ABSTRACT Like other normal variations in the human body, tori and exostoses are categorized as bony nodular protuberances whose aetiology had been attributed early to mainly genetic theories. With a better understanding of bone mechanics, the influence of environmental factors came forward, which led to conflict between these two major etiological theories. We present a case of a mother and her son, who presented with torus mandibularis on the lingual aspect of the mandible. Drastic differences in extent and size between the two generations were observed. In Prosthodontic practice, such lesions are considered to be significant since they alter the design of the prosthesis and are also a source of bone grafts during implant placement. A cast partial denture was fabricated for the elderly female patient. Because the tori were small, they did not influence the designing of the partial cast denture.

KEYWORDS exostoses, heredity, cast partial denture, oral hygiene maintenance, malocclusion

Introduction

Bone is a vital, mineralized tissue that responds to changes in the environment. Depending on the stimulus, the bone may deposit or resorb its matrix. However, certain conditions are thought to be genetically dependent, and in such cases, bone growth is seen irrespective of the presence or absence of a stimulus. Tori and exostoses belong to bony nodular protuberances, which are designated according to the number and anatomic location.[1]

Depending upon the location, they are called torus Palatinus (maxilla) or torus mandibularis (mandible). Torus Mandibularis (TM) is commonly located on the mandible’s lingual aspect, especially between the canine and the premolar regions. The aetiology of tori has been theorized by many without any common consensus. While some have postulated genetic factors, [2,3] others implicate environmental factors.[4,5] Masticatory hyperfunction has been proposed as the possible mechanism of extra bony growth since teeth are closely associated with bone development. [6-8]

Several studies have attempted to understand the heritability of torus mandibularis. As a result, three different views have been concluded regarding the heritability of torus mandibularis: autosomal recessive, [9] autosomal dominant, [10] and polygenetic.[11] In the context of these studies, we report two cases of torus mandibularis that were present in the mother and his son.

Case report

Case 1 (Mother)

An elderly female patient was referred to SDS 542 course for undergraduate students (Clinical Removable Prosthodontics - 2) with a chief complaint of inability to masticate because of loss of teeth. Medical, social, and Drug history were noncontributory, although she had a history of smoking (Sheesha), which she stopped about 2 years back. Dental history revealed negative oral hygiene maintenance habits loss of teeth due to caries that were extracted over a period of time. Extraoral examination revealed a hypertonic, thick mandibular lip that did not maintain a normal class 1 relation with the maxillary lip. In addition, the lower lip was everted because of the protrusion of mandibular anteriors (Fig 1). Intraoral examination revealed crowded anteriors with proximal caries on right-sided incisors, a class 1 modification 1 partial edentulous situation (Kennedy...
– Applegate) and multiple small nodular bony outgrowths (2-3 mm) in the region of premolars and canine (Fig 2). Since the size of the tori was small, the patient did not report having any associated problems. Upon asking whether such lesions were present in any family member, she reported that her father and her son accompanying her for the dental treatment had the same condition. After a thorough dental diagnosis, a treatment plan that included oral prophylaxis, restorative treatment and fabrication of a surveyed crown and a partial cast denture was presented to her, to which she consented. After doing all prophylactic periodontal and restorative treatments, routine clinical and laboratory procedures fabricate the desired cast partial denture.

**Case 2 (Son)**

A young male individual accompanying her mother for her prosthetic dental treatment was requested at the behest of the author to undergo a clinical dental examination since her mother had reported in her familial history that her father and son both were having the kind of bony growths that she possessed. Clinical examination of the individual demonstrated the presence of large bony outgrowths that were multiple and extended from mandibular central incisor to mandibular first molar (antero-posteriorly) on either side (Fig 3). Mediolaterally, the maximum dimension of the bony outgrowth was noted to be about 1.9 cms in the second premolar region on either side. The patient had noted the growth in his childhood, and since his mother also possessed bony outgrowths, he did not seek any medical advice for the same. Compared to her mother’s tori, his tori were extensive, and he reported having pronouncing problems. Nevertheless, the individual was reassured about the benign nature of the condition.

