




TEMPOROMANDIBULAR DISORDERS CORRELATION TO PARAFUNCTIONAL ACTIVITIES AND ORAL TORI AND BONY EXOSTOSES

Muhannad Ali Kashmoola ^{1*}, Sayfaldeen Muhannad Ali Kashmoola ², Nazih Shaabam Mustafa ³

^{1,3} Faculty of Dentistry, OMFSOD, IIUM

² Faculty of Dentistry, Bilad Al-RAFidain University college, faculty of Dentistry

* **Email:**

Abstract

Objective: To investigate existence of oral tori and bony exostoses and their correlation/effect to temporomandibular disorders and parafunctional habits. **Materials and Methods:** A cross sectional descriptive and analytical study was carried out among 100 patients who attended polyclinic KOD, IIUM. Demographic background, status of oral tori, parafunctional activities (PFA) and temporomandibular disorder (TMD) were assessed. A cross analysis was done between gender, age group, oral tori, bony exostoses, temporomandibular disorder and parafunctional activities. **Results:** In this study, half of the patients had oral tori and bony exostoses; it was significantly seen among the female patients within 21 and 50 year old age group. In a cross analysis between PFA and TMD and oral tori and bony exostoses status, 42% of the sample who did not have both PFA and TMD also did not have both tori and bony exostoses. 4% of the sample had both PFA and TMD but absent of both oral tori and bony exostoses. Although, PFA and TMD were considered as two groups (absent or present), there was a significant association ($p < 0.05$) between PFA and TMD and the existence of oral tori and bony exostoses, not significant ($p > 0.05$) when PFA and TMD as in 4 groups (both absent, only PFA, only TMD and both present). **Conclusion:** The study showed there is still argument on association between PFA and TMD and the existence of oral tori and bony exostoses. It may be due to both of them are not from the same aetiology and/or small sample size. Further study should be conducted with proper study design with adequate sample size.

Keywords: Oral tori, bony exostoses, temporomandibular disorder, parafunctional activities

This article is open-access under the CC BY 4.0 license (<http://creativecommons.org/licenses/by/4.0/>)

1. Introduction

Tori are bony exostoses that are either torus palatinus (TP) develop at the hard palate, or the torus mandibularis (TM) found on lingual aspect of the mandible. In addition to that, bony exostoses of the jaw bone can also be seen at palatal aspect of maxilla or buccal aspect of both jaws.

They are composed of compact mature hyperplastic bone and sometimes have a cancellous bone at centre, covered by oral mucosa. Genetic and environmental factors and such and nutrition can play a role in aetiology of these exostoses (Al-Dwairi *et al*, 2017).

Torus palatinus (TP) is usually symmetrical, however, it can be irregular mass. Torus mandibularis (TM) is above mylohyoid line to lower premolars (Bukanan BA *et al*, 2020).

Tori populations varies from 0-66% for TP, and from 0-85.7% for TM. There is significant differences in

relation to race. Highest seen in Mongoloids followed by Caucasians then African. The prevalence rate also differ between palatal exostosis (8.1%-56%), and between 0.09%-23.2 % for buccal exostoses which are mostly associated with maxilla. Masticatory stress and occlusal load stimulates the growth of torus mandibularis (Kalaighan 2018, Bukanan BA *et al*, 2020, Telang *et al*, 2020)

Temporomandibular disorders (TMD) is a clinical term that refers to dysfunction of temporomandibular joint (TMJ) and muscles of mastication, and associated structures. Common aetiology of TMD is parafunctional activities as grinding, clenching teeth and/or bruxism (Robert *et al*, 2018)

Since TMD, oral tori and bony exostosis are related to parafunctional activity, then the correlation between TMD and parafunctional activity is worth to be investigated.

A wide variety of prevalence rates of tori and bony exostoses based on their clinical characteristics and their

relation to parafunctional activities and temporomandibular disorder has been found in relation to race. However, only few literatures about local and Asian's tori and bony exostoses have been reported.

According to a study done by Sirirungrojying & Kerdpon, nutritional disturbances, hereditary factors, environmental factors, evolution and masticatory hyperfunction can lead to tori and bony exostoses, (Sirirungrojying S and Kerdpon D, 1999). Gorsky et al found that common osseous outgrowth is probably caused by multifactorial aetiology, including a complicated and unclear interaction between genetic factors and environmental factors (Gorsky et al, 1996).

