Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

HHS Public Access

Author manuscript

J Oral Rehabil. Author manuscript; available in PMC 2016 October 01.

Published in final edited form as:

J Oral Rehabil. 2015 October ; 42(10): 751–758. doi:10.1111/joor.12310.

Validity of Self-reported Sleep Bruxism among Myofascial Temporomandibular Disorder Patients and Controls

Karen G. Raphael[1], **Malvin N. Janal**[2], **David A. Sirois**[1], **Boris Dubrovsky**[3], **Jack J. Klausner**[1], **Ana C. Krieger**[4], and **Gilles J. Lavigne**[5]

[1]Dept. of Oral & Maxillofacial Pathology, Radiology & Medicine, New York University College of Dentistry, New York, NY, USA

[2]Dept. of Epidemiology and Health Promotion, New York University College of Dentistry, New York, NY, USA

[3]New York Methodist Hospital, Center for Sleep Disorders Medicine and Research, Brooklyn, NY, USA

[4]Departments of Medicine, Neurology and Neuroscience, and Genetic Medicine, Weill Cornell Medical College, Cornell University, New York, NY, USA

[5]Faculté de Médecine Dentaire, Université de Montréal, Montréal, Quebec, Canada

Abstract

Sleep bruxism (SB), primarily involving rhythmic grinding of the teeth during sleep, has been advanced as a causal or maintenance factor for a variety of orofacial problems, including temporomandibular disorders (TMD). Since laboratory polysomnographic (PSG) assessment is extremely expensive and time-consuming, most research testing this belief has relied on patient self-report of SB. The current case-control study examined the accuracy of those self-reports relative to laboratory-based PSG assessment of SB in a large sample of women suffering from chronic myofascial TMD (n=124) and a demographically matched control group without TMD (n=46). A clinical research coordinator administered a structured questionnaire to assess self-reported SB. Participants then spent two consecutive nights in a sleep laboratory. Audiovisual and electromyographic data from the second night were scored to assess whether participants met criteria for presence of 2 or more (2+) rhythmic masticatory muscle activity episodes accompanied by grinding sounds, moderate SB, or severe SB, using previously validated research scoring standards. Contingency tables were constructed to assess positive and negative predictive values, sensitivity and specificity, and 95% confidence intervals surrounding the point estimates. Results showed that self-report significantly predicted 2+ grinding sounds during sleep for TMD cases. However, self-reported SB failed to significantly predict presence or absence of either moderate or severe SB as assessed by PSG, for both cases and controls. These data show that self-report of tooth grinding awareness is highly unlikely to be a valid indicator of true SB. Studies relying on self-report to assess SB must be viewed with extreme caution.

Corresponding author: Dr. Karen G. Raphael, New York University College of Dentistry, 380 Second Avenue, Suite 301, New York, NY 10010, kgr234@nyu.edu; tel: 212-992-7043, fax: 212-997-7130.

The authors report no conflicts of interest.

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

Keywords

myofascial pain; temporomandibular disorders; TMD; sleep; bruxism; sleep bruxism; self-report; screening; polysomnography

Sleep bruxism (SB), primarily involving grinding of the teeth during sleep, has often been identified in the research literature as a risk factor for the onset or maintenance of temporomandibular disorders (TMDs), with nearly all studies finding higher self-reported SB rates in TMD cases than controls. One systematic review (1) notes that nearly all of the evidence supporting a relationship between SB and TMDs derives from self-reported interviews. In contrast to self-report, the gold standard for assessment of SB (2, 3) is generally considered to be the laboratory-based polysomnography (PSG) study. During laboratory PSG studies, electromyographic (EMG) activity of the masticatory muscles can be monitored, and audiovisual monitoring can differentiate between rhythmic masticatory muscle activity (RMMA) associated with SB and other non-SB activity, including movement artifacts. Since laboratory PSG studies are extremely expensive and time-consuming, requiring extensive training and precision in scoring, alternatives to the gold standard are necessarily employed. In addition to simple self-report, clinical evaluations may be utilized which include an examination of wear patterns of the teeth combined with patient interview. Unfortunately, clinical assessments of bruxism are likely to have insufficient reliability to be useful (4), and objectively-assessed tooth wear itself has not usually been associated with TMD pain (5–9).

