

Research article

Current developments in bruxism identification

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Abstract: Background and Objectives: Bruxism is a parafunctional activity that can have several causes. Patients with bruxism need an interdisciplinary approach to treatment planning and individualized treatment options. The present study evaluates dentists' knowledge of the bruxism condition and their need for further education. Diagnosis and treatment methods used by practitioners from different specialties are emphasized.

Materials and Methods: A prospective cross-sectional, observational, and analytical cohort study was conducted. It employed a questionnaire based on information on etiology, diagnosis, and treatment methods and included data from 80 dental practitioners from Cluj County.

Results: Most dentists (81.3%) recognized awake and sleep bruxism as separate entities. Most participants identified psychological status as the primary etiological factor (80%), followed by occlusal interferences (13.8%) and other factors (genetics). Anamnesis and clinical examination were performed for bruxism diagnosis (90%). Occlusal balance (%) and occlusal splints (%) were the most encountered treatment methods. Only 27.5% of the practitioners referred patients to other specialists. Physiotherapy and psychotherapy were the primary interdisciplinary approaches. Cognitive behavioral therapy was employed by 43.8%, whereas pharmaceutical therapy by 20% of the practitioners.

Conclusions. There is a need for standardized training among dentists due to a lack of information on this topic. When combined with an interdisciplinary approach, complementary diagnostic methods such as polysomnography and BruxApp can yield accurate diagnosis.

Keywords: bruxism, occlusion, stress, polysomnography

Introduction

According to the American Academy of Orofacial Pain (2008), bruxism is a parafunctional activity that occurs during the day or nighttime and includes clenching of the jaws and teeth grinding. It can lead to teeth wear that is not correlated with the normal masticatory function (1).

In dentistry, bruxism is a complex condition that affects a significant proportion of the population, between 13 and 31%, according to Manfredini (2), and could have serious consequences on oral and general health. Bruxism is characterized by involuntary and repeated movements of the masticatory muscles, which cause rubbing, grinding, or excessive pressure between teeth surfaces (1). This disorder can harm the teeth, muscles, temporomandibular joints, as well as the overall stomatognathic system.

It is also important to note that bruxism can be associated with various etiological factors such as stress, anxiety, dental malocclusion, as well as certain medical conditions or medications (3). A proper diagnosis of bruxism requires a multidisciplinary approach, involving collaboration between dentists, sleep physicians, and other health professionals.

Bruxism may arise at any time of day, both while sleeping and when awake (4). In evaluating bruxism, both procedures, self-report, and electromyography can be applied (5). The question of whether sleep bruxism is a condition unto itself that requires treatment or if it might be a risk factor for other conditions is currently being debated. (6). The purpose of the study is to evaluate dentists' expertise on the topic of bruxism, the pathology, the diagnosis methods, and their importance in establishing adequate treatment. It can show the level of dentists' knowledge of the latest research and clinical guidelines regarding bruxism, identifying the possible knowledge gaps and identifying continuing education needs.

By understanding the mechanisms of bruxism and by promoting an early and accurate diagnosis, practitioners can help to enhance oral health and the quality of life of patients affected by this condition.

Materials and methods

The study is a cross-sectional, analytical, observational, prospective cohort study, based on a questionnaire. The data that has been collected between June and July 2023.

The questionnaire was based on information about the etiology, diagnosis, and management of bruxism. This approach involved dentists from Cluj County with different experiences in the field, from both rural and urban environments. A specialization-based division was established. The sample included 80 dentists.

The inclusion criteria encompassed issues such as being registered with the Cluj County College of Dentists and having the legal right to practice dentistry in both urban and rural areas. The exclusion criteria were individuals who did not meet the previously mentioned inclusion criteria and those who did not agree to complete the questionnaire or to the data processing.

No personal data was collected, processed, or stored. The obtained information was used only for scientific purposes.

The questions in the questionnaire are shown in Annex number 1. Thirteen of the questions were closed-ended to collect qualitative information and allow medical professionals to share their knowledge. Both multiple-choice and simple-choice ("yes"/"no") questions were utilized for obtaining succinct responses and to provide a more comprehensive understanding of the physicians' knowledge and perspectives. The following was the sequence in which the questions were stated: - general questions about the practitioner and the field of activity;

- questions regarding the frequency of bruxism in daily practice and the differentiation of the two clinical entities;

- questions about known and used diagnostic methods;

- questions about bruxism management.