It has been reported that severe attrition can be associated with presence of tori. Therefore, etiologic factors can include excessive masticatory forces (Eggen S and Natvig B, 1991, Apinhasmit et al, 2002). Sonnier et al stated that the prevalence of torus mandibularis (TM) was directly related to the presence of teeth (Sonnier et al, 1999). This also supported by a study that found torus mandibularis was reported in Thais with clenching (Kerdpon D and Sirirungrojying S, 1999).

Sirirungrojying & Kerdpon proposed that forces from parafunctional activities can cause oral tori and bony exostoses as well as TMJ disorders (Sirirungrojying S and Kerdpon D, 1999). Nevertheless, recently a study proposed in Japan by M. Yoshinaka et al, they mentioned in their research that there was no relationship between the presence of torus palatinus with occlusal force, occlusal support, temporomandibular disorder syndrome and also bruxism (M. Yoshinaka et al, 2010).

While a study done in Jordanian population by Sawair et al, stated that there is a significant relationship between bony exostoses and the number of functioning teeth and masticatory forces. Exostoses might perform a buttressing function reinforcing the alveolar process against excessive occlusal force. Therefore, patients who have higher occlusal stresses, such as those with clenching or bruxism were expected to have more prevalent of oral bony outgrowths (Sawair et al, 2009).

A study conducted in Ghana reported that oral tori and bony exostoses present as a bony projection with smooth continuous surface with the adjacent bone or a multilobular, spherical bony bulging that have a well demarcated base forming a nodular cluster. In a Norwegian population, small tori were more frequent than and majority were solitary type, as supported in previous report by Gorsky et al (Haugen L et al, 1992). However, these study contrasted with a study in Malaysia that said maxillary tori measuring more than two centimeters occurs about three times more frequently than the below two centimeters (Yaacob H et al, 1983).

A Nigerian study reported that females have more medium- and small- sized tori than males, who tends to have more large and small- sized tori. They also found more symmetrical bilateral torus mandibularis (TM) than unilateral torus mandibularis (TM) commonly in multiple nodules more than single nodule, which was in contrast with research done by Haugen, who reported that there were more single tori than multiple. (J O Agbaje et al, 2005).

A study done in Jordan reported the need of modification of the of removable appliance or surgically correction of the high prevalence of medium to large variants of oral tori and bony exostoses and the dominant premolar-molar. (Sawair et al, 2009).

Objectives

- To identify the demographic data of the patients
- To investigate the existence of oral tori and bony exostoses
- To assess the parafunctional activities and temporomandibular disorder
- To find out the relationship between the existence of oral tori and bony exostoses with gender and age group
- To assess the existence of oral tori and bony exostoses and their correlation with parafunctional activities and temporomandibular disorder

2. Materials and Methods

The purpose of the study will be explained and patients who agreed to participate in the study will be asked for consent and interviewed.

A cross sectional descriptive and analytical study was carried out among 100 patients who attended polyclinic KOD, IIUM. Demographic background, status of oral tori, parafunctional activities (PFA) and temporomandibular disorder (TMD) were assessed.

Inclusion criteria

Patients with oral tori and/or bony exostoses

The exclusion criteria

- Patients of 13 years and below
- Patient with syndrome such as Down's Syndrome, and any other bone disease

Clinical examination & impression taking

- Visualized and palpated oral tori and bony exostoses in both groups were assessed as present respectively. The size of each torus was recorded.

- Impression was taken for each patient for future records and investigation
- TM, TP and bony exostoses in both groups were assessed as present when a painless bony swelling in the palate and the lingual area of the mandible respectively could be visualized and palpated. The size of each torus was recorded.

- Consented subjects presented with torus palatinus, torus mandibularis, any bony exostoses or any signs of parafunctional activity will be taken pictures for records.

Data analysis

By using SPSS software version 20, chi-square test and T-test were used to compare differences between different parameters.

