

Recurrence of exostosis as a result of medication-induced bruxism: case study

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ABSTRACT

Introduction: Alveolar oral exostosis is a common, benign condition routinely found in dentistry. Clinical problems associated with exostoses are the maintenance of oral hygiene as well as the fabrication of prosthodontic appliances. Over time, exostoses may contribute to irritation and periodontal disease. **Case description:** The patient in this case study had a recurrence of exostoses and was bothered by consistent and prominent pain. She reported being a bruxer; her bruxism was exacerbated due to attention-deficit hyperactivity disorder and antidepressant medications. **Discussion:** The etiology behind the recurrence of exostosis is discussed. The most evident etiology seems to be persistence of medication-induced bruxism, specifically awake bruxism. **Conclusion:** It is necessary to take a proper history to identify the cause of the recurrence of exostosis. Dental hygienists can contribute to a better understanding of and provide better treatment options for patients who have medication-induced bruxism.

RÉSUMÉ

Introduction : L'exostose buccale alvéolaire est une affection bénigne couramment observée en dentisterie. Les problèmes cliniques associés aux exostoses sont le maintien de l'hygiène buccale ainsi que la fabrication d'appareils prosthodontiques. Avec le temps, les exostoses peuvent causer de l'irritation et des maladies parodontales. **Description de cas :** Dans cette étude de cas, la patiente présente des exostoses récurrentes et est dérangée par une douleur constante et proéminente. Elle a déclaré souffrir de bruxisme exacerbé par la prise de médicaments antidépresseurs et contre le trouble déficitaire de l'attention avec hyperactivité. **Discussion :** L'étiologie derrière la récurrence de l'exostose est abordée. L'étiologie la plus évidente semble être la persistance du bruxisme induit par les médicaments, en particulier le bruxisme diurne. **Conclusion :** Il est nécessaire d'obtenir les antécédents médicaux appropriés pour identifier la cause de la récurrence de l'exostose. Les hygiénistes dentaires peuvent contribuer à une meilleure compréhension et offrir de meilleures options de traitement aux patients atteints de bruxisme induit par les médicaments.

Keywords: attention deficit hyperactivity disorder; bruxism; exostosis; surgical intervention; temporomandibular joint disorder

CDHA Research Agenda category: risk assessment and management

INTRODUCTION

Exostosis is a benign overgrowth of bone of unknown etiology.¹ In the oral cavity, based on site of occurrence of this growth, it is divided into 3 different subtypes: torus palatinus (in the palate), torus mandibularis (on the floor of the mouth), and buccal bone exostosis (buccal aspect of the alveolar ridge).¹

Buccal exostoses are clinically relevant as they may impede prosthodontic rehabilitation or oral hygiene.¹ They are hypothesized to be formed due to occlusal trauma that may induce bone to overgrow for occlusal load distribution and reinforcement.¹ Currently, there is no consensus on the etiology of exostoses. However, the factors usually implicated are genetics, the environment, hyperfunctional oral masticatory habits, nutrition, and climate.²

Following a review of the literature, 5 journal articles that discuss the concurrence of upper and lower jaw exostosis and tori were found.²⁻⁶ Jainkittivong and Langlais⁴ reported that, in the study group of 960 subjects, 234 (90.7%) had tori concurrent with exostoses while 24 (9.3%) had only exostoses. There were 34 (3.5%) individuals with

both maxillary and mandibular exostoses.⁴ Among the 418 patients with torus palatinus, 86 (20.6%) also exhibited exostosis; of the total 105 patients with torus mandibularis, 38 (36.2%) exhibited co-occurrence of exostosis.⁴

No studies exist correlating medication to occurrence of exostoses. However, multiple studies report medication-induced bruxism^{7,8} as well as bruxers who develop occlusal trauma and exostoses.⁹ In the absence of other etiologic factors, as well as a history of antidepressant and anti-attention-deficit hyperactivity disorder (ADHD) prescriptions, it is hypothesized that the patient's medication led to a recurrence of exostosis.

