Tooth Wear in Young Subjects: A Discriminator Between Sleep Bruxers and Controls?

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Purpose: This study investigated whether the presence of tooth wear in young adults can help to discriminate patients with sleep bruxism (SB) from control subjects. ***Materials and Methods:*** The tooth wear clinical scores and frequency of sleep masseter electromyographic activity of 130 subjects (26.6 ± 0.5 years) were compared in this case-control study. Tooth wear scores (collected during clinical examination) for the incisors, canines, and molars were pooled or analyzed separately for statistics. Sleep bruxers (SBrs) were divided into two subgroups according to moderate to high (M-H-SBr; n = 59) and low (L-SBr; n = 48) frequency of masseter muscle contractions. Control subjects (n = 23) had no history of tooth grinding. The sensitivity and specificity of tooth wear versus SB diagnosis, as well as positive and negative predictive values (PPV and NPV), were calculated. One-way analysis of variance and the Mann-Whitey *U* test were used to compare groups. ***Results:*** Both SBr subgroups showed significantly higher tooth wear scores than the control group for both pooled and separated scores ($P < .001$). No difference was observed between M-H-SBr and L-SBr frequency groups ($P = .14$). The pooled sum of tooth wear scores discriminates SBrs from controls (sensitivity = 94%, specificity = 87%). The tooth wear PPV for SB detection was modest (26% to 71%) but the NPV to exclude controls was high (94% to 99%). ***Conclusions:*** Although the presence of tooth wear discriminates SBrs with a current history of tooth grinding from nonbruxers in young adults, its diagnostic value is modest. Moreover, tooth wear does not help to discriminate the severity of SB. Caution is therefore mandatory for clinicians using tooth wear as an outcome for SB diagnosis. *Int J Prosthodont 2009;22:342–350.*

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Sleep bruxism (SB) is defined as an oral activity characterized by grinding or clenching of the teeth during sleep, usually associated with sleep arousals.[1] The signs or symptoms used to confirm a diagnosis of SB include: tooth grinding sounds that disrupt the bed partner's sleep, jaw muscle discomfort, temporomandibular joint pain, and headache in the temporal area as reported by the patient. Clinically, the following can be observed in patients reporting bruxism: tooth wear, cheek sucking and tongue indentation, and tooth fracture or failure of a dental restoration or prosthesis.[2–5] However, the power of these signs and symptoms to predict a diagnosis of SB has yet to be firmly established. The focus of this paper is on tooth wear.

Table 1 Summary of Tooth Wear Assessment Methods

Study	No. of subjects (age [y])	Methods	Tooth wear methods	Other tool
Ommerborn et al[21]	48 Bru + 21 Ctrl (29)	Dental cast (both)	(Bruxcore Bruxism-Monitoring Device)	–
Baba et al[25]	8 Bru + 8 Ctrl (30)	Dental casts (both)	Murphy[11]	Occlusal force
Pergamalian et al[24]	100 TMD (29.1 ± 8.1)	Dental casts (mandibular)†‡	Pullinger and Selingman[45]/modified	–
John et al[46]	145 TMD + 120 Ctrl (31.2)	Dental casts (anterior)	Pullinger and Selingman[45]/modified	–
Pigno et al[20]	71* (36-85)	Dental casts (maxillary)†	Johansson et al[6]	Occlusal force
Khan et al[22]	34 Bru + 34 sBru + 34 Ctrl	Epoxy models (both)†	Scanning-electron microscopy	–
Pintado et al[41]	18* (22-30)	Epoxy models§	3-D profiling system/measurement[12]	–
Pullinger and Seligman[45]	228 TMD + 148 Ctrl	Dental casts (both)†	Richards and Brown[13]	–
Johansson et al[19]	90* (20)	Dental casts (both)†	Home made scale	–
Seligman et al[8]	222* (24.6)	Dental casts (both)†	Richards and Brown[13]	–
Dettmar et al[27]	5* (19.6 ± 2.0)	Dental casts (both)	Measurement of tooth contact area[14]	EMG (PSG)
Carlsson et al[43]	18 Bru (38.0) + 12 Ctrl	Dental casts (both)	Home made scale	Occlusal force
Xhonga[39]	15 Bru + 15 Ctrl (26.6)	Silicon models (both)	Measurement with microscope	–
Schierz et al[9]	31 TMD + 615 Ctrl (39.6)	Clinical examination (anterior)	John et al[46]/modified	–
Cosme et al[10]	31 Bru + 49 Ctrl (25.3)	Clinical examination (both)		Bite pad with load transducer
Bernhardt et al[42]	2529* (20-79)	Clinical examination (both)	Hugoson[15]	–
Carlsson et al[23]	100* (35)	Clinical examination (both)†	Egermark-Eriksson[16]	–
Ekfeldt et al[40]	585* (20-80)	Clinical examination (both)†	Hugoson et al[17]	–
Marbach et al[44]	151 TMD + 139 Ctrl (38.9)	Clinical examination	Hannson and Nilner[18]	–