3. Results

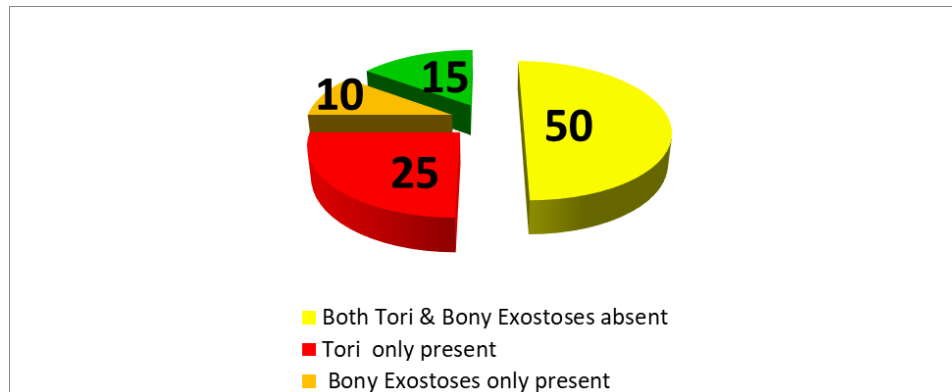


Fig 1. Status of Oral Tori and Bony Exostoses

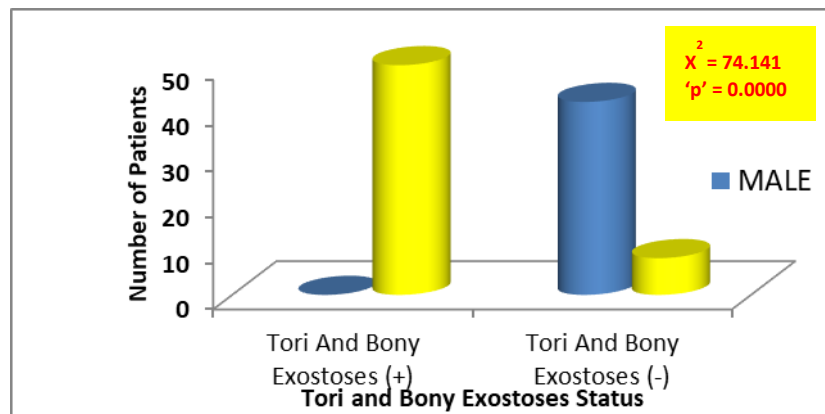


Fig2. Gender vs Presence of Oral Tori and Bony Exostoses

Table1. A cross analysis between age group and presence of Oral Tori and Bony Exostoses

AGE GROUP (Year)	Tori & BX (+)	Tori & BX (-)
21-30	26	0
31-40	20	0
41-50	4	28
51-60	0	18
61-70	0	4
$X^2 = 86.000$ $'P' = 0.000$		

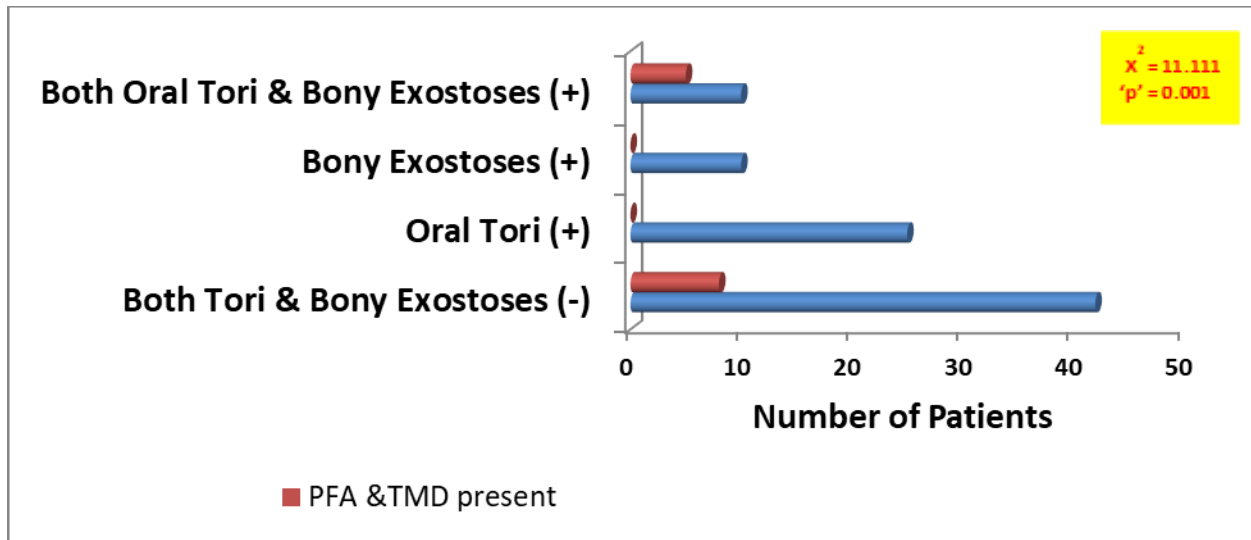


Fig 3. Oral Tori & Bony Exostoses VS PFA & TMD

Table 2. A cross analysis between Oral tori and Bony Exostoses status and Parafunctional Activities and TMD status (n=100)

