

## Oral tori in edentulous patient

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### Abstract

**Background and objective:** This study aimed to determine the prevalence, size, shape and location of tori in partially and completely edentulous patients attending the College of Dentistry/ Hawler Medical University from 2009-2011.

**Methods:** In a retrospective study four hundred and fifty patients case file from Erbil city were examined for the presence of oral tori in prosthodontic department, College of Dentistry, Hawler Medical University. The size, shape and location of tori were recorded and related with the age and sex of patients.

**Results:** The overall prevalence of tori was 14.2% (64 cases). The prevalence of torus palatinus was 60.9% (39/64), while that of torus mandibularis was significantly lesser 23.5% (15/64). Both types of tori were associated with each other in 15.62% of cases (10/64).

**Conclusion:** There was no statistically significant difference in the prevalence of tori between males and females. There was a significant relationship between the presence of mandibular and palatal tori.

**Keywords:** Edentulous patients, Torus palatinus, Torus mandibularis

### Introduction

The most remarkable exostoses of the human jaws are torus palatinus (TP) and torus mandibularis (TM). TP is a sessile nodule of bone that occurs along the midline of the hard palate. TM is a bony protuberance located on the lingual aspect of the mandible, commonly at the canine and premolar areas.<sup>1</sup> Tori are benign anatomical bony prominences occurring in the hard palate and the lingual aspect of the mandible. Although they are generally asymptomatic, surgical intervention may be required in some cases for prosthodontic purposes.<sup>2</sup> Currently, tori are considered to be an interplay of genetic and environmental factors with a familial occurrence suggesting autosomal dominant inheritance with reduced penetrance.<sup>3</sup> Although tori are not pathologically significant, they may obscure radiographic details of maxillary sinuses and lower premolars.

They may also interfere with the construction and function of removable dentures, as well as oral functional movement.<sup>4</sup>

The prevalence of tori varies widely in different populations, ranging from 0.4% to 66.5% for TP<sup>5</sup> and 0.5% to 63.4% for TM.<sup>5-7</sup> Racial differences appear significant, with a high prevalence in Asian and Eskimo populations.<sup>7</sup> Differences in the prevalence of tori between genders have also been reported. Most authors reported that TM was more frequent in males<sup>7,8</sup> while TP affected more females than males.<sup>8,9</sup> The occurrence of tori in various ethnic groups ranges from 9% to 66%. Even between similar ethnic groups living in different environments, different figures have been reported. The prevalence of torus mandibularis among whites and blacks ranges from 8% to 16% and shows no sex difference.<sup>3,10</sup>

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All mandibular tori should be excised because the mucosa over the tori is more prone to irritation due to constant movement of the denture during mastication.<sup>11</sup> The existence of abnormal bony enlargements should not be allowed to compromise the design of the removable partial denture. Although modification of denture design can at times accommodate for exostoses, more frequently this results in additional stress to the supporting elements and compromised function. Ordinarily the mucosa covering bony protuberances is extremely thin and friable. Removable partial denture components in proximity to this type of tissue may cause irritation and chronic ulceration. Exostoses approximating gingival margins may complicate the maintenance of periodontal health and lead to the eventual loss of strategic abutment teeth.<sup>12</sup> Similarly torus palatinus can be annoying to complete or partial denture patients. This is especially true if the prosthesis exceeds a tolerable size which then can interfere with proper seating leading to tissue inflammation. Discoloration of torus palatinus and alveolar bone with minocyclin-induced staining may be of concern to the patient.<sup>13</sup> The aim of this study was to determine the prevalence, size, shape and location of tori in partially and completely edentulous patients and the sex variation in their distribution.

### Methods

A retrospective study was performed in the Prosthodontic Department, College of Dentistry, Hawler Medical University from October 2009- April 2011. The existence of tori had systematically and routinely been ascertained by visual inspection and palpation. The case file of four hundred and fifty partially and completely edentulous patients (219 males and 231 females), who attended the Prosthodontics clinic for constructing new partial or complete dentures, were analyzed and searched for the key word "Tori".

The following criteria which cited by Al Quran<sup>14</sup> were used to classify different

types and shapes of tori

1. Flat Torus: Occurring as a slightly convex protuberance with a smooth surface for mandibular tori. The same applies for palatal tori but extending symmetrically on both side of the palate

2. Lobular Torus: Present as a pedunculated or sessile lobular mass that can arise from a single base. This applies for tori in both locations

3. Nodular Torus: Occurring as a multiple protuberance each with individual bases; these may coalesce forming grooves between them. This applies for tori in both locations.

4. Spindle Torus: Present along the midline ridge along the palatal raphe area for palatal tori and elongated tori bilaterally in the mandible for mandibular tori.

