PREVALENCE AND RISK-FACTORS OF BRUXISM IN CHILDREN AND ADOLESCENT POPULATION AND ITS IMPACT ON QUALITY OF LIFE (REVIEW)

Tsitadze T., Puturidze S., Lomidze T., Margvelashvili V., Kalandadze M.

Ivane Javakhishvili Tbilisi State University, Georgia

Bruxism is a disorder that is characterized by grinding and clenching the teeth either in sleep or also awake. It has become an increasing problem all over the world, considering its negative impact on the quality of life in children and adult population. Etiology of bruxism is multifactorial, but to summarize it can be divided into two factors: peripheral (morphological) and central (pathophysiological, psychological). Peripheral plays a minor role and major regulator of bruxism is central. The knowledge and approach to understanding the pathology is changing as new definitions, classifications and theories regarding etiology has been accumulated with the evolution and growth of knowledge of this subject [13]. However, last studies define that bruxism is a psychophysiological disorder [18]. In addition, bruxism is no longer accepted as a single entity and it has two distinct circadian manifestations. These 2 distinct manifestations of bruxism may take place in different circadian phases, creating sleep and/or awake bruxism, which may share common risk factors and lead to similar consequences on the masticatory system, although etiology and pathophysiology may differ [1]. The risk factors and associated problems of bruxism are amply documented and studied, however the recent publications point out that personality features, such as anxiety traits and stress sensitivity, are the main psychological factors associated with bruxism, both in children/adolescents and in adults [25]. As a result, bruxism may lead to the health problems such as tooth wear, tooth mobility, and other clinical findings like tongue/cheek indentation, masticatory muscle hypertrophy, temporomandibular joint pain, headaches, and masticatory muscle pain or fatigue [15]. Due to unfavorable effects that sleep or awake bruxism has on the oral hard and soft tissue, the dental health care practitioners are particularly concerned with it [22]. Therefore, a sound knowledge of the physiopathology of this parafunction together with the etiologic and associated factors is needed for properly screening the various forms of bruxism in children and adolescents [24].

This is a review paper and hence study discusses the possible risk-factors leading to bruxism in children and adolescent population. Moreover, the paper looks into its pathological impact affecting individual's health and quality of life as well as the methods of treatment. The focus group of this review is children and adolescents, because bruxism is observed to be more prevalent in these groups.

The review of the literature has been carried out using the "ScienceDirect", "Scopus" and "PubMed" scientific bases in order to define relevant scientific works - published in English, not earlier than 2014. Following keywords are used: bruxism, tooth wear, sleep apnea, sleep and awake bruxism, bruxism prevalence. Over 200 articles were analyzed and 31 most relevant articles were chosen and analyzed in details.

Classification of Bruxism. Bruxism is classified according to: presence, occurrence, etiology, and motor activity [29]. The presence of bruxism can be the past bruxism, which is currently non-active and the present bruxism, which is currently active [29,31]. Three types of bruxism can be identified according to its occurrence: sleep bruxism, which occurs when individual sleeps, awake bruxism which occurs while individual is awake and combined bruxism, which occurs in both situations [31]. Etiologically the bruxism can be primary and secondary. In the case of primary bruxism the cause factors are not identifiable. However, in the case of secondary bruxism, causing factors can be presented as a consequence of neurologic, psychiatric, sleep or movement disorders, or of an iatrogenic type associated with drug use/withdrawal [31]. Motor activity type of bruxism can be classified into three groups: tonic, phasic and combined. A tonic bruxism is when the muscular contraction lasts less than 2 seconds, while the phasic bruxism is characterized by the brief repeated muscular contractions with at least three consecutive electromyographic bursts of 0.25 and 2 seconds. A variation of tonic and phasic episodes is the combined bruxism [29].

Risk-factors of Bruxism. Commonly, the risk factors of bruxism are known to be: gender, age, genetics, endocrine disorders, allergies, enlargement of the tonsils, cheeks tonus, perioral musculature participation, biting, mouth breathing (day and/or night), headaches, mental health problem, anxiety, emotional instability, psychological factors, hyperactivity, medication, noisy bedroom and even family income [2,8,9,11,14]. Pediatric dentistry classifies 3 groups of causing factors:

1. Local factors including occlusal interferences, high or poor filling restorations.
2. Systematic factors including malnutrition and nutritional deficiencies, allergies, endocrine disorders;
3. Psychological factors including personality disorders and increased stress [11].