A recent international consensus statement (10) proposed that bruxism, sleep or awake, be classified as possible, probable, or definite, with self-report yielding only a ‘possible’ diagnosis of bruxism. The current investigation follows up on the international consensus group’s discussion of the need for further elaboration of utility of assessment techniques that vary from the laboratory PSG standard. (10) It compares structured-interview-based measures of sleep tooth grinding as our measure of self-reported SB to laboratory-based PSG measures of SB, among a large sample of patients diagnosed with myofascial temporomandibular disorder (TMD) and demographically matched controls. This study is the first to evaluate whether self-reports of SB are valid indicators of SB as assessed by laboratory PSG.

Material and Methods

This project was approved by the Institutional Review Board of the New York University School of Medicine. All participants completed a thorough informed consent process before enrolling.

Participants

All participants were women, given the strikingly higher prevalence of TMDs in women. (11–13) Participants were recruited, consented, examined and interviewed at the New York University College of Dentistry (NYUCD), USA. All had to be fluent in English. Laboratory-based PSG studies were conducted at a sleep center affiliated with the NYU

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

School of Medicine. Participants for this investigation were enrolled solely on the basis of a diagnosis of myofascial TMD. Participants' beliefs or knowledge of their own SB was only queried after enrollment, to avoid sampling bias in either SB prevalence of sleep EMG activity.

TMD Cases—Participating myofascial TMD patients met Research Diagnostic Criteria (RDC/TMD) for TMD Group I (14): pain of muscle origin, including a complaint of pain and pain associated with localized areas of tenderness to palpation in muscle. Criteria include: (1) Report of pain or ache in the jaw, temples, face, preauricular area, or inside the ear at rest or during function; plus: (2) Pain reported in response to palpation of 3 or more of the following 20 muscle sites: (left and right count as separate sites for each muscle): posterior temporalis, middle temporalis, anterior temporalis, origin of masseter, body of masseter, insertion of masseter, posterior mandibular region, submandibular region, lateral pterygoid area, and tendon of the temporalis. At least one site must have been ipsilateral to the complaint of pain.

Non-TMD Controls—A sample of female controls was recruited from acquaintances of participating TMD cases and women seeking care at NYUCD clinics for conditions unrelated to chronic facial pain. The control sample was constituted to demographically match the case sample on age, socioeconomic status, self-identified race and self-identified Hispanic ethnicity. Controls could not have reported having one or more weeks of facial pain in the last two years or more than one painful site on masticatory muscle palpation, according to RDC/TMD (14) examination procedures.

Measures

Assessment of SB: Self-Report—A clinical research coordinator conducted a structured interview with each participant, asking whether she engaged in grinding her teeth at night during sleep. Questions about clenching and daytime behaviors were also asked but are extraneous to the current investigation. For each of the sleep grinding questions to which the participant indicated "yes," the interviewer asked how she knew that she engaged in that behavior (see Table 1). The current analysis focuses on lifetime history of having regularly ground their teeth during sleep and how they knew it (e.g., told by dentist, sleep partner, etc.). Similar questions about having ground during sleep in the past two weeks were also asked, but rates of endorsement were too low to be of practical utility in analyses.

Assessment of SB: PSG—Since sleep monitoring, as well as sleeping in an unfamiliar laboratory environment can alter natural sleep (see (15)), participants spent two consecutive nights in the sleep laboratory. The first night was used for acclimation. Data from this night were not used in statistical analysis, except for three cases who failed to return for a second night and for six cases and one control when technical problems prevented second night scoring. Sleep recordings were made from approximately 10:30 pm to 7:00 am, adjusted to the participant's usual sleep time. The setting of the recordings has been described in detail elsewhere (3, 16). Technicians were blind to participants' case status.

