International Journal of Science and Research Archive
eISSN: 2582-8185
Cross Ref DOI: 10.30574/ijsra
Journal homepage: https://ijsra.net/

(REVIEW ARTICLE)

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Bruxism in the Edentulous State: A Short Review of Contemporary Diagnostic and Management Paradigms

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International Journal of Science and Research Archive, 2026, 18(01), 544-548

Publication history: Received on 11 December 2025; revised on 16 January 2026; accepted on 19 January 2026

Article DOI: https://doi.org/10.30574/ijsra.2026.18.1.0109

Abstract

Introduction: Bruxism was originally viewed as a peripheral dental issue, yet the current understanding of bruxism shows that it is a centrally regulated neuromuscular behavior which means that the bruxism exists after tooth loss.

Review: The present study synthesizes current research findings about bruxism in patients who have lost all their teeth. The study suggests that bruxism is more common among people without teeth than among people with teeth. Recent studies based on instrumental assessment have shown that the prevalence of sleep bruxism is higher in edentulous individuals than that found in the general population. The absence of teeth in the mouth of patients complicates the diagnosis of the disease because the clinician has to rely on the following signs: accelerated wear of the prosthesis, component fractures, and patient complaints, and additional objective evidence of using portable electromyography (EMG). The clinical consequences are very severe and can affect the longevity of both removable dentures and fixed dental prostheses. The literature on bruxism management is predominantly palliative and involves the use of robust prosthetic designs and complementary treatments such as botulinum toxin, which has been proven in a randomized controlled trial.

Conclusion: The analysis of the literature shows that there is a huge disparity between the relevance of the problem and the amount of dedicated research, which is a clear indication that there is a need for further research to develop evidence-based guidelines for the management of the vulnerable patient population.

Keywords: Bruxism; Complete Denture; Edentulous; Literature Review

1. Introduction

The understanding of bruxism has undergone a fundamental paradigm shift. Once considered a parafunctional habit driven by peripheral factors like occlusal interferences, it is now recognized as a centrally regulated masticatory muscle activity with a multifactorial etiology.[1,2] This modern understanding, which implicates pathophysiological, psychosocial, and genetic factors, is critical because it conceptually detaches the behavior from the presence of teeth.[1,2] Consequently, the involuntary clenching, grinding, and bracing characteristic of bruxism can persist in completely edentulous individuals, presenting significant challenges for successful prosthetic rehabilitation.[1]

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The forces generated during bruxism episodes can be destructive, leading to accelerated wear of artificial teeth, fracture of denture bases and components, and complications with dental implants.[3,4] Despite the high clinical stakes, the literature on bruxism in the edentulous population remains remarkably sparse.[1] This literature review aims to synthesize the current state of knowledge by exploring the prevalence, diagnostic challenges, clinical consequences, and management strategies for bruxism in completely edentulous patients. By doing so, it seeks to highlight critical gaps in the existing research and provide a comprehensive overview for clinicians and researchers.

2. Method

This literature review was conducted through a systematic search of major electronic databases to identify relevant scholarly articles. The primary databases searched included PubMed/MEDLINE, Scopus, and Web of Science, with supplemental searches performed in Google Scholar. The search strategy was designed to be comprehensive, employing a combination of keywords and MeSH (Medical Subject Headings) terms. Search terms included "bruxism," "sleep bruxism," "awake bruxism," "parafunction," "edentulous," "complete denture," "implant overdenture," "diagnosis," and "management". Boolean operators (AND, OR) were used to combine these terms in various configurations to maximize the retrieval of relevant studies.

The selection process focused on peer-reviewed articles published between January 2015 and August 2025 to ensure the review reflects the most current evidence and contemporary understanding of the topic. Inclusion criteria were established to select studies that specifically evaluated the prevalence, diagnosis, or management of bruxism in completely edentulous human subjects.

Articles were excluded if they focused exclusively on dentate or partially edentulous populations without providing distinct data for edentulous subjects, were published before 2015, or were not available in English. The initial screening was performed by two independent reviewers who assessed the titles and abstracts of the retrieved articles. Subsequently, a full-text review of all potentially eligible articles was conducted to determine final inclusion. Data on study design, population characteristics, diagnostic methods, prevalence rates, clinical sequelae, and management outcomes were systematically extracted from the selected articles to form the basis of this narrative synthesis.

3. Results and discussion

3.1. Prevalence and Diagnostic Challenge

The available literature indicates that bruxism is not only present but is also highly prevalent among edentulous subjects. The prevalence of Sleep Bruxism (SB) is reported to be 20% while that of Awake Bruxism (AB) is reported to be 36% in patients who wear complete dentures.[5] However, a recent study using portable electromyography (EMG) for instrumental diagnosis found a definitive SB prevalence of 78.26% in a cohort of new denture wearers.[6] This rate is higher than the 8–21% prevalence reported in the general adult population, indicating that the condition may be more common than what was thought and may be missed when non-instrumental methods are used.[7] However, although the user of denture in Indonesia keep increasing, there are still limited studies about the prevalence of SB in patients.[8]

Since there are no teeth to assess, diagnosing bruxism presents a challenge. In the absence of pathological tooth wear, the clinician will have to use a range of indirect signs and symptoms.[1] The diagnostic approach (e.g. table 1) is graded from "possible" to "probable" to "definitive" according to the level of evidence.[3,9] A "possible" diagnosis is based on self-report by the patient, which is usually not reliable for SB as the activity is not conscious.[5,10] A "probable" diagnosis is based on self-report and clinical examination. For the edentulous patient, this involves the inspection of the prosthesis for wear of artificial teeth, repeated fractures, hypertrophy of the masseter muscles, and patient complaints of morning jaw pain or fatigue.[5,10]

