



(REVIEW ARTICLE)

Bruxism in children, is it a result of psychological problems?

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Publication history: Received on 05 July 2020; revised on 20 July 2020; accepted on 24 July 2020

Article DOI: <https://doi.org/10.30574/wjarr.2020.7.1.0244>

Abstract

Bruxism is involuntary, excessive grinding, clenching or rubbing of teeth during non-functional movements of the mastication. It is a destructive habit that may result in tooth wear. Although research on bruxism is extensive, its etiology remains debatable. The literature suggests that bruxism is correlated with both experienced and anticipated life stress. The purpose of this article is to review describe 3 out of 8 cases of severe bruxism in children of similar age with different life histories and to discuss the factors that could have triggered this parafunctional condition..

Keywords: Bruxism; Psychological problems; Bite plate

1. Introduction

Bruxism is involuntary, excessive grinding, clenching or rubbing of teeth during non-functional movements of the mastication [1,2,3]. Reported prevalence in children ranges from 7% to 15.1% [4, 5, 6] with girls apparently more frequently affected [7]. Bruxism can occur during the day or night [8]. Generally, patients clench their teeth throughout the day, gnash, and clench them during sleep [9]. However, nocturnal bruxism is more frequent; it varies with the individual and has been related to emotional or physical stress. [10] Bruxism cannot be considered normal, even during the primary or mixed dentition stages. [11] However, it is not considered a pathology during childhood until structural damage of the stomatognathic system (muscles, teeth, mucosa and TMJ) is seen, [1] although harmful effects on parafunction have been described in the permanent dentition when bruxism develops early [12]. Bruxism usually causes tooth wear as evidenced by wear facets that can range from mild to severe and can be localized or found throughout the dentition. Other trauma to the dentition and supporting tissues include thermal hypersensitivity, tooth hypermobility, injury to the periodontal ligament and periodontium, hypercementosis, fractured cusps, pulpitis and pulpal necrosis. [3] The etiology of bruxism has been defined as multifactorial. [13] It is mainly regulated centrally, not peripherally. [14] This means that oral habits, [15] temporomandibular disorders (TMD), [16-19] malocclusions, [20, 21] hypopnea, [22, 23] high anxiety levels [24] and stress [25, 26] among others [27] could influence the peripheral occurrence of bruxism. These factors act as motion stimuli to the central nervous system, which reacts with an alteration in the neurotransmission of dopamine, [28-30] and the result is the clenching or grinding of the teeth. The association between bruxism and TMD in children is strongly supported, [31-33] and the existence of an association between TMD and anxiety, depression and stress has been examined previously [34]. However, none of these studies demonstrated the causality of the relation between the psychological factors and TMD [35,36]. Alert parents ask dentists and physicians about tooth grinding of their children as well as the side effects of it and how to stop this habit. They often want to know the reason of this habit and its prevalence. Thus, it is important for dentists and physicians to inform parents properly [37].

A rigid occlusal splint (biteplate) is the most common form of treatment for bruxism. The aim of a biteplate is to stabilize and improve the function of the temporomandibular joint and muscles of mastication, diminish abnormal muscle activity and protect the teeth from excessive friction and traumatic loads [38]. Moreover, a biteplate can be used to

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promote a stable, functional joint position and ideal occlusion, which, in turn, reorganizes neuromuscular activity, reducing in abnormal activity [39]. A review article reported that there is no effective treatment with permanent effect [40]. Therefore, palliative approaches are recommended at present. It is expected that self-management of bruxism through self-relaxation reduces the frequency and intensity of awake bruxism. Occlusal adjustment of dentition and interocclusal appliances may be effective [40]. Although others reported that there is not sufficient evidence to state that the appliance is effective [41]. Regarding using medications in the treatment of bruxism, Propranolol is not effective [42]. Botulinum toxin injection may be effective [43, 44]. Bromocriptine does not increase or decrease sleep bruxism [45]. Clonazepam decreases sleep bruxism [46, 47]. When considering the terminal planes, MS was present in 17.3% of the sample, DS in 10.5% and VP in 72.3% [48].

2. Case Description

In this report, we describe 3 cases of severe bruxism in children with different life histories and discuss the possible factors that could have triggered this parafunctional condition.

2.1. Case 1

A 6-year-old girl was brought to the orthodontic clinic by her mother. On history, her mother's chief complaint was that the girl's gnashing her teeth at night, and the severe wearing in her teeth since about one year. The child did not have any medical history. No previous dental treatment was reported. Ingestion of acid drinks or medication was denied. Although the mother described the child as highly excitable, during the consultation she was extremely shy and introspective. Her mother reported that the child had a bad experience a year ago, when she was coming back from the kindergarten the bus left her in front of her house but there was nobody at home, the mother was at the mall, and the girl was left there alone for 2 hours, with some dogs in the neighborhood.

