

The missed diagnosis and over-treatment of symptoms related to bruxism

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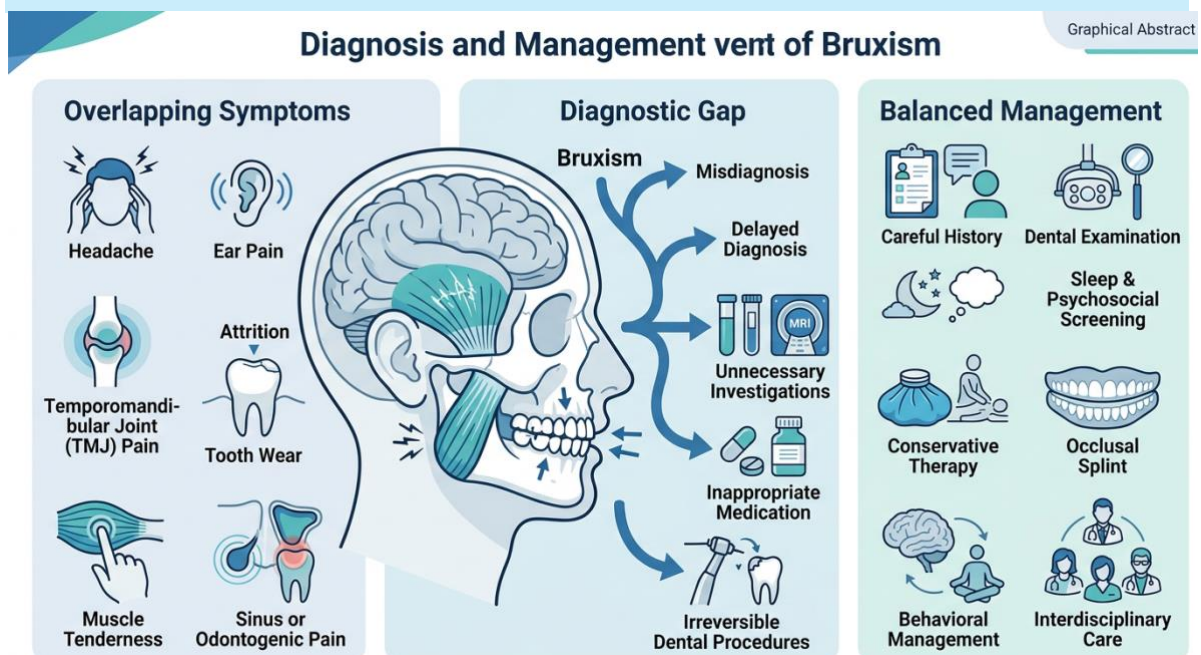
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ABSTRACT

Bruxism is a common oral parafunctional activity characterized by repetitive activity of the jaw muscles, such as clenching or grinding of teeth and bracing or thrusting of the mandible. It can occur during sleep or during wakefulness and can be accompanied by dental, muscular, temporomandibular, otologic, and headache symptoms. Bruxism is often underdiagnosed or diagnosed late because of the overlap of its clinical manifestations with migraine, tension-type headache, temporomandibular disorders, otalgia, sinus pain, and odontogenic disease. Such a diagnostic void can result in recurrent consultations, unnecessary investigations, inappropriate pharmacologic therapy, irreversible dental procedures, and treatment targeting secondary symptoms rather than the underlying behavior or contributing factors. In contrast, bruxism per se may be overtreated when mild or incidental findings are interpreted to be pathological. This review discusses the missed diagnosis of bruxism-associated symptoms, overtreatment patterns, differential diagnosis, clinical evaluation, and evidence-based management. A balanced approach that highlights careful history, dental examination, screening for sleep and psychosocial comorbidities, conservative therapy, and interdisciplinary care may reduce unnecessary treatment and improve patient outcomes.