The questionnaires were distributed in physical and electronic format (Google Forms and via WhatsApp) to dentists of different specialties.

After answering the questionnaires, the data were sent electronically, and Microsoft Excel was used to create the database required for the analysis. Statistical analysis was performed using MedCalc Statistical Software version 19.1 (MedCalc Software, Ostend, Belgium (7)). A threshold of below 0.05 was determined for statistical significance.

The tests were applied based on the following hypotheses: the relationship between the level of experience of dentists and their knowledge of bruxism; the direct impact of the environment (rural/urban) in the diagnosis and management of bruxism; the correlation between experience and the redirection of patients with bruxism.

Results

General information about the participants

Eighty dentists participated in the study, most of whom were general dentists (48.8%), followed by specialists (31.3%). In terms of specialization, general dentistry accounted for 46.3% of dentists, followed by prosthodontists, which accounted for 25%.

52.5% of dentists had less than five years of experience, and most of practitioners (75%), were employed in urban environments. Of the 42 physicians who had been in practice for less than five years, 14 reported having sent the patient to a specialist.

Sings, symptoms, and etiological factors

The dentists stated that during the primary consultation, they would monitor the signs and symptoms of bruxism or other temporomandibular dysfunctions. 98.8% of the practitioners said that they encountered patients with bruxism, most of the patients being diagnosed with sleep bruxism. The difference between awake and sleep bruxism, as two different entities, was recognized by 81.3% of the respondents. Most participants identified psychological status as the primary etiological factor in the occurrence of bruxism (80%), followed by occlusal interferences (13.8%) and other factors (genetics). Despite the large percentage of practitioners who identified the psycho-emotional status as being the main cause of bruxism, 75% of them were not using questionnaires to evaluate the etiological factors.

Diagnosis methods

The majority of the dentists responded that they used anamnesis (90%) and clinical examination (90%) to diagnose bruxism. The questionnaire-based method of assessing psycho-emotional status was used by 26.3% of the respondents, and polysomnography was used by 2.5%.

The most well-known complementary method for bruxism diagnosis was electromyography (56,3%). Through the primary consultation, physicians observed both endo- and exo-oral changes. Hypertrophy of the masseter muscle was the most encountered change during exo-oral examination (60%), and dental wear was the most frequent during endo-oral examination (92.5%).

Treatment methods

Physiotherapy and psychotherapy were considered the primary interdisciplinary approaches. Occlusal balancing was chosen as a treatment method by 45% of the dentists, while occlusal splints were used by 95%.

A small percentage of dentists preferred to redirect the patient to another specialist (27.5%), and among the most common reasons were the lack of knowledge of bruxism management or the lack of experience.

Cognitive behavioral therapy was used by 43.8% of practitioners, while pharmaceutical therapy was used by 20%. Polysomnography was recognized by 37.5%, whereas BruxApp was employed by 30% of the respondents. The majority of the dentists in our survey chose electromyography over polysomnography.

Statistical analysis

The correlation between the level of experience and the redirecting of patients with bruxism couldn't be demonstrated, nevertheless the correlation between the number of dentists who don't recognize the two entities of bruxism and their uncertain answer regarding the etiology of bruxism was significant (0.02).

Discussion

By comparing the responses of physicians who failed to distinguish between awake and sleep bruxism as distinct conditions and the etiology of bruxism, it was attempted to assess the dentists' level of expertise. An important aspect is recognizing the two entities of

bruxism as clinically different, as they are presented by Manfredini et al., Lobbezoo et al., Ilovar et al. (8, 9, 10). Nevertheless, the study showed a lack of understanding in differentiation between the two entities. Solely two participants chose stress, sleep dysfunction, genetic factors, alcohol and coffee consumption, and particular medical conditions as being among the etiological factors of bruxism. Several authors have described each of these variables (1, 11, 12, 13, 14). Hence, the need for additional information among dentists on bruxism is emphasized.

