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นิพนธ์ต้นฉบับ *Original Article*

Prevalence of Torus Palatinus and Torus Mandibularis in Patients attending Dental Department of Rajavithi Hospital, Bangkok

Pitchya Tuchinda D.D.S.

Dental Department of Rajvithi Hospital, Bangkok, Thailand

Abstract The purposes of this study was to report on the prevalence, shape, and location of torus palatines (TP) and torus mandibularis (TM), and to assess their gender and age-related differences among 519 Thai dental patients attending Dental Department in the Rajavithi Hospital, Bangkok, Thailand. The prevalence of TP and TM was 58.57 percent and 25.43 percent, respectively. TP was significantly more common in female than in male (64.46% versus 42.96%, $p<0.05$). Most of TP were found in spindle shape (34.87%), smaller than 2 cm in size (91.45%), and were commonly located at premolar to molar area (86.84%). The prevalence of TM was similar between male and female (29.63% in men versus 23.96% in women, $p>0.05$). It occurred most commonly in bilateral multiple pattern and was often located at anterior to premolar area (58.33%).

Keywords: torus palatines, torus mandibularis

Introduction

Torus palatines (TP) and the torus mandibularis (TM) are two of the most common intraoral exostoses. The word 'tori' means "to stand out" or "lump" in Latin.[1] They are non-pathological overgrowth of the cortical part and sometimes also spongeous part of bone. The detection usually occurs during a routine clinical examination, as they usually do not produce any symptom except in case of significant growth or in edentulous patients. In those cases, they may hinder the construction of prosthesis. They are formed by a dense cortical and limited amount of bone marrow, and covered with a thin and poorly vascularized mucosa. The etiology of tori is still unknown and several factors have been proposed as causative.[2-6] The most widely accepted theory today is genetics.[1-4,6-8] Other causes include eating habits[2,3,8], states of vitamin deficiency or supplements rich in calcium[9], and also diet.[2,10-13]

TP is a sessile nodule of the bone found only in the midline of hard palate. It is divided by shape into flat, spindle, nodular, and lobular, and the size can range from millimeters to centimeters. TM is a bony tubercle that presents along the lingual aspect of the mandible; and is divided into unilateral solitary, bilateral solitary, unilateral multiple, bilateral multiple, and bilateral combined.

The prevalence of tori varies widely in different population, ranking from 0.40 percent to 66.50 percent for TP and 0.50 percent to 63.40 percent for TM.[4] Racial differences appear significant, with high prevalence in Asian and Eskimos.[9,14-18] Most authors reported that TP was more common in women[6,12,19-21] whereas TM affected more men.[6,11,12,21]

The purpose of the present study was to assess the prevalence, shape, size, and location of TP and TM in patients attending Dental Department, Rajavithi Hospital; and to investigate the relationship between the findings in relation to age and gender.

Material and Methods

The study was approved by the research ethics committee of Rajavithi Hospital. It was performed as a prospective and descriptive study from October to December 2012 at the dental department, Rajavithi Hospital, Bangkok, Thai-

land. Only Thai patients attending Dental Department who were examined by the author were included. Diagnosis of tori was made by clinical inspection and palpation. TP was defined as a raised body exostoses in the middle of hard palate; and TM wad defined as a body overgrowth on the lingual aspect of the mandible. Questionable tori were recorded as not present.

The size of TP was graded according to the classification of Gorsky et al[22] as more or less than 2 cm. The location was classified as anterior to premolar area, anterior to molar area, premolar area, premolar to molar area and molar area. The shape of TP was classified as flat, nodular, spindle and lobular according to Thoma and Goldman .[23]

TM was classified by number of nodes and their placements into five categories: solitary unilateral, solitary bilateral, multiple unilateral, multiple bilateral and combined bilateral, as previously described by Simunkovic SK et al.[24] Location of TM were classified in relation to the mandibular teeth as anterior area, anterior to premolar area, anterior to molar area, premolar area, premolar to molar area and molar area.

All statistical analyses were performed using Social Science (vesion 17.0). The chi-square test or Fisher's Exact test was used for group differences. Differences between group with $p<0.05$ were considered significant.

Results

There were altogether 519 subjects, 135 were men (26.01%) and 384 were woman (73.99%). The mean age was 40.44□18.78 years, 43.03□19.32 for men and 39.53□18.54 for women, with the age ranging from 3 to 86 years. The age distribution was presented in Table 1; and majority of them were 21-30 years old (126 cases or 24.28%).

There were 304 subjects with TP (58.57%), with the mean age of 41.12±8.81 years and the age ranging from 6 to 86 years. It was more frequent in woman than in men (64.46% versus 42.96%, $p< 0.05$). As for TM, there were 132 subjects; and the prevalence was 25.43 percent. The mean age was 44.34□17.96 years with the age ranging from 13 to 83 years; and there was no difference in gender (29.63% versus 23.96%, $p>0.05$).

