

Periapical Lesions Associated with Bruxism - Case Reports

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Abstract: *Bruxism is a parafunctional medical condition characterized by excessive masticatory muscle function resulting in clenching or grinding of the teeth during sleep (sleep bruxism) or wakefulness (awake bruxism). It is usually easily detected due to its effects, most commonly pain in the masticatory muscles or temporomandibular joint, headaches, prosthodontic complications, tooth mobility, mechanical tooth wear and cracked or split teeth. The multifactorial etiology of bruxism is difficult to be established and requires a careful medical and social history and additional tests to enable a correct diagnosis. With the description of the two cases, we want to draw attention to patients defined as high-risk for bruxism and to emphasize the importance of preventive projects and the need for appropriate treatment of the parafunctional activity and its pathological effects on the structures of the masticatory system.*

Key words: bruxism, calcium-hydroxide paste, periapical lesions, tooth wear

1. Introduction

Bruxism is a parafunctional medical condition characterized by excessive masticatory muscle function resulting in clenching or grinding of the teeth during sleep (sleep bruxism) or wakefulness (awake bruxism). [3, 4, 7, 11, 14, 20] The Academy of Orofacial Pain determines bruxism as a diurnal or nocturnal parafunctional activity involving unconscious clenching, grinding or bracing of the teeth. [1] The dysfunctional contacts of the jaws, different from the contractions of the masseter and temporalis muscles in the chewing movements of the mandible, can lead to occlusal trauma and other disorders in the oral cavity. [21]

Bruxism is common among the general population (80-90%) who grind their teeth to varying degrees throughout their lives [2, 4, 15] Clinical conditions develop in males and females with hyperkinetic movement disorders or those suffering from anxiety or stress [2, 3, 18], especially when it comes to awake bruxism. Its overall prevalence is about 8-31.4% [13] and is considered the third most common form of sleep disorder.

Modern concepts of the etiology of bruxism accept its multifactorial origin and recognize interaction between psychosocial, pathophysiological and morphological-peripheral factors. [8, 12] The importance of personality traits, anxiety, and especially the emotional stress is steadily increasing as psychosocial risk factors for bruxism. [9, 12, 18, 19] Genetic factors may also be involved, because 21-50% of people with sleep bruxism have some degree of inherited susceptibility to it from a direct family member. [10, 14]

Bruxism is usually easily detected due to its effects, most commonly pain in the masticatory muscles or temporomandibular joint, headaches, prosthodontic

complications, tooth mobility, mechanical tooth wear and cracked or split teeth. During clenching or grinding excessive forces exert their detrimental effect mainly on the teeth, periodontium and temporomandibular joint. [5, 14, 15]

2. Case Reports

A 41-yr-old male patient visited the dental office in five months apart with similar complaints from different teeth-46 and 26.

Case 1

The patient complained of swelling in the area of the lower right molars and constant throbbing pain, which was more intense 1-2 days ago when the restoration of the first molar fell, before the appearance of edema. Mastication was impaired as he felt the tooth painful in contact with the opposite ones.

During the intraoral examination, generalized tooth wear of the dentition with varying degrees of attrition was detected. Tooth 46 was with signs of previous preparation; the dentin was with a normal color. The tooth crown was of reduced height, attrition facets were found on the remaining parts of the tooth crown and on the adjacent and opposite teeth. Probing of dentin was painless, with no findings of carious tissue and no contact with the pulp chamber. Percussion was not performed as the patient felt the tooth painful. Submucosal edema with fluctuation involving the periapical region of tooth 46 was palpated. The tooth had a second degree of mobility. The adjacent lymph nodes were involved, mobile and painful. The EPT test was negative. Widened periodontal ligament space, loss of apical lamina dura and periapical radiolucency around both roots, gradually blending with the surrounding bone at the periphery of the lesion, were detected on the X-ray. (Fig 1 A)

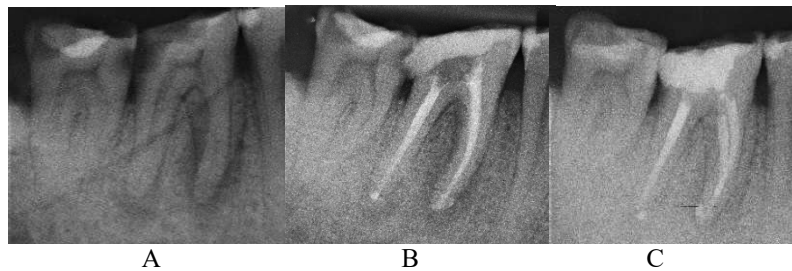


Figure 1: Case 1 (tooth 46): A. Initial radiographic finding; B. Root canal filling; C. The case in 1 year follow-up.

