The triangle bruxism, pain, and psychosocial factors

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Publication date
2011

Chapter 3

SELF-REPORTED BRUXISM AND TEMPOROMANDIBULAR DISORDERS. FINDINGS FROM TWO SPECIALIZED CENTERS

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Submitted for publication

Abstract

The aim of the present investigation was to assess the correlation between self-reported awake/sleep bruxism and the different forms of temporomandibular disorders (TMD) and to provide a comparison of two-center findings. A standardized Research Diagnostic Criteria for TMD (RDC/TMD) assessment was performed on patients (N=616; 77% females) attending two tertiary clinics to assign axis I physical diagnoses and to record data on self-reported awake and sleep bruxism. A weak, positive association between the RDC/TMD axis I diagnosis and self-reported of bruxism was shown in the overall study sample (Cramer's V=0.170; $p<0.001$). The association was significant both in females (chi-square, $p<0.01$) and in males ($p<0.05$). Age-stratified data showed that the bruxism-TMD association was significant only in the 30-39 years age range ($p<0.01$), with moderate strength (V=0.329). Significant differences emerged between the two clinics' samples as for the prevalence of TMD diagnoses and their association with self-reported bruxism. The significantly higher prevalence of self-reported bruxism in patients with myofascial pain alone, as described in one clinic sample was not replicated in the other. In the latter sample, more multiple RDC/TMD diagnoses were present. In line with previous literature findings, it can be suggested that the potential usefulness of cross-sectional investigations to retrieve valid information for the clinical setting is limited, since, at best, they are able to describe unspecific bruxism-TMD associations with no clear results on the awake and sleep bruxism relationships with the different temporomandibular disorders.

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Introduction

Bruxism is commonly considered a major risk factor for temporomandibular disorders (TMD), but there are still many unsolved issues concerning the actual causal relationship between the occurrence of bruxism and TMD symptoms [1,2].

The design of scientifically sound studies is complicated by difficulties in diagnosing clinical bruxism, as well as by the unclear relationship between instrumentally detected bruxism on the one hand and clinically diagnosed or self-perceived bruxism on the other hand [3,4]. These difficulties also affect investigations on bruxism etiology and treatment [5,6], and a recent systematic review of the literature pointed out that inconsistent findings on the bruxism-TMD relationship may depend upon the adoption of non-homogeneous diagnostic techniques among studies [7].

Works on self-reported or clinical bruxism diagnosis commonly showed a positive association with TMD pain [8-10], while, on the contrary, such positive association was not always confirmed with studies using instrumental bruxism detection, viz., by means of polysomnography (PSG) and/or electromyography (EMG) [11,12]. Also, the studies on the bruxism-TMD relationship rarely relied on standardized TMD diagnoses. A possible strategy to ease the comparison of findings is to adopt standardized and reproducible diagnostic procedures for both TMD and bruxism. Such purpose could be achieved with the diffusion of information gained over the years with the Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD), which provides diagnostic guidelines for temporomandibular disorders as well as an anamnestic investigation of awake and sleep bruxism [13]. To the best of our knowledge, no studies address the issue of the bruxism-TMD association by relying on the RDC/TMD for diagnosing both disorders.

In this investigation,, a retrospective analysis of data gathered at two highly specialized centers for the treatment of TMD, bruxism, and orofacial pain was performed with the aims: 1. to assess the association between self-reported awake and sleep bruxism on the one hand and the different forms of temporomandibular disorders on the other; and 2. to discuss the differences between findings of the two centers.

Materials and methods

The clinical records of two samples of patients seeking treatment for TMD, recruited according to the modalities described below, were examined. All participants underwent a thorough assessment in accordance with the RDC/TMD version 1.0 guidelines [13]. The Italian and Hebrew language versions of the RDC/TMD, as available on the International RDC/TMD Consortium website [14], were adopted in the Padova and Tel Aviv samples, respectively, to assign the following axis I diagnoses: myofascial pain, either with or without limited mouth opening; disc displacement, with or without reduction; and inflammatory-degenerative disorders. The RDC/TMD's standardized anamnestic investigation was used to record data on the self-reported daytime and nighttime bruxism, on the basis of patients' answers to questions 15c ("Do you clench or grind your teeth during sleep?") and 15d ("Do you clench or grind your teeth while awake?"). For a detailed description of the diagnostic criteria, readers are referred to the original RDC/TMD publication [13] and to the successive studies [15], some of which have raised concerns that should be taken into consideration when revising the current RDC/TMD guidelines [16-18].