Bru = bruxer; sBru = suspected bruxer; Ctrl = control; TMD = temporomandibular disorder patient; both = maxillary and mandibular teeth; EMG = electromyography.
*Data on distribution between patient or control individuals not available.
†Separation between incisors, canine, and molars.
‡Excluded incisors.
§Included canine, second premolar, and first molar.

In the literature, tooth wear is described as loss of the constitution of the tooth, and it is grouped under the terms attrition, erosion, and abrasion.[6,7] In relation to SB, tooth wear has been further described as the cause of potential loss of enamel or dentin, hypersensitivity to cold and warmth, and eventual tooth cracking and fracture.[2]

For years, researchers have been working to demonstrate the association between SB and tooth wear in order to develop reliable methods to score or monitor tooth wear attrition (Table 1). To our knowledge, a consensus has not yet been reached. Some studies demonstrate that sleep bruxers (SBrs) can be differentiated from nonbruxers based on the degree of tooth wear,[19–21] while others have demonstrated that tooth wear magnitude or severity does not vary between those two populations.[22–24] One of the major limitations of these studies is that bruxism assessments are most frequently based on self-reports or questionnaires about tooth grinding.

To the authors' knowledge, three studies have used technologic tools to further assess the relationship between tooth wear and SB. One used occlusal force during the night,[25] whereas the other two used sleep polygraphic recordings of masseter muscles.[26,27] Again, due to the absence of a standard scoring protocol for SB and an audio-video control to discriminate SB from other orofacial activities during sleep, caution is recommended when interpreting the data.[5,28]

Therefore, the first aim of the present study was to investigate whether tooth wear can help to discriminate SBrs diagnosed through polysomnographic and audio-video recordings of the frequency of jaw motor activity during sleep from control individuals. The second aim of this study was to report on the relationship between tooth wear and frequency of jaw muscle contractions within polysomnographically defined subgroups of SBrs exhibiting moderate to high and low frequency jaw muscle (eg, masseter or temporalis) activity.[29] The null hypotheses were that tooth wear cannot differentiate tooth grinders from control individuals and that it cannot predict SB severity in relation to the frequency of jaw muscle activity.

Materials and Methods

Participants

In this case-control study, clinical examination and sleep recording data collected in 130 participants from 1988 to 2007 were analyzed. The participants were young and from both genders, with a higher proportion of women (58.5%) than men (41.5%). The subjects' mean age was 26.6 ± 0.5 years (range: 19 to 44 years). The present study uses the same sample of subjects as in the study by Rompré et al.[29]