La Vigne et al., Yap & Chua, and Bayar et al. showed the significant importance of the psychological status (stress, anxiety) in the etiology of bruxism (1, 15, 16). On the contrary, the hypothesis that occlusal interferences would have an effect on bruxism patients was disproved. by Yap & Chua and Lobbezoo et al. (11, 15).

Shetty et al., Pinatodo et al emphasize the main role of the importance of diagnosing methods of bruxism (17, 18). In the present study, the utility of using a questionnaire-based diagnosing method was highlighted by the high number of respondents (81,3 %), who recognized sleep bruxism, as well as awake bruxism.

Surface electromyography and heart rate data collected by small equipment are simple and reliable tools for diagnosing sleep bruxism (19).

Other diagnosing methods, such as polysomnography and BruxApp were shown as being relevant by Trindade & Rodriguez and Emodi-Perlman et al. (20, 21). In our study, polysomnography was granted by 37.5 %, whereas BruxApp was employed by 30%. Anamnesis and clinical examination were used as diagnostic methods by a significant number of dentists, as opposed to instrumental methods, such as polysomnography. These instrumental methods, while useful and precise, impose a high and inconsistent cost for the patient as well as rigorous training of the examiner (22).

Polysomnography is the supplementary method acknowledged by Trindade and Rodriguez as the gold standard in diagnosing bruxism (20). The majority of the dentists in our survey chose electromyography over polysomnography.

Electromyography is rarely described in the literature due to the disadvantages described by Mainieri et al., the lack of electroencephalographic, electrooculographic, and audiovisual recording components, as well as the lack of a scale to quantify the bruxism's intensity (20, 23).

There is little data to establish definitive findings about medicine that causes or worsens sleep bruxism or awake bruxism (24). In our study, treatment was mainly based on occlusal splints (92.5%) and occlusal grinding (45%), whereas medication was prescribed poorly (20%). There fails to be a treatment for sleep bruxism at present, despite the condition being common and having detrimental effects on dental conditions and quality of life (25).

When occlusal splints were utilized to treat bruxism patients, it was observed that the splints reduced muscle activity (26). Among various temporomandibular disorders that can be treated with occlusal splints are bruxism, headaches, and positional abnormalities (27). Occlusal splints were used as the first intention therapy in sleep bruxism by 92.5% of participants in our study.

Oral appliances including stabilizing splints, cognitive-behavioral therapy, biofeedback treatment, and pharmaceutical therapy have been employed for the treatment of bruxism (28). In our study cognitive behavioral therapy was employed by 43.8% and pharmaceutical therapy by 20% of the practitioners.

To treat sleep bruxism, research has been conducted on the optimal disocclusion guidance for occlusal splints, canine guiding demonstrated significant increases in mouth opening, discomfort, sleep quality, and muscular activity while bilateral balanced occlusion reduced pain levels (29).

The occlusal balancing procedure and occlusal splints were used as treatment methods by the majority of practitioners (45% of respondents). However, current treatment methods did not completely eliminate the associated symptomatology. Using the occlusal splints as a protection method for the teeth and not as a curing treatment for bruxism was shown by

Okeson & Lobbezoo et al. (30, 31). Nevertheless, Goldstein & Auclair Clark do not recommend the occlusal balance as a main treatment method because of insufficient evidence to demonstrate occlusion as the main etiological factor of bruxism (32).

There was a tendency to refer patients to psychotherapists and physiotherapists for the treatment of bruxism. These treatment methods are part of the five approach types for managing patients with bruxism described by Manfredini et al. (33).

The need for a standardized questionnaire is highlighted, which would offer replicability in the assessment of the knowledge of this entity. An additional benefit of using a standardized questionnaire is the ease of use for the patient.

The need for a differential diagnostic and treatment protocol for both awake and sleep bruxism is an important aspect of managing patients with bruxism.

The study's originality is evident in the design of the questionnaire, which is addressed to practitioners and follows the use of the latest therapeutic techniques in the treatment of bruxism.

Our strengths are highlighted by the different specialties of the clinicians included in the study, providing a complex picture of medical knowledge and the need for medical education on the parafunction of the dental-maxillary apparatus. The limitations are represented by the low number of participants and by geographical area. Rural areas were less well represented, and the age distribution of the population was not balanced.