Data were retrieved from databases of adult patient populations attending either the TMD Clinic, University of Padova, Italy, during the period from January 1st, 2009 to June 31st, 2009 (N=219; 74.4% females; mean age 42.9±16.1, range 18-81 years), or the Orofacial Pain Clinic, University of Tel Aviv, Israel, during the period from January 1st, 2001 to December 31st, 2004 (N=397; 79.6% females; mean age 35.6±14.7, range 18-84 years) to seek treatment for TMD. Both centers serve as reference clinics for patients' referral from vast areas around their location, and investigators responsible for the RDC/TMD assessments have been involved in previous publications on RDC/TMD-related epidemiological and diagnostic issues [19-22].

For the overall sample as well as for the two clinic samples, the prevalence of each of the single and multiple RDC/TMD axis I diagnoses was assessed, as well as the frequency of positive answers to the questions on self-reported bruxism. The different combinations of clinical TMD diagnoses (no diagnoses; myofascial pain; disc displacement; inflammatory-degenerative joint disorders; myofascial pain and disc displacement; myofascial pain and inflammatory-degenerative joint disorders; disc

displacement and inflammatory-degenerative joint disorders; myofascial pain, disc displacement and inflammatory-degenerative joint disorders) were cross-tabulated with anamnestical bruxism reports (no reported bruxism; reported awake clenching/grinding; reported sleep clenching/grinding; reported awake and sleep clenching/grinding), and a chi-square test was performed to compare the prevalence of the bruxism reports between the TMD diagnostic groups. Goodman and Kruskal tau test for directional measures and Cramer's V test for symmetric measures were performed to assess the direction and strength of the association, if present. All procedures were controlled for sex and age. Statistical significance was set at $p<0.05$.

Results

The prevalence of single and multiple RDC/TMD axis I diagnoses ranged between 8.1% for combined disc displacements and inflammatory-degenerative disorders to 27.1% for myofascial pain alone. 4.4% of subjects received no diagnoses. Significant differences were shown between the two clinic samples, with myofascial pain alone being the most prevalent diagnosis in the Tel Aviv sample (36.8%) and myofascial pain combined with inflammatory-degenerative disorders in Padova (27.4%) (Chi-square test, $p<0.01$) (Table 3.1).

Sex differences were shown in the overall sample as for the prevalence of RDC/TMD diagnoses, with females receiving mainly a myofascial pain diagnosis, alone (27.8%) or combined with either inflammatory-degenerative joint disorders (16.7%) or disc displacement (15.4%), and males showing a higher prevalence of disc displacement alone (24.1%), along with myofascial pain alone (24.8%) diagnoses. Myofascial pain alone was also the commonest diagnosis in the Tel Aviv females (38.3%), while males showed predominantly a disc displacement alone diagnosis (35.8%). In the Padova sample, both genders were characterized by a majority of multiple diagnoses, which accounted for up to 58.9% of males and 82.4% of female patients.

Positive endorsement to the questions 15c ("sleep clenching/grinding") and/or 15d ("awake clenching/grinding") was recorded by 56.7% of the overall sample, with 28.4% of subjects giving positive answers to both questions. Significant differences for the

prevalence of at least one positive response to bruxism items emerged between the two clinic samples (Tel Aviv 62.5%, Padova 46.1%) (Chi-square, $p<0.01$). Sex-related differences were not significant, neither in the overall sample (females 56.4%, males 57.7%) nor in the Tel Aviv samples (females 63%, males 60.5%), while males in the Padova sample endorsed a significantly higher prevalence of positive responses to questions on sleep and awake bruxism (53.6%) with respect to females (43.6%) ($p<0.01$).

A positive association between the RDC/TMD axis I diagnosis and anamnestic self-report of bruxism was shown in the overall study sample ($p<0.001$). The strength of association, however, was weak (Cramer's $V=0.170$), and knowing the responses to the two questions on bruxism reduces only 3.8% of the percentage of errors in predicting the axis I TMD diagnosis (Goodman and Kruskal tau= 0.038). This suggests that the association was likely due to a single diagnostic category which differs from the others, viz., myofascial pain alone. The association was significant both in females (chi-square, $p<0.01$) and in males ($p<0.05$). Age-stratified data showed that the bruxism-TMD association was significant only in the 30-39 years age range ($p<0.01$), with moderate strength ($V=0.329$) (Table 3.2).