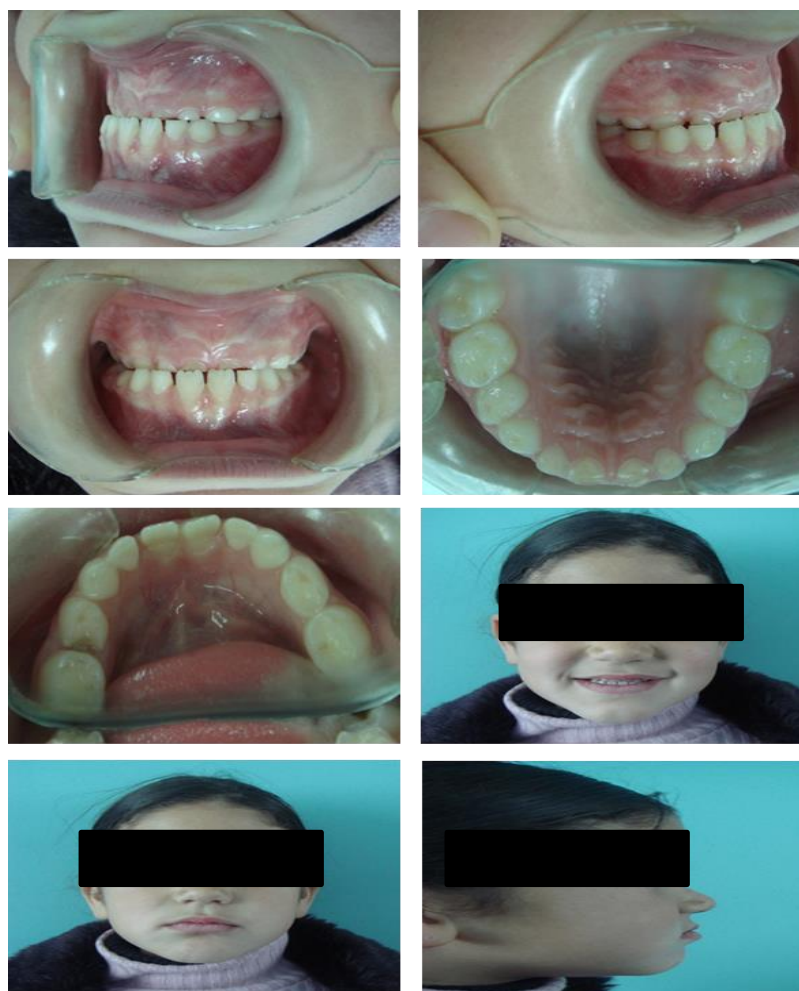


Figure 1a Intraoral and extraoral photographs of case-1

Clinical examination revealed that the patient was at the early mixed-dentition stage, with erupting maxillary and mandibular permanent first molars and mandibular permanent central incisors. Beside the anterior cross bite there was a mesial step relation between maxillary and mandibular primary second molars on both the right and left sides, while the right canine was in CLI and the left primary canine showed Class III relation. The lower midline was 2 mm deviated to the right (Fig. 1a). No occlusal interferences, mandibular deviation, mouth-opening limitation or any other clinical sign indicating temporomandibular dysfunction was noticed during intraoral clinical examination. Good oral hygiene was observed, no gingival inflammation was present, only one caries in 84 tooth was observed. The incisal faces of all anterior maxillary primary teeth were badly worn. Worn occlusal facets in teeth 53, 54, 63, 64, 74, 73, 72, 82, 83 and 84 were also present (Fig. 1a). The child had no history of pain, even with mechanical stimulation. Radiographic examination confirmed pronounced wear in the above-mentioned primary teeth. No damage to supporting tissues was verified (Fig. 1b).

