

## DETERMINATION OF MAXILLARY ARCH CHARACTERISTICS IN PATIENTS WITH TORUS PALATINUS VISITING KLINIK PERGIGIAN, MELAKA-MANIPAL MEDICAL COLLEGE, MELAKA: A COMPARATIVE STUDY

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### ABSTRACT:

Torus palatinus (Tori) is a common, non-pathological bony exostoses located along the midline of the vault on the hard palate. This study was conducted with the intention of associating the possibility of torus palatinus to be one of the factors that may cause changes in the maxillary arch and thereby contribute to malocclusion. 100 consented patients with and without torus palatinus (n = 50 in each group) were included in the study and their arch characteristics were assessed. Descriptive data for tori group showed significantly larger anterior arch width, posterior arch width and arch length, whereas the tooth material is found to be insignificantly more than non-tori group. No studies have been found in the literature so far which compared the arch characteristics between subjects with and without torus palatinus.

**Key words:** Torus palatinus, malocclusion, arch characteristics



### INTRODUCTION:

Torus palatinus (Tori) is a common, non-pathological bony exostoses located along the midline of the vault on the hard palate, microscopic examination of torus palatinus reveals normal bone structure composed of thick cortical bone tissue and a deeper, small area of trabecular bone<sup>1</sup>. The pathogenesis of these tori has long been debated, with arguments centring on genetic versus environmental factors, such as masticatory stress<sup>[1]</sup>. Most authorities suggest that the torus palatinus is inherited as an autosomal dominant trait

resulting in a familial tendency, but it varies diversely according to different ethnicity and backgrounds. The prevalence of a palatal tori has varied widely in a number of population studies, ranging from 9% to 60%.<sup>[2,6]</sup> There is significant racial differences with higher prevalence in Asian and Inuit populations. Gender predominance of female to male ratio is 2:1.<sup>[2]</sup> Studies supports the theory that tori are dynamic lesions related to environmental factors which may undergo resorption remodelling in later

life due to decreased functional stresses.<sup>[3]</sup> Most palatal tori are small, measuring less than 2 cm in diameter, however, they can slowly increase in size, sometimes to the extent that they fill the entire palatal vault.

Dental malocclusion can be broadly divided into intra-arch malocclusion like spacing (due to bigger arch with/ arch length compare to size of the teeth), crowding (due to smaller arch with/ arch length compare to size of the teeth) and inter- arch malocclusion like Angle’s Class I,II,III malocclusion.<sup>[4,5]</sup> This research was driven by the inquisitiveness of the research team members when it was noticed that a high number of patients visiting Klinik Pergigian, Melaka-Manipal Medical College, Malaysia presented with a palatal tori. This was supported by a research article which confirmed a good percentage (12%) of occurrence of torus palatinus among Malaysians.<sup>[2]</sup> It also observed that most of these patients possessed a form of malocclusion. Till date, very few studies have investigated the association of a torus palatinus and types of malocclusion. Hence, the study objectives were to compare and evaluate any association present between the type of malocclusion and torus palatinus, to compare and evaluate the arch width, arch length and tooth sizes seen in outpatients with presence

of torus palatinus among the test and control groups.

**MATERIALS AND METHODS:**

This comparative study was carried out on 100 consented patients with and without torus palatinus (50 patients in each group), visiting Klinik Pergigian, Melaka-Manipal Medical College, Melaka, Malaysia. Alginate impressions were taken and study casts were prepared. The arch characteristics were assessed using an electronic digital calliper, brass wire and meter ruler. The inclusion criteria was patients aged 16 years and above, subjects of Indian, Chinese and Malay ethnicity, subjects with fully erupted set of teeth from permanent central incisors to permanent first molars in the first and second quadrants, no history of previous orthodontic therapy and teeth with normal morphologies. Teeth with broken crowns, cracks or fractures, grossly decayed teeth and supernumerary, if any, were excluded. Data recorded were then compared among the Tori and Non-tori group

**RESULTS:**

**Table 1:** Descriptive data on the type of malocclusion, anterior arch width, posterior arch width, arch length and tooth material for both tori and the non-tori group.

	Tori	Non-tori	P-Value
<b>Malocclusion</b>			
Angle’sClass I	98%	98%	
Angle’sClass II	2%	2%	
Angle’sClass III	0%	0%	

<b>Anterior Arch width</b>			
Mean	37.581	34.943	0.0007 (<0.05)
Standard deviation	3.136	2.188	
<b>Posterior Arch width</b>			
Mean	48.572	45.967	0.0001 (<0.05)
Standard deviation	4.541	2.646	
<b>Arch length</b>			
Mean	81.720	79.720	0.0248 (<0.05)
Standard Deviation	4.598	4.165	
<b>Tooth Material</b>			
Mean	95.741	95.642	0.9066 (>0.05)
Standard Deviation	3.984	4.471	

Table 1 represents the descriptive data on the type of malocclusion, anterior arch width, posterior arch width, arch length and tooth material for both tori and the non-tori group. 98% of the samples in both groups exhibited Angle's Class I malocclusion, 2% of the samples exhibit Angle's Class II malocclusion and none of the participants exhibit Angle's Class III malocclusion. In the Tori group of 50 samples, an average anterior arch width of 37.581mm was obtained while the non-tori group of another 50 participants showed an average arch width of 34.943mm. An average posterior arch width of 48.572mm and 45.967mm were seen in the tori and non-tori group respectively. The mean arch length shown in tori group was 81.72mm while the mean arch length in non-tori group was 79.720. Hence, it is obvious that the anterior arch width, posterior arch width and arch length are consistently larger in the tori group than of non-tori group. There were statistical

differences ( $p$ -value<0.05) in anterior arch width, posterior arch width, and arch length between tori and non-tori group.