Keywords: bruxism, missed diagnosis, overtreatment, sleep bruxism, awake bruxism, headache, migraine, temporomandibular disorders, orofacial pain, dental wear



Introduction

Bruxism is now increasingly understood as a behavior with multiple biological, psychological, and social determinants, rather than simply a dental disorder. Sleep bruxism is a sleep-related disorder, and the other type, awake bruxism, happens during wakefulness [1]. Sleep bruxism is generally classified as a sleep-related movement disorder, while awake bruxism is often linked to jaw clenching, tooth contact, or mandibular bracing in concentration, stress, or emotional tension [2].

Clinically, the significance of bruxism lies in its possible association with tooth wear, dental fractures, pain in masticatory muscles, symptoms in temporomandibular joints, morning headaches, sleep disturbance, and reduced quality of life [3]. However, not all bruxism cases are supposed to be pathological [4]. In certain individuals, bruxism can be mild, temporary, or clinically insignificant [5]. This leads to two opposite clinical difficulties, namely underdiagnosis (bruxism-related symptoms are misdiagnosed as other disorders) and

overtreatment (bruxism is treated aggressively despite limited clinical repercussions) [6].

Patients with bruxism-related pain typically present in non-dental settings, such as primary care, neurology, otolaryngology, pain medicine, and emergency departments. Symptoms such as headache, facial pain, earache, jaw tiredness, and tooth sensitivity might cause doctors to misdiagnose migraine, sinus disease, otitis, neuralgia, or temporomandibular condition without analyzing parafunctional jaw activity [7-9]. Therefore, the underlying bruxism may go undiagnosed, and patients are prescribed drugs, imaging, antibiotics, dental treatments, or referrals to specialists that may not address the major cause. This review investigates missing, misattributed, and overtreatment of bruxism-related symptoms. It also offers a clinically useful strategy for diagnosis and care that steers between neglect and over-intervention.

Materials and Methods

This narrative review was conducted to evaluate the missed diagnosis, overtreatment, clinical features, differential diagnosis, and management of bruxism-associated symptoms. Relevant literature was searched in PubMed/MEDLINE, Google Scholar, Scopus, and Web of Science using keywords such as “bruxism,” “sleep bruxism,” “awake bruxism,” “teeth grinding,” “jaw clenching,” “orofacial pain,” “temporomandibular disorders,” “headache,” “otalgia,” “misdiagnosis,” “overtreatment,” and “management.” Articles were included if they addressed the definition, diagnosis, clinical manifestations, differential diagnosis,

complications, or treatment of sleep or awake bruxism. Original studies, reviews, consensus statements, and clinical guidelines were considered. Articles that did not address bruxism, lacked clinical relevance, or had insufficient scientific support were excluded.

Data were extracted and summarized thematically, focusing on diagnostic challenges, symptom overlap with other conditions, overtreatment patterns, clinical assessment, conservative treatment, and interdisciplinary care. As the study was a narrative review based on published literature, ethical approval was not required.

Definitions and Classification

Bruxism is a repetitive activity of the jaw muscles characterized by clenching or grinding of the teeth and tensing or thrusting of the lower jaw. Bruxism has two principal circadian manifestations: sleep bruxism, which occurs during sleep, and awake

bruxism, which occurs during wakefulness. Sleep bruxism occurs during sleep, and it may be rhythmic or non-rhythmic activity of the masticatory muscles. Often reported by a bed partner or suspected based on tooth wear, jaw pain, or morning headache.

Bruxism (awake) occurs while awake and typically includes clenching, persistent teeth contact, or mandibular bracing without audible grinding. Often connected with stress, focus, anxiety, or habitual posture [10, 11].

A contemporary approach also distinguishes between: Possible bruxism: based on self-report. Probable bruxism: based on self-report plus clinical examination. Definite bruxism: diagnosis

Epidemiology and clinical burden

Bruxism occurs across age groups and is not restricted to children. Prevalence estimates are highly variable because of differences in diagnostic criteria, age groups, and assessment methods. Awake bruxism is frequently underreported because patients may not identify jaw clenching or tooth contact as abnormal. Sleep bruxism may also go unnoticed unless a bed partner hears the grinding or a dentist sees clinical signs [13].

