

Current Methods of Bruxism Diagnosis: A Short Communication

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Purpose: To assess the current diagnostic methods for sleep bruxism (SB). **Materials and Methods:** This review of the literature evaluates all available instrumental and noninstrumental methods of bruxism/SB diagnosis. **Results:** SB diagnosis can be performed using self-reports and clinical examination, but these methods have little agreement with polysomnography. Two portable electromyography/electrocardiography appliances have been validated against polysomnography (BiteStrip and Bruxoff), but they are indicated only for primary SB. Polysomnography is considered the gold standard and is indicated for secondary SB; however, it is expensive and time-consuming. **Conclusion:** No perfect method of SB diagnosis exists, and future research should concentrate on improving SB self-reports. *Int J Prosthodont* 2019;32:263–264. doi: 10.11607/ijp.6196

SELF-REPORTS AND CLINICAL EXAMINATION

Most studies on bruxism are based on self-reports of tooth grinding and/or clenching, and sleep bruxism (SB) diagnosis that relies on assessment by bed partners or family members is particularly difficult.¹ The literature has shown poor agreement between self-report and instrumental approaches, particularly with polysomnography (PSN), and self-reports should only be used in primary studies.² In addition, other clinical examination measures (eg, hypertrophic masticatory muscles when clenching the teeth; severe tooth grinding by clinical examination; morning headaches/face pain; indentations in the lips and/or linea alba of the cheeks) also have not been validated against PSN and might be temporary or related to swallowing or obstructive sleep apnea (OSA).¹ To increase the reliability of self-reports, real-time assessment over a period of time (eg, 1 or 2 weeks) in the patient's natural/ecologic habitat (ie, Experience Sampling Methods/Ecological Momentary Assessment [ESM/EMA]) by means of an SB activity/symptomatology diary has been proposed.¹

POLYSOMNOGRAPHY

The current gold standard for SB diagnosis is polysomnography (PSN), which is based on electromyography (EMG) assessment and grinding sounds; however, PSN is expensive, time-consuming, and not performed in the home environment. PSN is recommended in cases of secondary SB—ie, when there is a clinical history of sleep, neurologic, or other disorders affecting sleep—as opposed to primary SB, when these disorders are not present.^{1–3}

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PORTABLE APPLIANCES

Two recent meta-analyses^{2,3} evaluated the validity of questionnaires, clinical assessment, and portable diagnostic devices compared to PSN for SB diagnosis. They demonstrated that portable diagnostic devices have shown the best validity of all evaluated methods, especially as far as a four-channel EMG/electrocardiography (ECG) recording is concerned. Therefore, portable diagnostic devices seem to be practical and valid diagnostic methods of SB diagnosis.³

One portable EMG device, the BiteStrip* (<http://www.bitestrip.com/>), has been tested against PSN in patients with a positive history of SB.⁴ The results of the positive SB diagnosis with the BiteStrip against PSN, with 95% confidence intervals, were: overall agreement = 87.8% (75.8% to 94.3%); kappa index = 0.71 (0.44 to 0.97); sensitivity = 84.2% (68.7% to 93.9%); and positive predictive value (PPV) = 100% (89.1% to 100%). However, the weighted kappa index and weighted overall percent agreement for the intensity of SB (ie, no bruxism, light bruxism, moderate bruxism, or severe bruxism) between the BiteStrip and PSN was lower: kappa index = 0.51 (0.31 to 0.71) and weighted overall percent agreement = 80.27% (35.6% to 62.5%). In addition, there was a perfect specificity (100% [100%]) and a moderate negative predictive value (NPV; 64.7% [51.3% to 78.0%]) in patients without a PSN SB diagnosis.⁴ The PPV and NPV are of particular clinical relevance because, according to the results, 100% of the time the BiteStrip showed that the patient had the disease, the disease was actually present. In addition, 64.71% of the time the BiteStrip showed that the disease was negative, the disease was actually absent. Therefore, the BiteStrip is more accurate in diagnosing patients with SB than diagnosing patients without it, and it is better at detecting the presence of SB rather than its intensity. Another similar study also selected in the meta-analysis reached similar results: sensitivity = 0.71 to 0.72; and PPV = 59% to 81%.⁵

Another appliance validated against PSN is the Bruxoff device (<http://www.bruxoff.com/en/>). For manual scoring, the results were: accuracy = 89%; sensitivity = 83.3%; and specificity = 84.6%. For automatic scoring, the results were: accuracy = 91%; sensitivity = 91.6%; and specificity = 84.6%.⁶ Therefore, the device is accurate for patients with and without history of SB. However, the appliance is not disposable like the BiteStrip and can only be used in one patient at a time. Other appliances were either not tested or showed poor results and will therefore not be covered here.³

CLINICAL RECOMMENDATIONS

Self-reports and clinical examination in combination can be performed for SB diagnosis in daily practice. To confirm the clinical SB diagnosis, two portable EMG/ECG appliances have been successfully tested (ie, BiteStrip and Bruxoff), but they are indicated only for primary SB (ie, when sleep, neurologic, or other systemic disorders affecting sleep are not present). PSN (the gold standard) is indicated in secondary SB, when the above disorders are present; however, it is expensive and time-consuming.

CONCLUSIONS

The results in this review agree with a recent conclusion by a panel of experts that bruxism diagnosis can be divided into three different categories: (1) possible SB/awake bruxism based on a positive self-report only; (2) probable SB/awake bruxism based on a positive clinical inspection with or without a positive self-report; and (3) definite SB/awake bruxism based on a positive instrumental assessment with or without a positive self-report and/or a positive clinical examination.¹

ACKNOWLEDGMENTS

The authors report no conflicts of interest. According to the manufacturer site, the BiteStrip has been discontinued due to the increasing requirements of the Medical Device Regulations and the associated costs.

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*The Bitestrip has since been discontinued.