The average tooth material in tori group was 95.741mm while the non-tori group was 95.642mm. Tooth material of the tori group was also larger than of non-tori group, albeit the slight difference of only 0.099mm.

## DISCUSSION:

Tori are bony exostosis commonly found on the midline of the hard palate or the lingual aspects of the mandible above the mylohyoid line They are slow growing, non-neoplastic and non-pathological osseous projections. Its growth stabilizes around 22 – 24 years of age in average adult.<sup>[6]</sup>

In the present study, Angle's Class I malocclusion is the most commonly seen molar relationship in both the Tori and

the Non tori group, while none of the samples showed Class III malocclusion. The mean values of anterior arch width and posterior arch width obtained from our study is 37.581mm and 48.572mm respectively corresponded almost identically with the study done by Kihin Myo Thu et al,<sup>[7]</sup> where the anterior arch width is 35.48mm and posterior arch width is 47.93mm This supports our proposed parameter that Torus palatinus played a significant role in expansion of arch width.

In studies done by Mohd noor et al, and Khlid et al,<sup>[8]</sup> the arch length found in patients with torus palatinus was shorter compared to patients without torus palatinus, this is however different from

our result of our study. We found that the patient with torus palatinus had a larger arch length than non-tori group, and the result is statistically significant (p-value<0.05). However, in comparison to another study done by Mohd Izzat et al,<sup>[9]</sup> who managed to prove that the presence of tori is associated to the increased in tooth size, in our study we found that there is no significant difference in tooth material between the Tori and Non-tori group. (p-value>0.05)

### CONCLUSION:

So, the results from this study might be useful in educating, diagnosis and treatment planning in patients who have torus palatinus.

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**FIGURES:**

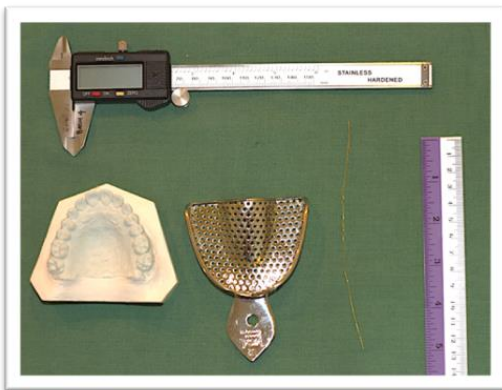


Figure 1: Armamentarium

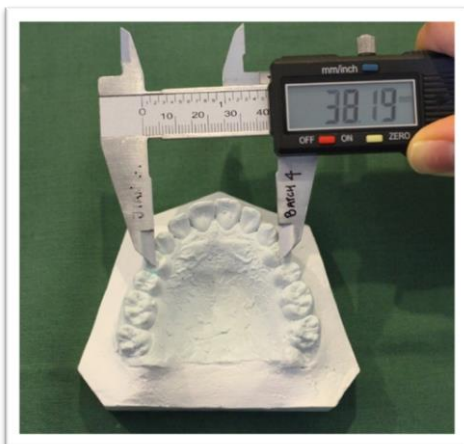


Figure 2: Arch width measurement in anterior region



Figure 3: Arch width measurement in posterior region

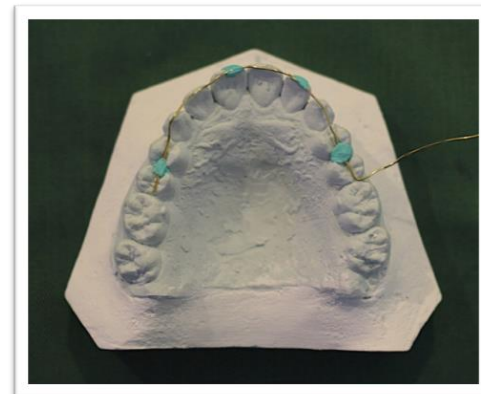


Figure 4: Arch length measurement

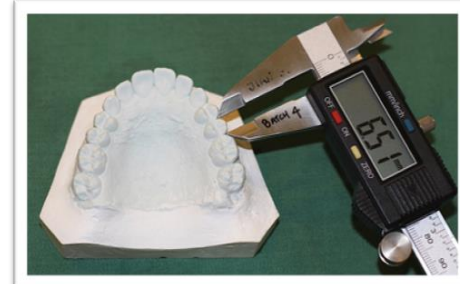


Figure 5: Tooth size measurement