However, several risk factors for bruxism in children and adolescents are identified among which behavioral abnormalities and sleep disturbances predominated [14]. A statistically significant association was found between childhood bruxism and restless sleep in children. Children with restless sleep are more likely to exhibit bruxism [20]. Mental disorders, mainly anxiety disorders, and other psychological variables were also significantly related to tooth grinding during sleep. Based on the available evidence, a significant association between sleep bruxism and stressful, anxious, and tense personality traits is found in children aged between 6 and 11 years; likewise, a significant association between sleep bruxism and psychosocial disorders was present in adolescents of age between twelve and seventeen years old [30]. In a group of adolescents legal psychoactive substances intake showed moderate association with sleep bruxism [3].

Prevalence of Bruxism. A cross-sectional study of 151 preschool children revealed the prevalence of bruxism to be 45.0% associated with the location of headache as well as some parafunctional habits [6]. Correspondingly, another school-based cross sectional study of total 935 children aged between 2-5 and 8-10 years demonstrated that the prevalence of bruxism was 22.3% in 2-5 age group and 32.7% in 8-10 age group related with poor sleep quality [17]. Furthermore, the clinical examination of 253 undergraduate students was in concordance with the numbers of previous research, bruxism occurred in 31.6% most associated with bruxism were stress, muscle pain, TMJ pain, and TMJ noise [26].

Effects of bruxism on the health. Statistically significant data proves association between oral health and general health

[16,21,27]. Bruxism can cause short-term and long-term, permanent effects on individual's health conditions. Short-term effects of bruxism include: tooth sensitivities,headaches, facial myalgia, ear ache, tightness/stiffness of the shoulders, limitation of mouth opening, sleep disruption, sleep disruption of bed partner due to noise, excess tooth mobility, inflamed and receding gums. While long-term effects are Temporomandibular Joint Disorder, tooth wear and breakage, tongue's deformation [5,10,11].

The reviewed literature and statistically significant data prove that bruxism still remains a serious problem all over the world. The findings demonstrate many different factors associated with jaw clenching and tooth grinding. Recognition of the possible causes, clinical characteristics, signs and symptoms of the bruxism in childhood and elimination of the problem as early as possible is very important in order to avoid further difficulties [20]. According to literature, it is evident that there are not any general medical procedures for treating bruxism and each individual case requires specific way of treatment. The aim of treatment is to find and remove the factors causing bruxism, change the behavior and eventually repair the caused harm.

The dentists usually act through restorative procedures and occlusal splints, but in some specific cases, systemic treatment using pharmacological prescriptions is needed, associated with medical and psychological support [4].

Methods of treatments preferable for sleep bruxism includes: occlusal therapy, pharmacological therapy, contingent electrical stimulation, behavioral treatments and biofeedback [9]. Improving the quality of sleep, reducing the use of stimulants such as caffeine and nicotine, having a good bedtime routine and relaxing before bed are some of them [12]. On the one hand interventions such as counselling about triggers, habits modification, relaxation therapy, or biofeedback treatment methods are appropriate for treating of awake bruxism [7].

Considering the potential negative consequences of persistent bruxism on dental and oral health, the following recommendations can be given: self-observation for bringing awareness of clenching or grinding activities during waking hours; muscle relaxation, for a "muscular and vegetative stabilization" In order to achieve an improved body perception and stress management; and splint therapy, to protect the tooth structures from attrition other oral structures from overload, and also to protectt possible dental reconstructions from damage [14].

Conclusion. Bruxism is a common disorder among children and adults, becoming a growing concern for both family members and health professionals. As it was mentioned above, bruxism is a complex disorder with a controversial etiology [19]. It is obvious that this parafunctional habit whether sleep and/or awake, consists in an important change in the oral sensory-motor system, which requires a multidisciplinary approach, in order to reduce injuries in dentognathic structures [28]. In this context studies suggest a variety of treatment methodologies including dentistry, physiotherapy and psychology.

Despite the fact that several psychoactive drugs and behavioral therapies are used as a treatment methodologies, they are still effective only for limited samples and with the risk of severe side-effects. Thus, the further research, treatment strategies as well as outreach is needed, to show how widespread the disease is, how severely it may affect the helath and promote the actions to decrease the prevalence of bruxism, particularly in children and young adults.

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SUMMARY

PREVALENCE AND RISK-FACTORS OF BRUXISM IN CHILDREN AND ADOLESCENT POPULATION AND ITS IMPACT ON QUEALITY OF LIFE (REVIEW)

Tsitadze T., Puturidze S., Lomidze T., Margvelashvili V., Kalandadze M.