The treatment protocol included anesthesia, rubber dam isolation, proper endodontic access and location of all (3) orifices. The chemo-mechanical instrumentation of the canals was performed at a full working length with the WaveOneGold system (Dentsply Sirona), after a glide path was created with the PathFile System (Dentsply Sirona) in the presence of 2.5% NaOCl solution. The irrigation protocol finished with ultrasonically activated consequent irrigations with 17%EDTA solution and 2.5% NaOCl. Calcium hydroxide dressing was applied for 14 days and the cavity was covered with a temporary cement. An incision and drainage of the swelling were made.

The calcium hydroxide paste was removed at the second visit. As the swelling and complaints disappeared, the treatment was completed by filling all canals with AH Plus sealer (Dentsply Sirona) and WaveOne Gold gutta-percha points fitting the already shaped canals. (Fig.1 B) A permanent composite restoration was placed.

Recall visits were scheduled at 3, 6 and 12 months. No complaints were registered, radiographic examination

registered healing of the periapical structure, the tooth-restoration interface was intact. (Fig.1 C).

The patient signed an informed consent concerning his present status, treatment protocol, possible complications and expected treatment results.

Case 2

The same patient visited the practice in five months with complaints of a sudden, throbbing, constant pain from the upper first left molar. Mastication was impaired and painful.

Examination revealed old mesial and distal composite restorations of tooth 26 with preserved integrity, deep attrition facets and exposed crown dentin. Vertical percussion and palpation in the region of the palatal root were painful. The lymph nodes were involved, mobile and painful. The EPT test was negative. Widened periodontal ligament space, loss of apical lamina dura and localized periapical radiolucency around the palatal root, were detected radiographically. (Fig 2 A)

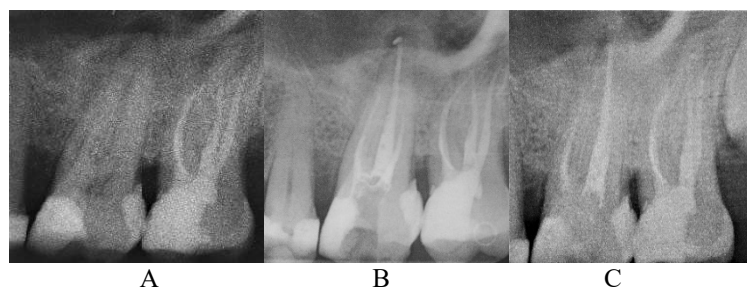


Figure 2: Case 2 (tooth 26): A. Initial radiographic finding; B. Root canal filling; C. The case in 1 year follow-up.

The treatment protocol was the same as described in Case 1. The root canal filling and the findings at one year follow-up are shown on Fig. 2 B and C.

3. Discussion

The multifactorial etiology of bruxism is difficult to be established and requires a careful medical and social history and additional tests to enable a correct diagnosis. [20] Often patients neglect or underestimate the stress levels in their life, the presence of an altered masticatory pattern and the early symptoms of this parafunctional occlusal habit. Early diagnosis of bruxism is advantageous as detrimental damage to the tooth structure; periodontium and temporomandibular joint can be prevented. [21, 25]

Evidence for this statement is readily found in the described cases, as the patient reports the presence of daily stress combined with tension in the masticatory muscles and clenching of the teeth for years. No record for teeth grinding. He has never consulted a specialist for these problems, but only treated their consequences—frequent loss and repair of restorations, partial fractures of the tooth crowns. For the first time a year ago, two of the molars suddenly lost their vitality without any apparent reason. Our diagnosis “bruxism” was based only on patient’s psychosocial life history and clinical findings.

The loss of vitality and the development of periapical lesions around two of the molars were unexpected as there were no clinical or paraclinical findings during the patient’s regular visits over the years. Examination of the teeth did not reveal carious tissues, tooth crown fractures,

dental pulp communication or loss of restorations over a long time period, which can lead to massive microbial infection. The significant loss of crown height and the daily exposure of the dentin to excessive masticatory forces may have resulted in chronic impairment of blood circulation resulting in undetected pulp death.

The endodontic treatment of the teeth followed the common protocol for elimination of the root canal microbial species by providing sufficient space for irrigants and their activation. [23, 24]The use of inter-appointment calcium-hydroxide dressing additionally favored the cleaning of the root canal space, reduced exudate pressure and promoted healing of the altered periapical tissue and bone regeneration. [6, 16, 17, 22]

4. Conclusion

With the description of the two cases, we want to draw attention to patients defined as high-risk for bruxism and to emphasize the importance of preventive projects and the need for appropriate treatment of the parafunctional activity and its pathological effects on the structures of the masticatory system.