### Statistical Analysis

A computer software SPSS was used after a cross tabulation to calculate the overall prevalence of tori and the frequency of each clinical type. The Chi-square test was used to determine the significance of differences between two different rates and the result was considered statistically significant when probability was less than 0.05.

### Results

From a total of 450 patients, with an age range of 30-70 years, the overall prevalence of tori was 14.2% (64/450) Table (1). There was no significant difference in the overall prevalence of tori between males and females ( $p > 0.05$ ). The prevalence of torus palatinus alone was 60.9% (39/64), while that of torus mandibularis alone was significantly lesser 23.5% (15/64). Both tori were associated with each other in 15.62% of cases (10/64).

Table (2) shows the prevalence of palatal and mandibular tori in different age groups of the study population. There were significantly ( $p < 0.05$ ) more reported cases of palatal and mandibular tori in the oldest age group (70-74). This is may be due to fewer numbers of patients within this age range compared to other age groups

other age groups in which palatal tori were reported in 7.7% and mandibular tori reported in 20%; this contributed to the high percentage of the overall tori. However, the association between both tori was most common in the 50-59 and 60-69 age groups (30%). Among the different clinical types of tori in both jaws (64 tori), 39.06% were flat, 18.75% were spindle, 34.37% of the nodular type, and around 7.81%

were of the lobular type Table (3). Palatal tori were predominantly of the flat type, while nodular tori were the majority in the mandible and had the major contribution to the high percentage of nodular tori (table.3) The majority of TP was found in the premolar to molar area while for TM mostly it was found in the canine to premolar area as shown in Table (4).

**Table1:** Prevalence of tori according to anatomic location

Location	Males 219 N (%)	Females 231 N (%)	Total 450 N (%)
Palate	22 (4.9%)	17 (3.77%)	39 (8.66%)
Mandible	9 (2%)	6 (1.33%)	15 (3.33%)
Total palate and mandible	4 (0.88%)	6 (1.3%)	10 (2.2%)
Total	27 (6%)	37 (8.2%)	64 (14.2%)

**Table 2:** Prevalence of different forms of tori according to age groups.

Age	Study population (450) (%)	Palate (39)(%)	Mandible (15) (%)	Palate and mandible (10) (%)	Total 64 (%)
30-39	121(26.88)	7 (17.94)	2 (13.33)	2 (20)	11 (17.18)
40-49	149(33.11)	12 (30.76)	3 (20)	1 (10)	16(25)
50-59	162(36)	11(28.20)	3(20)	3(30)	17(26.56)
60-69	11(2.44)	6(15.38)	4(26.66)	3(30)	13(20.31)
70-74	7(1.55)	3(7.7)	3(20)	1(10)	7(10.93)

**Table 3:** Clinical shapes of tori

Shape	Torus palatinus 39 N (%)	Torus mandibularis 15 N (%)	Palate and mandible 10 N(%)	Total 64 N (%)
Nodular	12 (30.76)	7 (46.66)	3(30)	22 (34.37%)
Flat	16 (41.02)	5 (33.33)	4(40)	25 (39.06%)
Spindle	8 (20.51)	2 (13.33)	2(20)	12 (18.75%)
Lobular	3 (7.7)	1(6.66)	1(10)	5 (7.81%)

**Table 4:** distribution of tori in relation to location

	Premolar area	Molar area	Premolar to molar area	Canine to premolar area	Incisor area	Total
TP	3	14	20	2	0	39
TM	5	0	1	7	2	15
TP & TM	4	0	2	3	1	10

**Table 5:** Distribution of TP and TM in relation to gender and size

Gender	Small	Medium	Large	Total
Male	TP 11	TP 6	TP 4	TP 21
	TM 5	TM 3	TM 2	TM 10
Female	TP 8	TP 11	TP 1	TP 20
	TM 5	TM 6	TM 2	TM 13