Ivane Javakhishvili Tbilisi State University, Georgia

Bruxism has become more and more debatable and pressing issue all over the world last years. the etiology of bruxism has been changing diverse definitions, over the years, however recently it is defined as a repetitive jaw-muscle activity characterized by clenching or grinding of the teeth and by bracing or thrusting of the mandible. This literature review discusses the possible risk factors of bruxism in children and adolescence, among which behavioral abnormalities and sleep disturbances predominates. Moreover, it reviews pathological impact of bruxism on general health and quality of life.

The literature review has been carried out using the "ScienceDirect", "Scopus" and "PubMed" databases in order to define relevant scientific works - published in English, during the last 5 years. 31 most relevant articles were chosen.

Bruxism is a psychophysiological disorder that can take place during the day and/ or night, in a form of clenching and grinding. It can cause health problems such as tooth sensitivities, headaches, facial myalgia, ear ache, tightness/stiffness of the shoulders, limitation of mouth opening, sleep disruption, sleep disruption of bed partner due to noise, excess tooth mobility, inflamed & receding gums, Temporomandibular Joint Disorder, tooth wear and breakage and tongue's deformation. Considering the potential negative consequences of bruxism on dental and oral health, various clinical methods have been devised to assess it over the years. As the etiology is multifactorial, there is no exact treatment to prevent bruxism. Counselling and behavioral strategies, splint therapy, medications, and contingent electrical stimulation can be used as different ways reducing the effects of bruxism

Keywords: bruxism, tooth wear, sleep apnea, sleep and awake bruxism, bruxism prevalence.

РЕЗЮМЕ

ПРЕВАЛЕНТНОСТЬ И ОПРЕДЕЛЕНИЕ РИСК-ФАКТОРОВ БРУКСИЗМА В ПОПУЛЯЦИИ ДЕТЕЙ И ПОДРОСТКОВ И ЕГО ВЛИЯНИЕ НА КАЧЕСТВО ЖИЗНИ (ОБЗОР)

Цитадзе Т.Г., Путуридзе С.Д., Ломидзе Т.Ш., Маргвелашвили В.В., Каландадзе М.Н.

Тбилисский государственный университет им. И. Джавахишвили, Грузия

В последние годы бруксизм является актуальной и спорной темой во всем мире. Со временем меняется как его вызывающие причины, так и классификация и методы лечения. В обзоре обсуждаются возможные риск-факторы развития бруксизма в детском и в взрослом возрасте, его патологические результаты, влияющие на здоровье и качество жизни человека.

Литературный обзор основан на данных «ScienceDirect», «Scopus» и «PubMed» за последние 5 лет. Отобрана 31 научная релевантная статья на английском языке.

Бруксизм – психофизиологическое нарушение, которое проявляется скрипом зубов, вызывая целый ряд неудобств: боль в области лица, чувство напряжения в области плеч, неполноценный сон, нарушение функционирования височно-нижнечелюстных суставов, стираемость зубов, воспаление десен, боль в области уха. Данные симптомы отрицательно влияют на качество жизни человека.

На сегодняшний день разработано множество методов лечения бруксизма, однако ввиду разнообразия вызывающих бруксизм факторов какого-либо уникального метода его лечения не имеется. Методами лечения бруксизма являются медикаментозное лечение, электростимуляция и сплинт-терапия. Результаты проведенных аналитических работ диктуют необходимость продолжения исследований по разработке уникального, всестороннего и полноценного метода лечения бруксизма.

რეზიუმე

ბრუქსიზმის პრევალენტობისა და რისკ-ფაქტორების განსაზღვრა ბავშვთა და მოზარდთა პოპულაციაში და მისი გავლენა ცხოვრების ხარისხზე (მიმოხილვა)

თ.წითაძე, ს.ფუთურიძე, თ.ლომთაძე, ვ.მარგველაშვილი, მ.კალანდაძე

ი.ჯავახიშვილის სახ. თბილისის სახელმწიფო უნივერსიტეტი, საქართველო

ბოლო წლების განმავლობაში ბრუქსიზმი მეტად აქტუალური და საკამათო თემა გახდა მთელი მსოფლიო მასშტაბით. დროთა განმავლობაში იცვლება, როგორც მისი გამომწვევი მიზეზები, ასევე კლასიფიკაციები და მკურნალობის მეთოდები. მიმოხილვაში განხილულია ყველა შესაძლო რისკ ფაქტორები, რომლებიც კავშირშია ბრუქსიზმის განვითარებასთან ბავშვებსა და მოზარდებში, ასევე, მათი ზეგავლენა ადამიანის ჯანმრთელობასა და ცხოვრების ხარისხზე.

