

The bruxism screener (BruxScreen): Development, pilot testing and face validity

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Abstract

Background: To assess awake and sleep bruxism, the Standardised Tool for the Assessment of Bruxism (STAB) is currently being developed. The STAB will be a comprehensive tool for the detailed assessment of bruxism behaviour itself as well as of its possible consequences, causes, and comorbid conditions.

Objective: Since the STAB cannot fully meet the 'A4 principle' for a bruxism assessment tool, i.e., being Accurate (reliable and valid), Applicable (feasible), Affordable (cost-effective), and Accessible (suitable for everyday clinical use), the Bruxism Screener (BruxScreen) has been developed to be used in large-scale epidemiological research projects and, especially, in general, dental practices.

Methods: The BruxScreen consists of two parts: a questionnaire (BruxScreen-Q) to be completed by patients, and a clinical assessment form (BruxScreen-C) to be completed by dentists.

Results: This paper describes the development of the BruxScreen and provides the outcomes of the pilot testing phase and the face validity assessment (i.e. that the first impressions of the tool indicate that it adequately reflects the construct to be measured).

Conclusion: The resulting BruxScreen is considered ready for more profound psychometric testing in the general dental setting.

KEYWORDS

bruxism, diagnosis, face validity, pilot projects, temporomandibular joint disorders, tooth wear

1 | INTRODUCTION

Bruxism is currently defined as a jaw-muscle activity that can occur while awake (awake bruxism) or during sleep (sleep bruxism).^{1,2} According to a systematic review of the literature, bruxism is a common condition, with estimated prevalence rates for the general adult population of 8%–31.4% for awake bruxism and 12.8 ± 3.1%

for sleep bruxism.³ The aetiology of bruxism is multifactorial, with biological (e.g. genetics, sleep arousals), psychosocial (e.g. stress, depression) and lifestyle (e.g. smoking, alcohol usage) factors playing a role.^{4,5} The purported clinical consequences can be negative for the individual patient (e.g. mechanical tooth wear, temporomandibular disorders),^{6,7} although the evidence for causality of these associations is still contradictory.^{7,8} Interestingly, more recently, also

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possible positive health outcomes have been reported in association with bruxism (e.g. maintaining or restoring upper airway patency during sleep).^{2,5,9}

Despite the growing body of knowledge on bruxism, there are still many aspects of this jaw-muscle activity that need further research, especially because the management of bruxism, when indicated due to the presence of severe negative consequences,¹⁰ is still in its infancies.^{5,11} Underlying safe and effective management strategies for bruxism is an Accurate (reliable and valid), Applicable (feasible), Affordable (cost-effective), and Accessible (suitable for everyday clinical use) assessment of bruxism (see the A4 principle as outlined by Lobbezoo et al.²). To that end, in 2020, a roadmap was published for the development of a Standardised Tool for the Assessment of Bruxism (STAB).¹² This roadmap was the necessary next step after the publication of two international consensus papers on the definition and assessment of bruxism.^{1,2} Currently, the STAB is being finalised by a group of international bruxism experts, based on the outcomes of a series of consensus meetings organised by the International Network for Orofacial Pain and Related Disorders Methodology (INFORM) of the International Association for Dental Research (IADR). The final STAB will consist of two Axes.¹² Axis A focuses on the assessment of the bruxism behaviour itself as well as of its possible consequences, with three approaches, namely a subject-based (self-report), a clinically based (clinical examination), and an instrumentally based (e.g. electromyography, polysomnography) assessment. Axis B assesses possible etiological factors as well as comorbid conditions of bruxism. When deemed necessary by the clinician or researcher who will be using the STAB, it is also possible to select one or more additional tools from a 'toolbox' to enable an even more detailed assessment. For an overview of the items that can be assessed with the future STAB, please see Manfredini et al.¹²

