

Prevalence and Pattern of Tori among Edentulous patients of Dental College Islamabad

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ABSTRACT

Aim: To find out the prevalence and patterns of tori in edentulous patients and determine their association with gender and age.

Study design: A cross-sectional observational study.

Place and duration: Prosthodontic Department of Islamic International Dental College, Islamabad from 1st September 2021 to 1st December 2021.

Methodology: A total of 165 edentulous patients of both genders were selected using non-probability purposive sampling. After collecting demographic data, intra-oral examination was carried out. Maxillary and mandibular stone casts were made after taking alginate impressions. Sharp graphite pencil was used to mark torus mandibularis and torus palatinus and the stone casts were carefully analyzed for size, shape and location of tori.

Results: Total prevalence of tori in present study was 11.5%. 7.7% males and 14.9% female patients reported having tori. No gender association with tori existence found; $p > 0.05$. Maximum number of tori reported in age group 71-80 years (21.4%). Chi square test showed association of tori presence with age; $p < 0.05$. The flat and spindle shaped tori were (1.2%) whereas lobular and nodular shaped accounted for 1(0.6%) torus palatinus. The prevalence of small sized tori was mostly reported (7.9%). Unilateral single tori were frequently found (6.7%).

Conclusion: The prevalence of tori occurrence in edentulous patients is low. There was no significant difference in the prevalence of tori among male and female patients however tori exitance increases with increasing age.

Key words: Torus Palatinus, Torus Mandibularis, frequency, edentulous, prevalence.

INTRODUCTION

Tori are bony outgrowths that are non-pathological and commonly seen on the alveolar surfaces of maxilla and mandible^{1,2}. Torus mandibularis grow on the mandible lingual cortical bone, whereas, torus palatinus grows in the midline of the hard palate.³ The etiology of the tori growth is unknown and many factors are said to be responsible such as: genetic, developmental anomalies, growth alteration, infection and mal-nutrition^{3,4}.

Some researchers say that the environmental factors like Vitamin deficiencies, bruxism and calcium supplements causes their growth^{3,4}. Few investigators believe parafunctional habits e.g., tongue thrust and thumb sucking results in increased pressure⁵.

Literature shows that their prevalence varies between ethnic groups. i.e.; high prevalence seen in Asian whereas lower in blacks (16%) and whites (8%).⁵ It was seen that the tori prevalence varies according to country, race as well as ethnic group^{6,7}.

Torus palatinus can be classified as flat, spindle, nodular and lobular according to shape, whereas torus mandibularis can be classified as unilateral, bilateral single, unilateral and bilateral multiple and bilateral combined⁸. Size can be as small as pea to enormous size that covers the whole palate. They are incidentally discovered during routine examination of a patient as they usually are symptomless however if significantly grown can hinder the denture fabrication in edentulous patients^{9,10}. Mucous membrane covers the tori can easily be traumatized while insertion and removal of removable dentures, unless relief is given. If they are very large, surgical removal becomes mandatory.¹⁰ The torus and its surroundings can be accompanied by uneven resorption and result in denture rocking^{10,11}. Failure to achieve exact surface details also results in denture failure. Large mandibular tori prevent complete seating of impression trays and dentures. The undercuts lock the denture. Phonetic disturbances in palatal sound can occur when tongue articulate towards the palate¹². Their significant growth can result into obstructive sleep apnea and compromised esthetics¹³.

Consideration should be given to tori and their characteristics as they have clinical importance in denture and can affect denture support, retention and phonetics. By knowing their prevalence and characteristics in our society, we can better plan the denture construction procedures by incorporation of additional factors that can, minimize the problem shooting of tori. Moreover, there is very less literature available on tori prevalence in our country. To facilitate further discussion on this anomaly baseline data for future epidemiological studies is required so that we can compare our results with other studies.

The aim of the study was to determine the prevalence of tori on edentulous patients, their distributional variation in age and gender and study their characteristics.

METHODOLOGY

This cross-sectional observational study included 165 edentulous patients of both genders. The age range of the patients was 41 to 80 years and patients were divided into four age groups i.e., 41-50, 51-60, 61-70, 71-80. The data was collected in three months period from 1st September 2021 till 1st December 2021. All patients were selected from the out-door of Prosthodontics department of Islamic International Dental college Islamabad, using non-probability purposive sampling technique. The sample size was estimated based on the observation obtained from previous study on prevalence of torus palatinus and torus mandibularis.¹⁴ Only completely edentulous patients who came for complete denture fabrication were included in the study. Patients with soft tissue hyperplasia/growth, any surgical intervention of maxilla and mandible tumors, were excluded from the study. Patients having questionable tori were also excluded. Informed consent was taken. Ethical approval was obtained from Institutional ethical committee.