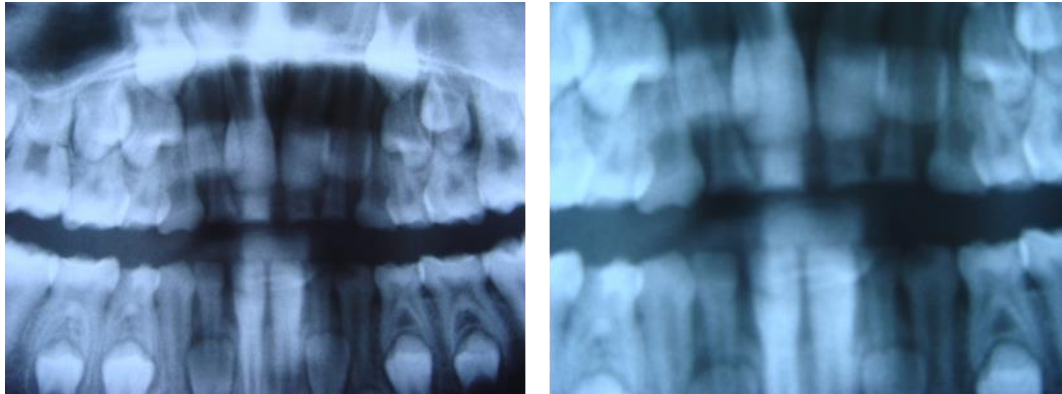


Figure 1b Radiographic x-rays of the case-1

The treatment plan for this patient consisted of three parts: composite resin restoration in tooth 84; placement of a soft-based biteplate, 3 mm thick, on the mandibular arch for night use; and referral for psychological monitoring. Follow-up visits were scheduled every seven weeks to verify tooth wear and monitor eruption of permanent teeth and bone growth. When necessary, splints were modified to allow adequate bone growth and tooth eruption. The patient was followed up for one year.

2.2. Case 2

A 6-year-old girl was brought to the orthodontic clinic by her parents. According to her mother, the child usually clenched her teeth throughout the day and gnashed and clenched them during sleep. The mother stated that the child suffered of hypoxia during labour and due to that she has a kind of cerebral palsy and mental retardation, but she does not use any medication for that. Also they mentioned that she is often abused by the other children in the family and neighbourhood. Her mother reported that the bruxism had started 2 years earlier, and that she has no other medical problem. During consultation, the patient was very hyperactive, and we faced some problems in taking the x rays and photographs. Her medical history was uneventful and evaluation of her diet revealed no ingestion of acid drinks or medication. Intraoral clinical examination showed that the patient was in the early mixed-dentition stage. The relation between maxillary and mandibular permanent first molars was Angle Class I on both right and left sides; a Class I relation was also observed between maxillary and mandibular primary canines bilaterally. Neither mouth-opening limitation nor crepitation was detected during the examination of the temporomandibular joint. The patient did not present any functional mandibular deviation, but she has 1mm midline shift (Fig. 2a). Maxillary and mandibular permanent first molars and mandibular permanent central incisors were already in the arches. Furthermore, fair oral hygiene was observed; probing revealed no gingival bleeding. The patient presented caries in teeth 54, 64, 65 and 84. The tooth 75 was extracted and remaining roots of tooth 85 were present. Pronounced wear was observed in all primary teeth (Fig. 2a).

The child did not report a history of pain in either worn teeth or the temporomandibular joint. Radiographic examination confirmed pronounced wear on primary teeth and the absence of injury to supporting tissues. (Fig. 2b) The treatment plan for this patient included conservative treatment for the carious teeth, placement of a soft-based biteplate, 3 mm thick, on the mandibular arch, which will act as space maintainer also, for day and night use and referral for psychological monitoring. Follow-up visits were scheduled every seven weeks to verify tooth wear and monitor eruption of permanent teeth and bone growth. When necessary, splints were modified to allow adequate bone growth. The patient was followed up for one year.