The relationship of TP occurrence and size by sex was shown in Table 2. Out of the 304 TP studied, most were smaller than 2 cm (278 versus 26). The mean age of subjects having smaller than 2 cm (39.96□18.65 years) was less than those having larger size (53.85□15.92 years) ($p<0.05$).

Table 3 shows the distribution of TP in relations to location and age group. The most common location was pre-

Table 1. Disribution of torus palatinus and torus mandibularis in relation to age group and gender

Age group (years)	Total patients	Number of patients with torus palatines (TP) or torus mandibularis(TM)					
		TP			TM		
		males	females	total	males	females	total
<11	10	2	1	3	0	0	0
11-20	66	7	28	35	5	5	10
21-30	126	6	72	78	4	26	30
31-40	78	14	36	50	6	12	18
41-50	69	6	29	35	8	11	19
51-60	74	7	33	40	11	16	27
61-70	59	10	30	40	4	12	16
>70	37	6	17	23	2	10	12
Total	519	58	246	304	40	92	132

Table 2 Distribution of torus palatinus by size and age group

Age group (years)	TP Size						TOTAL
	< 2cm.			> 2cm.			
	male	female	total	male	female	total	
<11	2	1	3	0	0	0	3
11-20	7	28	35	0	0	0	35
21-30	6	68	74	0	4	4	78
31-40	13	36	49	1	0	1	50
41-50	6	24	30	0	5	5	35
51-60	7	29	36	0	4	4	40
61-70	10	21	31	0	9	9	40
>70	6	14	20	0	3	3	23
Total	57	221	278	1	25	26	304

molar to molar area (86.84%) followed by molar area (10.85%), anterior to molar area (1.97%), and anterior to premolar area (0.33%).

Table 4 shows the distribution of TP in relation to shape and size. The most common shape was spindle (34.8%). Other less common shapes were nodular (27.7%), flat (28.4%) and lobular (9.7%). Most flat shape TP were smaller than 2 cm.

Table 5 shows the distribution of TM in relation to location and age groups. The most common location was anterior to premolar area (58.33%), followed by anterior to molar area (34.84%), anterior area (5.30%), and premolar to molar area (4.51%). The highest number of TM nodes on the right side was eight and that on the left was seven. The most common number of right TM nodes was one (34.61%), followed by two (40.00%), and three (19.23%). The most common number of left TM nodes was two (40.29%), followed by one (34.32%), and three (19.40%).

Table 6 shows prevalence of various types of TM in relation to gender. All of subjects exhibited bilateral TM and

Table 3 distribution of torus palatinus in relation to location and age group

Age group (years)	Location Area of TP				
	anterior to premolar	anterior to molar	premolar to molar	molar	Total
<11	0	0	3	0	3
11-20	0	0	30	5	35
21-30	0	0	72	6	78
31-40	0	0	42	8	50
41-50	0	0	31	4	35
51-60	0	1	35	4	40
61-70	1	2	32	5	40
>70	0	3	19	1	23
TOTAL	1	6	264	33	304

asymmetrical pattern was predominated (53.79%). TM was detected as multiple bilateral (59.10%), solitare bilateral (26.51%), and combine bilateral (14.39%). Solitare bilateral TM was found in the symmetrical pattern more than asymmetrical pattern (71.43% versus 28.57%). When TM was multiple bilateral, it occurred the asymmetrical pattern more than the symmetrical pattern (54.05% versus 45.95%).

Table 4 Distribution of torus palatinus in relation to size and shape

Shape	Size		
	< 2 cm.	> 2 cm.	Total
	n (%)	n (%)	n (%)
Spindle	95 (34.20)	11 (42.30)	106 (34.87)
Nodular	77 (27.70)	4 (15.40)	81 (26.64)
Lobular	27 (9.70)	11 (42.30)	38 (12.50)
Flat	79 (28.40)	0 (0.0)	79 (25.98)
Total	278	26	304

Table 5 Distribution of torus mandibulararis in relation to location and age group

Age group	Location area of TM					
(years)	anterior	anterior to premolar	anterior to molar	premolar	premolar to molar	Total
	R/L	R/L	R/L	R/L	R/L	
<11	0/0	0/0	0/0	0/0	0/0	0
11-20	1/1	4/4	4/4	0/0	1/1	10
21-30	3/1	14/18	9/11	2/2	0/0	30
31-40	0/0	11/12	5/5	3/0	0/1	18
41-50	1/1	8/9	9/9	1/0	0/0	19
51-60	2/1	13/16	9/7	0/0	2/1	27
61-70	0/0	10/12	4/3	1/0	1/1	16
>70	0/0	5/6	6/5	0/0	0/1	12
TOTAL	7/4	65/77	46/44	7/2	4/5	132