Based on previous publications, SB subjects were included in the study according to the following criteria: *(1)* a self-reported history of frequent tooth grinding occurring at least 3 nights per week for the preceding 6 months, as confirmed by a sleep partner; *(2)* at least one of the following criteria: presence of abnormal tooth wear; jaw muscle discomfort, fatigue, or pain and jaw lock upon awakening; and masseter muscle hypertrophy upon voluntary forceful clenching.[1,29–31] The control group was constituted of subjects who did not report any history of tooth grinding or sleep laboratory evidence of SB as described below. General exclusion criteria were the presence of temporomandibular disorders, class 2 or 3 malocclusion, a medical history of neurologic or psychiatric disorders, bodily pain (eg, widespread pain, musculoskeletal or neuropathic pain), or a known history of sleep disorders (eg, insomnia, periodic limb movement, sleep disorder breathing such as apnea-hypopnea, rapid eye movement [REM] behavior disorder, somnambulism, nightmare or nocturnal terror, sleep enuresis). Patients with fewer than two posterior teeth (third molars not considered) or wearing a complete or partial denture were excluded. All participants completed an informed consent form according to the institutional rules of the Hôpital du Sacré-Coeur de Montréal, Montréal, Canada.

Tooth Wear Scoring

Tooth wear was scored for each tooth according to a method derived from criteria set forth by Johansson et al.[6] No dental casts were used; the tooth wear examinations were done directly in the clinic by three clinicians trained by the same investigator. No interclass coefficient correlation was estimated between examiners due to the fact that tooth wear was used as secondary data in a longitudinal sleep laboratory study.[29,30] The tooth wear evaluation procedure was performed with the patient sitting upright in a dental chair using a dental light from the ceiling. The tooth surface was dried with air or cotton and the degree of tooth wear was assessed in direct view or using a dental mirror according to five criteria[6]:

- Score 0: No visible facets in the enamel. Intact occlusal/incisal morphology.
- Score 1: Marked wear facets in the enamel. Altered occlusal/incisal morphology.
- Score 2: Wear into the dentin. The dentin is exposed occlusally/incisally or on an adjacent tooth surface. Occlusal/incisal morphology is changed in shape with a height reduction of the crown.
- Score 3: Extensive wear into the dentin. Larger dentin area (> 2 mm^2) exposed at occlusal/incisal tooth surface. Occlusal/incisal morphology is totally lost locally or generally. Substantial loss of crown height.
- Score 4: Wear into secondary dentin.

Average tooth wear scores (0 to 4) were obtained by dividing the sum of the scores by the number of teeth present. Tooth wear scores were calculated for each tooth type (incisor, canine, and molar) as well as for anterior teeth (incisor and canine), and data were pooled for all teeth (incisor, canine, and molar). Calculations were performed for the maxilla and mandible both together and separately.

Polygraphic Recordings and Sleep Variables Scoring

The data collected from the sleep recordings are reported elsewhere.[29] In summary, the data were collected and analyzed as follows. Polysomnographic (PSG) recordings were made in a sound-attenuated and temperature-controlled sleep laboratory room for 2 consecutive nights. None of the participants were taking sleep medication or were under the influence of alcohol, nicotine, or caffeine at the time of recording. The first night was used to permit subjects to adapt to the sleep laboratory environment and to confirm the absence of sleep disorders (eg, sleep breathing, periodic limb movements, insomnia). Data recorded during the second night were used for the analysis presented in this paper.

The sleep data were collected as follows: brain activity with two surface electroencephalographic (EEG) recordings (C_3-A_2 and O_2-A_1), heart activity with electrocardiographic (ECG) recording, eye movement for REM sleep recognition with bilateral electrooculographic (EOG) recording, and muscle activity with electromyographic (EMG) recordings of chin/suprahyoid, bilateral masseter, temporalis, and tibialis muscles. Respiratory activity was recorded using an airflow sensor and canula (since 2004), chest movement sensors (chest and abdominal belts), and oxymetry for oxygen saturation (SaO_2). Audio-video recordings were carried out to distinguish SB from nonspecific movements, such as snoring or cessation of breathing (eg, apnea) and other orofacial movements.[32,33] All signals were sampled at an acquisition rate of 256 Hz and stored at transformed 128 Hz for offline analysis using commercial software (Harmonie, Stellate).