The clinical burden of bruxism extends beyond dental wear. Chronic or recurrent pain, problems with chewing, poor sleep quality, anxiety about damage to their teeth, frequent visits to health care providers, and unnecessary treatment are some of the problems patients may experience. In some patients, bruxism contributes to a cycle of pain, muscle tension, sleep disruption, and psychological distress.

However, population-level interpretation requires caution. Bruxism is common, but severe complications occur in only a subset of patients. Therefore, diagnosis should not automatically lead to aggressive intervention [14].

Pathophysiology

There are many causes of bruxism. Occlusal factors have been historically emphasized, but more recent evidence indicates that central nervous system mechanisms, sleep physiology, autonomic activity, psychosocial stressors, and medications

made based on instrumental assessment, e.g., electromyography or polysomnography. This classification is important because self-report alone may be unreliable. Many patients are unaware of daytime clenching or sleep grinding. Tooth wear alone is not indicative of active bruxism. They may be indicative of past behaviors, diet, erosion, aging, or occupational exposure [12].

often play important roles [1, 5].
Psychosocial Factors: Awake bruxism is often associated with stress, anxiety, emotional tension, and increased arousal and may affect sleep bruxism. Many patients report clenching while working, driving, studying, or in emotional stress situations. Thus, the activity of the jaw muscles may persist in this activity as a conditioned habit even when the original stressor has changed [15]. Sleep bruxism may be associated with micro-arousals, autonomic activation, snoring, and obstructive sleep apnea. Some patients report tooth grinding associated with restless sleep, daytime sleepiness, morning headache, or witnessed pauses in breathing. Failure to screen for sleep-disordered breathing may result in incomplete treatment [16].
Medications and substances: Certain medications (notably selective serotonin reuptake inhibitors and other psychotropic agents) have been linked with bruxism in susceptible individuals. Stimulants, nicotine, caffeine, alcohol, and recreational substances may also increase risk or worsen symptoms [17].
Neurological and Medical Conditions: Bruxism may be associated with neurological disorders, movement disorders, gastroesophageal reflux disease, attention-deficit/hyperactivity disorder, and other systemic conditions. These associations are not necessarily causal in every patient but should be considered when symptoms are atypical or severe [18].

Clinical presentations that lead to missed diagnosis

Bruxism-related symptoms often mimic other disorders. Missed diagnosis occurs

when clinicians treat the presenting symptom without evaluating jaw-muscle

activity, tooth wear, or oral parafunction [19].

Headache and Migraine-Like Symptoms: Morning headache, temporal pain, scalp tenderness, and pressure-like pain may be associated with sleep bruxism or sustained awake clenching. Because these symptoms overlap with migraine and tension-type headache, patients may receive analgesics, triptans, preventive migraine medications, neuroimaging, or neurology referrals before bruxism is considered.

Bruxism should be suspected when headaches: Are worse on waking. Are associated with jaw stiffness or tooth sensitivity. Occur with temporal muscle tenderness. Coexist with tooth wear or fractured restorations. Fail to respond adequately to standard headache therapy. Importantly, bruxism and migraine can coexist. The presence of bruxism does not exclude primary headache disorders. A careful history is needed to determine whether jaw-muscle activity is a trigger, contributor, consequence, or unrelated finding [20].

Temporomandibular Joint Disorders: Bruxism is frequently confused with temporomandibular disorders, but the two are not the same. Temporomandibular disorders are disorders of the temporomandibular joints, masticatory muscles, and associated structures. Bruxism may contribute to muscle overload in some patients, but bruxism does not occur in all patients with temporomandibular disorders. Some patients experience muscle overload, yet bruxism is not present in all individuals with temporomandibular disorders, nor do temporomandibular disorders arise in every person exhibiting bruxism. Misclassification can result in unnecessary splints, occlusal adjustments, radiography, or invasive procedures. A systematic evaluation of jaw opening, joint sounds, muscle tenderness, and functional limitation is needed [21].