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

The PSG record consisted of a 6-channel electroencephalogram (EEG), bilateral electrooculogram (EOG), bilateral submental (chin) and anterior tibialis EMG), right and left masseter and temporalis EMG, EKG, chest and abdominal motion (by belts with Piezoelectric sensors), body position, airflow by nasal pressure transducer and nasal/oral thermistor, and oximetry. Skin was abraded lightly with Nuprep® (Weaver & Co., Aurora, CO) prior to electrode placement to reduce noise and skin impedance. Sleep data were recorded using SomnoStarPro acquisition system (San Diego, CA) using sampling rates at 200Hz (and bandpass filtering 15–70 Hz) for EMG channels. Audio and video signals were recorded in parallel. Right masseter voltage was recorded from lights out until lights on, excluding periods in which the sleep technician intervened for technical reasons such as a disengaged electrode or the subject had an explicit behavioral awakening (e.g., request to unhook and use the lavatory). After exporting data to Stellate Harmonie (formerly Montreal, Canada; currently Natus, USA), the records were examined by two Ph.D.-level scorers with expertise in sleep medicine and trained by one of the authors' (GL) staff. The record was first scanned for periods in which the signal was at least approximately twice the awake resting baseline. Then, events were scored according to research diagnostic criteria for SB (RDC/SB) (3, 17), a set of highly specific rules defining rhythmic masticatory muscle activity (RMMA), orofacial events, and oromotor events (see (18) for details). Audio-video signals were used to differentiate tooth-grinding sounds from other oral noise during sleep (e.g., snoring, sleep talking, TMJ clicking with yawning). Three PSG-based measures of SB were examined in this study, consistent with earlier standards. (3, 17) First, as the least stringent measure associated with SB but insufficient for its diagnosis, we identified participants with at least 2 episodes (i.e., 2+ grinding events) accompanied by tooth grinding noises. Next, consistent with prior pain-related research on SB, (17) we identified whether participants met criteria for "subthreshold" or moderate RDC/SB, defined as ≥2 but ≤4 episodes of SB per hour of sleep. Finally, as the most stringent SB measure, we determined whether participants met RDC/SB criteria characterized by > 4 episodes of SB per hour of sleep, or > 25 bursts per hour of sleep.

Statistical methods—Contingency tables were created to compare dichotomized self-reports (yes or no, and omitting the few participants reporting 'don't know") with dichotomized 'gold standard' PSG evidence for 2+ grinding events, moderate SB, and severe SB. Predictive values were considered the most clinically relevant measure of association, and were justified in this study by base rates of SB that are likely to be representative of those found in the general population of TMD patients and controls. Sensitivity and specificity were also calculated, for comparison with other measures and studies in which true base rate of occurrence is not known. 95% confidence intervals were calculated for all prior measures using Wilson's efficient score method, corrected for continuity, (19) a method considered to be appropriate when cell proportions may be extreme (20). Finally, Fisher's exact tests were calculated to determine p-values for the association between dichotomized self-report and PSG measures. Conclusions regarding statistical significance would have been identical, if Pearson Chi-square tests with continuity correction had been used. "Significant" is used to indicate Type I error rates less than 5%.

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

Results

Tables 1–3 detail the operating characteristics between self-reports of tooth grinding in relation to the three PSG SB standards. The first column of all 3 tables, labeled percentages of “screen positive” participants, represents the percentage of case or control subjects who endorsed the self-report item. Rates of self-reported SB show large discrepancies between cases and controls, with much higher rates in cases, regardless of the referent reporting source (any, self, dentist, sleep partner); as previously reported, these case-control differences were highly statistically significant (18).

As shown in Table 1, among both cases and controls, there was a moderate level of agreement between the self-report of SB (regardless of the source of that information) and 2+ grinding noises during sleep (PV+s≅ 70%). That is, reports from about 70% of the people who reported grinding during the night were validated by the PSG. By contrast, while close to 60% of case reports of not grinding during the night were validated by the PSG, only about 20% of control reports were validated. As a result of the different PV− and the smaller number of controls (i.e., ~121 vs. 46), only the rates in the cases were significant. Together, these results suggest that reports of sleep grinding appear more accurate in cases than in controls, at least with reference to the presence of grinding noises in the PSG record. Nevertheless, while significant, the concordance between self-reports and PSG was not acceptably high in either group.

Table 2 and 3 examine self-report utility in relation to potentially more clinically important PSG standards of moderate (Table 2) and severe (Table 3) SB. As previously reported (18), these events were much less common than grinding noises according to PSG, and occurred at similar rates in cases and controls. The last column of both tables reveals that the self-reported bruxism was never significantly associated with the two more stringent PSG standards for SB. Negative predictive values usually exceeded 70% for all types of self-report, but positive predictive values were rarely greater than 38%. The one higher positive predictive value occurred in controls, where sleep partner self-report correctly identified moderate or severe SB for two of three of such reports.

