. Laboratory-based assessments are often impractical for elite athletes and professional dancers, due to their demanding schedules and high levels of psychophysical stress. In contrast, smartphone-based EMA provides a validated, accessible, and context-sensitive method for monitoring awake bruxism in real-world conditions. By capturing real-time data during training, rehearsal, and recovery periods, and by potentially enhancing behavioral awareness, EMA-based tools may enable earlier identification of maladaptive motor patterns and support targeted preventive strategies.

However, it is important to acknowledge that EMA relies on user compliance and self-reporting, which may introduce reporting bias and variability in data quality. Despite these limitations, the integration of EMA within broader digital health ecosystems represents a promising direction for improving the assessment and management of bruxism in high-performance populations.

3.4. Clinical and Systemic Implications of Bruxism

The clinical manifestations of bruxism extend beyond isolated dental attrition, encompassing a range of musculoskeletal, neurological, and systemic conditions. A comprehensive understanding of these comorbidities is particularly important in high-performance populations, where such disturbances may significantly impair both physical performance and overall well-being.

Temporomandibular Disorders (TMD) and Pain Management

Bruxism is widely recognized as a contributing factor to the development and exacerbation of temporomandibular disorders (TMD). A retrospective study by Nykänen et al. investigating patients referred to tertiary care for TMD management reported that temporomandibular joint pain-dysfunction syndrome accounted for 17.4% of referrals. Notably, awake bruxism (AB) was highly prevalent in this cohort, with 48.7% of patients self-reporting the behavior.

The study also highlighted important challenges in clinical management. Patients presenting with possible AB who underwent standard therapeutic approaches, including splint therapy or neuropathic pain medication, demonstrated less favorable outcomes compared to individuals without AB. Overall, only approximately half of the patients achieved meaningful symptom relief following combined treatment modalities. These findings suggest that inadequate identification and monitoring of AB may limit treatment effectiveness and underscore the need for more standardized and objective assessment strategies.

Primary Headaches and Craniofacial Pain

The sustained muscle activity associated with bruxism may contribute to the development of craniofacial pain and primary headache disorders. A scoping review by Nascimento et al. (2024) identified a consistent association between sleep bruxism and primary headaches in children and adolescents. Sleep bruxism was correlated not only with the presence of migraines but also with increased frequency, duration, and intensity of headache episodes. Additionally, individuals with tension-type headaches demonstrated a higher likelihood of concurrent sleep bruxism, with a greater prevalence observed among females.

Although these findings are derived from pediatric populations, similar neurobiological mechanisms may be relevant in adult high-performance groups. In athletes and dancers, where psychological stress and muscular overactivity are prevalent, the interaction between bruxism and headache disorders may further exacerbate functional limitations and reduce performance capacity.

Re-evaluating Associations with Sleep Apnea and Tooth Wear

Traditional clinical assumptions have often linked sleep bruxism with obstructive sleep apnea (OSA) and severe tooth wear; however, recent evidence suggests a more complex and less direct relationship. Systematic reviews and meta-analyses by Błaszczyk et al. and Sambale et al. found no significant association between OSA and sleep bruxism. The reported odds ratio for the presence of bruxism in patients with OSA was 1.23 (95% CI: 0.47–3.20), with no consistent relationship observed across varying degrees of OSA severity or patient characteristics. These findings indicate that OSA and sleep bruxism may represent distinct clinical entities with partially overlapping but independent pathophysiological pathways.

Similarly, the use of tooth wear as a reliable indicator of active bruxism has been increasingly questioned. A scoping review by Bronkhorst et al. analyzing 30 studies reported predominantly weak or inconclusive associations between general tooth wear and objectively measured bruxism. Notably, studies relying on self-reported "possible bruxism" were more likely to identify associations, whereas investigations employing instrumental assessments and multivariate analyses generally failed to confirm a significant relationship, with the exception of specific forms of cervical wear.

These findings highlight the limitations of relying solely on clinical signs for diagnosis and reinforce the importance of incorporating objective, technology-based assessment methods. The integration of approaches such as ecological momentary assessment (EMA) and portable electromyography (EMG) may enhance diagnostic accuracy, support individualized treatment planning, and reduce the risk of misinterpretation in high-performance populations.

4. Discussion

4.1. Public Health and Psychosocial Implications

Bruxism is increasingly recognized not merely as a localized dental anomaly, but as a widespread public health issue deeply rooted in psychosocial well-being and modern lifestyle factors. Awake bruxism (AB), in particular, is estimated to affect approximately one in four individuals in the general population, presenting a significant burden on healthcare systems due to its association with orofacial pain and restorative dental failures (Lövgren et al., 2026). However, the true complexity of bruxism lies in its profound connection to mental health.

The impact of severe psychological and cognitive load on motor behaviors is vividly illustrated in studies examining university students, a demographic characterized by intense academic pressure and lifestyle transitions. Research by Hilgenberg-Sydney et al. on dental students demonstrated that both awake and sleep bruxism are significantly associated with moderate-to-high anxiety levels, the use of psychotropic medications, and a higher frequency of temporomandibular disorder (TMD) signs. Similarly, Fluerasu et al. (2022) investigated medical students and found that extreme stress and anxiety - often exacerbated by social factors such as cultural adaptation and lifestyle changes - act as major favorable factors for both AB and SB. Furthermore, their study highlighted a specific psychosocial nuance: while stress and anxiety trigger both forms of bruxism, depression was uniquely associated with awake bruxism, with female students exhibiting statistically higher levels of these emotional burdens.

