

Temporomandibular Disorder Patients' Illness Beliefs and Self-efficacy Related to Bruxism

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Aims: To examine temporomandibular disorder (TMD) patients' illness beliefs and self-efficacy in relation to bruxism, and to examine whether these beliefs are related to the severity of patients' self-perceived bruxing behavior. **Methods:** A total of 504 TMD patients (75% women; mean age \pm SD: 40.7 \pm 14.6 years), referred to the TMD Clinic of the Academic Centre for Dentistry Amsterdam, completed a battery of questionnaires, of which one inquired about the frequency of oral parafunctional behaviors, including bruxism (clenching and grinding). Patients' illness beliefs were assessed with a question about the perceived causal relationship between bruxism and TMD pain; patients' self-efficacy was assessed with questions about the general possibility of reducing oral parafunctional behaviors and patients' own appraisal of their capability to accomplish this. **Results:** Sleep bruxism or awake bruxism was attributed by 66.7% and 53.8% of the patients, respectively, as a cause of TMD pain; 89.9% believed that oral parafunctions could be reduced, and 92.5% believed themselves capable of doing so. The higher a patient's bruxism frequency, the more bruxism was believed to be the cause of TMD pain (Spearman's rho 0.77 and 0.71, $P < .001$) and the more pessimistic the self-efficacy beliefs were about the reducibility of oral parafunctions (Kruskal-Wallis $\chi^2 = 19.91$, $df = 2$, $P < .001$; and Kruskal-Wallis $\chi^2 = 7.15$, $df = 2$, $P = .028$). **Conclusion:** Most TMD patients believe in the harmfulness of bruxism and the possibility of reducing this behavior. Bruxism frequency is associated with illness beliefs and self-efficacy. J OROFAC PAIN 2010;24:367-372

Key words: bruxism, illness beliefs, oral parafunctions, self-efficacy, temporomandibular disorders

The Patient History Questionnaire of the Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD)¹ includes items for assessing oral parafunctional behaviors. Specifically, two questions assess bruxism, defined as clenching or grinding behaviors, both during the daytime and during the hours of sleep. The assumption underlying the inclusion of these two questions in the Questionnaire is that these parafunctional behaviors may be related to TMD pain with the subsequent implication that reducing these behaviors would lead to a reduction in TMD symptoms. However, studies of the association between bruxism and TMD symptoms have so far led to contradictory results, such that reviews of this literature have concluded that the relationship between bruxism and TMD pain is not clear and that it needs further examination.^{2,3} One review also demonstrated that while attempts to treat TMD symptoms by reducing muscle hyperactivity with splints, biofeedback, or relaxation exercises led to positive results, the quality of the studies did not allow

more definite conclusions.⁴ Nevertheless, although the scientific data are as yet conflicting with regards to whether jaw muscle hyperactivity, or any other potential risk factor, is related to TMD complaints,³ a preference has been developed for noninvasive approaches, in which the patient's involvement in self-management methods is required. These methods mostly involve working on a reduction of muscle hyperactivity and psychological stress. Changing oral parafunctional behaviors requires the compliance of the patient in actively developing jaw muscle relaxation skills. Thus, success of the latter types of treatment modes is dependent upon the motivation of the patient, which is, at least in part, determined by the patient's illness beliefs and self-efficacy.

Illness beliefs relate to beliefs that people develop when confronted with signs of illness, for example with TMD symptoms. Illness beliefs may develop around different dimensions of the illness: the character of the symptoms, their causes, the timelines, their consequences, and their controllability. Illness beliefs can either help or hinder the individual: They may help the individual facing and controlling the illness,⁵ but hindrance can emerge from a discrepancy between the patient's beliefs and the clinician's knowledge, which may lead to reduced treatment adherence.⁶ In order to comply with TMD treatment that includes skill acquisition for reducing oral parafunctions, the patient must sufficiently accept the assumption that jaw muscle hyperactivity is related to TMD complaints.

The term "self-efficacy" has been defined as "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments."⁷ It entails the opinion a patient has about the possibility that a certain type of behavior can be changed, combined with the notion that the person considers himself/herself capable of doing so. Bandura⁸ states it as: "Expectations of personal efficacy determine whether coping behavior will be initiated, how much effort will be expended, and how long it will be sustained in the face of obstacles and aversive experiences." Although TMD patients may also engage in such coping behavior, not because they believe that there is a relationship between parafunction and TMD, but because they have been asked to do so by their care provider and they have a certain level of optimism regarding a new treatment not previously presented, self-efficacy may also be a very powerful factor moderating the effects of clinical efforts to control oral parafunctions. If it is desirable for TMD patients to reduce their excessive oral behaviors, they should not only incorporate the assumption that those behaviors are harmful, but they must also positively appraise their own capacity to change them. These beliefs of TMD patients are the subject of this study.