Sleep stages were scored over 20-second sleep segments[34] and clinicians were blind to subject status. The relevant sleep outcomes were estimated (eg, sleep duration, sleep efficiency, stage duration). The jaw muscle EMG episodes, also named rhythmic masticatory muscle activity (RMMA), were scored under three types: *(1)* phasic episodes (three EMG bursts or more, each lasting 0.25 to 2.0 seconds), *(2)* tonic episodes (one EMG burst $>$ 2.0 seconds), and *(3)* mixed episodes (both types of bursts).[29–31] The EMG scoring was done from the bilateral masseter and temporalis muscles in parallel to audio-video recordings as described above.

Table 2 Demographics and Electromyographic Data of Tooth Grinding and Control Individuals

	M-H-SBr	L-SBr	Controls	*P* value group effect
Demographics				
Gender distribution	36 F, 23 M	32 F, 16 M	8 F, 15 M	.03
Age (y)	25.5 ± 0.6	27.9 ± 0.9	26.6 ± 1.5	.12
Anamnesis (y)	8 (1-20)	10 (1-40)		.27
Bruxism episodes				
No. of episodes/h	5.9 (3.7-15.2)	2.1 (0.1-4.5)	1.2 (0.0-4.0)	< .0001*
No. of episodes with noise	10.5 (0-84)	1.0 (0-12)	0.0 (0.0-.05)	< .0001*
Bruxism bursts				
No. of bursts/h	46.7 (21.0-136.8)	12.2 (0.5-23.4)	6.0 (0.0-33.4)	< .0001*

F = female, M = male.
*Post-hoc test. All paired comparisons' *P* values are <.05.
Mean ± SEM or median (min-max) when data were normalized.

Division of Subjects into SBrs and Controls

Subjects were classified into three groups based on the presence or absence of a positive tooth grinding history and the sleep laboratory EMG data using sleep bruxism research diagnostic criteria (SB-RDC)[30]: group 1—moderate to high frequency SBrs (M-H-SBr) with a positive sleep partner report of current tooth grinding, group 2—low frequency SBrs (L-SBr) with a positive sleep partner report of current tooth grinding, and group 3—control subjects with a low RMMA frequency and a negative sleep partner report of current tooth grinding (Table 2).[29]

Data Reduction in Subgroups Following Sleep Scoring

As seen in Table 2 and as described above, the 107 SB participants were divided into two groups: 59 moderate to high frequency SBrs (M-H-SBr) and 48 low frequency SBrs (L-SBr). The 23 control individuals were clearly not tooth grinders, as confirmed in the sleep laboratory. The SB variables of interest are: the number of RMMA episodes per hour, the number of episodes with noise, and the number of bruxism bursts per hour.[29,30]

Statistical Analysis

SB variables were distributed with a logarithm transformation. For these variables, the group effect was compared by one-way analysis of variance (ANOVA) followed by pairwise mean comparisons.

For the tooth wear score, the data of the two SBr subgroups and the control group were compared by Kruskal-Wallis one-way ANOVA followed by the Mann-Whitney *U* test as a post-hoc analysis for particular tooth types.

The SBr subgroups were discriminated from the control group using the following analysis. First, the sensitivity (percentage of SBrs with tooth wear) and the specificity (percentage of control individuals without tooth wear) of tooth wear scores were estimated. For this reason, the receiver operating characteristic (ROC) curve was drawn on the graph and the area under the curve was calculated for comparisons and classification among each tooth type. The larger the area under the curve on the graph, the clearer the degree of difference between the SBr subgroups and control group for each tooth type. The appropriate cutoff points were drawn from this graph for each tooth type and were divided between the positive and the negative tooth wear groups.[35,36] Thus the cutoff point was selected to result in a higher sensitivity and specificity within the tooth wear scores (0 to 4). The 95% confidence intervals for the sensitivity and specificity of the selected cutoff points were calculated from the ROC curve. Using the obtained cutoff point, a 2-by-2 contingency table was made for calculating the sensitivity and specificity of tooth wear for each tooth type. Furthermore, the positive (PPV) and negative predictive values (NPV) were calculated using the sensitivity and specificity of this result and an SB prevalence of 13% for young individuals.[37,38] Correlations between tooth wear scores and SB variables were calculated using the Spearman rank correlation coefficient. Statistical significance was accepted at $P < .05$. Systat 11(Systat Sofware) and SPSS 14.0 (SPSS) software were used for this analysis.