Malki et al.⁷ showed that children (ages 5 to 15 years) who were using a central nervous system stimulant for treatment of ADHD had 2.5 times more worn teeth, and children prescribed medications such as methylphenidate and amphetamine had higher numbers of teeth with attrition, showing that bruxism (day and night grinding) was taking place. In a review of previous studies, children with ADHD had a higher incidence of bruxism.⁸ A systematic

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review of 5 studies conducted with patients ranging in age from 32 to 60 years showed positive association of tori with a history of bruxism, clenching, and attrition.⁹

According to the Centers for Disease Control and Prevention, for 2016 to 2019, an estimated 6 million children (ages 3 to 17 years) were diagnosed with ADHD (the percentage medicated ranged from 38% to 81%). During the 2015 to 2018 period, 13.2% of adults used antidepressant medications; this figure was higher among women (17.7%) than men (8.4%).¹⁰ This case study discusses how the patient's medication-induced parafunctional habits caused continuous occlusal trauma and exostoses.

CASE DESCRIPTION

A 65-year-old female was referred to the oral surgeon after complaining of traumatizing her oral mucosa while flossing and toothbrushing. She had a previous history of mandibular bilateral tori, which had been surgically removed 8 to 10 years earlier and a suspected recurrence.

On intraoral inspection, bilateral buccal exostoses on the maxilla and mandible near the first and second molars were present. The patient also had palatal and lingual mandibular tori, but she stated no cause for concern. The oral surgeon recommended exostoses removal; the risks, benefits, and alternative treatments were discussed, and informed consent was secured.

The patient noted on her medical history that she was being treated for ADHD and had been prescribed Adderall™ (5 mg twice daily) as well as Effexor™ (37.5 mg daily) as an antidepressant.

The patient indicated that she had been prescribed Cymbalta™ in the past but could not continue it because one of the side effects was bruxism. With her history of bruxism and clenching, Cymbalta caused severe trismus and pain. In 1976, her dentist noted generalized recession and median palatine torus present along with mandibular bilateral tori that were causing issues with lacerating her oral mucosa while flossing. As a result, the mandibular bilateral tori were removed. The patient's dentist noticed generalized attrition on the occlusal and incisal edges and fabricated a hard occlusal splint, which the patient still wears.

The tori reappeared recently, along with both maxillary and mandibular bilateral exostoses. In 2022, maxillary bilateral exostoses, mandibular bilateral exostoses, and mandibular bilateral tori were removed. However, the median palatine torus was not removed.

Exostoses removal procedure (24 March 2022)

After sedative was administered intravenously, local anesthesia was achieved by multiple nerve blocks. The exostoses removal procedure included a sulcular incision with a #15 blade to the sulcus of maxillary and mandibular right and left. Exostoses were removed with rotary instruments, and a flap was raised. A rasp (an instrument to trim and shape bone surfaces) was used to smooth alveolar bone, and a raised flap was used to cover the

denuded area. The incision was closed with 4-0 chromic gut interdental suture. No complications were noted. Pre- and postoperative images are depicted in Figures 1, 2, 3, and 4.

RESULTS

On 25 March 2022, the patient stated that some sutures were loose and bothering her. She was not in much pain. No postoperative issues were noted. The oral surgeon stated that the patient was healing well and recommended a soft diet for a few days.

On 29 March 2022, the patient mentioned some exposed bone on mandibular right adjacent to #30 and #31. The oral surgeon stated that bone would fill in the surgery site. The flap broke down earlier than planned; patient will continue Peridex™ until finished, then switch to Listerine™ diluted with water.