Clearly, the future STAB and its toolbox will allow a comprehensive assessment of individuals with possible bruxism, along with the activity's possible consequences, causes, and comorbidities. Of important notice, however, is the fact that the system cannot fully meet the above-explained A4 principle for assessment tools: the comprehensiveness of the STAB prevents the tool from being routinely Applicable, Affordable, and Accessible, while its Accuracy still needs to be determined. For that reason, as a parallel track alongside the development of the comprehensive STAB, the Bruxism Screener (BruxScreen) has been developed to be used in large-scale epidemiological research projects and, especially, in general, dental practices. Depending on the outcome of the assessment with the BruxScreen, clinicians may choose to either assess the bruxism condition more extensively using the comprehensive STAB or to proceed with the management of the detected bruxism and/or its consequences, whenever indicated. It is this paper's aim to describe the development of the BruxScreen and to provide the outcomes of the pilot testing phase and face validity assessment. It is hypothesised that after the pilot testing phase, the BruxScreen will have an adequate level of face validity, i.e., that the first impressions of the tool indicate that it adequately reflects the construct to be measured.¹³ After

that, the tool will be ready for more profound psychometric testing in the general dental setting.

2 | METHODS

As an important prerequisite, the BruxScreen should meet the A4 principle²; see Introduction. The broad construct of Accuracy should at least be tested in terms of the tool's face validity. Its Applicability should be reflected in its easy-to-use character as well as in a limited time investment by both the patient and the dentist. Its Affordability means that extra costs on top of the regular costs of dental consultations should be negligible. Its Accessibility, finally, means that the tool should be easy to implement in everyday dental practices worldwide. Taking these prerequisites into account, it was decided by the developers of the BruxScreen (see below) to limit the tool to Axis A aspects (i.e. the assessment of the bruxism behaviour itself as well as of its possible consequences), with only two approaches, namely a subject-based (self-report) and a clinically based (clinical examination) assessment.

The developers of the BruxScreen were three of this paper's authors (F.L., J.A., and D.M.). They proceeded by e-mail exchange, and finally reached consensus on the tool. As a first step, the three developers each produced their own version of a possible BruxScreen. Those were brought into discussion amongst the three of them during an online meeting, after which one of them (F.L.) proceeded with the production of the first draft of the BruxScreen. After several rounds of e-mail exchanges, the first version of the BruxScreen resulted. This version is described below and was subjected to pilot testing, followed by a face validity assessment.

It should be noted that the BruxScreen is not a selection of components of the comprehensive STAB, which are not necessarily A4-proof,² but is actually composed of already existing brief and valid tools for the assessment of bruxism and its most common consequences. In some cases, the already existing brief tools have been derived from more comprehensive tools. In addition to that, some of the already existing brief tools have been modified. Below, an overview is given of all items of the BruxScreen, along with an explanation of their sources and of the modifications made. In addition, the BruxScreen¹ is included in [Appendix 1](#).

2.1 | Part I: Self-report questionnaire

The self-report part of the BruxScreen, i.e., the self-report questionnaire (BruxScreen-Q), assesses both the bruxism behaviour itself and some of the most commonly occurring possible negative consequences of bruxism, viz., signs and symptoms of temporomandibular disorders (TMDs). The BruxScreen-Q is preceded by a brief explanation of the constructs to be assessed; see [Appendix 1](#).

The first question of the BruxScreen-Q concerns the bruxism behaviour itself. To that end, the BRUX scale was derived from the Oral Parafunctions Questionnaire.¹⁴ This scale consists of four

questions, assessing the self-perceived presence of clenching and grinding while awake and during sleep. Responses are given on a 5-point ordinal scale, viz., 0 (never), 1 (sometimes), 2 (regularly), 3 (often) and 4 (always). As to gather information about two other commonly encountered jaw-muscle activities, namely teeth contact and mandible bracing,¹⁵ two additional questions were derived from the Oral Behaviours Checklist (OBC).¹⁶ Both questions were modified by adding 'lightly' to the teeth contact question and 'firmly' to the mandible bracing question (questions 1e and 1f; see [Appendix 1](#)). Further, 'while awake' was added to both questions, and 'based on the last month' was omitted. In addition, the same response options used for the BRUX scale questions were provided for the OBC questions.