Results

Sleep Bruxism Variables

The number of RMMA episodes per hour was approximately five times higher in the M-H-SBr group and approximately two times higher for the L-SBr group in

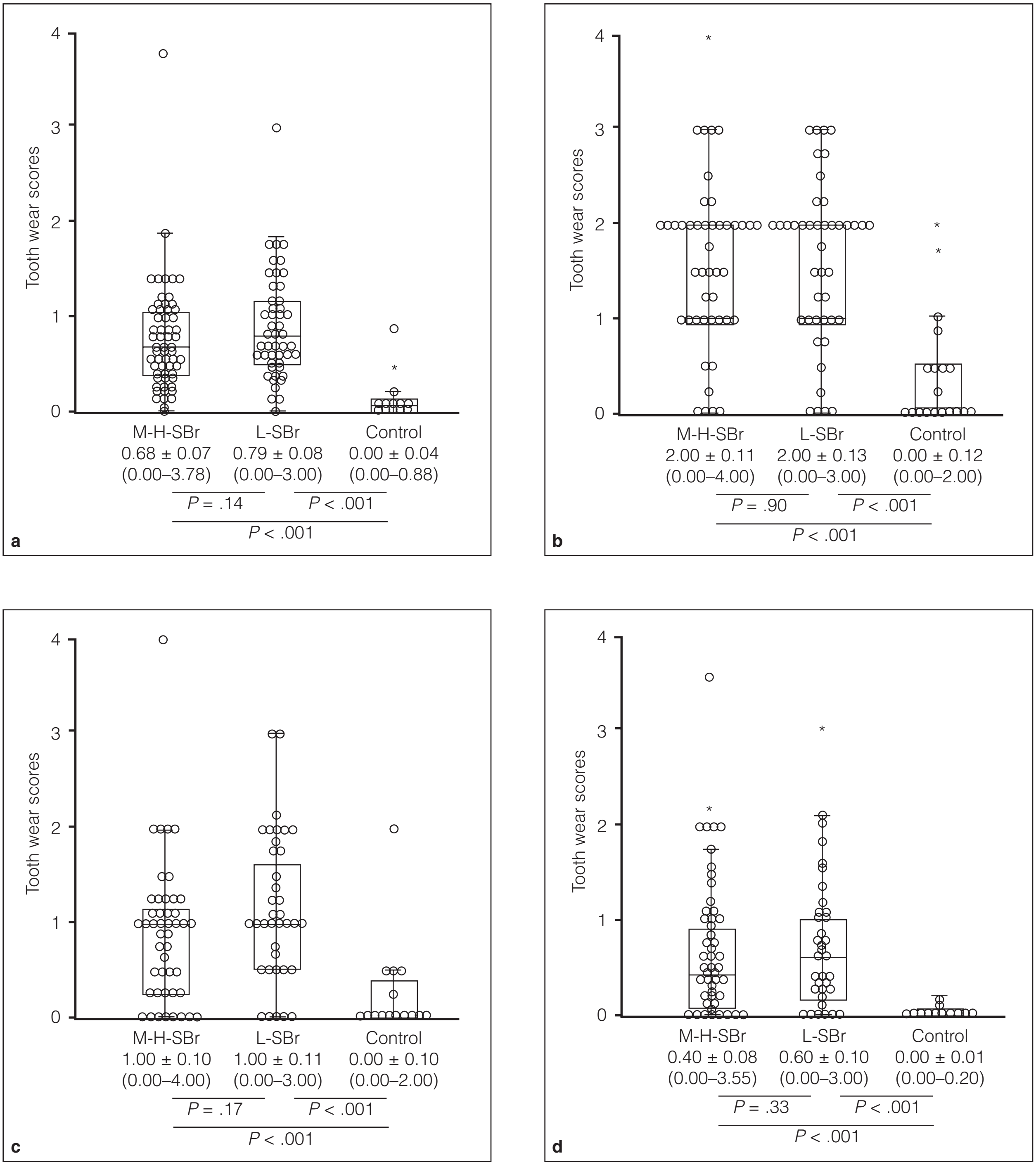

Fig 1 The distribution of occlusal tooth wear scores for sleep bruxism subgroups and control subjects. Median ± SEM (min–max) is presented for sum of tooth wear scores **(a)** and for maxillary and mandibular canines **(b)**, incisors **(c)**, and molars **(d)**. The Mann-Whitney *U* test was used to compare each subgroup. Box plots combined with symmetric dot densities are shown.

comparison to the control group, respectively ($P < .0001$) (Table 2). In a comparison between the M-H-SBr and the L-SBr groups, the number of RMMA episodes per hour was found to be approximately three times lower in the latter ($P < .0001$). The number of tooth grinding episodes with noise was higher for the M-H-SBr in comparison to the control group ($P < .0001$); a slight difference was also found when comparing the L-SBr and control groups ($P = .03$). Comparing the M-H-SBr and the L-SBr groups, it was found that the number of RMMA episodes with noise was approximately 10 times lower for the latter ($P < .0001$). The third bruxism

Table 3 The Sensitivity, Specificity, and Predictive Values of Tooth Wear

Tooth types	Area (95% CI)	Cutoff	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)
Pooled	0.945 (0.888-1.003)	0.2	94.4	87.0	52.0	99.0
Anterior	0.887 (0.799-0.975)	0.4	88.8	87.0	50.5	98.1
Both canines	0.886 (0.814-0.959)	0.6	86.9	82.6	42.7	97.7
Both molars	0.870 (0.810-0.929)	0.0	76.6	91.3	56.8	96.3
Mandibular canines	0.865 (0.784-0.946)	0.3	86.9	78.3	37.4	97.6