The purpose of this study was to examine TMD patients' illness beliefs and self-efficacy in relation to bruxism and to examine whether these beliefs are related to the severity of patients' self-perceived bruxing behavior.

Material and Methods

Participants

Participants in this study were 504 consecutive patients referred with a diagnosis of TMD symptoms to the Clinic for Temporomandibular Disorders of the Academic Centre for Dentistry Amsterdam (75% women; mean age \pm SD = 40.7 \pm 14.6 years). Prior to the first consultation, all patients completed a battery of questionnaires, which contained, among others, questions about bruxism and the patient's illness beliefs and self-efficacy related to bruxism and other oral parafunctions. All patients had signed an informed consent statement.

The Oral Parafunctions Questionnaire

Bruxism was assessed with a 12-item self-report questionnaire, which had been examined in a previous study.⁹ It included questions about bruxism and about several other habitual behaviors of the mouth unrelated to eating, drinking, or talking. Examples are chewing gum, playing and pushing with the tongue, and biting on pens or lips. The items were formulated as follows: "For each of the following activities, will you please indicate how often you have recently engaged in them?" Response options, using an ordinal five-point scale, included: 0 ("never"), 1 ("sometimes"), 2 ("regularly"), 3 ("often"), and 4 ("always"). In a previous study with TMD patients, the questionnaire was examined for its psychometric properties.⁹ The 12 oral parafunction items could be reduced, based on a Principal Component Analysis (PCA), to three sets of related items, with each set forming a measurement scale. A BRUX scale was derived from the following items: clenching at night, grinding at night, clenching in daytime, and grinding in daytime; an average score (range: 0 to 4) of the four items was computed. In this study, only responses to this BRUX scale were used.

Illness Beliefs

Patients' beliefs about the causal relation between bruxism (tooth clenching and grinding) and TMD pain were assessed using the lead-in question: "Do

Table 1 Frequencies and Mean Scores (Range: 0 to 4) of Replies to the Four Questions of the BRUX Scale (n = 504)

	n	Never (%)	Sometimes (%)	Regularly (%)	Often (%)	Always (%)	Mean \pm SD
Sleep clenching	364	33.0	14.3	13.2	21.7	17.8	1.77 \pm 1.53
Sleep grinding	357	49.0	16.5	10.4	13.2	10.9	1.20 \pm 1.44
Awake clenching	449	37.6	23.3	17.1	17.1	4.9	1.29 \pm 1.26
Awake grinding	448	74.6	15.0	4.8	3.8	1.8	0.43 \pm 0.89

you think the following factors are causing your jaw pain?" Using a five-point ordinal scale of 0 ("no"), 1 ("a little"), 2 ("somewhat"), 3 ("much"), and 4 ("very much"), the respondent rated each of five factors: "occlusion," "stress in family, work, or school," "emotional excitement, anxiety, or depression," "awake clenching or grinding," and "sleep clenching or grinding." For the purpose of this study, only these last two factors were analyzed.

Self-efficacy

Two self-efficacy questions addressed the two different parts of self-efficacy beliefs, namely a general statement about the changeability of oral parafunctions (Do you think that these types of habits can be unlearned?) and a statement about one's personal capacity to change it (Do you think that you could manage to do it, if you wanted to?). Both questions could be answered on a three-point scale, namely 1 ("yes"), 2 ("partly"), and 3 ("no").

Data Analysis

To assess possible relationships between scores on the BRUX scale and patients' illness beliefs about bruxism causing TMD pain, Spearman's rho correlation coefficients were calculated. Differences between patients' responses to the questions on self-efficacy beliefs and scores on the BRUX scale were analyzed with a Kruskal-Wallis test and post-hoc Mann-Whitney *U* tests. For all analyses, the SPSS 15.0.1 package (SPSS) was used. Probability levels of $P < .05$ were considered statistically significant.

Results

The Oral Parafunction Questionnaire

The frequencies and mean (\pm SD) scores of the responses to the four questions of the BRUX scale are shown in Table 1. The mean total BRUX score was 1.14 ± 0.98 .

Illness Beliefs

Answers to the illness belief questions about the perceived relationship between sleep and awake clenching and grinding on the one hand, and TMD pain complaints on the other, are shown in Table 2. Note that 66.7% of the patients believed that clenching and grinding at night was a cause of their TMD pain to some extent, varying from "a little" to "very much," while 53.8% believed that daytime clenching and grinding caused TMD pain. Correlations between strength of illness belief in the causation of TMD pain and severity score on the BRUX scale were high: Spearman's rho was 0.77 for sleep clenching and grinding, and 0.71 for awake clenching and grinding ($P < .001$).