The second question of the BruxScreen-Q assesses TMDs, concerning both the pain aspects and the dysfunction aspects. As a starting point, the 3Q/TMD was selected for this end.¹⁷ The phrasing of the three questions of the 3Q/TMD was slightly modified. In the first question, "Do you have (...) once a week or more?" was replaced by "How often do you experience (...)?". In the second and third questions, similar modifications were made. Further, the response options of the original 3Q/TMD (No or Yes) were replaced by the above-given response options of the BRUX scale.¹⁴ In addition, to gather information about commonly reported non-pain symptoms in the musculoskeletal system as well, the first two (pain-related) questions of the 3Q/TMD were also phrased to assess unpleasantness, sensitivity, tiredness, tension, and stiffness.¹⁸ Finally, to gather information about the time of the day during which the symptoms are present, the first question was asked separately for 'upon awakening' and for 'any other time',¹⁹ while the second and third questions were asked separately for 'during meals' and for 'any other time'. The resulting questions 2a (presence of pain and non-pain symptoms), 2b (presence of pain and non-pain symptoms with jaw function), and 2c (presence of disturbed jaw movements) are shown in [Appendix 1](#).

2.2 | Part II: Clinical assessment form

By means of the clinical part of the BruxScreen, i.e., the clinical assessment form (BruxScreen-C), the dentist assesses possible extra-oral and intra-oral signs that may be associated with bruxism, notably masseter muscle hypertrophy, intra-oral soft tissue hyperkeratosis and lesions and tooth wear. Since the possible causes of fractures and failures of dental restorations and implants also include many non-bruxism ones, it was decided, also for sake of brevity, not to add those aspects to this tool. Like for the questionnaire part, the BruxScreen-C is preceded by a brief explanation for the dentist of the constructs to be assessed; see [Appendix 1](#).

The first item of the BruxScreen-C to be assessed is the presence or absence of masseter muscle hypertrophy. To that end, the dentist observes the masseter muscles in two conditions: while the muscles are relaxed and while they are contracted. The dentist is instructed to score 'absent' in all cases of doubt.^{20,21}

The second item of the BruxScreen-C concerns the intra-oral inspection of non-dental tissues, notably hyperkeratotic impressions in the lip, cheek, and tongue^{20,21}; traumatic ulcers²¹; and alveolar bone exostoses and tori.²² Also for these signs, the choice is either present or absent, with a choice for the latter in all cases of doubt.

The third and final item of the BruxScreen-C to be assessed by the dentist concerns the intra-oral inspection of dental tissues, notably tooth wear. Since bruxism is mainly associated with intrinsic mechanical wear (i.e. attrition) of occlusal and incisal surfaces of the teeth, only surfaces that are involved in the articulation of the upper and lower teeth will be assessed. To that end, the screening module of the Tooth Wear Evaluation System (TWES)²³ has been included in the BruxScreen-C. Occlusal and incisal tooth wear is scored for each sextant (highest value per sextant is noted), using a 5-point ordinal scale: 0 (no visible wear), 1 (visible wear within the enamel), 2 (visible wear with dentin exposure and loss of clinical crown height of $\leq 1/3$), 3 (loss of crown height $> 1/3$ but $< 2/3$), and 4 (loss of crown height $\geq 2/3$).²⁴ In addition, the palatal surface of the second sextant (upper front) is scored for intrinsic mechanical wear as well, because also this surface plays a role in the articulation. To that end, a 3-point ordinal scale is used: 0 (no visible wear), 1 (visible wear confined to the enamel), and 2 (visible wear into the dentine).²⁵ Finally, although the TWES contains a comprehensive module for the qualification of tooth wear (i.e. a tool to determine the clinical signs that indicate mechanical and/or chemical tooth wear),²³ for sake of brevity the BruxScreen-C only contains a single item that asks the dentist to identify if the observed tooth wear is mainly determined mechanically, chemically or both mechanically and chemically. See [Appendix 1](#) for all items of the BruxScreen-C.

3 | RESULTS

3.1 | Pilot testing

The pilot testing was performed at the university clinics of Helsinki, Finland, and Sienna, Italy, according to the procedures described in "Measurement in Medicine" by De Vet et al.¹³ The above-described first version of the BruxScreen-Q was pilot-tested in 15 patients (10 females, 5 males; age range = 18–82 years); that of the BruxScreen-C, in 20 dentists (12 females, 8 males; age range = 26–52 years; 17 general practitioners, 2 periodontologists, 1 endodontologist) and 7 dental students (5 females; 2 males; age range = 20–23 years). Local-language versions were used to that end, which was produced following the rules for forward and back translation.¹³ According to local legislation, medical ethical approval was not necessary for this type of study, neither in Finland nor in Italy. The intention of the pilot testing was to assess the comprehensibility of the questions and response options, as well as the feasibility of the tool. In addition, any other information that could be relevant to the development of the tool was gathered by the examiners. To that end, the so-called 'probing' method was used, where the patients as well as the participating dentists and dental students were questioned in

detail by the examiners about the perceived content and interpretation of the items.¹³ As such, the pilot testing yielded the following main outcomes:

- **Comprehensibility:** Most patients reported good comprehension, both of the explanation and the questions and response options of the BruxScreen-Q; only two of them indicated that they would appreciate some additional explanation of terms. Likewise, good comprehension was reported by most of the clinicians (participating dentists and dental students) regarding the BruxScreen-C, although 2 of the 20 participating dentists indicated that they would like to see the explanation part of the BruxScreen-C expanded to better clarify the meaning and appearance of the clinical signs.
- **Feasibility:** The patients as well as the participating dentists and dental students reported that the self-report questionnaire and the clinical assessment form could be completed within a reasonable time span of no more than 5 min and 10 min, respectively. In addition, the clinicians all indicated that a tool like this would be easy to implement in the everyday dental setting.
- **Miscellaneous:** Four patients wondered which response option to select in case of not knowing. Further, three patients indicated that they preferred less response options. In addition, two dentists were missing cut-off criteria for establishing the presence of bruxism, as well as an indication of how the responses to the BruxScreen would translate into management strategies for bruxism.

Based on the above outcomes and following discussions amongst the developers, it was decided to add the response option 'don't know' throughout the entire BruxScreen-Q. The issues of cut-off criteria and translation of responses into management strategies were not used to adjust the proposed BruxScreen but were rather considered to relate to the interpretability of the tool, as will be discussed in the Discussion section.

3.2 | Face validity assessment

The face validity of the tool, i.e., the degree to which the BruxScreen looks as though it is an adequate reflection of the construct to be measured,¹³ were assessed subjectively by collecting feedback on the tool from amongst all authors of this paper. In the absence of any standards with regard to how to assess face validity,¹³ the outcomes could not be quantified. Rather, the discussants agreed that the BruxScreen will likely yield a valid assessment of the frequency of the various awake and sleep bruxism-related jaw-muscle activities (i.e. teeth clenching, teeth grinding teeth contact, and mandible bracing)¹⁵ as well as of its most common negative consequences (i.e. TMDs, mechanical tooth wear) and clinical signs (i.e. masseter muscle hypertrophy and intra-oral soft tissue hyperkeratosis and lesions), taking into account the fact that self-reports and clinical assessments do not yield definite evidence for the presence or absence of bruxism, for which instrumentally based assessments are needed.²⁶

4 | DISCUSSION

This paper aimed to describe the development of a screening tool for the assessment of bruxism and some of its most common possible consequences: the Bruxism Screener (BruxScreen). The tool consists of a questionnaire (BruxScreen-Q) for usage by patients and a clinical assessment form (BruxScreen-C) to be completed by dentists. The first version of the BruxScreen was pilot tested and underwent a face validity assessment, following the procedures described in "Measurement in Medicine" by De Vet et al.¹³ The pilot testing resulted in the addition of an extra response option to the self-report questionnaire, viz., 'don't know'. The face validity assessment demonstrated that the tool is likely to measure the constructs of interest, namely bruxism and some of its most common consequences and extra-oral and intra-oral signs. The resulting BruxScreen is shown in [Appendix 1](#).

The decision to select and modify already existing brief tools for the BruxScreen is based on several arguments. First, brief tools were selected, because the developers wanted the screener to be applicable, affordable and accessible for use in general dental practices.² For that reason, no comprehensive self-report questionnaires or instrumentally based assessment tools were added to the BruxScreen. Second, some modifications were made because of emerging insights into bruxism-related jaw-muscle activities (hence, the addition of questions on teeth contact and mandible bracing)¹⁵ and the importance of non-pain musculoskeletal symptoms in TMDs (hence, the inclusion of unpleasantness, sensitivity, tiredness, tension and stiffness).¹⁸ Also, the fluctuation in TMD complaints, one of the cardinal characteristics of TMD,²⁷ is reflected in the BruxScreen (hence the distinction between 'upon awakening' and 'any other time').