ლიტერატურული მიმოხილვა ეფუძნება "Science Direct", "Scopus" და "PubMed" მონაცემთა ბაზებს, კერძოდ სამეცნიერო ნაშრომებს ინგლისურ ენაზე, და გამოქვეყნებულია ბოლო 5 წლის განმავლობაში. განხილულია 31 სტატია.

ბრუქსიზმი არის ფსიქოფიზიოლოგიური დარღვევა, რომელიც გამოიხატება დღისით ან და ღამით კბილების კრაჭუნით, იწვევს მთელ რიგ პრობლემებს: ტკივილს სახის და მხრების არეში დაჭიმულობის შეგრძნებას, არასრულფასოვან ძილს, კბილების მაგარი ქსოვილის ცვეთას, კბილების მორყევას, საფეთქელ-ქვედა ყბის სახსრის ფუნქციონირების დარღვევას, ღრძილების ანთებას, ტკივილს საფეთქლის არეში, თავის ტკივილს, რაც უარყოფიდად მოქმედებს ადამიანის ცხოვრების ხარისხზე.

სადღეისოდ შემუშავებულია ბრუქსიზმის სამკურნალო უამრავი მეთოდი. გამომწვევი მიზეზების მრავალფეროვნების გამო არ არსებობს რაიმე უნიკალური მეთოდი მის სამკურნალოდ. ექიმთან კონსულტაციები, მედიკამენტებისა და ელექტრო სტიმულაციის გამოყენება და სპლინტ-თერაპია წარმოადგენს სხვადასხვა გზას ბრუქსიზმთან საბრძოლველად.

COMPARATIVE EVALUATION OF THE CLINICAL EFFICACY OF MODERN REMINERALIZING DRUGS IN THE TREATMENT OF ENAMEL CARIES (FOCAL DEMINERALIZATION)

Solovyeva Z., Zaporozhskaya-Abramova E., Adamchik A., Gushchin A., Risovanniy S., Manukyan I.

Federal State Budgetary Educational Institution of Higher Education «Kuban State Medical University» of the Ministry of Healthcare of the Russian Federation, Krasnodar, Russia

Tooth caries is a multifactorial disease, in the development of which enamel resistance plays an important role [4,25]. It is known that the development of caries is due to the demineralization of tooth enamel with acids, which are the product of fermentation of dietary carbohydrates by bacteria of dental plaque [28]. Caries is a dynamic and reversible process; an understanding of this fact has led to the development of new technologies that can diagnose caries at the earliest stages for its timely treatment and prevention [5,22]. The clinical efficacy of fluoride in the prevention of caries has been proven by numerous studies [1,6]. As remineralizing agents, agents containing various fluorine compounds are used: sodium fluoride, aminofluoride, sodium monofluorophosphate, etc [8]

In the 1970s, Professor A. Knappvost developed a method for deep fluoridation of hard dental tissues. Deep fluoridation is based on chemical reactions that occur during the sequential processing of hard tooth tissues with a solution of magnesium and copper fluoride silicates and a suspension of highly dispersed calcium hydroxide, which leads to the formation of a fluorosilicate complex [7]. The complex spontaneously disintegrates with the formation of microcrystals of calcium fluoride, magnesium, copper, and polymerized silicic acid. Fluoride crystals are located on the surface and deep inside the enamel in a thixotropic silica gel, due to which there is a prolonged release of fluoride ions in a concentration sufficient for remineralization [13,24].

It is known that fluorides remain the leading means in the prevention and treatment of initial lesions of hard dental tissues [19]. The enamel remineralization in this case is due to the formation of a more durable fluorapatite based on epitaxial growth of residual crystals. However, the formed crystals of apatite may differ in their physicochemical and strength properties from intact enamel crystals [10,17]. Since mature enamel is a dead tissue, almost devoid of proteins involved in regulating the processes of building hydroxyapatite crystals, an ideal remineralization drug should ensure the organization and formation of micro-architecture of hydroxyapatite crystals, which are most similar to those of healthy enamel [12,23,27]. Currently, a drug for biomimetic recovery of enamel based on amelogenin protein "InnoDent" (PLC, "InnoDent", Kazakhstan) has appeared on the dental market, study of clinical efficacy of which is of great interest [2,22,25].

The study objective was to evaluate the clinical efficiency of use of modern remineralizing formulas: "Enamel-sealing liquid" (original name "Tiefenfluorid", Humanchemie, Germany), "FluoroLux" (TechnoDent, Russia), "InnoDent" (PLC, "InnoDent", Kazakhstan) and Clinpro™ XT Varnish (3M ESPE, Germany) in treatment of focal demineralization.