Patients' intra-oral examination was carried out while they were seated on dental chair. Demographic data like age and gender was recorded Each patient was examined visually, and clinically palpated for palatal and mandibular tori. Alginate primary impression were taken in stock trays and poured in hard plaster to fabricate dental casts. For diagnosis of torus palatinus; it was defined as the bony out-growth on the mid palate and torus

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mandibularis was defined as the bony out-growth on lingual cortical bone from pre-molar to molar area⁸. Questionable out-growths were excluded. The shape of torus palatinus was classified as nodular, spindle, lobular and flat, according to JainKiHivong¹⁵. The torus mandibularis shape was classified into four groups i.e., Unilateral single, bilateral single, unilateral multiple, bilateral multiple⁸. For the size; the tori were measured at the highest elevation of the bony growth using digital Vernier Caliper to an accuracy of 0.01mm. Reichart¹⁶ classification was used to grade the size as follows <3mm(small), 3-6mm(medium), >6mm(large).

Data analysis: Descripted statistics were calculated for tori shape, size, number and location. Chi-Square test was used to find out the association of the characteristics with age and gender. SPSS version 20 was used for statistical analysis. P value less than 0.05 was considered statistically significant.

RESULTS

A total of 165 dental casts of both genders were evaluated for the presence of torus palatinus and torus mandibularis. 78(52.7%) were male and 87(47.3%) were female patients who came for the fabrication of complete denture prosthesis. Out of these patients only 6(7.7%) males were found with tori and 72(92.3%) had no tori. 13(14.9) female patients reported having tori while 74(85.1%) had no tori. The Chi Square test showed no gender association with tori existence; p>0.05 (Table I).

The age range of the patients was 41 to 80 years with mean age 64.33 years ±SD 8.856. Majority of the patients who came for the fabrication of complete dentures were in age groups 61 to 70 years. Maximum number of tori reported in age group 71-80 years; 9(21.4%) and minimum in 51-60 group; 1(2.2%). Chi square test showed association of tori presence with age p <0.05 (Table II).

Total prevalence of tori in present study was 20(11.5%) out of which 6(3.6%) were torus palatinus whereas 14(8.5%) were torus mandibularis. The flat and spindle shaped tori were 2(1.2%) whereas lobular and nodular shaped accounted for 1(0.6%) torus palatinus (Table III). The unilateral single tori were frequently found in mandible 11(6.7%) followed by bilateral single tori 3(1.8%). The association with gender was significant, p<0.0 (Table IV).

The prevalence of small sized tori was mostly reported 13(7.9%), medium sized were 4(2.4%) and least frequent were large sized tori 3(1.8%). Small sized tori were frequently seen in both genders; 5(38.5%) male, 8(61.5%) females. Association of size of tori with gender was found to be insignificant p>0.05 (Table V).

Table I: Distribution of tori according to gender (n=165).

| Gender | Tori | No tori |
|--------|-----------|------------|
| Male | 6(7.7%) | 72(92.3%) |
| Female | 13(14.9%) | 74(85.1%) |
| Total | 19(11.5%) | 146(88.5%) |

P value 0.145 X2=2.122

Table II: Distribution of tori according to age, (n=165).

| Age groups | No tori | Tori |
|------------|------------|-----------|
| 41-50 | 9(81.8%) | 2(18.2%) |
| 51-60 | 45(97.8%) | 1(2.2%) |
| 61-70 | 59(89.4%) | 7(10.6%) |
| 71-80 | 33(78.6%) | 9(21.4%) |
| Total | 146(88.5%) | 19(11.5%) |

P value 0.036 X2=8.524

Table III: Distribution of torus Palatinus according to shape,(n=165).

| Gender | No Tori | Torus Palatinus | | | |
|--------|------------|-----------------|---------|---------|---------|
| | | Flat | Lobular | Nodular | Spindle |
| Male | 75(96.2%) | 1(1.3%) | 1(1.3%) | 0(0.0%) | 1(1.3%) |
| Female | 84(96.6%) | 1(1.1%) | 0(0.0%) | 1(1.1%) | 1(1.1%) |
| Total | 159(96.4%) | 2(1.2%) | 1(0.6%) | 1(0.6%) | 2(1.2%) |

P value 0.731, X2 =2.025

Table IV: Distribution of torus mandibularis according to shape, N=165

| Gender | No Tori | Torus Mandibularis | | | |
|--------|------------|--------------------|---------------------|------------------|--------------------|
| | | Unilatéral single | Unilatéral multiple | Bilatéral single | Bilatéral multiple |
| Male | 74(94.9%) | 1(1.3%) | 3(3.8%) | 0(0.0%) | 0(0.0%) |
| Female | 77(88.5%) | 10(11.5%) | 0(0.0%) | 0(0.0%) | 0(0.0%) |
| Total | 151(91.5%) | 11(6.7%) | 3(1.8%) | 0(0.0%) | 0(0.0%) |