Thus, if a woman suffering from a TMD self-reports that she has engaged in SB, it is very likely to be an over-report. On the other hand, if she asserts that she has not engaged in SB, more than three-quarters of the time she is likely to be correct. In our relatively small sample of controls, self-report of SB via any referent did not significantly predict PSG findings.

Discussion

To our knowledge, this is the first study to directly examine the concordance between self-reported SB and PSG-assessed SB. The current study found that self-report of SB indicated by endorsement of sleep tooth grinding provides above chance concordance with the occurrence of the common behavior of making 2+ grinding sounds at night (PV+ usually ≥ 70%, particularly among TMD cases). However, a negative SB self-report was less likely to predict the absence of such sounds (PV− typically ~50% among TMD cases, and much lower among controls). Yet, the production of two or more grinding sounds during sleep is a

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

common behavior, more common, in fact, in matched controls than TMD cases (18), and is unlikely to be of clinical importance. On the other hand, self-report did not predict potentially clinically significant (i.e., presumed to be associated with negative oral health consequences) moderate or severe bruxism and as seen in the PSG for either cases or controls. The difficulty in predicting PSG SB is in part attributable to its relative rarity, at least compared to occasional sleep grinding, in both cases (16.9% and 9.7% for moderate and severe PSG-assessed bruxism) and controls (17.4% and 10.9% for moderate and severe PSG-assessed SB). (18) Nevertheless, the occurrence of these events was independent of the participants' reports of SB.

Several cautionary notes related to interpretation of these data are important. By asking participants whether they "ever" ground their teeth during sleep, we have classified individuals who were told perhaps even in childhood or decades ago that their ground their teeth similarly to those who were told consistently and recently that they ground their teeth. To the extent that self-reports of sleep bruxism were based on information, positive predictive values would have been attenuated. Unfortunately, endorsement of self-reports in "past two weeks" were too rare to be of analytic use.

Although it may be viewed as a limitation, the current analyses focused on self-reports of grinding at night rather than also including self-reports of clenching at night. This was because TMD cases were much more likely to report sleep grinding than sleep clenching and only a single non-TMD control reporting sleep clenching. Moreover, the overwhelming majority of sleep bruxism events consist of phasic/grinding rather than tonic/clenching behaviors (21).

Could the fact that only a single PSG night was scored and classified have contributed to the poor concordance between self-reported SB and PSG-evaluated SB? This seems unlikely. It has been shown that diagnosis of severe SB is likely to be consistent over time (22). More recently, research examining differences between first and subsequent night effects of SB diagnoses (23) confirms that a single night is likely to be sufficient for identifying moderate or severe SB.

The current findings are important, because they are the first to demonstrate that the many studies based on self-reported SB/sleep tooth grinding are likely to reflect inaccurate assessments of oral sleep behavior. These errors may arise from factors such as a patient being told by a clinician that she engages in SB (24) or, when trying to make sense of her unexplained pain symptoms, a patient is told by her sleep partner that she makes grinding sounds during sleep. When patients suffer from unexplained symptoms, they may become 'intuitive epidemiologists,' engaging in extra effort to search for cause of their symptoms. (25) The error introduced by this bias in self-report of SB invalidates comparisons of cases and controls on self-reported SB, or comparisons between self-reported SB and anything else (e.g., psychological factors). In particular, these data are entirely inconsistent with an etiological model of TMD that has dominated dentistry since the 1960s (e.g., (26)).

The international consensus statement's (10) conclusion that self-reported bruxism reflects 'possible' bruxism is supported in part by the current analyses, in that 2+ tooth grinding

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

sounds during PSG are more likely to occur among TMD cases who self-report SB. If the goal is to use self-report as a proxy for anything other than occasional grinding sounds, self-report of SB is likely to be useful only in its absence. Only the failure of patients to indicate that they engage in SB is likely to have value in TMD patients: When patients suffer from facial pain and their treating clinician has accepted the prevailing belief (27–29) that SB is its cause and then tells these patients that they probably brux during sleep, but patients nevertheless disagree with that conclusion, the patients are likely to be correct.