**Table 6:** Distribution of TM alone in relation to number of nodes and size

Placement	Small	Medium	Large	Total
Unilateral	3	1	0	4
Bilateral	4	6	1	11

## Discussion

This is the first study to report the prevalence of tori in partially and completely edentulous patients in Erbil city. The results showed a high prevalence of tori (14.2%). This is comparable with the results of earlier reported studies; 12.3% in Trinidad and Tobago West Indies<sup>2</sup>, (13.9%) in Jordan<sup>14</sup>, (14.6%) in Ghanaian community<sup>15</sup>, (31.9%) in Thai population<sup>16</sup>, (17%) in Japan<sup>17</sup> and (12.9) in Sulaimani Governorate-Iraq<sup>18</sup>, but it was greater than that of Nigerian population (4.3)<sup>19</sup>. However, the present study did not show any significant difference in the prevalence of either palatal or mandibular tori between males and females implying the sex based factor has little influence on the prevalence of tori. This is in contrast to a Norwegian study<sup>7</sup> and other studies<sup>3,8,17,19,20-26</sup> which demonstrated males had a higher ratio to females for tori. Haugen<sup>8</sup> suggested genetics as the responsible actor for the difference, while Alvesalo<sup>27</sup> suggested sexual dimorphism in the manifestation of torus mandibularis might result from the effect of Y chromosome on growth, occurrence, expression, and timing of development of mandibular tori. Similarly, there was no significant difference in the prevalence between mandibular (23.5%) and palatal tori (60.9%) ( $p > 0.05$ ). The high prevalence of tori among the 70-74 years age group in our study should not be considered very important because the sample of that age group was small and might have not reflected the true prevalence. A larger sample size is needed for future studies. The results of the present study disagrees with Choyayeb and Volpe<sup>28</sup> who found no relationship between age and the presence of tori in either jaw. The role of nutrients in the etiology of tori has been recently reviewed by Eggen et al.<sup>29</sup> who suggested that saltwater fish consumption in Norway could possibly supply higher levels of polyunsaturated fatty acids and Vitamin D which is involved in bone growth this in turn could increase the chances of

tori. Also it has been reported that genetic and dietary factors may be involved in the etiology and prevalence variation of tori. For the time being, genetic factors are the probable cause in the occurrence of tori in our population as sea fish consumption is not as common as other parts of the world. In parallel with this suggestion earlier studies suggested eating tough food may be implicated in the etiology of tori as this may trigger pressure towards the median palatine region, thereby leading to the thickening of the palatal vault. In these studies researchers observed the probability of finding mandibular tori in a person bearing palatal tori was more than twice higher than in a person without this characteristic.<sup>30</sup> The results of our study supported this observation as mandibular and palatal tori were associated with each other in nearly 15.62% of all individuals with tori. The present study suggested most tori in the palate were flat and most of the mandibular tori were of the nodular type. This is in agreement with previous studies.<sup>3,14,30,31</sup> which could be due to genetic factors or dietary habits. Most individuals in this study were unaware of the presence of tori and did not present with clinical symptoms. No other clinical medical conditions or dental anomalies were observed in the present study in association with tori.

The presence of either palatal or mandibular tori can obscure the radiographic details of maxillary sinuses and lower premolars and interfere with the construction of removable prostheses. For example, the lower labial bar is rarely indicated as a major connector for a removable partial denture.<sup>32</sup> It can be used satisfactorily when large mandibular tori interfere with conventional lingual bar placement or when the lower teeth are severely lingually tipped and placement of a lingual bar is not possible. In the present study patients with only nodular and lobular forms of tori, were referred for surgical reduction prior to the construction of complete dentures which incorporate a combination of soft acrylic flanges and liners.<sup>33</sup>

## Conclusion

Palatal and mandibular tori require no treatment unless they become so large interfering with function, denture placement, or causing recurring traumatic surface ulcerations.