The Tel Aviv population showed an association between the RDC/TMD axis I diagnosis and anamnestic bruxism (chi-square, $p<0.001$; $V=0.204$; tau=0.137) (Table 3.3). The association was described in both genders, in males being stronger than in females ($V=0.410$ and $V=0.201$, respectively), and, as in the overall sample, it was significant only in the 30-39 years age range ($p=0.047$).

The association between the RDC/TMD diagnoses and clenching/grinding reports was not significant in the Padova sample ($p=0.558$) (Table 3.4), neither in females ($p=0.814$) nor in males ($p=0.964$). No significant association between TMD and self-reported bruxism was shown in any of the age-stratified groups in the Padova sample.

Table 3.8. Cross-tabulation of RDC/TMD diagnoses and self-reported bruxism diagnosis in the overall study sample (N=616)/females (N=479)/males (N=137). Overall sample: Chi-square, p<0.001; V=0.170; tau=0.038. Females: Chi-square, p=0.007; V=0.167; tau=0.016. Males: Chi-square, p=0.041; V=0.286; tau=0.056. MP=myofascial pain; DD=disc displacement; IDD=inflammatory-degenerative disorders; SR=self-report. Values are expressed in % and refer to the total of the study sample.

	No SR bruxism	Awake bruxism	Sleep bruxism	Awake and sleep bruxism	Total
No TMD	1.3/0.8/2.9	0.3/0.2/0.7	1.3/0.8/2.9	1.5/1.3/2.2	4.4/3.1/8.8
MP alone	7.8/9.2/2.9	2.6/2.3/3.6	4.7/4.0/7.3	12.0/12.3/10.9	27.1/27.8/24.8
DD alone	7.8/5.8/14.6	1.5/0.6/4.4	1.6/1.7/1.5	3.2/3.1/3.6	14.1/11.3/24.1
IDD alone	4.7/5.0/3.6	0.8/0.6/1.5	1.6/1.5/2.2	1.1/1.3/0.7	8.3/8.4/8.0
MP + DD	6.0/6.3/5.1	1.8/2.1/0.7	2.8/3.3/0.7	2.9/3.8/0	13.5/15.4/6.6
MP + IDD	6.5/6.7/5.8	2.6/2.7/2.2	2.8/3.1/1.5	3.6/4.2/1.5	15.4/16.7/10.9
DD +IDD	5.0/5.6/2.9	0.3/0.2/0.7	1.0/1.0/0.7	1.8/1.9/1.5	8.1/8.8/5.8
MP + DD + IDD	4.2/4.2/4.4	1.1/0.8/2.2	1.5/1.5/1.5	2.3/2.1/2.9	9.1/8.6/10.9
Total	43.3/43.6/42.3	11.0/9.6/16.1	17.2/16.9/18.2	28.4/29.9/23.4	100

Table 3.2. RDC/TMD diagnoses and self-reported bruxism diagnosis in the overall study sample. Age-stratified data. Values are expressed in % and are referred to the total number of patients for each age group.

		No TMD	MP alone	DD alone	IDD alone	MP + DD	MP + IDD	DD + IDD	MP + DD + IDD	Sig.
18-29 yrs. (N=243)	**No SRbr**	0.8	8.2	14	3.7	9.5	2.5	4.9	3.7	p=0.137
	Awake	0.4	3.7	1.6	0.4	1.6	1.2	0	0.8	
	Sleep	0.4	5.8	2.9	0.4	3.7	1.6	0	0.4	
	Aw + Sl	0.4	10.7	4.9	0.8	3.7	1.6	2.9	2.5	
30-39 yrs. (N=122)	**No SRbr**	2.5	4.1	6.6	4.1	4.9	4.1	9	4.1	p=0.008
	Awake	0	0	2.5	0.8	3.3	0.8	0	2.5	
	Sleep	2.5	4.1	2.5	0.8	1.6	4.9	0.8	0.8	
	Aw + Sl	1.6	13.1	3.3	0.8	4.9	4.1	0.8	4.1	
40-49 yrs. (N=98)	**No SRbr**	0	9.2	4.1	4.1	4.1	3.1	5.1	2	p=0.515
	Awake	0	4.1	1	2	1	3.1	2	1	
	Sleep	1	8.2	0	1	5.1	3.1	2	3.1	
	Aw + Sl	3.1	15.3	3.1	1	1	3.1	2	2	
50-59 yrs. (N=77)	**No SRbr**	0	5.2	1.3	1.3	2.6	14.3	1.3	6.5	p=0.274
	Awake	0	1.3	1.3	1.3	2.6	5.2	0	0	
	Sleep	2.6	2.6	0	7.8	1.3	3.9	2.6	2.6	
	Aw + Sl	3.9	7.8	1.3	3.9	2.6	10.4	1.3	1.3	
60-69 yrs. (N=50)	**No SRbr**	6	12	2	10	4	14	2	8	p=0.268
	Awake	2	4	0	0	0	6	0	2	
	Sleep	2	0	0	2	0	2	0	4	
	Aw + Sl	0	18	0	0	0	2	0	0	
70-84 yrs. (N=26)	**No SRbr**	-	15.4	-	19.2	-	30.8	3.8	3.8	p=0.056
	Awake	-	0	-	0	-	7.7	0	0	
	Sleep	-	0	-	0	-	0	3.8	0	
	Aw + Sl	-	11.5	-	0	-	3.8	0	0	