		Oral Tori & Bony Exostoses Status (%)			
		Both Tori & Bony Exostoses absent	Tori present	Bony Exostosis present	Both Tori & Bony Exostoses present
Parafunctional Activities (PFA) & TMD status (%)	Both PFA & TMD absent	42	25	10	10
	Only PFA present	2	0	0	2
	Only TMD present	2	0	0	2
	Both PFA & TMD present	4	0	0	1
$\chi^2 - 0.141$ 'p' - 0.079					

4. Discussion

In this study, half of the patients had oral tori and bony exostoses; it was significantly seen among the female patients within 41 and 70 year old age group. For the tori status, out of 100 samples, 50% of them does not have both tori and bony exostoses, 25% of them do have tori only, 10% of them do have bony exostosis only, and 15% of them do have tori and bony exostoses.

Gender vs Presence of tori and bony exostoses shows *P* value is less than 0.05 indicated that there is relation between gender and the presence of oral tori and bony exostoses.

For the parafunctional & TMD status, 87% of the sample does not have both parafunctional habit and TMD. 4% of the samples only have PFD, 4% of the samples only have TMD, and 5% of the sample does have both PFD & TMD. In a cross analysis between PFA and TMD and oral tori and bony exostoses status, 42% of the sample who did

not have both PFA and TMD also did not have both tori and bony exostoses. 4% of the sample had both PFA and TMD but absent of both oral tori and bony exostoses.

Although, PFA and TMD were considered as two groups (absent or present), there was a significant association ($p < 0.05$) between PFA and TMD and the existence of oral tori and bony exostoses, not significant ($p > 0.05$) when PFA and TMD as in 4 groups (both absent, only PFA, only TMD and both present).

5. Conclusions

The study showed that there is still argument on relationship between PFA and TMD on the existence of oral tori and bony exostoses. It may be due to both of them are not from the same aetiology and/or small sample size. Further study should be conducted with proper study design with adequate sample size.

References

- [1]. Al-Dwairi ZN, Al-Daqaq ANF, Kielbassa AM, et al. (2017): Association between oral tori, occlusal force, and mandibular cortical index. *Quintessence Int.* 48(10): 841–849.
- [2]. Bukanan BA et al (2020): Prevalence of Torus Palatinus and Torus Mandibularis among Dental Patients in Riyadh Elm University, Saudi Arabia. *Donn. J. Dent. Oral. Hyg.*, 6(2) pp. 039-42.
- [3]. kalaignan P, Mohan J. S, Jayakumar A (2018): Determination of Grading for Maxillary and Mandibular Tori- an in Vivo Study. *Biomed Pharmacol J* 2018;11(2).
- [4]. Telang LA, Telang A, Nerali J, Pradeep P. (2020): Tori in a Malaysian population: Morphological and ethnic variations. *J Forensic Dent Sci.* 2019 May-Aug;11(2):107-112. doi: 10.4103/jfo.jfds_66_19. PMID: 32082047; PMCID: PMC7006306.
- [5]. Robert J. A. M. de Kanter, Pasquale G. F. C. M. Battistuzzi, Gert-Jan Truin, "Temporomandibular Disorders: "Occlusion" Matters!", *Pain Research and Management*, vol. 2018, Article, ID 8746858, 13 pages, <https://doi.org/10.1155/2018/8746858>
- [6]. Sirirungrojying, S. (1999). Relationship between oral tori and temporomandibular disorder. *International Dental Journal*, 101-104.
- [7]. Reichart P A, Neuhaus F, Sookasem M. (1988) Prevalence of torus palatinus and torus mandibularis in Germans and Thai. *Community Dent Oral Epidemiol* 16: 611-64.
- [8]. McNeill C, editor. (1993) Temporomandibular disorders: Guidelines for classification, Assessment and Management. Baltimore: Quintessence Publishing Co., 11: 39-60.
- [9]. John MT, Frank H, Lobbezoo F, Drangsholt M, Dette KE. (2002) No association between incisal tooth wear and temporomandibular disorders. *J Prosthet Dent* 87:197-203.
- [10]. DuangpornKerdpon, S. S. (1999). A clinical study of oral tori in southern Thailand: prevalence and the relation to parafunctional activity. *Eur J Oral Sci*, 107:9-13