**Discussion**

The difference between tori and exostoses is in their number and location. Exostoses are usually multiple, occur on the buccal or palatal aspect, and occur less frequently than tori. According to anthropological studies, the prevalence of torus mandibularis is higher in Mongoloids than Caucasians.[3,4,12] Since the aetiology of tori and exostoses has not reached any consensus, an interplay of genetic and environmental factors seems more likely than any individual entity. According to the threshold theory, the environmental factors need to reach a particular threshold level before genetic factors start expressing themselves in an individual. This leads to conclude that both factors determine the expressivity making its aetiology multifactorial.[13,14]

We report two cases of torus mandibularis, present in a mother and his son, thus indicating an autosomal recessive character. This agrees with the studies by Krahl [15] and Alvesalo [9], who also concluded the autosomal recessive character of the condition. However, the autosomal dominance hereditability character of the condition has been reported.[10] In a study...
among modern Thais,[16] presence of tori is likely to occur in families and children whose parents exhibit the trait rather than who did not exhibit the trait. Our report supports the view of genetic inheritance, although environmental factors may increase or decrease the extent. This is based on the view that, in our case, the clinical picture in both cases varied extremely clinically. Since torus mandibularis is more common in men, we also report a case in a female subject.[3,5,6] Clinically, the tori poses problems in the fabrication of dental prostheses, especially if the type of prosthesis is removable.[17] It also interferes with hygiene maintenance and compromises prosthesis retention and stability.[18] The tori are a good source of autograft bone and should be considered whenever bone grafting is desired in implant-supported cases.

Conclusion
Based on the evidence presented in this report, genetic inheritance of tori does exist, while environmental factors may play an important role in the severity of the tori. One may inherit the tori from his parents, but it may take a mild or a severe form, based on individual environmental factors.

Acknowledgements
We would like to thank the staff and students of the College of dentistry, whose constant vigil identifies such rare cases.

Funding
This work did not receive any grant from funding agencies in the public, commercial, or not-for-profit sectors.

Conflict of interest
There are no conflicts of interest to declare by any of the authors of this study.

References
1. Regezi JA, Scuibba JJ. Oral pathology: clinico-pathologic correlations. Philadelphia: WB Saunders Co; 1989. p. 386-7
2. Suzuki M, Sakai T. A familial study of torus palatinus and torus mandibularis. Am J Phys Anthropol 1960;18:263-72.
3. Mattoo KA, Kumar S. Mandibular tori – difficulties encountered during tooth preparation for a fixed partial denture. A case report. J Anat Sci 2009; 3:26-28
4. King DP, Moore GE. An analysis of torus palatinus in a transatlantic study. J Oral Med 1976;31:44-6.
5. Eggen S, Natvig B, Gasmeyer J. Variation in torus palatinus prevalence in Norway. A statistical analysis using logistic regression. Commn Dent Oral Epidemiol 1991;19:32-5.
6. Matthews GP. Mandibular and palatine tori and their etiology. J Dent Res 1933;13:245.
7. Johnson OM. Tori and masticatory stress. J Prosthet Dent 1959; 9: 975-7.
8. Eggen S, Natvig B. Relationship between torus mandibularis and number of present teeth. Scand J Dent Res 1986;94:233-40
9. Alvesalo L, Kari M. Dental survey in Hailuoto. V. Torus mandibularis: incidence and some viewpoints connected with inheritance. Proc Finn Dent Soc. 1972; 68(6): 307-14.
10. Suzuki M, Sakai T. A familial study of toruspalatinus and torus mandibularis. Am J Phys Anthropol 1960; 18:263-272
11. Johnson CC, Gorlin RJ, Anderson VE. Torus mandibularis: a genetic study. Am J Hum Genet 1965; 17: 433-442.
12. Miller SC, Roth H. Torus palatinus: a statistical study. J Am Dent Assoc 1940,27:1950-7.
13. Haugen LK. Palatine and mandibular tori. A morphologic study in the current Norwegian population. Acta Odontol Scand 1992;50:65-77.
14. Seah YH. Torus palatinus and torus mandibularis: a review of the literature. Aust Dent J 1995;40:318-21.
15. Krahł VE, A familial study of the palatine and mandibular tori. Anat Rec 1949; 23: 103-477.
16. Kerdpon D, Sirirungrojying S. A clinical study of oral tori in southern Thailand: prevalence and the relation to para-functional activity. Eur J OralSci 1999; 107: 9-13
17. Kumar S, Mattoo KA , Verma A. Problems encountered during treatment of patient with mandibular tori. Clinical Dentistry 2010; 4:51-53
18. Rahman S, Deep A, Mattoo KA. Bony Exostoses on Hard Palate - Prosthetic Inferences. Archives of Dentistry and Oral Health. 2019; 2(2): 01-03.