A "definitive" diagnosis requires instrumental confirmation.[11] While the existing laboratory-based polysomnography (PSG) remains as the gold standard, its cost and inaccessibility make it difficult for routine clinical use.[1] Portable EMG devices, which patients can use at home to record masticatory muscle activity during sleep, have emerged as a valid and feasible alternative.[1,11] These devices were used effectively to study and represent a crucial tool for advancing both the clinical diagnosis and research of bruxism in this population.[6]

Table 1 Diagnosis Grading for Bruxism

Grade	Level of Evidence
Possible	Self-report (usually comes with symptoms such as muscle spasm or pain)
Probable	Self-report and Clinical Examination of teeth (attrition might occurs)
Definitive	Instrumental confirmation (such as PSG and Portable EMG)

3.2. Clinical Consequences of Bruxism in the Edentulous

The non-functional forces exerted during bruxism can have severe consequences for the prostheses and supporting structures of an edentulous patient.

- Impact on Conventional Dentures: For wearers of complete dentures, bruxism can lead to a cascade of problems. The most common issue is the accelerated wear of acrylic denture teeth, leading to a loss of vertical dimension of occlusion (VDO), compromised aesthetics, and reduced masticatory function.[5] The repetitive, heavy loading is also a primary cause of denture base fracture, particularly midline fractures of the maxillary denture.[12] Furthermore, the non-axial forces destabilize the dentures, leading to poor retention, chronic tissue soreness, and potentially accelerating the resorption of the residual alveolar ridge.[1,5]
- Impact on Implant-Supported Prostheses: Bruxism is consistently identified in the literature as a major risk factor for complications with implant-supported prostheses.[13,14] The absence of a periodontal ligament removes the natural shock-absorbing mechanism, making implants vulnerable to overload.[14] The most common complications include the chipping or fracture of veneering materials, loosening or fracture of prosthetic parts, and accelerated wear of attachment components in overdentures.[3]

3.3. Management Strategies

The management of bruxism in edentulous patients is palliative, aiming to mitigate its destructive effects rather than cure the underlying centrally-mediated behavior.[15] Strategies are primarily focused on prosthodontic design and may be supplemented with adjunctive therapies.

3.4. Prosthodontic Solutions

- For Complete Dentures: Management focuses on creating a robust and stable prosthesis. To prevent fracture, denture bases can be reinforced with materials such as cast metal, glass fibers, or nanoparticles like Polyether Ethyl Ketone (PEEK).[12,16] The choice of occlusal scheme is also critical. Lingualized occlusion is often the most favorable for bruxers, as it helps to centralize forces and minimize destabilizing lateral pressures during grinding, thereby enhancing denture stability.[17] The application of a resilient silicone-based liner to the denture's fitting surface can provide a shock-absorbing effect, increasing comfort for patients with atrophic or sore ridges.[18,19]
- For Implant-Supported Prostheses: Protecting the implants and the superstructure from overload is very important. This involves thorough planning from the outset, such as using an adequate number and spread of implants.[20] A key management strategy is the provision of a protective occlusal splint (night guard) to be worn at night, which has been shown to reduce mechanical complications and improve patient satisfaction.[21]

3.5. Adjunctive and Non-Prosthetic Interventions

Botulinum Toxin (BTX): The strongest evidence for a non-prosthetic intervention comes from a 2021 randomized controlled trial by Ali et al.[21] This study demonstrated that BTX injections into the masticatory muscles of edentulous patients with implant overdentures were superior to both occlusal splints and a control group in improving patient satisfaction and sleep quality, while also significantly reducing the rate of mechanical complications.[21] While the broader literature on BTX for bruxism is often of low methodological quality, this trial provides strong, specific evidence for its use in this population.[22] Behavioral Therapies represent a reasonable approach for management because bruxism is strongly associated with psychological elements such as stress and anxiety.[15,23] Counseling about stress management and relaxation techniques alongside sleep hygiene practices presents a safe and affordable addition to standard care even though their effectiveness for edentulous patients remains unstudied.[23]

4. Conclusion

The edentulous population experiences bruxism at high frequencies which creates severe obstacles for achieving successful prosthetic rehabilitation. The behavior persists after tooth loss because of its centrally-mediated etiology which requires clinicians to maintain high clinical suspicion. A correct bruxism diagnosis remains difficult without tooth wear as primary evidence so clinicians should use multiple assessment methods including clinical prosthesis evaluation and instrumental assessments when available. The main approach in management involves using strong prosthetic design methods alongside additional therapeutic interventions to reduce destructive forces. The major finding from this review reveals an extreme shortage of high-quality evidence that prevents the creation of standardized evidence-based clinical guidelines. The improvement of long-term outcomes and quality of life for edentulous patients with bruxism depends on addressing the current knowledge gap through well-designed research.

Compliance with ethical standards

Acknowledgments

The authors gratefully acknowledge the support provided by the Faculty of Dentistry, Petra Christian University, Surabaya, Indonesia. The faculty's commitment to fostering academic excellence and providing institutional resources was instrumental in the successful completion of this review. Their encouragement and facilitation of interdisciplinary collaboration across the Departments of Prosthodontics, Pediatric Dentistry, Oral Biology, and Oral Medicine significantly strengthened the scholarly quality and clinical relevance of this work.

Disclosure of conflict of interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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