Bruxism in the Neurology Clinic

Though rarely a primary presentation in the general neurology practice, teeth grinding, gritting, or clinching may present as a trigger for other neurologic complaints.

BY MARTIN TAYLOR, DO, PhD

It is unlikely that a patient will present to a general neurologist with the primary complaint of teeth grinding, gritting, or clinching. It is, however, not uncommon that such a problem is present as a trigger for other neurologic complaints. The definition of bruxism varies somewhat in the literature. The American Academy of Orofacial Pain defines it as “diurnal or nocturnal parafunctional activity including clenching, bracing, gnashing, and grinding of the teeth.”\(^1\) The glossary of prosthodontic terms (GPT-8) gives a more complete definition: “Parafunctional grinding of the teeth (or). An oral habit consisting of involuntary rhythmic or spasmodic nonfunctional gnashing, grinding, or clenching of teeth, in non-chewing movements of the mandible, that can lead to occlusal trauma.”\(^2\)

Bruxism can occur during wake and/or sleep and can involve multiple muscles of mastication including the temporalis, masseter, and pterygoids. Surprisingly, almost 80 percent of grinding and gritting episodes are not accompanied by noise.\(^3\) Awake bruxism occurs in 20 percent of the adult population; sleep grinding as reported by a sleep partner is seen in eight percent of the population with female predominance.\(^4\)

The most common clinically associated symptoms include: masseter hypertrophy, tooth wear and sensitivity, morning stiffness or pain in the temporalis and masseter muscles, clicking or locking of the temporomandibular joint (TMJ) and tongue indentations.\(^5,6\) Pain and spasms involving the jaw muscles associated with bruxism are commonly mislabeled as TMJ dysfunction. The more appropriate term is temporomandibular dysfunction (TMD) as this term can include problems with the TMJ joint, an abnormal bite (malocclusion), bruxism, and/or myofascial related pain. The clinical presentation to the neurologist from this disorder may manifest as headaches, facial pain, anxiety, sleep disorder, or dystonia.

### ETIOLOGY AND ASSOCIATED CONDITIONS

Multiple factors are thought to play a role in the pathophysiology of bruxism including abnormal orofacial anatomy/malocclusion, stress/anxiety, medications, and other associated neurologic disorders.\(^6\) Exposure to substances such as alcohol, caffeine and other stimulants, and medications such as serotonin reuptake inhibitors likely act as triggers.\(^7\) More importantly for neurologists, as both a neuromuscular and dental disorder, bruxism crosses specialty lines. Physicians (including neurologists) are not typically trained in evaluation of TMD related issues and many dentists lack specialized training (with the exception of treating malocclusion and preventing tooth damage). Working with our dental colleagues and especially TMD specialists is imperative to ensure the best possible outcome for patients. Reciprocal consultation requests can occur for head and neck related pain; forming a relationship with a dental specialist can benefit patients.

### TABLE 1. BRUXISM SCREENING QUESTIONS

- Has anyone heard you grinding your teeth at night?
- Is your jaw ever fatigued or sore on awakening in the morning?
- Are you teeth or gums ever sore on awakening in the morning?
- Do you ever experience temporal headache on awakening in the morning?
- Are you ever aware of grinding your teeth during the day?
- Are you ever aware of clenching your teeth during the day?

### PRACTICAL POINTER

As both a neuromuscular and dental disorder, bruxism crosses specialty lines. Physicians (including neurologists) are not typically trained in evaluation of TMD related issues and many dentists lack specialized training (with the exception of treating malocclusion and preventing tooth damage). Working with our dental colleagues and especially TMD specialists is imperative to ensure the best possible outcome for patients. Reciprocal consultation requests can occur for head and neck related pain; forming a relationship with a dental specialist can benefit patients.
evidence suggests a central dysregulation of the direct and indirect pathways of the basal ganglion as a main pathology in bruxism.6 Bruxism, as an associated symptom, is significantly increased in some disorders of the basal ganglia such as cranio-cervical dystonia and Huntington’s disease.9,10 Within this context, an argument can be made that bruxism is a form of oromandibular dystonia. Kwak et al. observed that bruxism is more common in patients with disorders of frontal lobe dysfunction (frontotemporal dementia, normal pressure hydrocephalus) when compared to Parkinson’s disease or Alzheimer’s disease.11 Ylikoski, et al. also found no association with Parkinson’s disease and Bruxism.12 Psychosocial factors including anxiety, depression, and stress sensitivity also appear to be associated with clenching.13 Fernandes et al. have shown a significant relationship between painful TMD and headache.14 The association was found to be greatest with chronic migraine, followed by episodic migraine, and then episodic tension-type headache. Sleep bruxism was associated only with chronic migraine. Morning headaches have also been shown to have some association with bruxism in at least two studies.15,16

DIAGNOSIS

Screening questionnaires can be helpful to make sure symptoms are not overlooked. See Table 1 for an intake screening example.6 Physical exam should include palpation of the masseter, temporalis, and sternocleidomastoid muscles evaluating for muscle hypertrophy, tenderness and/or pain. In addition, the TMJ should be inspected for pain and clicking/locking as well as limitation of jaw opening. A basic evaluation for a significant underbite or overbite should be assessed. A dental examination can assess for abnormal teeth wear or damage, indentations in the sides of the tongue, and for malocclusion.