Self-efficacy

Responses of patients to the two self-efficacy questions (Table 3) revealed that 89.9% of the patients believed that it is possible to reduce or unlearn oral parafunctions, and 92.5% of the patients believed that they could accomplish this partly or completely, if they wanted to. For both self-efficacy questions, patients who answered "yes" or "no" to the belief that oral parafunctions could be unlearned had lower mean BRUX scores than patients who thought that oral parafunctions could be "partially" unlearned. (Kruskal-Wallis $\chi^2 = 19.91$, $df = 2$, $P < .001$; and Kruskal-Wallis $\chi^2 = 7.15$, $df = 2$, $P = .028$, respectively) (Table 3). Post-hoc Mann-Whitney *U* tests showed that for both questions, the differences between answers "partly" and "yes" were significant.

Discussion

In this study, illness beliefs that TMD patients have about the causal relationship between bruxism and TMD pain and the self-efficacy that patients experience in regard to their capability to reduce their oral parafunctional behaviors were examined. To the

Table 2 Frequencies of Replies to Two Illness Belief Questions and the Association Between Illness Beliefs and Bruxism Frequency (Spearman Rho)

Replies	Question one (n = 447)*		Question two (n = 455)†	
	%	BRUX score (mean ± SD)	%	BRUX score (mean ± SD)
No	33.3	0.32 ± 0.59	46.2	0.52 ± 0.61
A little	16.3	0.90 ± 0.57	20.2	1.37 ± 0.81
Somewhat	16.8	1.35 ± 0.70	16.3	1.58 ± 0.65
Much	14.8	1.85 ± 0.72	10.5	2.16 ± 0.63
Very much	18.8	2.16 ± 0.83	6.8	2.70 ± 0.96

Spearman rho: 0.766 and 0.705 for Question one and Question two, respectively ($P < .001$).

* = Do you think clenching and grinding at night is a factor causing your jaw pain?; † = Do you think clenching and grinding in daytime is a factor causing your jaw pain?

Table 3 Frequencies of Replies to Two Self-efficacy Questions and the Association Between Self-efficacy and Bruxism Frequency (χ^2)

Replies	Question one (n = 298)*		Question two (n = 313)†	
	%	BRUX score (mean ± SD)	%	BRUX score (mean ± SD)
No	10.1	1.17 ± 0.92	7.5	1.26 ± 1.11
Partly	39.5	1.50 ± 0.99	25.3	1.41 ± 0.96
Yes	50.4	0.97 ± 0.94	67.2	1.10 ± 0.98

χ^2 (df = 2) for Question 1: 19.91 ($P < .001$); for Question 2: 7.15 ($P < .05$). Post-hoc Mann-Whitney U: Self-efficacy Questions 1 and 2: partly > yes.

* = Do you think these activities (oral parafunctions) can be unlearned?; † = Do you think you can do it if you want to?

authors' knowledge, this is the first study in which beliefs held by TMD patients concerning the interaction between oral parafunctions, TMD, and oral behavior change have been examined. The study showed that, while a majority of patients believe in the harmfulness of bruxism with regards to TMD symptoms, more than a third of the patients do not associate their TMD symptoms with any bruxism. Most patients seem to be fairly optimistic about their ability to reduce their parafunctions, and optimism is higher if they brux less frequently.

In this study, the presence or absence of parafunctional behaviors was based on self-report measures. Patients' accounts of their oral parafunctional activities were not assessed with respect to whether they were in agreement with actual behaviors. However, it is known that individuals with TMD or without have a clear sense as to what the different words used for these parafunctional behaviors mean in terms of motor activities,¹⁰ suggesting that these self-reports of waking behaviors are sufficiently accurate to reflect the actual frequencies of these be-

haviors. The self-report of sleep bruxism represents a different challenge. Ideally, sleep bruxism should be measured using nocturnal electromyographic or polysomnographic monitoring in order to determine the presence of a behavior that occurs during sleep and hence is not accessible to most individuals' awareness. For routine clinical settings and for studies using large groups of subjects, however, sleep laboratory methods are often impractical or just not available for either financial or logistical reasons.^{2,3} In those situations, studies are necessarily limited to self-report measures of sleep bruxism. Because the present study was particularly interested in the opinions of the patients, the use of self-report questionnaires was the preferred method, and such self-report data offers a large amount of valuable and unique information that objective measures would not have provided.