The hierarchical structure of the international consensus statement for defining bruxism (10) requires self-report, clinical examination and PSG to identify ‘definite’ bruxism. This structure is most likely based upon the previously untested (and now shown as false) assumption that self-report is 100% sensitive but insufficiently specific. However, given the high rates of false negatives based on self-report, even among TMD cases who are much more likely to self-report bruxism, many individuals who demonstrate high levels of SB on PSG will have an inconclusive diagnosis of SB, if a patient does not self-report sleep tooth grinding. PSG alone, regardless of self-report or clinical assessment, seems to be a more straightforward standard for concluding that a patient engages in moderate or severe SB.

These data lead to the clear conclusion that, for both clinical and research use, self-report of SB is not a useful proxy for PSG-based evidence of SB. In women without a TMD, self-report consistently failed to significantly predict any PSG standard. Among TMD cases, particularly when derived from a sleep partner’s report, self-report was a significant predictor of grinding sounds. Since occasional grinding sounds are more likely to occur in women without TMD than among women with TMD, such a differentiation seems of little clinical or research value. Based on these findings, self-reported SB cannot be recommended even as a screening method for assessment of clinically significant SB, i.e., regular SB activity that has been hypothesized to have negative oral health consequences, certainly for women with or without a TMD. If comparable data become available for parents of children or for men, reliability of self-versus PSG-assessed SB in other samples should be examined in future research. In the absence of such data and given unlikely contradictory conclusions, we urge that self-report should not be used as a proxy for PSG-based evidence of SB.

Acknowledgments

This research was supported in part by Grant No. R01DE018569 from the National Institutes of Health, Bethesda, MD, USA.

References

1. Manfredini D, Lobbezoo F. Relationship between bruxism and temporomandibular disorders: a systematic review of literature from 1998 to 2008. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2010; 109:e26–50. [PubMed: 20451831]
2. Lavigne GJ, Khoury S, Abe S, Yamaguchi T, Raphael K. Bruxism physiology and pathology: an overview for clinicians. J Oral Rehabil. 2008; 35:476–94. [PubMed: 18557915]
3. Lavigne GJ, Rompre PH, Montplaisir JY. Sleep bruxism: validity of clinical research diagnostic criteria in a controlled polysomnographic study. J Dent Res. 1996; 75:546–52. [PubMed: 8655758]
4. Marbach JJ, Raphael KG, Janal MN, Hirschkorn-Roth R. Reliability of clinician judgements of bruxism. J Oral Rehabil. 2003; 30:113–8. [PubMed: 12535135]