Table 3.3. Cross-tabulation. RDC/TMD diagnoses and self-reported bruxism diagnosis in the Tel Aviv sample (N=397). Chi-square, p<0.001; V=0.204; tau=0.137. MP=myofascial pain; DD=disc displacement; IDD=inflammatory-degenerative disorders; SR=self-report. Values are expressed in % and refer to the total of the Tel Aviv sample.

	No SR bruxism	Awake bruxism	Sleep bruxism	Awake and sleep bruxism	Total
No TMD	1.0	0.5	2.0	2.0	5.5
MP alone	10.1	2.8	6.8	17.1	36.8
DD alone	10.6	1.8	2.5	4.5	19.4
IDD alone	2.3	0.5	1.5	0.5	4.8
MP + DD	8.6	2.8	3.5	3.8	18.6
MP + IDD	2.8	2.0	1.8	2.3	8.8
DD +IDD	1.8	0.3	0.3	1.3	3.5
MP + DD + IDD	0.5	0.3	0.8	1.0	2.5
Total	37.5	10.8	19.1	32.5	100

Table 3.4. Cross-tabulation. RDC/TMD diagnoses and self-reported bruxism diagnosis in the Padova sample (N=219). Chi-square, p=0.558. MP=myofascial pain; DD=disc displacement; IDD=inflammatory-degenerative disorders; SR=self-report. Values are expressed in % and refer to the total of the Padova sample.

	No SR bruxism	Awake bruxism	Sleep bruxism	Awake and sleep bruxism	Total
No TMD	1.8	0	0	0.5	2.3
MP alone	3.7	2.3	0.9	2.7	9.6
DD alone	2.7	0.9	0	0.9	4.6
IDD alone	9.1	1.4	1.8	2.3	14.6
MP + DD	1.4	0	1.4	1.4	4.1
MP + IDD	13.2	3.7	4.6	5.9	27.4
DD +IDD	11	0.5	2.3	2.7	16.4
MP + DD + IDD	11	2.7	2.7	4.6	21
Total	53.9	11.4	13.7	21	100

Discussion

The issue of the relationship between bruxism and temporomandibular disorders is one of the most controversial aspects in dentistry. In particular, suggestions from the currently available systematic reviews are tempered by the complexity of the biological model under investigation and by the difficulties to investigate the specificity of the relationship of each TMD diagnostic category with sleep and/or awake bruxism [2,7]. The two largest sample studies on this issue using standardized criteria for TMD diagnosis, viz., the RDC/TMD [13], showed that bruxism is mainly associated with myofascial pain [9], and the

association concerns daytime clenching in particular [23]. Notwithstanding that, both investigations had some limitations, being represented by the adoption of bruxism diagnostic criteria potentially biased in favor of a myofascial pain diagnosis in one study [9] and by the exclusion of patients with multiple TMD diagnoses in the other [23]. The present investigation attempted to discuss the findings on the bruxism-TMD association by taking into account all the diagnostic information that could be gathered with the adoption of the RDC/TMD guidelines, viz., a clinical TMD diagnosis and a self-reported sleep/awake bruxism diagnosis.