On 8 April 2022, the patient stated that bone was still exposed on the mandibular right and slightly sore. The

Figure 1. Exostoses on the mandibular buccal surface

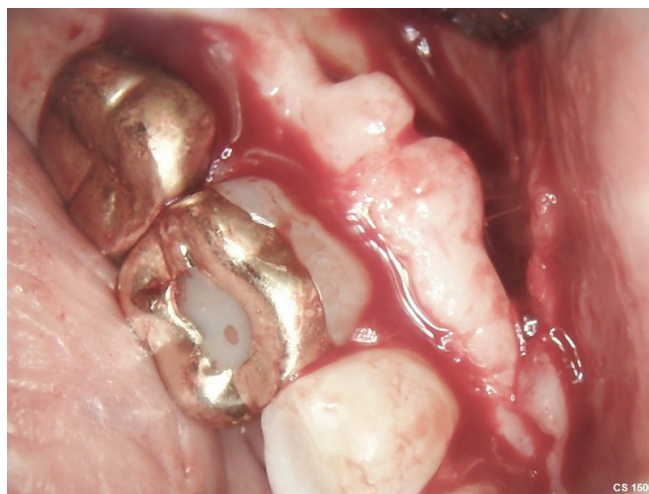


Figure 2. Exostoses on the maxillary buccal surface

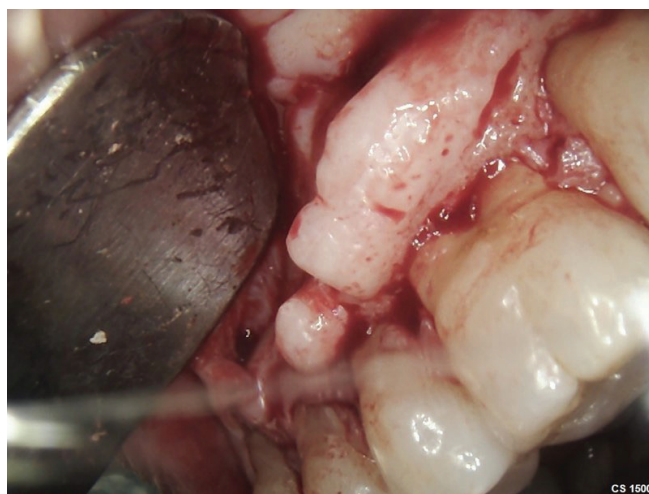


Figure 3. Exposed bone following surgery adjacent to #30, #31



Figure 4. Postoperative healing of maxillary right buccal



oral surgeon stated that the bony piece would flake off in time and would heal well.

On 22 April 2022, the patient stated that the area on the mandibular right behind the last molar (buccal) was causing some discomfort. The oral surgeon removed a small bone spur on the mandibular right. The patient was not recalled for a follow-up, provided no issues arose.

DISCUSSION

The etiologic factors that most researchers agree cause exostosis are occlusal trauma and nutritional, environmental, and genetic considerations.¹⁻⁵ In this case study, the patient had a history of bruxism that could be considered a factor in recurrence of tori. Additionally, the preoperative images of the buccal exostosis clearly show wear facets on the occlusal surface of multiple teeth (despite using an occlusal splint), indicating that bruxism and the associated attrition and occlusal trauma still exist.

According to a systematic review by Bertazzo-Silveira et al.⁹ to investigate if a correlation exists between the occurrence of exostosis and bruxism, data from 5 studies and a qualitative analysis showed that torus mandibularis and bruxism appear to be correlated. However, due to a disparity in the definition of bruxism, no conclusions could be drawn from their data.⁹ In contrast, Cortes et al.¹¹ analyzed mandibular bone structure and conclusively stated that patients who reported parafunctional oral habits (such as bruxism, dental attrition, and temporomandibular joint disorders [TMD]) have different mandibular bone structure. They found that those with squarer-shaped jaws have an increased tendency to develop torus mandibularis.¹¹

Further evidence in support of a relationship between ADHD and bruxism was reported in a systematic review by Souto-Souza et al. in 2020.¹² Their findings revealed that patients diagnosed with ADHD as children or adolescents are 31% more prone to bruxism than children without ADHD.¹² Psychosocial therapy is often a temporary solution for bruxism.⁸ Some medications to treat ADHD, such as amphetamines, have been shown to have a higher incidence of causing bruxism (both sleep and awake).¹³ Additionally, medications such as antidepressants and antipsychotics may increase the risk and severity of bruxism.¹⁴ Interestingly, some patients do not even realize they are bruxing during the day or night.¹³