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

5. Pergamalian A, Rudy TE, Zaki HS, Greco CM. The association between wear facets, bruxism, and severity of facial pain in patients with temporomandibular disorders. J Prosthet Dent. 2003; 90:194–200. [PubMed: 12886214]
6. Schierz O, John MT, Schroeder E, Lobbezoo F. Association between anterior tooth wear and temporomandibular disorder pain in a German population. J Prosthet Dent. 2007; 97:305–9. [PubMed: 17547950]
7. Hirsch C, John MT, Lobbezoo F, Setz JM, Schaller HG. Incisal tooth wear and self-reported TMD pain in children and adolescents. Int J Prosthodont. 2004; 17:205–10. [PubMed: 15119873]
8. John MT, Frank H, Lobbezoo F, Drangsholt M, Dette KE. No association between incisal tooth wear and temporomandibular disorders. J Prosthet Dent. 2002; 87:197–203. [PubMed: 11854677]
9. Janal MN, Raphael KG, Klausner J, Teaford M. The role of tooth-grinding in the maintenance of myofascial face pain: a test of alternate models. Pain Med. 2007; 8:486–96. [PubMed: 17716322]
10. Lobbezoo F, Ahlberg J, Glaros AG, Kato T, Koyano K, Lavigne GJ, et al. Bruxism defined and graded: an international consensus. J Oral Rehabil. 2013; 40:2–4. [PubMed: 23121262]
11. Marbach JJ, Ballard GT, Frankel MR, Raphael KG. Patterns of TMJ surgery: evidence of sex differences. J Am Dent Assoc. 1997; 128:609–14. [PubMed: 9150644]
12. LeResche L. Epidemiology of temporomandibular disorders: implications for the investigation of etiologic factors. Crit Rev Oral Biol Med. 1997; 8:291–305. [PubMed: 9260045]
13. Dworkin SF, Huggins KH, LeResche L, Von Korff M, Howard J, Truelove E, et al. Epidemiology of signs and symptoms in temporomandibular disorders: clinical signs in cases and controls. J Am Dent Assoc. 1990; 120:273–81. [PubMed: 2312947]
14. Dworkin SF, LeResche L. Research diagnostic criteria for temporomandibular disorders: review, criteria, examinations and specifications, critique. J Craniomandib Disord. 1992; 6:301–55. [PubMed: 1298767]
15. Thorpy, MJ. International classification of sleep disorders: diagnostic and coding manual. Rochester, MN: Allen Press; 1997.
16. Lobbezoo F, Lavigne GJ, Tanguay R, Montplaisir JY. The effect of catecholamine precursor L-dopa on sleep bruxism: a controlled clinical trial. Mov Disord. 1997; 12:73–8. [PubMed: 8990057]
17. Rompre PH, Daigle-Landry D, Guitard F, Montplaisir JY, Lavigne GJ. Identification of a sleep bruxism subgroup with a higher risk of pain. J Dent Res. 2007; 86:837–42. [PubMed: 17720851]
18. Raphael KG, Sirois DA, Janal MN, Wigren PE, Dubrovsky B, Nemelivsky LV, et al. Sleep bruxism and myofascial temporomandibular disorders: A laboratory-based polysomnographic investigation. J Am Dent Assoc. 2012; 143:1223–31. [PubMed: 23115152]
19. Wilson EB. Probable Inference, the Law of Succession, and Statistical Inference. Journal of the American Statistical Association. 1927; 22:209–12.
20. Newcombe RG. Two-sided confidence intervals for the single proportion: comparison of seven methods. Stat Med. 1998; 17:857–72. [PubMed: 9595616]
21. Maluly M, Andersen ML, Dal-Fabbro C, Garbuio S, Bittencourt L, de Siqueira JT, et al. Polysomnographic study of the prevalence of sleep bruxism in a population sample. J Dent Res. 2013; 92:97S–103S. [PubMed: 23690359]
22. Lavigne GJ, Guitard F, Rompre PH, Montplaisir JY. Variability in sleep bruxism activity over time. J Sleep Res. 2001; 10:237–44. [PubMed: 11696077]
23. Hasegawa Y, Lavigne G, Rompré P, Kato T, Urade M, Huynh N. Is there a First Night Effect on Sleep Bruxism? A Sleep Laboratory Study. Journal of Clinical Sleep Medicine: JCSM: Official Publication of the American Academy of Sleep Medicine. 2013; 9:1139–45. [PubMed: 24235894]
24. Marbach JJ, Raphael KG, Dohrenwend BP, Lennon MC. The validity of tooth grinding measures: etiology of pain dysfunction syndrome revisited. J Am Dent Assoc. 1990; 120:327–33. [PubMed: 2179359]
25. Raphael K. Recall bias: a proposal for assessment and control. Int J Epidemiol. 1987; 16:167–70. [PubMed: 3610443]
26. Laskin DM. Etiology of the pain-dysfunction syndrome. J Am Dent Assoc. 1969; 79:147–53. [PubMed: 5254545]

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

27. Le Resche L, Truelove EL, Dworkin SF. Temporomandibular disorders: a survey of dentists' knowledge and beliefs. J Am Dent Assoc. 1993; 124:90–4. 7–106. [PubMed: 8482787]

28. Tegelberg A, Wenneberg B, List T. General practice dentists' knowledge of temporomandibular disorders in children and adolescents. Eur J Dent Educ. 2007; 11:216–21. [PubMed: 17935561]

29. Glaros AG, Glass EG, McLaughlin L. Knowledge and beliefs of dentists regarding temporomandibular disorders and chronic pain. J Orofac Pain. 1994; 8:216–22. [PubMed: 7920357]

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

J Oral Rehabil. Author manuscript; available in PMC 2016 October 01.