P value 0.007, X2 =9.962

Table V: Distribution of tori according to size, N=165

| Gender | No Tori | Tori size(mm) | | |
|--------|------------|---------------|---------|---------|
| | | Small | Medium | Large |
| Male | 71(91.0%) | 5(1.3%) | 1(1.3%) | 1(1.3%) |
| Female | 74(85.1%) | 8(9.2%) | 3(3.4%) | 2(2.3%) |
| Total | 145(87.9%) | 13(7.9%) | 4(2.4%) | 3(1.8%) |

P value 0.659, X2 1.602

DISCUSSION

Variations have been seen in the tori occurrence in the different populations of the world. The current study reported overall low occurrence of tori i.e., 11.5%. We found comparatively high prevalence of the torus mandibularis (8.5%) than torus palatinus (3.6%). In concordance with the results of the current study Hama¹⁷ and coworkers reported 4.75 %TP and 4.8%TM. Al Zarea¹⁸ reported 7.79 %subjects have TP and 9.80% had TM. In contrast Abbasi¹⁹ and coworkers reported 7.6% torus palatinus and only 0.3% torus mandibularis in their study. Santosh¹³ and coworkers reported high frequency of torus palatinus in their study 44.08%. We reported high prevalence of TM that could be due to the fact that with increasing age the increase in the force in the mandibular arch due to bruxism and other parafunctional activities affect mandible more than maxilla¹⁷. We believe that these contrasting results can also be due to different racial and genetic factors.

Tori occurrence within gender had been studied in different population of the world. We found more female patients 14.9% with tori as compare to males 7.7% but this gender difference is not significant. Bsoul²⁰ reported high prevalence in females in Jordan. Similar findings were seen in Malaysian females 35% as compared to males 20%⁷. Hassanabadi²¹ and coworkers reported females with higher prevalence but found this finding to be insignificant p<0.05. Similar results were seen in the studies done by Hiremath¹⁴ Hama¹⁷ Santosh¹³ and Al Shareed²². In contrast to the finding of current study, Al Zarea¹⁸ reported increase percentage in males 19% as compare to females 15.94% as was reported by A Loukas⁵, but stated insignificant statistical importance. Others reveal no diversity in prevalence and entailing that sex-based factor has minimal impact. Al Quran²³ reported insignificant difference in prevalence of tori in both genders and stated little sex-based influence on prevalence of tori. Most published reports suggested that TP is higher in females and is due to X chromosome dominant type¹³. This could be explained on the fact that genetic and environmental factors play their role and effect women more.

We reported higher occurrence of tori in olde age group as compare to the patients in young age group and found significant age-related association of tori. Similarly, Al Quran²³ reported significantly increased cases of both tori in old age group 81 to 90 years. Other researchers observed certain prevalence with respect to age as more frequency of tori in middle age of life. Hassanabadi²¹ and coworkers found 49 to 59 age group with maximum tori. Maduakor²⁴ found fifth decade as the peak occurrence age. Al Zarea¹⁸ reported maximum percentage 36.36% of tori observed in age group 60 to 69 years but observed insignificant association of age and tori occurrence. Al Shareeda²² found peak occurrence for both tori at 5ht decade of life. They stated that the prevalence of tori increases with age until 40 to 49 years and after that torus tend to decrease over 50 years old.

Prevalence of small sized tori 7.9% was seen in the current study. We found frequent flat and spindle shaped torus palatinus 1.2% whereas lobular and nodular shapes were least observed. Unilateral single tori were frequent in mandible. Likewise, Al Zarea¹⁸ found 56.41% flat tori in palate and bilateral solitary 37.50% in mandible. In concordance with the observations of our study, Al Quran²³ reported 33% flat, 18% spindle, 33% nodular and around 15% lobular tori. They further stated that flat types were mostly seen in TP and nodular were seen in TM. Similar findings were documented by Hassanabadi²¹ and coworkers and found occurrence of TP 41.46% flat type the most prevalent and bilateral solitary TM 42.11% the most common. In contrast Santosh¹⁷ and coworkers reported bilateral torus mandibularis 40.38 more than unilateral right torus mandibularis 36.53%. Increase in the force due to parafunctional activities affect bone and results in to development of tori¹⁷.

The prevalence of tori occurrence in our patients was less but these anomalies should be carefully considered in edentulous patients as they can affect denture support, retention and phonetics. We suggest that future studies should be carried out on larger scale to know tori prevalence's in our region as very less literature is available in our country. Limitation of the study was its sample size and sampling technique but this study will help as base line data for future epidemiological studies.

CONCLUSION

The prevalence of tori occurrence in edentulous patients is low. There was no significant difference in the prevalence of tori among male and female patients however tori exitance increases with increasing age.

Conflict of interest: Nil

Authors' contribution: **AGC:** Data collection, **MF:** Statistical analysis, **UM:** Conceived idea, **FNC:** Literature review, **MAR:** Manuscript Writing, **FS:** Manuscript proof reading, **SN:** Research Supervisor

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