Maxillary canines	0.856 (0.783-0.929)	0.3	85.8	69.6	29.7	97.0
Mandibular molars	0.852 (0.789-0.916)	0.15	72.9	95.6	71.2	96.0
Maxillary molars	0.827 (0.758-0.897)	0.0	67.3	95.6	69.6	95.1
Both incisors	0.802 (0.707-0.896)	0.2	79.4	69.6	28.1	95.8
Mandibular incisors	0.764 (0.666-0.863)	0.2	72.9	69.6	26.4	94.5
Maxillary incisors	0.760 (0.662-0.857)	0.2	67.3	78.3	31.7	94.1

Pooled = sum of scores for all teeth; Area = area under the receiver operating characteristic (ROC) curve; Cutoff = discriminative point of tooth wear scores (0–4); Both = both maxillary and mandibular teeth.

variable, the number of RMMA bursts per hour, was approximately seven and two times higher for the M-H-SBr and L-SBr groups in comparison to the control group, respectively ($P < .0001$). A comparison between the M-H-SBr and the L-SBr groups showed that the number of bruxism bursts per hour was approximately four times lower in the latter ($P < .0001$).

Tooth Wear Scores

The tooth wear scores of all participants were low (below 2 over 4) and are described in Fig 1 for the sum of all teeth pooled, both maxillary and mandibular canines, both maxillary and mandibular central and lateral incisors, and both maxillary and mandibular molars. A significant difference in tooth wear scores was found in both the moderate to high and the low RMMA frequency groups together in comparison to the scores of the control group ($P < .001$). However, tooth wear scores did not contribute to discriminating between the two SBr subgroups ($P > .05$) (Fig 1). Tooth wear scores in the male SBr group were significantly higher in comparison to the female group for canine tooth types (all canines and for maxillary and mandibular canines separately) ($P < .05$; data not shown).