The inclusion of already existing brief tools, with or without modifications, is especially related to the self-report questionnaire. The BruxScreen-C only includes one of such tools, namely the screening module of the Tooth Wear Evaluation System (TWES),²³ while the associated qualification module of the TWES was substituted with a single item to keep the BruxScreen-C as compact and thereby as feasible as possible. Also, the other clinical tools, namely the ones for extra-oral and intra-oral inspection, were as brief and as simple as possible, including a dichotomous response option for all items (absent or present). This is related to the fact that to the authors' best knowledge, no such tools that meet the A4 principle currently exist.²

Pilot testing yielded one issue that required attention, namely the addition of the extra response option ('don't know'). Following discussion amongst the developers, the other issues did not lead to modifications of the BruxScreen at this stage. The remarks about a more extensive explanation of terms for patients and dentists were ignored because the vast majority considered the text sufficient. In addition, also the face validity of the text was good. The suggestion to reduce the number of response options was ignored as well because we wanted to stay as close as possible to the original BRUX scale response options, of which it was

demonstrated that patients could easily comprehend the sometimes subtle differences between responses.¹⁴ We even decided to use these response options for the other questions as well, as to create uniformity between the constituent questions of the BruxScreen, thereby also facilitating statistical analyses of future data sets.

Importantly, the explanation for the patient on the BruxScreen was found to be comprehensible by almost all participants. This is important in light of the recent finding that prior explanations, either face-to-face, as a video, or in writing, on the constructs under study yield improved comprehension and thereby more accurate outcomes of the investigation.²⁸

The importance of the fact that face validity was found to be present should not be underestimated either: lack of face validity is a very strong argument not to use a certain tool.¹³ However, clearly, the validation process of the BruxScreen is far from completed yet. The tool is now ready to be tested for its reliability, its criterion validity (against gold-standard, muscle work-based measures for awake and sleep bruxism), its responsiveness to change, and, importantly, its interpretability.¹³ The general dental setting will be the arena for these tests.

The aspect of interpretability relates back to the pilot-testing finding that two dentists were missing cut-off criteria for establishing the presence of bruxism, as well as an indication of how the responses to the BruxScreen would translate into management strategies for bruxism. These are important issues that need to be studied with high priority because only when these issues are clarified, the BruxScreen will rightfully become a first-choice instrument for the assessment of bruxism in large-scale epidemiological studies and everyday general dental practice. Importantly, instructions need to be developed that will guide the user towards either a more comprehensive assessment using the STAB or a decision tree regarding the management of the detected bruxism and its consequences. It should be noted, however, that it will always remain essential to establish clinical decisions regarding the presence or absence of bruxism as well as regarding its management on the basis of a weighted compromise between the severity of the purported negative consequences of bruxism on the one hand and its possible positive health outcomes on the other hand. As such, the adoption of cut-off criteria related to the BruxScreen is undesirable; rather, awake and sleep bruxism are better assessed on a continuum spectrum.²⁶

4.1 | Conclusions

Based on the outcomes of the pilot testing and the face validity assessment, we have successfully developed a Bruxism Screener (BruxScreen). The instrument is now considered ready for more profound psychometric testing in the general dental setting.

AUTHOR CONTRIBUTIONS

FL, JA and DM contributed to the conception of this project. FL and MV drafted the manuscript. All authors critically revised the

manuscript and approved the final version. They are all responsible for all aspects of the work.

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The authors declare no conflicts of interest.

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Data sharing is not applicable to this article as no new data were created or analysed in this study.

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ENDNOTE

ⁱ The version of the BruxScreen in the Appendix 1 is the one that resulted after the pilot testing phase; see below.

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APPENDIX 1

BRUXSCREEN-Q

Bruxism Screener (BruxScreen)

Part I: self-report questionnaire

Explanation

This questionnaire assesses the possible presence of bruxism and its related jaw symptoms. Bruxism is an activity of the jaw muscles that expresses itself in two different ways: as light or firm clenching of the jaws and teeth, or as grinding of the teeth. Clenching is a motionless activity, while during grinding the lower jaw moves along the upper jaw. Grinding is usually accompanied by grinding sounds. Both activities can occur during sleep and while awake. Usually, bruxism is a harmless activity, but some individuals suffer from some possible consequences, like pain in the jaws, jaw-muscle stiffness, or a limited mouth opening. You are kindly requested to answer the brief questionnaire below, so that your dentist will have more information available about the possible presence of this jaw-muscle activity. Please hand the fully completed questionnaire to your dentist, who will subsequently perform a brief inspection of your jaws and teeth as to confirm the presence of the conditions that you have indicated on this questionnaire.