Polysomnography with nocturnal electromyographic recordings of the temporalis and masseter muscles can be diagnostic for bruxism and can reveal associated microarousals or sleep stage changes, increased respiratory and pulse rates, and even involuntary leg movements.17 Lavine et al. have proposed a specific set of polysomnographic criteria:18

- more than four bruxism episodes per hour
- more than six bruxism bursts per episode and/or 25 bruxism bursts per hour of sleep
- at least two episodes with grinding sounds

Portable EMG recording devices can also be used at home which may be less cumbersome than a full sleep study.19,20

<table>
<thead>
<tr>
<th>TABLE 2. SIGNS AND SYMPTOMS OF BRUXISM</th>
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<tbody>
<tr>
<td>• Clenching, grinding, or gritting during the day and/or grinding or tapping reported by a sleep partner</td>
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<tr>
<td>• Masseter hypertrophy</td>
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<tr>
<td>• Tooth wear and hypersensitivity</td>
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<tr>
<td>• Morning muscle stiffness or pain in involving the masticatory muscles</td>
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<tr>
<td>• Clicking or locking of temporomandibular joint</td>
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<tr>
<td>• Tongue indentations/scallopine</td>
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TREATMENTS

As both a neuromuscular and dental disorder, bruxism crosses specialty lines. Physicians (including neurologists) are not typically trained in evaluation of TMD related issues and many dentists lack specialized training (with the exception of treating malocclusion and preventing tooth damage). Working with our dental colleagues and especially TMD specialists is imperative to ensure the best possible outcome for patients. Reciprocal consultation requests can occur for head and neck related pain; therefore forming a relationship with a dental specialist that can benefit patients.

Behavioral therapy such as progressive relaxation techniques or biofeedback may be helpful for the bruxer during waking hours or ease symptoms upon falling asleep.21 Surface electromyography with leads attached to the temporalis and masseter muscles can give audio feedback to the patient and assist in learning to both recognize clenching and retrain the muscles to relax. These devices can be used in a TMD specialist’s office or at home for more frequent use.

Intraoral appliances (e.g., bruxism appliances, bite plates, night guards, occlusal devices) are the mainstay of dental treatment for bruxism. Appliances may be made of hard or soft acrylic, polycarbonate, nylon, or thermoplastic resin and are typically custom made by dentists or orthodontists.22 Despite their wide use, they do not change nocturnal bruxing behavior, and there is little objective data to support their use.23,24 The most important effects of an intraoral appliance may be to protect the teeth and surrounding oral anatomy from excessive forces and to ensure and equal bite.

Although medication treatments such as muscle relaxants and benzodiazepines may be successfully help with symptoms, there is lack of evidence for these drug classes.25,26 A single small placebo controlled trial did report significant improvement of sleep quality and decrease in the mean sleep bruxism index with 1mg of clonazepam taken thirty minutes before lights out.27 Based on a recent
Consider screening for bruxism in all patients seen for head/facial pain and sleep disorders.

Do not rely on a history of audible grinding while asleep to make a diagnosis of bruxism.

Consider bruxism in patients with daily frontotemporal headaches present upon awakening.

Foster a relationship with a trusted dental TMD expert for best clinical outcomes.

Consider adding botulinum toxin therapy for bruxism to your clinical practice.

Ask about temporalis and masseter spasms/pain in your patients with blephharospasm and cervical dystonia.

The use of botulinum toxin therapy may be the most important advancement in the treatment of bruxism, and neurologists are well-equipped to provide this service. Results of non-controlled research trials evaluating botulinum toxins specifically for bruxism and TMD related pain have been mixed. Systemic literature reviews from 1990 to 2014 found only two randomized controlled trials treating bruxism with botulinum toxin, both of which were positive. Lee et al. injected each masseter (12 subjects) with 80 units of abobotulinumtoxinA (Dysport) and reported decreased bruxism frequency. Guarda-Nardini et al. treated subjects with 30 units of onabotulinumtoxinA (Botox) in each masseter and 20 units in each temporal muscle (20 subjects) and reported decreased pain on chewing. Not mentioned in the literature reviews was a negative controlled trial by Embreg et al. Twenty one subjects were treated in a placebo-controlled, cross over design with 50 units of onabotulinumtoxinA (Botox) in each masseter muscle. No improvement in pain at rest was noted at one or three months post injection.

These small and limited trials do not allow for a meaningful conclusion regarding the use of botulinum toxins. This clinician has observed excellent subjective response to botulinum toxins in larger doses compared the studies above with patients reporting reduction in pain and spasms/grinding. Larger randomized controlled trials are needed to determine if this treatment option is objectively beneficial.