Otolaryngological symptoms: Bruxism patients may complain of a feeling of fullness or earache-like pain, tinnitus, or

pain around the temporomandibular joint. These symptoms may lead to repeated examinations for otitis media, eustachian tube dysfunction, or other ear disorders. If otoscopic findings are normal and pain is related to jaw movement or tenderness of muscles, bruxism and temporomandibular disorders should be considered [22]. *Tooth Sensitivity and Dental Pain:* Bruxism can lead to tooth sensitivity, fractured teeth, pulpal symptoms, restoration failure, and stress on the periodontium. However, dental pain may be misdiagnosed as caries, irreversible pulpitis, or failed restorations, leading to unnecessary procedures such as fillings, root canals, crowns, or extractions without addressing the underlying problem of excessive occlusal loading or parafunction [23]. *Face and sinuses:* Vague symptoms, such as midfacial pressure and maxillary tooth discomfort, may be attributable to sinusitis. If there is no nasal obstruction, purulent discharge, fever, or objective sinus findings, clinicians should consider referred muscle pain, dental causes, and bruxism overload [24].

Bruxism as a Potential Contributor to Migraine

In susceptible individuals, repetitive clenching, grinding, or mandibular bracing can produce sustained loading of the temporalis, masseter, and associated craniofacial tissues. The resulting peripheral nociceptive input enters through trigeminal afferents and may lower the threshold for activation of the trigeminovascular system, particularly in patients with an already sensitized migraine network [25].

Recurrent peripheral input may amplify temporal and facial pain and promote peripheral or central sensitization. Accordingly, bruxism may be clinically relevant when headache follows a consistent temporal relationship with jaw activity, is accompanied by temporalis or masseter tenderness and jaw fatigue and improves when excessive parafunction is reduced.

Current evidence supports an association rather than a proven causal relationship.

Systematic reviews have reported heterogeneous findings and low or very low certainty of evidence, particularly when sleep bruxism is distinguished from awake bruxism and when instrumental diagnosis is required [26, 27]. Bruxism should therefore

Patterns of Overtreatment

There are two broad situations in which overtreatment occurs. First, bruxism is ignored and treated as other diseases' symptoms. Secondly, bruxism is accepted but treated with measures out of proportion to the severity. *Over-diagnosis of misdiagnosed symptoms:* The patient may receive repeated doses of analgesics or migraine therapies. Antibiotics for possible sinus or ear infection. Neuroimaging for chronic headache without red-flag features. Pain due to occlusal overload (root canal treatment or crowns). Multiple specialist consultations without joint assessment. Long-acting sedatives, opioids, or muscle relaxants. Invasive procedures of the temporomandibular joint. Such interventions may increase costs, adverse effects, anxiety, and iatrogenic harm without solving the underlying problem [28]. *Bruxism Overtreatment:* When bruxism is diagnosed, management can be overdone. For example: Irreversible occlusal adjustment

Diagnostic Approach of Bruxism

A proper diagnostic approach should identify clinically significant bruxism, differentiate it from mimicking conditions, and identify comorbidities. Clinicians should inquire about: Noise of teeth grinding in sleep. Jaw bracing or daytime clenching. Jaw stiffness or tiredness in the morning. Time and place of headache. Fractures or sensitivity of the teeth. Sleep quality, snoring, observed apneas, and daytime sleepiness. Stress, anxiety, workload, concentration, and cramping. History of medication, particularly antidepressants and stimulants. Caffeine, nicotine, alcohol, and recreational drug use. Previous dental treatment and symptom response. Red flags encompass neurological deficits, fever, trauma, weight loss, or sudden severe headache. *Examination may include:* Tooth

be regarded as a possible contributing or precipitating factor in selected patients, while migraine and other primary headache disorders remain independent diagnoses that require appropriate evaluation.