Sleep Bruxism Prediction Based on Tooth Types

As seen in Table 3, the estimation of the data between sensitivity over specificity, expressed by the area under the ROC curve, revealed that pooled tooth wear scores (ie, sum of scores from all teeth) have the highest value to discriminate individuals with SB from controls. In a decreasing order, discriminatory tooth wear scores (again, based on the area under the curve of sensitivity over specificity) were also important for anterior teeth (both maxillary and mandibular canines and central and lateral incisors together), pooled maxillary and mandibular molars and canines, separated maxillary and mandbibular canines and molars, and finally, the incisors.

The cutoff tooth wear score values to discriminate SB subjects from control individuals were in general low and variable. The highest value was obtained for the maxillary and mandibular canine scores together (0.6).

The highest tooth wear sensitivity was again found for the pooled scores (94.4%), but the PPV was modest (52%) and the NPV was high (99.0%). Conversely, the tooth wear specificity was high for pooled and separated maxillary and mandibular molar scores (91.3% and 95.6%, respectively). The molar tooth wear scores had the best capacity to correctly predict SB; the values were a modest PPV (56.8% for both molar scores and 71.2% for mandibular molars, respectively). The molar tooth wear scoring also had the highest capacity to exclude a normal individual from an SB diagnosis; the NPV values were high (96.3% and 96.0% and 95.1% for mandibular and maxillary molars together and separately, respectively).

Correlation with Tooth Wear

No associations between the SB variables, age, anamnesis, and each tooth type versus tooth wear for the two SBr and control individual groups were found using the Spearman rank correlation (data not shown).

Discussion

In summary, the pooled values of all tooth wear scores have the best power to discriminate and predict the presence of SB in individuals also presenting with RMMA and tooth grinding in a sleep laboratory. The use of molar tooth wear scores (both maxillary and mandibular combined or alone) was also acceptable to exclude control individuals. The PPV of canine and incisor tooth wear scores was too low (from 26.4% to 42.7%) to be valid for a correct diagnosis of SB.

Based on the literature, some studies report that patients identified with bruxism and tooth wear can be differentiated from controls[19–21,39–42]; however, others found no differences.[22,24,25,27,43–46] The issue of whether tooth wear is a reliable discriminator between SB and controls remains controversial. Discrepancies between studies may be due in part to the fact that bruxism was not diagnosed using sleep laboratory or ambulatory recording of jaw muscle activity with sound recordings to confirm the diagnosis. Most studies are based on a patient's self-report of a history of tooth grinding or jaw clenching. Patients who sleep alone may not be aware of tooth grinding; it is usually a sleep partner or family member who informs the individual that he or she is grinding or snoring during sleep.[2,5]

In this sleep laboratory study, the occlusal tooth wear patterns were scored based on data from 59 SB subjects with moderate to high RMMA frequency, 48 SB subjects with low RMMA frequency, and 23 individuals without a history or sleep laboratory evidence of tooth grinding. Despite this small sample size, the authors were able to detect differences in tooth wear between the SB and control groups.

While the individual scores of tooth wear were higher for canine teeth (mean average of 2 over 4) than those for incisors (intermediate and more variable scores) and scores for molars were the lowest (mean average below 1 over 4), these observations alone do not indicate the power to discriminate patients from normal individuals or to predict a diagnosis of SB. In fact, the authors observed that pooled tooth wear scores were best for discriminating and predicting the presence of SB.