A multicenter retrospective design with data recruited at two specialized centers for the treatment of TMD and orofacial pain was adopted. From a methodological viewpoint, it should be pointed out that the original RDC/TMD guidelines [13] allowed the integration of clinical diagnoses for joint disorders with the use of radiological and imaging techniques. The two centers adopted a different approach as for the use of imaging, which was seldom prescribed (less than 10% of cases) to Israeli patients and often prescribed (about 80% of cases) to the Italians. The reason for such differences could be found in the peculiarities of the national healthcare systems, with the Italian one supporting the widespread adoption of imaging techniques for routine use, as well as in the features of the study samples, with the Italian one being represented mostly by patients referred to the clinic for the assessment of joint disorders and the Israeli one collecting a full spectrum of orofacial pain patients. The RDC/TMD diagnoses, as discussed below, were the resultant of the integrated clinical and radiological assessment. Thus, due to the different prescription pattern for imaging techniques between the two clinics, it should be kept in mind that the two samples were not perfectly homogeneous as for the diagnostic strategies adopted for TMD assessment. In view of the above, findings from the two centers were also described separately to discuss how the strategy for diagnosing TMD could influence the resulting TMD-bruxism association.

As expected on the basis of the different features of patient referral and use of imaging, the patient populations attending the two clinics differed regarding the distribution pattern of TMD diagnoses. In particular, there were a significantly higher prevalence of myofascial pain alone in the Israeli sample (36.8% vs. 9.6%) on the one hand, and a

significantly higher prevalence of multiple TMD diagnoses in the Italian sample (69.2% vs. 33.4%) on the other hand.

The prevalence of self-reported bruxism in the overall sample was 56.7%, with no sex differences. The frequency of positive answers for self-reported bruxism was higher in the Israeli sample than in the Italian one (62.5% vs. 46.1%). Interestingly, in both samples, the percentage of subjects responding positively to both bruxism questions almost reached 50% of those responding positively to at least one question. Such finding is open to several interpretations. First, it should be considered that patients may often be unable to discriminate between sleep and awake bruxism and are likely to consider "bruxism" as a single entity. Second, self-reporting of bruxism may be influenced by several factors concerning individual beliefs on, for example, the causes of pain and/or tooth wear, as well as by the opinions expressed by the dentist. Third, self-reported bruxism has an unclear reliability to the actual bruxism activity and patients may not be able to provide information about the intensity and frequency of bruxism behaviors. For those reasons, self-reporting of bruxism is not suitable as a stand-alone strategy to diagnose bruxism, but it still remain the most suitable approach to gather data for cross-center comparison. In view of the above considerations, TMD patients may be prompted to report more bruxism than individuals from the general population, as suggested by literature data describing a 10.6%[24] to 31.4%[25] prevalence of self-reported bruxism at community level versus 46-58%[9,26] in TMD patient populations.

As expected, the outcome of the present investigation was in line with that of studies on self-reported bruxism showing a positive association with TMD [27]. The prevalence of any self-reported bruxism was up to 70.4% in patients with myofascial pain alone, which was significantly higher than all the other TMD diagnostic categories, showing a bruxism prevalence which ranged from 38.2% to 57.7%. The diagnostic groups' comparison gave similar results in both sexes, thus suggesting that sex differences described in the literature on TMD prevalence are unlikely to be due to a different bruxism prevalence between females and males.

The most interesting considerations emerged from the comparison of findings of the two clinics. A self-reported bruxism-myofascial pain association was described in the

Israeli sample, but in the Italian sample no significant differences emerged between the TMD diagnostic categories as for the prevalence of self-reported bruxism. This observation is likely to be clinically relevant and may constitute a major finding of this retrospective two-center assessment, since it may suggest that the peculiarities of the study samples influence the observation of specific bruxism-TMD associations. In the present investigation, the prevalence of myofascial pain, alone or combined with other diagnoses, was similar between the two clinics' samples (Tel Aviv 66.7% vs. Padova 62.1%), but the different adoption of imaging techniques, which was allowed but not mandatory in the original RDC/TMD publication and led to a significantly higher number of TMJ disorders diagnoses in the Italian sample, might have caused lack of diagnostic homogeneity, viz., an overdiagnosis of "pure" myofascial pain patients in the Israeli sample on the one hand or an overdiagnosis of multiple myofascial/joint disorders in the Italian sample on the other hand. Both strategies may influence the study of the actual bruxism-myofascial pain association. These considerations suggest a cautious interpretation of the TMD-bruxism literature, which should be critically re-appraised with focus on the external validity of each single study [28], based on the diagnostic criteria adopted in the different investigations. Also, notwithstanding the unsolved issue of the actual clinical significance of some imaging signs in the TMD practice [19,29], the issue of the different countries' laws and healthcare systems guidelines with respect to the adoption of TMJ imaging techniques must be taken into account as a potential bias against diagnostic homogeneity for multicenter comparisons [30].