Despite being prescribed a hard occlusal splint (worn nightly), the patient in this case study still experienced bruxism, as evidenced by the worn occlusal facets. This finding points towards awake bruxism. The patient also reported that she was placed on Cymbalta™ (duloxetine) and that the drug had to be replaced with another antidepressant as it exacerbated her bruxism. The replacement drug was Effexor™ (venlafaxine). Findings from a study by de Baat et al.¹⁴ showed that duloxetine was positively correlated with sleep bruxism, with an odds ratio of 2.16. In addition, they found that venlafaxine had an even higher correlation with sleep bruxism (odds ratio of 2.28).¹⁴ Furthermore, they included a discussion of a case report of a patient taking venlafaxine who developed awake bruxism, which was attributed to the drug.¹⁴

It is critical to determine the signs and symptoms of bruxism to learn how to treat patients effectively. Some systemic factors that are noted with bruxism are gastrointestinal difficulties, allergies, nutritional deficiencies, and nervous tension.¹³ Signs and symptoms in patients who are bruxing are headaches, difficulty chewing or limited opening of the jaw, major signs of wear (attrition, abfraction, wear facets), periodontal disease and mobility (due to the flexion of teeth), muscle fatigue in the head/neck area, scalloping on the lateral borders of the tongue, and linea alba on the buccal mucosa of the cheeks (unilateral or bilateral).¹³

Some medication interventions have been somewhat successful in the management and treatment of bruxism.

Supplements such as magnesium, calcium, and pantothenic acid may have some basic effects, and prescription drugs such as tricyclic antidepressants and amitriptyline therapy in addition to duloxetine may significantly decrease or eliminate bruxism tendencies.¹⁵ Botulinum toxin A (BTA) is a neurotoxin used to cause selective paralysis of muscles; 4 randomized control trials found that BTA was effective in reducing both sleep and awake bruxism.¹⁴ A major drawback of this treatment is bone loss in the condylar region and osteopenia.¹⁴ Buspirone is an anti-anxiety medication that has been seen as a useful drug to reduce non-specific bruxism induced by antidepressants.¹⁴ The side effects, such as lightheadedness, giddiness, headache, and nausea, should be considered when prescribing buspirone.¹⁴ Clozapine is an antipsychotic medication that was used successfully to stop awake bruxism in a patient who had paranoia, so that could also be a drug to consider prescribing.¹⁴ Another antipsychotic medication, quetiapine, was found to cause remission of awake bruxism in patients treated with antidepressants and experiencing non-specific bruxism.¹⁴

Females have been found to have a greater chance of having TMD symptoms, such as sore muscles in the head and neck region, crepitus, premature wearing of tooth structures, and trismus.¹⁶ Medications such as Concerta™ have provided some relief for TMD symptoms. Oral health professionals must evaluate TMD limitations and symptomology prior to performing restorative care.¹⁶

The patient in this case did exhibit increased stress due to work-related stressors, a diagnosis of multiple sclerosis, and the need to learn to navigate the diagnosis and change/regulation of medications to manage the condition. Thus, stress combined with her intake of Adderall™ and Effexor™ could have increased her risk of both sleep and awake bruxism that most likely resulted in her exostoses.

CONCLUSION

Patients using ADHD and antidepressant medications should be informed of the risks and side effects of such drugs. As oral health professionals, dental hygienists need to take an accurate medical and dental history to correctly identify the cause of the disorder. In consultation with the patient's psychiatrist, dosage of the medications could be reduced or prescription of any other medications to ameliorate bruxism could be considered. Exostosis is a common finding, but only the patient's medical and dental history and a complete oral examination may reveal the etiology behind it.

CONFLICTS OF INTEREST

The authors report no conflicts of interest.

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