Most clinicians know from patient reports that tooth grinding during sleep varies over time as well as from night to night. Variability of tooth grinding events is over 50% between sleep laboratory sessions.[31] This variability brings into question the validity of clinical observation of tooth wear for diagnosing SB in the absence of a clear and current history of tooth grinding.[2,5] In general, as described above, it is a bed partner or family member who provides the most reliable report on current grinding in a given individual.

Surprisingly, tooth wear scores were not powerful enough to further discriminate the severity of SB between moderate to high frequency SBrs and low frequency SBrs, based on the frequency of jaw muscle or RMMA activity. In a similar young age group, it was recently shown that there is a poor correlation between bruxism duration and tooth wear.[25] A direct relationship between magnitude of tooth wear and frequency of SB events is also not supported by the current data.

Factors such as the presence of anxiety or pain may also influence the magnitude of tooth wear between these two subgroups of tooth grinders.[29] A high positive predictive value (ie, the probability that an individual who has tooth wear is actually diagnosed in the sleep laboratory with SB)[38] was found for individual molar scores and pooled scores from all teeth. Other factors such as oral dryness and quality of saliva as a lubricant, density of dental enamel, and resistance to damage from tooth wear may also explain some of the discrepancies.[47]

The high negative predictive values of all the scores regardless of tooth type are of interest. In fact, the high NPV observed for all tooth types (ie, the probability that someone without tooth wear [negative test result] is subsequently diagnosed as a control individual and not as an SBr)[38] is reassuring. The challenge lies in how to confirm a diagnosis of SB based on tooth damage and more specifically, tooth wear. As yet, there is no definitive answer to this question, but sleep ambulatory and laboratory recording of jaw muscle activity in parallel with audio-video recordings help to exclude nonbruxism-related sleep movement disorder or activities.[2,29,47]

The results of the present study need to be interpreted with caution. To be able to investigate mechanisms related to SB causes, the authors restricted the age inclusion to between 18 and 45 years, in otherwise healthy subjects not taking medication and not presenting medical problems that may contribute to tooth damage, such as gastrointestinal reflux problems. Thus, the majority of the SB subjects were under 30 years old. The cumulative influences of age in relation to diet, medication, and health status on tooth wear remain to be assessed.[40,42] In addition, other parafunctional activities, such as wake time or diurnal tooth clenching or tapping, chewing gum or tobacco, type of diet (acidic, abrasive), as well as functional tooth contacts, can also contribute to occlusal tooth wear. Therefore, it will be necessary to estimate the influences of various cumulative factors on tooth wear in a prospective study.[20,40,48]

Another limitation of the present study is that patients were not observed in a natural environment. It is now feasible to record patients at home with ambulatory audio-video and polygraphic signals of muscles. To our knowledge, the impact of home versus sleep laboratory recording on the frequency of SB episodes or scores and RMMA is unknown. Finally, as previously mentioned, the data used in this analysis have been sampled over a long period of time. Therefore, the scorings of tooth wear were performed by different examiners at different time points and no inter- or intraobserver agreement on tooth wear scoring has been performed. However, the variability of measurements between examiners is expected to be low, since they were all trained by the same instructor.

A future prospective study will gain validity in using: *(1)* standardized diagnostic and scoring criteria and methodology to discriminate tooth grinding SB patients from normal individuals, *(2)* various tooth wear scoring methods, *(3)* more rigorous inter- and intraindividual estimation of the tooth wear scores, and *(4)* a general population presenting various tooth damage risk factors (eg, age, diet, oral dryness, saliva fluidity or lubrication quality, medication, poor density of enamel) to assess bruxism wear specificity.

Conclusions

Tooth wear, in association with a current history of sleep-related tooth grinding, seems helpful to discriminate SB patients from individuals without a tooth-grinding history. Interestingly, the pooled sum of tooth wear scores and those of molar teeth presented the highest discriminative and predictive values. However, it seems that tooth wear is a poor indicator of SB severity in relation to the frequency of jaw muscle activity. Clinicians need to recognize that in the absence of current reports on tooth grinding, tooth wear is probably not accurate for active SB diagnosis.

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