The age-stratified data analysis showed that the between-TMD group differences as concerns the prevalence of self-report bruxism were significant only in the 30-39 years age range. To the best of our knowledge, this analysis was never reported before. The rationale to perform it, lies in the attempt to assess the epidemiological plausibility of a causal link for the observed association between bruxism and TMD. The prevalence of positive responders to at least one of the two bruxism questions was up to 67.5-68.5% in the 40-49 and 50-59 age ranges, with decrease in the younger and a very low prevalence in the older patients. By contrast, TMD patients belonged more to the two youngest age groups (18-29 years, 39.4%; 30-39 years, 19.8%), thus suggesting that from an epidemiological viewpoint the bruxism-TMD association is likely to have a low specificity

and that other factors must be involved to explain the association of self-reported bruxism with myofascial pain in the 30-39 years age range alone.

The above findings are in line with the many investigations supporting an association between anamnestic and self-reportedly diagnosed bruxism and TMD [9,23,27,31], but it should be noticed that several differences were pointed out between the findings of the two clinics, suggesting that diagnostic strategies for bruxism and TMD strongly influence the resulting association between the two disorders. Self-report/questionnaire-diagnosed bruxism, which still remains the most suitable approach to gather large-sample data for epidemiological reasons, is poorly specific and may introduce potential bias and confounders at the diagnostic level, due to the preconceived idea by the patients and/or the interviewing clinicians that pain in the morning is a criterion for bruxism self-recognition [7]. The present investigation, analyzing retrospectively the data gathered at two specialized clinics adopting the same RDC/TMD protocol but with a less restrictive use of TMJ imaging in one center, supports the claim that the purported myofascial pain-bruxism association is not very specific and is dependent on the peculiarities of the diagnostic approaches. The inclusion of patients with multiple TMD diagnoses allowed gathering some additional information with respect to previous investigations focusing on "pure" muscle or TMJ disorders [23]. The multicenter design was a strength of this investigation with respect to previous studies with similar methods of collecting data [9], because it allowed comparing findings and discussing how the selection of diagnostic criteria may influence one study's findings. The two-center comparison also allowed describing some potential shortcomings of the 1992 RDC/TMD diagnostic guidelines, since they included arbitrary options for allowing inclusion of radiological signs for diagnostic assessment, thus introducing a confounding factor when data gathered with different strategies are compared. The reproducibility and reliability of the RDC/TMD algorithms undergoing revision should thus be tested also by taking into account the need for reducing subjective interpretation of the diagnostic pathway. For example, it can be suggested to provide a clearer description of those cases for which imaging techniques are needed and to define whether clinical or radiological findings must be considered the guiding principle for diagnosing joint disorders [22].

Definitive statements on the bruxism-TMD relation are far from being achieved with cross-sectional investigations. It can be hypothesized that longitudinal studies adopting standardized criteria for TMD and bruxism diagnosis as well as researches focusing on a better clinical detection and discrimination of bruxism activities will be fundamental to improve knowledge on this issue. At this stage, also an improvement in the differentiation between pain and fatigue is a compelling need, as is a better comprehension and diagnosis of allodynia, since the potential mislabeling of fatigue and allodynia as myofascial pain has to be considered a major bias for the study of bruxism effects [32,33].

Conclusions

The present investigation was a multicenter study attempting to get deeper into the bruxism-TMD relation by the adoption of the RDC/TMD criteria. In line with previous literature findings, an association between self-reported bruxism and TMD was described in the overall sample, but some differences emerged between the two clinics' samples. The more widespread use of TMJ imaging techniques in one clinic sample led to a higher prevalence of multiple diagnoses, and the significantly higher prevalence of self-reported bruxism in patients with myofascial pain alone described in the other clinic sample was not replicated, thus suggesting that the purported bruxism-myofascial pain association might have been biased by relying on an anamnestic bruxism diagnosis alone, which may lead to have patients considering myofascial pain as an analogous of bruxism. Very little information could be gathered on the potentially different relation with sleep and awake bruxism, since the patient's capability to discriminate between the two entities is likely low. From an epidemiological viewpoint, the different age distribution of bruxism and TMD diagnoses described in both clinics' samples seems to support the hypothesis that other factors may be involved in the potential cause-and-effect link between the two disorders. At this stage, there appears to be a need for cautionary statements on the potential usefulness of cross-sectional investigations to retrieve valid information for the clinical setting, since at best, they are able to describe unspecific bruxism-TMD associations.

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