## References

- Neville BW, Damm DD, Allen CM and Bouquot JE. Oral and Maxillofacial Pathology. WB Saunders, Philadelphia. 1995. 17-20.
- Al-Bayaty HF, Murti PR, Matthews R, Gupta PC. An epidemiological study of tori among 667 dental outpatients in Trinidad & Tobago, West Indies. *Int Dent J.* 2001 Aug;51(4):300-4.
- Gorsky M, Raviv M, Kfir E, Moskona D. Prevalence of torus palatinus in a population of young and adult Israelis. *Arch Oral Biol.* 1996 Jun;41(6):623-5.
- Seah YH: Torus palatinus and torus mandibularis, a review of the literature, *Aust Dent J.* 1995; 40, 318-21.
- Sonnier KE, Horning GM, Cohen ME. Palatal tubercles, palatal tori, and mandibular tori: prevalence and anatomical features in a U.S. population. *J Periodontol.* 1999; Mar;70(3): 329-36.
- Kerdpon D and Sirirungrojying S :A clinical study of oral tori in southern Thailand: ,prevalence and the relation to parafunctional activity, *Eur J Oral Sci* 1999 107, 9-13.
- Eggen S, Natvig B, Gasmyr J. Variations in torus palatines in Norway. *Scand J Dent Res.* 1991; 102: 51-59.
- Haugen LK. Palatine and mandibular tori. Amorphological study in the current Norwegian population. *Acta Odontol Scand* 1992;50:65-77.
- Naidich TP, Valente M, Abrams K, Spreitzer JJ and Doundoulakis SH: Torus palatinus, *Int J Neuroradiol* 1997; 3, 229-43.
- Belsky JL, Hamer JS, Hubert JE, Insogna K, Johns W. Torus palatinus: a new anatomical correlation ith bone density in postmenopausal women. *J Clin Endocrinol Metab.* 2003 May;88(5):2081-6.
- Veeraiyan D.N, Ramalingam .K, Bhat .V. Text book of prosthodontics-Deepak Nallaswamy, Jaypee brothers medical publishers (P)LTD, New Delhi,2003. 43.
- Carr A. B, McGivney G. P.,Brown D. T. McCrackens removable partial prosthodontic 11<sup>th</sup> edition.Elsevier Mosby St.Louis Missouri. 2005: 233-234.
- Ayangco L, Sheridan PJ. Minocyclin-induced staining of torus palatinus and alveolar bone. *J Periodontol* 2003;74(5):669-71.
- Al Quran FAM, Al-Dwairi ZN. Torus Palatinus and Torus Mandibularis in Edentulous Patients. *J Contemp Dent Pract* 2006 May;(7)2:112-119
- Bruce I, Ndanu TA, Addo ME. Epidemiological aspects of oral tori in a Ghanaian community. *Int Dent J.* 2004;54 (2): 78-82.
- Apinhasmit W, Jainkittivong A, Swasdison S .Torus palatinus and torus mandibularis in thai population. *ScienceAsia* 2002;28: 105-111.
- Yoshinaka M, Ikebe K, Furuya-Yoshinaka K, Hazeyama T. Prevalence of torus palatinus among a group of Japanese elderly. *J oral rehabil* 2010;37: 848-853.
- Miran F A. Study of Prevalence of Torus Palatinus and Torus Mandibularis Among Partially and Completely Edentulous Patients in Sulaimani Governorate. *Kurdistan Academicians Journal*, 2008,6 (1) part A:1-6
- Agbaje J.O, Arowojolu M.O, Kolude B, Lawoyin J.O. Torus palatinus and torus mandibularis in a Nigerian population. *African j oral health* 2005:2 (1):30-36
- Agnihotri N, Agnihotri J. New Jersey Dental School, University of Medicine & Dentistry of New Jersey.2003.Prevalence of oral tori in subjects requiring prosthodontic care.
- Apinhasmit W, Jainkittivong A, Swasdison S .T. Prevalence and clinical characteristics of oral tori in 1,520 Chulalongkorn University Dental School patients. *Surg Radiol Anat.* 2007 Mar;29(2):125-131.
- Ogunsalu CU. Oral tori in Jamicans of African origin: a clinical study. *West Ind Dent J* 1994 1:5-7.
- Bernaba JM: Morphology and incidence of torus palatinus and mandibularis in Brazilian Indians, *J Dent Res* ,1997 56, 499-501.
- Al-Sebaie D, Alwrikat M. prevalence of torus palatinus and torus mandibularis in Jordanian population. *Pakistan Oral & Dental Journal* 2011;31(1):214-216 .
- Yildiz E, Deniz M, Ceyhan O. Prevalence of torus palatinus in Turkish Schoolchildren. *Surg RadiolAnat* 2005;27 (5): 368-371.
- Al-Sebaie D, Alwrikat M. Prevalence of torus palatinus and torus mandibularis in Jordanian. *Pakistan Oral & Dental Journal* 2011; 31( 1) :214-216
- Alvesalo L, Mayhall JT, Varrela J. Torus mandibularis in 45,X females (Turner syndrome). *AM JPhys Anthropol* 1996;101: 145-9.
- Chohayeb AA, Volpe AR. Occurrence of torus palatinus and mandibularis among women of different ethnic groups. *Am J Dent* 2001; 14(5): 278-80.
- Eggen S, Natvig B. Relationship between torus mandibularis and number of present teeth. *Scand JDent Resea* 1986 94:233-240.
- Austin JE, Radford GH, Banks SO Jr. Palatine and mandibular tori in Negro. *New York Dent J* 1995 1: 1 7-1 1.
- Antoniades DZ, Delazi M, Papanayiotou P. Concurrence of torus palatinus with palatal and buccal exostosis: a case report and review of the

literature. Oral Surg 1998; 85: 552-557.

32. Stewart K, Rudd K, Keuebker WA. Clinical removable partial prosthodontics. Ishiyaku EuroAmerica, Inc. 2nd ed. Hanley Industrial Court, St. Louis, Missouri. 1993:716
33. Abrams S. Complete Denture Covering Mandibular Tori Using Three Base Materials: A Case Report J Can Dent Assoc 2000; 66:494-6.