Figure 2a Intraoral and extraoral photographs of case-2

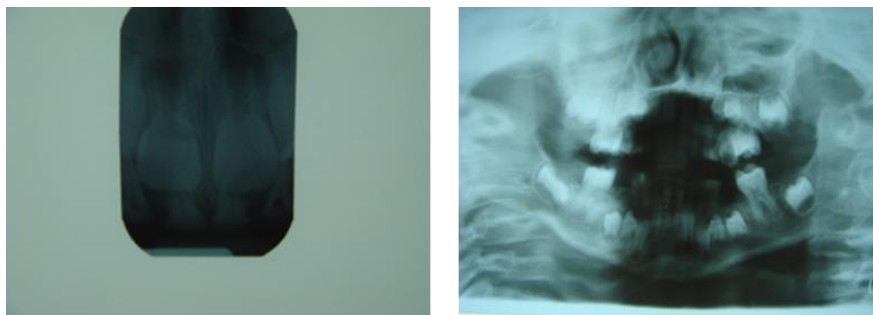


Figure 2b X ray radiographs of case-2

2.3. Case 3

This case severity is less than the previous two cases. A 5-year-old boy was brought to our orthodontic clinic by his father. According to his father, the child usually gnashed and clenched his teeth during sleep. The father reported that the bruxism had started one year earlier. During consultation, the patient was very calm and shy. His medical history was uneventful and evaluation of his diet revealed no ingestion of acid drinks or medication. During the investigation and with the help of the social worker at his kindergarten we realised that the boy is often beaten by his 1.5 years younger sister. Intraoral clinical examination showed that the patient was in the early mixed-dentition stage. The maxillary and mandibular permanent first molars were not erupted yet; a Class I relation was also observed between maxillary and mandibular primary molars and canines bilaterally. Neither mouth-opening limitation nor crepitation was detected during the examination of the temporomandibular joint. The patient did not present any functional mandibular deviation, (Fig. 3a). Mandibular permanent central incisors were already in the arch. Furthermore, good oral hygiene was observed; probing revealed no gingival bleeding. The patient presented no caries in any of the teeth. (Fig. 3a). Wearing facets were observed in the upper and lower deciduous molars and canines. The child did not report

a history of pain in either worn teeth or the temporom andibular joint. Radiographic examination confirmed pronounced wear on primary molars and canines and the absence of injury to supporting tissues.(Fig.3b)

The treatment plan for this patient was to place a soft-based biteplate, 3 mm thick, on the mandibular arch for night use and referral for psychological monitoring. Follow-up visits were scheduled every seven weeks to verify tooth wear and monitor eruption of permanent teeth and bone growth. When necessary, splints were modified to allow adequate bone growth. The patient was followed up for one years every seven weeks and then he was monitored once a year for 3 years. (Fig.3c)



Figure 3a Extraoral and intraoral photographs of case no.3 at the beginning of the treatment.

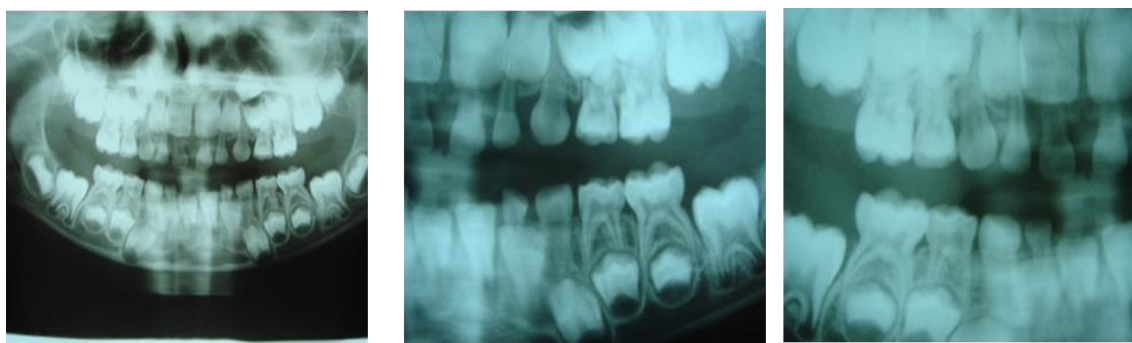


Figure 3b Xray radiographs of case no.3



Figure 3c Intraoral and extraoral photographs of case no.3 after 3 years of treatment

All the biteplates in three cases were fully renewed every six months. In all cases, Bruxism has disappeared in the first six months after using the bite plate.

3. Discussion

The etiology of bruxism is complex and multifactorial demanding systemic, psychological, occupational, and genetic factors. Recurrent provocation during sleep, which is associated with increased anxiety and stress, is regarded as the main cause of poor sleep quality [1, 7, 10, 49, 50]. These variables influence the release of chemical mediators, which provoke catecholamine release, altering the initiation and maintenance of wakefulness and sleep [51]. Children with bruxism may have additional symptoms, such as temporomandibular disorders, presence of tooth wear facets, [52] headaches, earaches, and pain in the masticatory muscles [53]. According to Carra et al., [54] Bruxism in young children can also be associated with fatigue of the masticatory musculature, headaches, and noisy breathing during sleep [55, 56, 57, 58]. Bruxism is a result of stress and anxiety in children. [56] Our report focused on 3 children with severe wear of primary teeth caused by gnashing. In the three cases, the condition was believed to have been triggered by psychological disturbances, resulting from harrowing and abuse although they had different experiences. Furthermore, all of them had been influenced by certain local factors, also different for each patient. Funch and Gale [59] stated that bruxism is correlated with psychological factors, suggesting that the kind of life the patient leads exerts great influence on the frequency, duration and severity of the condition. Thus, based on the presence of the emotional problems reported by the parents, we believed that in all probability the condition presented by these patients was bruxism.