Thank you for your help!

Your dentist

1. Bruxism

a. How often do you clench your teeth during sleep?

never, sometimes, regularly, often, always, don't know

- b. How often do you grind your teeth during sleep?
 never, sometimes, regularly, often, always, don't know
- c. How often do you clench your teeth while awake?
 never, sometimes, regularly, often, always, don't know
- d. How often do you grind your teeth while awake?
 never, sometimes, regularly, often, always, don't know
- e. How often do you lightly press, touch, or hold teeth together while awake other than while eating (that is, contact between upper and lower teeth)?
 never, sometimes, regularly, often, always, don't know
- f. How often do you firmly hold, tighten, or tense muscles while awake without clenching or bringing teeth together?
 never, sometimes, regularly, often, always, don't know

2. Jaw symptoms

- a. How often do you experience pain/unpleasantness/sensitivity/tiredness/tension/stiffness in your temple, face, jaw, or jaw joint?

	Pain	Unpleasantness	Sensitivity	Tiredness	Tension	Stiffness
Upon awakening	<input type="checkbox"/> never <input type="checkbox"/> sometimes <input type="checkbox"/> regularly <input type="checkbox"/> often <input type="checkbox"/> always <input type="checkbox"/> don't know	<input type="checkbox"/> never <input type="checkbox"/> sometimes <input type="checkbox"/> regularly <input type="checkbox"/> often <input type="checkbox"/> always <input type="checkbox"/> don't know	<input type="checkbox"/> never <input type="checkbox"/> sometimes <input type="checkbox"/> regularly <input type="checkbox"/> often <input type="checkbox"/> always <input type="checkbox"/> don't know	<input type="checkbox"/> never <input type="checkbox"/> sometimes <input type="checkbox"/> regularly <input type="checkbox"/> often <input type="checkbox"/> always <input type="checkbox"/> don't know	<input type="checkbox"/> never <input type="checkbox"/> sometimes <input type="checkbox"/> regularly <input type="checkbox"/> often <input type="checkbox"/> always <input type="checkbox"/> don't know	<input type="checkbox"/> never <input type="checkbox"/> sometimes <input type="checkbox"/> regularly <input type="checkbox"/> often <input type="checkbox"/> always <input type="checkbox"/> don't know
Any other time	<input type="checkbox"/> never <input type="checkbox"/> sometimes <input type="checkbox"/> regularly <input type="checkbox"/> often <input type="checkbox"/> always <input type="checkbox"/> don't know	<input type="checkbox"/> never <input type="checkbox"/> sometimes <input type="checkbox"/> regularly <input type="checkbox"/> often <input type="checkbox"/> always <input type="checkbox"/> don't know	<input type="checkbox"/> never <input type="checkbox"/> sometimes <input type="checkbox"/> regularly <input type="checkbox"/> often <input type="checkbox"/> always <input type="checkbox"/> don't know	<input type="checkbox"/> never <input type="checkbox"/> sometimes <input type="checkbox"/> regularly <input type="checkbox"/> often <input type="checkbox"/> always <input type="checkbox"/> don't know	<input type="checkbox"/> never <input type="checkbox"/> sometimes <input type="checkbox"/> regularly <input type="checkbox"/> often <input type="checkbox"/> always <input type="checkbox"/> don't know	<input type="checkbox"/> never <input type="checkbox"/> sometimes <input type="checkbox"/> regularly <input type="checkbox"/> often <input type="checkbox"/> always <input type="checkbox"/> don't know

- b. How often do you experience pain/unpleasantness/sensitivity/tiredness/tension/stiffness in your temple, face, jaw, or jaw joint when you open your mouth or chew?