References

- [1] American Academy of Orofacial Pain: Guidelines for Assessment.2008; 22: 190-200
- [2] American Academy of Sleep Medicine. International Classification of Sleep Disorders, Revised: Diagnostic and Coding Manual. Chicago, Illinois: American Academy of Sleep Medicine; 2001
- [3] Heboyan A, Karobari MI, Alwadani AH, et al. Bruxism as a Consequence of Stress and Movement Disorders: Brief Review. *European Journal of General Dentistry* 2022; 11 (2): 81-83; DOI: 10.1055/s-0042-1754374
- [4] Hilgenberg-Sydney PB, Lorenzon AL, Pimentel G, et al. Probable awake bruxism-prevalence and associated factors: a cross-sectional study. *Dental Press J Orthod.*2022; 27 (4): e2220298
- [5] Lavigne GJ, Khoury S, Abe S, et al. Bruxism physiology and pathology: an overview for clinicians. *J Oral Rehabil.*2008; 35 (7): 476-94
- [6] Lin LM, Rosenberg PA. Repair and regeneration in endodontics. *IntEndod J* 2011; 44: 889-906
- [7] Lobbezoo F, Ahlberg J, Raphael KG, et al. International consensus on the assessment of bruxism: report of a work in progress. *J Oral Rehabil.*2018; 45 (11): 837-44
- [8] Lobbezoo F, Naeije M. Bruxism is mainly regulated centrally, not peripherally. *J Oral Rehabil* 2001; 28: 1085-91
- [9] Lobbezoo F, Van Der Zaag J, Naeije M. Bruxism: Its multiple causes and its effects on dental implants-an updated review. *J Oral Rehabil* 2006; 33: 293-300
- [10] Macedo CR, Silva AB, Machado MA, Saconato H, Prado GF. Occlusal splints for treating sleep bruxism (tooth grinding). *Cochrane Database Syst Rev* 2007; 17: CD005514
- [11] Manfredini D, Ahlberg J, Wetselaar P, et al. The bruxism construct: from cut-off points to a continuum spectrum. *J Oral Rehabil.*2019; 46 (11): 991-7
- [12] Manfredini D, Lobbezoo F. Role of psychosocial factors in the etiology of bruxism. *J Orofac Pain* 2009; 23 (2): 153-66
- [13] Manfredini D, Winocur E, Guarda-Nardini L, et al. Epidemiology of bruxism in adults: A systematic review of the literature. *J Orofac Pain* 2013; 27: 99-110
- [14] Matusz K, Maciejewska-Szaniec Z, Gredes T et al. Common therapeutic approaches in sleep and awake bruxism-an overview *Neurologia i Neurochirurgia Polska* 2022; 56 (6) DOI: 10.5603/PJNNS.a2022.0073
- [15] Murali RV, Rangarajan P, Mounissamy A. Bruxism: Conceptual discussion and review. *J Pharm Bioall Sci* 2015; 7: S265-70
- [16] Paula-Silva FW, Santamaria M Jr, Leonardo MR, et al. Cone-beam computerized tomographic, radiographic, and histologic evaluation of periapical repair in dogs' post-endodontic treatment. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2009; 108: 796-805
- [17] Peters LB, van Winkelhoff AJ, Buijs JF, Wesselink PR. Effects of instrumentation, irrigation and dressing with calcium hydroxide on infection in pulpless teeth with periapical bone lesions. *IntEndod J* 2002; 35: 13-20
- [18] Polmann H, Domingos FL, Melo G, et al. Association between sleep bruxism and anxiety symptoms in adults: a systematic review. *J Oral Rehabil.*2019; 46 (5): 482-91
- [19] Poveda Roda R, Bagan JV, Díaz Fernández JM, et al. Review of temporomandibular joint pathology. Part I: Classification, epidemiology and risk factors. *Med Oral Patol Oral Cir Bucal* 2007; 12: E292-8
- [20] Rusin B, Wójcik A, Pakaszewski W et al. Bruxism-contemporary knowledge about the disorder and therapeutic possibilities. *Journal of Education, Health and Sport.*2022; 12 (12): 131-135
- [21] Shetty S, Pitti V, Satish Babu CL, et al. Bruxism: A literature review. *J Indian Prosthodont Soc* 2010; 10: 141-8
- [22] Silva RA, Leonardo MR, da Silva LA, et al. Effects of the association between a calcium hydroxide paste and 0.4% chlorhexidine on the development of the osteogenic phenotype in vitro. *J Endod* 2008; 34: 1485-9
- [23] Siqueira JF, Machado AG, Silveira RM, et al. Evaluation of the effectiveness of sodium hypochlorite used with three irrigation methods in the elimination of *Enterococcus faecalis* from the root canal in vitro. *IntEndod J* 1997; 30: 279-8226
- [24] Yesilsoy C, Whitaker E, Cleveland D, et al. Antimicrobial and toxic effects of established and potential root canal irrigants. *J Endod* 1995; 21: 513-5
- [25] Zavala SA, Reyes JB, Reinoso DC et al. Bruxism and masticatory pattern: an understudied relationship. *Jaw Functional Orthopedics and Craniofacial Growth (JFOCG)* 2022; 2 (2): 86-97