Conclusion

There is a need for a standardized questionnaire to assess dentists' knowledge of bruxism diagnosis and treatment, which could represent a replicable procedure. The study revealed a gap in medical knowledge, particularly in distinguishing between awake and sleep bruxism and its origin. In the treatment of bruxism, an interdisciplinary approach that includes physiotherapy and psychotherapy specialists is required.

Occlusal balancing and occlusal splints were identified as being the most commonly used treatment methods.

There is still a need to recognize complementary diagnostic methods like polysomnography and BruxApp, which can contribute to a more precise diagnosis and an individualized treatment plan.

Annex Number 1

Questionnaire on dentists' knowledge of bruxism

1. What is your occupation?

- Dentist
- Medical specialist
- Primary doctor
- Resident doctor

2. What is your specialty?

- General Dentistry
- Dental prosthetics
- Orthodontics
- Pedodontics
- Endodontics
- Dento-alveolar/maxillo-facial surgery
- Periodontology

3. How long have you been practicing your profession?

- Less than 5 years
- 5-10 years

- 11-20 years
- 21-30 years
- More than 30 years

4. The environment in which you work:

- Rural
- Urban

5. As part of the primary consultation protocol, do you monitor the symptoms and signs of bruxism or other temporomandibular dysfunctions?

- Yes
- No

6. Do you consider nocturnal bruxism and daytime bruxism to be different entities?

- Yes
- No

7. Have you met patients with bruxism in your profession?

- Yes
- No
- I don't know

8. How often do you meet patients with nocturnal bruxism in the office?

- Very often (weekly)
- Quite often (monthly)
- Infrequent (annual or less)
- Never

9. How often do you meet patients with diurnal bruxism in the office?

- Very often (weekly)
- Quite often (monthly)
- Infrequent (annual or less)
- Never

10. Do you usually diagnose bruxism patients yourself or do you refer them to more experienced colleagues?

- Yes
- No, I'm redirecting them

11. If the answer to the previous question was no, what would be the causes that would lead you to avoid approaching patients with bruxism?

- Lack of professional experience (I have been working for a short time)
- Lack of necessary knowledge in the diagnosis of bruxism
- Lack of knowledge regarding the management of bruxism
- Lack of ability to make a complete treatment plan for this condition

12. How often do you diagnose patients with temporomandibular disorders in your practice?

- Very often (weekly)
- Quite often (monthly)
- Infrequent (annual or less)
- Never

13. Which of the following variants do you consider to be possible etiological factors of bruxism?

- Occlusal interferences
- Psychological status: stress, anxiety
- Sleep disorders (e.g. snoring, sleep apnea)
- The genetic factor
- Alcohol/coffee consumption
- Some medical conditions (eg ADHD, epilepsy)

14. Which of these factors do you think is most involved in the onset of bruxism?

- Occlusal interferences
- Psychological status: stress, anxiety
- Sleep disorders (eg snoring, sleep apnea)
- The genetic factor
- Alcohol/coffee consumption
- Some medical conditions (eg ADHD, epilepsy)

15. In the preliminary consultation, do you also include the examination of the temporomandibular joint and the masticatory muscles?

- Yes
- No
- Sometimes

16. Which of the following complementary means of diagnosing bruxism are you familiar with?

- Electromyography
- Polysomnography
- Bruxoff
- BruxApp
- SleepProfiler

17. Do you refer patients with bruxism for interdisciplinary consultation to one of the following specialties?

- Psychotherapy
- Psychiatry
- Neurology
- Physiotherapy
- Pneumology
- They do not send patients for interdisciplinary consultation

18. Do you routinely assess the patient's occlusion statically and dynamically before initiating treatment?

- Yes
- No
- Sometimes

19. Do you consider occlusal balancing to be the first line of treatment for bruxism?

- Yes
- No
- Sometimes

20. What other therapeutic methods do you use in the management of bruxism?

- Occlusal gutters
- Drug therapy
- Psychological therapy
- Botulinum toxin injection
- Physiotherapy
- I do not treat bruxism

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