Taking diet and the absence of medical history of reflux in the patients into account, the possibility of the observed dental wear arising from a chemical process was discarded in accordance with Imfeld [60] and Lussi et al., [61] who have stated that the etiological factors contributing to chemical dissolution of dental enamel in children are related to either acid diet or medication.

The prevalence of bruxism in children is estimated to range from 7% to 15.1%. [3-5] A few studies confirm a higher rate in females than males [7, 62]. However, as bruxism is a condition related to certain personality characteristics aggression, anxiety and hyperactivity mainly triggered by life events, [26] significant differences between sexes are unlikely [63].

Some authors describe bruxism as a condition of multifactorial etiology, determined by an association of psychological, local and systemic factors [3, 64]. Local factors include occlusal interferences, malocclusion and temporomandibular dysfunction. [65] Allergic diseases represent systemic factors [66]. For the first case who has experienced social separation anxiety Rostami et al., [67] stated that the preschoolers in the High-Increasing separation anxiety trajectory had almost double the risk of presenting sleep bruxism For the second case she had a kind of cerebral palsy and mental retardation. Sandes et al. [68] and Peres et al., [69] stated that the more common oral conditions in individuals with CP

include higher mean decayed, missing and filled surfaces index, higher plaque index, tendency for delayed eruption of permanent molars, malocclusion, as well as high rates of bruxism. But the patient was a simple CP case and she did not use any medications for that but she was often abused by the children in the family and neighborhood. Our third case he was often abused by his little sister, and he did not have any medical problems. We believe that the reason of the bruxism in these three cases are related to psychological problems due to the level of emotional stress generated by life events experienced by the patients.

A study by Restrepo et al., [12] demonstrated that several psychological techniques have been efficacious in reducing signs of bruxism when they were applied to 33 children aged 3–6. Thus, an important part of treatment of these three cases was psychology treatment sessions. The second part of the treatment was Soft-based tailor-made bite plates were prescribed for the three children. According to Hachmann et al., [70] and McDonald et al., [65] a bite-plate covering the occlusal surfaces of all teeth should be used by patients suffering from bruxism to prevent continuous abrasion. According to Casamassimo et al., [71] the use of a myorelaxing plate is indicated and constitutes the initial phase of the therapy. Solberg et al. [72] assert that the use of biteplates reduces muscular activity, thus giving more comfort to the patient. The same results were achieved in the review article of Chisini LA et al., [73]. A soft-based material was chosen to protect the primary teeth, as suggested by Casamassimo et al., [71]. Furthermore, the thickness (3 mm) was sufficient to prevent perforation and increase resistance to impact. McDonald et al. [65] recommended that the bite plate should be 2–3 mm thick and extend to the vestibular area. The plates that we used are removable and the patients used them mainly at nighttime, and to allow a normal growth of the lower jaws and to permit the permanent teeth to erupt they were modified at the appointments and all the plates were renewed completely every six months.

There is also evidence that, in younger children, bruxism may be a consequence of the immaturity of the masticatory neuromuscular system, Vanderas et al., [74] have demonstrated that stress and anxiety may be directly related to bruxism, as patients suffering from bruxism show a higher catecholamine level, generally ascribed to emotional stress. Nevertheless, no catecholamine measurement of any type was performed on the patients in this article.

According to Lobbezoo and Naeije [14] level of stress and personality type have been included in the etiology of bruxism for many years. However, the exact contribution of psychological factors remains debatable. A controlled questionnaire study [75] demonstrated that those with bruxism generally present emotional imbalance and tend to develop more psychosomatic disorders. Kampe and others [76] have confirmed these findings who also demonstrated the presence of a higher level of anxiety in a group of people with bruxism. All these findings support our theory that our presented three cases had bruxism related to psychological problems or events.

4. Conclusion

In modern society bruxism is becoming an increasingly common condition in children. In treating this parafunctional habit, dentists, mainly orthodontist and paedodontists play a leading role in determining possible etiological factors to warn parents and to lead its multidisciplinary treatment. This article will help dentists in general to handle and manage the treatment of children with bruxism.

Compliance with ethical standards

Disclosure of conflict of interest

All the authors declare that they do not have any conflict of interest or any financial interest in this article.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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How to cite this article

Rahhal A, Ahmead M, Jaradat M and Issa H. (2020). Bruxism in children, is it a result of psychological problems? *World Journal of Advanced Research and Reviews*, 7(1), 234-244.