without clear indication. Full mouth reconstruction based on tooth wear only. Continued medical treatment without follow-up. Conservative care before Botox treatment. No re-evaluation, multiple splints. Historical tooth wear as active disease. Bruxism is defined as the assumption that all jaw pain is caused by bruxism. An important principle is that bruxism should be treated according to the clinical consequences and not only the presence [11]. However, overtreatment should be divided into two categories: treatment resulting from missed or misattributed bruxism and disproportionate treatment of bruxism itself. The presence of tooth wear or bruxism does not by itself justify irreversible occlusal adjustment, extensive reconstruction, repeated splints, or routine botulinum toxin therapy. A common clinical error is the assumption that all jaw pain is caused by bruxism.

wear pattern and enamel loss. Cracks, fractured restorations, mobility, or fremitus. Masticatory muscle tenderness or hypertrophy. Temporalis and masseter palpation. Range of jaw opening. Deviation or deflection upon opening. Temporomandibular joint sounds. Oral mucosal signs such as cheek ridging or tongue scalloping. Periodontal status. Occlusal assessment when relevant. Instrumental testing is not required for every patient. Polysomnography or electromyography may be useful when diagnosis is uncertain. Symptoms are severe. Sleep apnea, parasomnia, or seizure disorder is suspected. Research-level confirmation is needed. Treatment has failed despite appropriate care. *For differential diagnosis:* Conditions to

consider include migraine, tension-type headache, cluster headache, temporomandibular disorders, trigeminal neuralgia, dental caries or pulpitis, cracked tooth syndrome, periodontal disease, otitis or eustachian tube dysfunction, sinusitis, obstructive sleep apnea, medication-induced movement disorders, and cervical myofascial pain [11].

Management Principles

The aim is not always to abolish bruxism completely but to reduce harm, pain, and functional impairment. The key is education. Patients should be informed that bruxism may change with stress, sleep, substances, and health conditions. They need to be taught the difference between normal jaw rest posturing and clenching. Awake bruxism may benefit from reminders and habit reversal. Stabilizing splints or night guards can protect teeth and restorations from damage. They may help with symptoms in some patients, but they do not necessarily stop bruxism. Follow up with splints for fit, wear, response to symptoms, and possible adverse effects.

Awareness training, biofeedback, habit reversal, relaxation techniques, and stress management may be useful for awake bruxism. Patients can be advised to keep the teeth apart at rest, relax the jaw, and avoid sustained clenching during work or concentration. Physical therapy, stretching, posture correction, massage, and jaw relaxation exercises may help patients with muscle pain or temporomandibular symptoms. Treatment should be individualized and avoid excessive manipulation. Patients with snoring, witnessed apneas, excessive daytime sleepiness, resistant hypertension, or morning headaches should be screened for obstructive sleep apnea. Treating sleep-disordered breathing may improve sleep quality and may reduce associated jaw-muscle activity in some patients [29].

Medication Review for Bruxism

Clinicians should consider the possibility of medication-induced bruxism if bruxism begins after the initiation or increase of a

medication. Options include dose adjustment, switching medication, or adding therapy under medical supervision. Patients should not stop taking psychiatric medications without advice from a professional. *Pharmacologic Treatment:* Medication is not usually the first-line treatment of uncomplicated bruxism. In selected cases, short-term muscle relaxants, anxiolytic strategies, or other agents may be considered, but long-term use should be used cautiously due to sedation, dependence, and adverse effects.

- *Botulinum toxin:* Botulinum toxin may be used to decrease the activity of the masseter and pain in severe refractory cases, particularly when hypertrophy of the muscle or destructive clenching continues despite conservative therapy. It should not be used as a routine first-line therapy and needs careful dosing, informed consent, and monitoring.

Dental Rehabilitation: Restorative treatment may be indicated in cases of bruxism with significant wear of the teeth, fractures, or loss of vertical dimension. However, caution should be exercised in planning definitive reconstruction, and it is generally done after parafunctional activity is controlled or protected. Treatment should not be based solely on cosmetic concerns or the historical risk of wear, as such an approach may lead to irreversible overtreatment [3].