In the present study, patients were asked about their illness and self-efficacy beliefs, but the basis for these beliefs was not explored. The participants completed the questionnaire prior to their first

consultation. Therefore, a meeting with the TMD specialist had not yet taken place. However, this sequence does not exclude the possibility that at least some of the patients had already been informed or influenced in one way or the other about the possible damaging effects of oral parafunctions. It may also have been the completion of the questionnaire itself that changed patients' awareness of behaviors that often take place outside their conscious awareness. This would be in agreement with verbal reports of patients who will often report in the clinic that items on a self-report instrument will initiate self-evaluation, as well as with the scientific literature that suggests that the contexts that instruments offer may allow subjects' access to otherwise stored memory.^{11,12} The questionnaire may thus have functioned not only as a tool to assess information about the patients, but it may also have made patients more aware of parafunctions, thereby changing their response to the illness beliefs and self-efficacy questions. As stated above, this study was directed at the subjective judgments and opinions of the patients, regardless of their information source, but it would be a valuable next step to examine the factors determining the ways in which patients develop and recognize their beliefs.

In order to create an efficient self-report instrument for this first investigation, the two self-efficacy questions were directed toward all 12 items listed in the parafunction questionnaire and not toward bruxism in particular. Consequently, the data are reflective of a general estimate by the patient of the possibility of a change in oral behavior. The patients manifested a general optimism about this type of behavioral change; many patients even seemed to have thought they could unlearn most or all parafunctions that they reported, including the awake and sleep clenching and grinding behaviors.

Previous reviews of the literature have indicated that a causal relationship between oral parafunctions and TMD complaints has not yet been clearly established.²⁻⁴ The present study limited itself to assessing only the opinions that patients have about this subject. It is possible, however, that other factors may affect patients' beliefs and their compliance to therapy. They may express a certain amount of optimism while anticipating a new treatment plan, or perhaps they also want to please their care provider by expressing a positive attitude in the questionnaire. From the data in this study, it appears that TMD patients in general seem to believe in the possible harmfulness of clenching and grinding and in the relationship between these activities and TMD pain. The fact that patients who brux more believe more strongly in this relationship may have clinical sig-

nificance. In cross-sectional studies, it is impossible to establish how awareness of bruxism, self-efficacy, and illness beliefs are associated, ie, which causes which. Causal inferences can only be estimated on the basis of data from this type of design. However, to be able to change harmful behaviors, it is necessary to have the conviction that those behaviors are related to a complaint, so supporting that conviction is a major first step toward improvement. Most subjects also reported very positively about the possibility of behavioral change. The finding that patients who brux very frequently have more modest self-efficacy expectations suggests that they are also realistic about their ability to unlearn these behaviors. If reducing the frequency of oral parafunctions is one of the aims in the process of treating TMD patients, it is reassuring to know that so many of the patients referred to a specialized clinic have the same opinion about this.

This study has also shown that a substantial percentage of TMD patients report no clenching or grinding at all. When such patients enter the clinic, they may not be motivated to consider the possibility that their own contribution in reducing oral parafunctions, if present, is of major importance to the outcome of therapy. This is supported by the results of a study with chronic pain patients, which showed that patients' positive beliefs about noninvasive therapy before treatment started predicted both positive therapy results and higher treatment satisfaction levels.¹³ The type of information collected with the questions examined in the present study may be an important tool for the clinician to effectively manage a treatment strategy with these patients. Assessing illness beliefs and self-efficacy of TMD patients before treatment starts may be an important contribution to this process; a common cause of failure of behavioral treatment is inadequate baseline assessment of relevant cofactors associated with successful behavioral change, and illness beliefs and capacity to effect change may be two critically important cofactors. With such baseline information, these beliefs could then first be addressed with the patient. If a mismatch in beliefs between clinician and patient would threaten a successful treatment outcome, the clinician could then better determine a more useful treatment strategy, which might include referral to a behavioral specialist. Regardless of whether the patient was referred to a behavioral specialist or treated by the dentist, this type of assessment of what appear to be critical beliefs about bruxism and self-efficacy could lead to an increase in compliance with treatment. Hence, introducing questions about illness beliefs

and self-efficacy can be a useful and important adjunct to the clinical assessment of TMD patients.

The present study has implications for research purposes as well. The impact of health beliefs and self-efficacy has been shown in many different medical settings and patients, including those with coronary disease, arthritis, and alcoholism.¹⁴ These beliefs are of major importance in treatment outcomes. "If people lack awareness of how their lifestyle habits affect their health, they have little reason to put themselves through the misery of changing the bad habits they enjoy."⁷ Since it has been difficult to prove that different types of behavioral treatments are successful in reducing jaw muscle activities,⁴ it is recommended that future studies of TMD treatments include the patients' illness beliefs and self-efficacy as additional variables for examination, since the present data suggest their possible role as important moderating factors for treatment outcomes.

Conclusions

From the data of the present study, it can be concluded that most TMD patients are aware of bruxism and the harmful effects that it may have on the jaw. They are surprisingly optimistic about the possibility that they can change these behaviors. TMD specialists should assess and discuss these beliefs with their patients prior to treatment in order to enhance treatment compliance.

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