Table 1

Positive and Negative Predictive Value of Self-Report Versus Laboratory Polysomnography (PSG) Research Criteria for Sleep Bruxism (SB) Among Myofascial TMD Cases versus Controls: 2+ Grinding Sounds

Self-Report Interview:	**PSG SB Reference Standard: 2+ Episodes with Noise (prev.=59.7% in cases; 78.3% in controls)**					
Have you *ever* been told you grind teeth at night while sleeping?		**PV+(95% CI)**	**PV−(95% CI)**	**Sensitivity (95% CI)**	**Specificity (95% CI)**	**p-value**
cases	N=121	70.6%	56.6%	67.6%	60.0%	**
	Screen+:56.2%	(58.1–80.7%)	(42.4–69.9%)	(55.3–78.0%)	(45.2–73.3%)	
controls	N=46	71.4%	20.5%	13.9%	80.0%	NS
	Screen+:28.6%	(30.3–94.9%)	(9.8–36.9%)	(5.2–30.3%)	(44/1–96.5%)	
Were you told this by…?						
Dentist?						
cases	N=122	73.5%	47.9%	48.6%	72.9%	*
	Screen+:40.2%	(58.7–84.6%)	(36.2–59.5%)	(37.0–60.5%)	(57.9–84.2%)	
controls	N=46	50.0%	19.0%	5.6%	80.0%	NS
	Screen+:8.7%	(9.2–90.8%)	(9.1–34.6%)	(1.0–20.0%)	(44.2–96.5%)	
Sleep Partner?						
cases	N=124	81.3%	47.8%	35.1%	88.0%	**
	Screen+:25.8%	(63.0–92.1%)	(37.4–58.4%)	(24.6–47.2%)	(75.0–95.0%)	
controls	N=46	100%	23.3%	8.3%	100%	NS
	Screen+:6.5%	(31.0–100%)	(12.3–39.0%)	(2.2%–23.6%)	(65.5–100%)	
Self Notices?						
cases	N=121	73.3%	47.4%	45.2%	75.0%	*
	Screen+:37.7%	(57.8–84.9%)	(35.9–59.1%)	(33.7–57.2%)	(60.1–85.9%)	

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

Self-Report Interview:	PSG SB Reference Standard: 2+ Episodes with Noise (prev.=59.7% in cases; 78.3% in controls)					
Have you *ever* been told you grind teeth at night while sleeping?		**PV+(95% CI)**	**PV−(95% CI)**	**Sensitivity (95% CI)**	**Specificity (95% CI)**	**p-value**
controls	N=46	0%	88.1%	0%	90.2%	NS
	Screen+:8.7%	(0–66.4%)	(72.6–95.6%)	(0–53.7%)	(75.9–96.8%)	

* p<.05,

** p<.01,

*** p<.001

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

J Oral Rehabil. Author manuscript; available in PMC 2016 October 01.

Table 2

Positive and Negative Predictive Value of Self-Report Versus Laboratory Polysomnography (PSG) Research Criteria for Sleep Bruxism (SB) Among Myofascial TMD Cases versus Controls: Moderate SB

Self-Report Interview:	**PSG SB Reference Standard: Moderate Bruxism, ≥2 and <4 episodes per hour and <25 bursts per hour (prevalence=16.9% in cases and 17.4% in controls)**					
Have you *ever* been told you grind teeth at night while sleeping?		**PV+(95% CI)**	**PV−(95% CI)**	**Sensitivity (95% CI)**	**Specificity (95% CI)**	**p-value**
cases	N=121	33.8%	81.1%	69.7%	48.9%	NS
	Screen+:56.2%	(23.1–46.4%)	(67.6–90.1%)	(51.1–83.8%)	(38.1–59.7%)	
controls	N=46	28.6%	71.8%	15.4%	84.8%	NS
	Screen+:28.6%	(5.1–69.7%)	(54.9–84.5%)	(2.7–46.3%)	(67.3%–94.3%)	
Were you told this by…?						
Dentist?						
cases	N=122	34.7%	78.1%	51.5%	64.0%	NS
	Screen+:40.2%	(22.1–49.7%)	(66.6–86.6%)	(33.9–68.8%)	(53.1–73.7%)	
controls	N=46	0%	69.0%	0%	87.9%	NS
	Screen+:8.7%	(0–60.4%)	(52.8–81.9%)	(0–28.3%)	(70.9–96.0%)	
Sleep Partner?						
cases	N=124	37.5%	77.2%	36.4%	78.0%	NS
	Screen+:25.8%	(21.7–56.3%)	(67.0–85.0%)	(21.0–54.9%)	(67.9–85.8.0%)	
controls	N=46	66.7%	74.4%	15.4%	97.0%	NS
	Screen+:6.5%	(12.5–98.2%)	(58.5–86.0%)	(2.7–46.3%)	(82.5–99.8%)	
Self Notices?						