Reducing the missed diagnosis and overtreatment of bruxism

Interdisciplinary awareness is a practical approach. Primary care clinicians, neurologists, dentists, sleep physicians, otolaryngologists, and pain specialists should consider bruxism in those with unexplained recurrent headache, jaw pain, tooth sensitivity, facial pain, or earache-like symptoms. Suggested clinical checkpoints include: Ask about jaw habits in patients with headache or facial pain. Examine the teeth and masticatory muscles when symptoms are recurrent. Screen for sleep apnea when morning headache, snoring, or daytime sleepiness is present. Review medications when symptoms begin after

pharmacologic changes. Avoid irreversible dental procedures unless there is clear structural indication. Use conservative treatment first in most cases. Reassess the response rather than escalating treatment automatically. Recognize the coexistence of bruxism with migraine, temporomandibular disorders, or anxiety [3, 11].

Proposed Clinical Algorithm

The patient has headache, jaw pain, facial pain, ear symptoms, tooth sensitivity, or dental wear. *Red flags*: Sudden severe headache, neurologic deficit, fever, trauma, cancer history, progressive symptoms, and unexplained weight loss require urgent assessment. Identify signs of bruxism. Squeaky teeth, daytime clenching, morning jaw pain, temporal headache, tooth wear,

Summary

The missed diagnosis of bruxism reflects fragmentation between dental and medical care. A patient with morning headaches may see a physician but not a dentist; a patient with tooth wear may see a dentist but not be screened for sleep apnea or medication effects. The result is often symptom-based treatment rather than cause-oriented care.

At the same time, clinicians must avoid attributing all headache or facial pain to bruxism. Migraine, neuropathic pain, inflammatory disease, dental infection, and serious intracranial pathology must be considered when clinically indicated. The most appropriate model is not bruxism versus other diagnoses, but rather bruxism as a possible contributor within a broader biopsychosocial framework.

Overtreatment is particularly concerning because many interventions are irreversible or carry long-term risk. Occlusal equilibration, extensive crowns, extractions, chronic sedatives, and repeated antibiotics are potentially harmful when used without clear indication. Conservative measures such as education, behavioral modification, protective splints, sleep assessment, and stress management are relatively low risk and often appropriate first steps.

broken restorations, masseter soreness, and cheek ridging. Assess mimics and comorbidities, such as migraine, TMD, dental disease, sinusitis, otologic disease, sleep apnea, and medication effects. Classify probability (possible, probable, or definite bruxism). *Begin conservative management*: education, habit awareness, stress reduction, sleep hygiene, and a mouth guard if tooth protection is needed. *Treat associated conditions*: Sleep apnea, anxiety, medication-induced bruxism, dental pathology, or TMD. *Reconsideration*: Conservative if asymptomatic. Consider referring to a specialist, conducting an instrumental assessment, initiating pharmacologic therapy, or using botulinum toxin in selected cases of persistent or severe symptoms [30].

Future research should clarify which patients with bruxism are most likely to develop pain or dental damage, which diagnostic tools are practical in routine care, and which treatment combinations provide durable benefit. Greater integration between dentistry, sleep medicine, neurology, and primary care is needed.

In conclusion; Bruxism is a common but often overlooked contributor to headache, jaw pain, facial pain, tooth sensitivity, dental damage, and earache-like symptoms. Because these manifestations overlap with migraine, temporomandibular disorders, sinus disease, otologic conditions, and dental pathology, bruxism may be missed, and patients may receive unnecessary or ineffective treatment. Conversely, bruxism may be overtreated when mild findings are managed with aggressive dental or pharmacologic interventions. A balanced approach involves careful history and dental and muscle examination, screening for sleep and psychosocial factors, medication review, and conservative first-line management. Acknowledging bruxism as a potential factor but not necessarily the only

diagnosis can reduce misdiagnosis, prevent overtreatment, and improve patient-centered care.

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