	Pain	Unpleasantness	Sensitivity	Tiredness	Tension	Stiffness
During meals	<input type="checkbox"/> never <input type="checkbox"/> sometimes <input type="checkbox"/> regularly <input type="checkbox"/> often <input type="checkbox"/> always <input type="checkbox"/> don't know	<input type="checkbox"/> never <input type="checkbox"/> sometimes <input type="checkbox"/> regularly <input type="checkbox"/> often <input type="checkbox"/> always <input type="checkbox"/> don't know	<input type="checkbox"/> never <input type="checkbox"/> sometimes <input type="checkbox"/> regularly <input type="checkbox"/> often <input type="checkbox"/> always <input type="checkbox"/> don't know	<input type="checkbox"/> never <input type="checkbox"/> sometimes <input type="checkbox"/> regularly <input type="checkbox"/> often <input type="checkbox"/> always <input type="checkbox"/> don't know	<input type="checkbox"/> never <input type="checkbox"/> sometimes <input type="checkbox"/> regularly <input type="checkbox"/> often <input type="checkbox"/> always <input type="checkbox"/> don't know	<input type="checkbox"/> never <input type="checkbox"/> sometimes <input type="checkbox"/> regularly <input type="checkbox"/> often <input type="checkbox"/> always <input type="checkbox"/> don't know
Any other time	<input type="checkbox"/> never <input type="checkbox"/> sometimes <input type="checkbox"/> regularly <input type="checkbox"/> often <input type="checkbox"/> always <input type="checkbox"/> don't know	<input type="checkbox"/> never <input type="checkbox"/> sometimes <input type="checkbox"/> regularly <input type="checkbox"/> often <input type="checkbox"/> always <input type="checkbox"/> don't know	<input type="checkbox"/> never <input type="checkbox"/> sometimes <input type="checkbox"/> regularly <input type="checkbox"/> often <input type="checkbox"/> always <input type="checkbox"/> don't know	<input type="checkbox"/> never <input type="checkbox"/> sometimes <input type="checkbox"/> regularly <input type="checkbox"/> often <input type="checkbox"/> always <input type="checkbox"/> don't know	<input type="checkbox"/> never <input type="checkbox"/> sometimes <input type="checkbox"/> regularly <input type="checkbox"/> often <input type="checkbox"/> always <input type="checkbox"/> don't know	<input type="checkbox"/> never <input type="checkbox"/> sometimes <input type="checkbox"/> regularly <input type="checkbox"/> often <input type="checkbox"/> always <input type="checkbox"/> don't know

- c. How often does your jaw lock or become stuck?

- (i) During meals:
 never, sometimes, regularly, often, always, don't know
- (ii) Any other time:
 never, sometimes, regularly, often, always, don't know

BRUXSCREEN-C**Bruxism Screener (BruxScreen)***Part II: clinical assessment form*

Explanation

This clinical assessment tool aims at identifying signs that may be associated with bruxism. First, the facial outline is inspected for possible hypertrophy of the masseter muscles, both while the muscles are relaxed and when they are contracted. In case of doubt, select 'absent'. Second, the oral cavity is inspected for signs that may be associated with bruxism. Also in this case, when in doubt, select 'absent'. Third, the teeth are inspected for tooth wear. Please follow the scoring rules as indicated. In case of doubt between two scores, select the lower one. In addition, please indicate if the observed tooth wear is mainly mechanical (i.e. due to tooth-to-tooth contact), mainly chemical, or both.

1. Extra-oral inspection

- a. Masseter muscle hypertrophy (observed while the muscles are relaxed)

 absent, present

- b. Masseter muscle hypertrophy (observed while the muscles are contracted)

 absent, present

2. Intra-oral inspection of non-dental tissues

- a. Lip (indentations) b. Cheek (linea alba) c. Tongue (indentations)

 absent, present absent, present absent, present

- b. Tongue (traumatic lesions) e. Alveolar bone (exostoses/tori)

 absent, present absent, present

3. Intra-oral inspection of dental tissues

- a. Occlusal/incisal wear per sextant

(0) no visible wear, (1) visible wear within the enamel, (2) visible wear with dentin exposure and loss of clinical crown height of $\leq 1/3$, (3) loss of crown height $> 1/3$ but $< 2/3$, (4) loss of crown height $\geq 2/3$

- b. Palatal wear in sextant no. 2

(0) no visible wear, (1) wear confined to the enamel, (2) wear into the dentine

Sextant 1 – occlusal	Sextant 2 – incisal	Sextant 3 – occlusal
0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
	Sextant 2 – palatal	
	0 1 2	
Sextant 6 – occlusal	Sextant 5 – incisal	Sextant 4 – occlusal
0 1 2 3 4	0 1 2 3 4	0 1 2 3 4

- c. The observed tooth wear is:

 mainly mechanical, mainly chemical, both mechanical and chemical