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

Self-Report Interview:	PSG SB Reference Standard: Moderate Bruxism, ≥2 and <4 episodes per hour and <25 bursts per hour (prevalence=16.9% in cases and 17.4% in controls)					
Have you *ever* been told you grind teeth at night while sleeping?		**PV+(95% CI)**	**PV−(95% CI)**	**Sensitivity (95% CI)**	**Specificity (95% CI)**	**p-value**
cases	N=121	28.3%	73.7%	39.4%	62.9%	NS
	Screen+:37.7%	(16.5–43.7%)	(62.1–82.8%)	(23.4–57.8%)	(52.0–72.7%)	
controls	N=46	0%	100.0%	0%	87.9%	NS
	Screen+:8.7%	(0–60.4%)	(39.6–100.0%)	(0–28.3%)	(70.9–96.0%)	

* p<.05,

** p<.01,

*** p<.001

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

J Oral Rehabil. Author manuscript; available in PMC 2016 October 01.

Table 3

Positive and Negative Predictive Value of Self-Report Versus Laboratory Polysomnography (PSG) Research Criteria for Sleep Bruxism (SB) Among Myofascial TMD Cases versus Controls: Severe SB

Self-Report Interview:	**PSG SB Reference Standard: Severe Bruxism, ≥4 episodes per hour or >25 bursts per hour (prev.=9.7% in cases; 10.9% in controls)**					
Have you *ever* been told you grind teeth at night while sleeping?		**PV+(95% CI)**	**PV−(95% CI)**	**Sensitivity (95% CI)**	**Specificity (95% CI)**	**p-value**
case	N=121	33.8%	81.1%	69.7%	48.9%	NS
	Screen+:56.2	(23.1–46.4%)	(67.6–90.1%)	(51.1–83.8%)	(38.1–59.7%)	
controls	N=46	28.6%	92.3%	40.7%	87.8%	NS
	Screen+:28.6%	(5.1–69.7%)	(78.0–98.0%)	(7.3–83.0%)	(73.0–95.4%)	
Were you told this by…?						
Dentist?						
case	N=122	34.7%	78.1%	51.5%	64.0%	NS
	Screen+:40.2%	(22.1–49.7%)	(66.6–86.6%)	(33.9–68.8%)	(53.1–73.7%)	
controls	N=46	0%	88.1%	0	90.2%	NS
	Screen+:8.7%	(0–60.4%)	(73.6–95.5%)	(0–53.7%)	(75.9–96.8%)	
Sleep Partner?						
case	N=124	37.5%	77.2%	36.4%	78.0%	NS
	Screen+:25.8%	(21.7–56.3%)	(67.0–85.0%)	(21.0–54.9%)	(67.9–85.8.0%)	
controls	N=46	66.7%	74.4%	15.4%	97.0%	NS
	Screen+:6.5%	(12.5–98.2%)	(58.5–86.0%)	(2.7–46.3%)	(82.5–99.8%)	
Self Notices?						
case	N=122	28.3%	73.7%	39.4%	62.9%	NS

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

Self-Report Interview:	PSG SB Reference Standard: Severe Bruxism, ≥4 episodes per hour or >25 bursts per hour (prev.=9.7% in cases; 10.9% in controls)					
Have you *ever* been told you grind teeth at night while sleeping?		**PV+(95% CI)**	**PV−(95% CI)**	**Sensitivity (95% CI)**	**Specificity (95% CI)**	**p-value**
	Screen+:37.7%	(16.5–43.7%)	(62.1–82.8%)	(23.4–57.8%)	(52.0–72.7%)	
controls	N=46	0%	69.0%	0%	87.9%	NS
	Screen+:8.7%	(0–60.4%)	(31.0–18.1%)	(0–29.3%)	(70.9–96.0%)	

* p<.05,

** p<.01,

*** p<.001