Viewing bruxism through this psychosocial lens fundamentally alters the approach to its clinical management. Because the condition is heavily modulated by environmental stress and emotional regulation, traditional biomechanical treatments (such as occlusal splints) are often insufficient on their own. A systematic review by Lövgren et al. (2026) emphasized that while official guidelines are still lacking, the most effective management strategies fall within the broad category of cognitive behavioral therapy (CBT). Interventions such as biofeedback, habit reversal, counseling, and reminder prompts have shown predominantly positive effects in managing the frequency and consequences of AB.

This behavioral approach aligns closely with the integration of emerging diagnostic technologies discussed in this review. Smartphone-based Ecological Momentary Assessment (EMA) functions as both a reminder prompt and a biofeedback mechanism, as advocated by current therapeutic evidence, by actively training patients to recognize and reverse stress-induced jaw bracing.

4.2. The Unique Vulnerability of Athletes and Dancers

The synthesis of the aforementioned psychosocial factors provides a framework for understanding the unique vulnerability of elite athletes and professional dancers. Both groups operate under a state of chronic "allostatic load" - the cumulative physiological wear and tear resulting from repeated adaptation to profound psychophysical stress. In these high-performance arenas, the body is the primary instrument, and the pressure to perform (whether to secure a medal or flawlessly execute a solo routine) triggers intense neurobiological arousal.

As demonstrated by the endocrinological responses in flamenco dancers and the high prevalence of bruxism in combat sports and weightlifting, this arousal requires an outlet. Jaw bracing and teeth clenching frequently serve as subconscious, somatic compensatory mechanisms. Biomechanically, bracing the mandible can temporarily enhance core stability and muscular recruitment during heavy lifts or complex dynamic movements. Psychologically, it acts as a physical manifestation of internalized anxiety and concentration. However, when this acute adaptive response becomes a chronic habit (AB) or carries over into sleep architecture (SB), it significantly impairs physical recovery, reduces coordination, and multiplies the risk of systemic injuries. Therefore, identifying these behaviors is not merely a dental concern, but a critical component of sports medicine and dance science.

4.3. The Paradigm Shift

Technological Integration

To effectively manage bruxism in these dynamic populations, the traditional diagnostic paradigm must evolve. Laboratory-based polysomnography (PSG) and retrospective clinical inspections, while valid, lack the "ecological validity" required to assess performers in their natural environments. A dancer cannot be evaluated for pre-performance awake bruxism in a sleep lab, nor can an athlete accurately recall their involuntary jaw bracing during a stressful competition.

The integration of emerging diagnostic technologies resolves this exact clinical bottleneck. Smartphone-based Ecological Momentary Assessment (EMA) has proven highly effective in capturing the contextual nuances of awake bruxism, particularly identifying "mandible bracing" as the predominant stress-induced behavior. Simultaneously, the evolution of portable electromyography (EMG) - now enhanced by machine learning algorithms capable of analyzing multiple anatomical postures with over 93% accuracy - allows for the unobtrusive, multi-day quantification of muscle activity. Together, these digital health tools represent a paradigm shift: moving diagnostics out of the clinic and into the real world. They provide continuous, objective data that can empower coaches, sports psychologists, and dental professionals to deploy timely, data-driven interventions (such as biofeedback and CBT) before severe physical and psychological consequences manifest.

4.4. Research Gaps and Limitations

While this narrative review synthesizes evidence across multiple disciplines, several limitations and research gaps must be acknowledged. First, the literature included exhibits high methodological heterogeneity, particularly regarding how bruxism is defined and assessed (ranging from self-reported questionnaires to instrumental EMG). This variability complicates direct quantitative comparisons between studies.

Most importantly, this review exposes a significant gap in the current literature regarding professional dancers. While there is a robust body of evidence documenting the extreme psychophysical loads, mental health challenges, and endocrine stress responses in dancers, empirical studies directly measuring masticatory muscle activity (bruxism) within this specific population are virtually non-existent. The high risk of bruxism in dancers must currently be inferred by drawing neurobiological and occupational parallels with elite athletes and highly stressed academic cohorts. This glaring absence highlights an urgent need for targeted, empirical research.

5. Conclusions

Bruxism is a complex, central nervous system-driven motor behavior deeply intertwined with psychosocial stress and emotional regulation. This review highlights that populations subjected to extreme psychophysical loads, specifically elite athletes and professional dancers, are exceptionally vulnerable to both awake and sleep bruxism. In these groups, subconscious jaw bracing and teeth clenching not only threaten orofacial health but also compromise physical performance, recovery, and overall well-being.

Traditional, laboratory-based diagnostic methods are often impractical for active professionals, making the integration of emerging technologies essential. Artificial intelligence-enhanced portable EMG and smartphone-based EMA represent significant advancements, providing highly accurate, ecologically valid, and non-invasive monitoring. These digital health solutions facilitate precise diagnostics and serve as therapeutic biofeedback tools. Future research should prioritize the deployment of these innovative technologies within cohorts of professional dancers to address the current literature gap and support holistic, preventive healthcare strategies in high-performance arts and sports. Current conclusions regarding dancers should be interpreted cautiously due to the scarcity of direct epidemiological evidence.

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