R = right side, L = left side

Table 6 Prevalence of various types of torus mandibularis in relation to the gender

Gender	Torus mandibularis					
	solitary unilateral	solitary bilateral	combined bilateral	multiple unilateral	multiple bilateral	Total
	n	n	n	n	n	n (%)
Male	0	11	3	0	26	40 (30.3)
Female	0	24	16	0	52	92 (69.7)
Total	0	35	19	0	78	132 (100)

Discussion

In the worldwide literature, prevalence of TP has been reported to be as high as 66.0% and that of TM has been as high as 64.0 percent.[24] The concurrence rate of TP (58.57%) and TM (25.43%) in our study was much higher than those reported in many previous observations (3-12%).[9,15,21,25-26] The prevalence in this study corresponds with previous results in Mongolian and other Asian population.[18,21,26-31]

The high prevalence of TP in this study might support racial factor as one of the underlying conditions. The finding results agreed with many previous studies in showing that TP is more common in female.[18,21,26-31] While some studies revealed that TM is more common in male.[6,9,11,18,21,32] it is not in accordant with the results of this study which revealed that it could similarly occur in both genders. A study in Malaysia suggested that occurrence of TP was a sex related phenomenon, but not for TM.[33] Haugen stated that there was no obvious explanation for gender differences but suggested genetics as a responsible factor.[21] According to Alvesalo et al who studied TM in female with Turner syndrome, it was suggested that sexual dimorphism in the manifestation of TM might result from the effect of the Y chromosome on the growth, occurrence, expression, and timing of development of TM.[34] The current study showed that prevalence of TP was mostly in seventh decade of life whereas other data obtained from Northern and Southern Thailand showed the peak incidence in the forth decade.[6,9]

In this study, most of TP (91.45%) was smaller than 2 cm, which was in agreement with Gorsky *et al* (91.5%),[22] King and More (67%)[35], Yildiz et al (91%)[36], and Sisman *et al* (75.4%).[37] In this study, subjects with TP smaller than 2 cm. were significantly younger than those with TP larger than 2 cm ($p<0.05$), and those with TP larger than 2 cm were all over 20 years old. In addition, most of TP (86.84%) were in premolar to molar area, similar to the finding reported by Apinhasmit *et al*[38], Hiremath *et al*[33], and Sisman et al.[37]

The most common shape of TP in the present study was spindle (34.27%) which was in agreement with Riechart *et al*[9], Jainkittivong *et al*[39], and Simunkovic *et al*;[24] but was contrary to the results of many other authors who found that TP was usually flat.[26-28] In the present study, lobular TP was found with the least frequency (12.50%). Some authors reported that the least frequency of TP was nodular in Kolas *et al*[26], Hiremath *et al*.[33] The flat TP was the rarest type found in the study of Apinhasmit *et al* in Thai patients.[38] All the flat shape of TP found in this study was smaller than 2 cm. The most common TM location was anterior to premolar area (58.30%), similar to the findings in some other reports.[18,33,40]

In this study, all TMs were bilateral,and symmetrical pattern was predominated, which was similar to the findings in many studies.[9,21,26,41] TM was found more often as multiple nodes. This finding was in agreement with Jainkittivong A. *et al*[39], but was not consistent with other studies that reported single node TM.[9,21,26,41]

The results of this study indicated that TP and TM are quite common in Thai population. Both conditions usually do not cause symptoms but removal may be required if they interferes with function, sensitivity due to the thin mucosa layer, limitation of masticatory mechanism, esthetic reasons, retention of food remains or prosthetic treatment.[9] TP has been frequently noticed that may complicate prosthetic work. Pressure from a denture on the mucosa overlying these variations in the structure of the palate may cause discomfort to the patient. If the TP is positioned too far posterior, it can interfere with development of a posterior palatal seal. In such, surgical removal may be required for denture stability.

Conclusion

The prevalence of TP and TM in my study was high in comparisons to other Asian population. My results showed statistical significant relationship between occurrence of TP and gender. The age and gender related differences with size of Tori were also noted. The present study supported that the etiology of TM and TP was combination of multifactorial genetic and environmental factors.

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บทคัดย่อ อุบัติการณ์ของการเกิดปุ่มกระดูกงอกที่เพดานแข็งและปุ่มกระดูกงอกที่กระดูกขากรรไกรล่าง โรงพยาบาลราชวิถี

พิชญา ตู้จินดา ท.บ.

กลุ่มงานทันตกรรม โรงพยาบาลราชวิถี

วารสารวิชาการสาธารณสุข 2556;22:1022-8.

วัตถุประสงค์ของการวิจัยเพื่อศึกษาอุบัติการณ์การเกิดปุ่มกระดูกงอกที่เพดานแข็งและกระดูกขากรรไกรล่างด้านใน โดยจำแนกตามปัจจัยส่วนบุคคล อายุ เพศ ในผู้ป่วยที่มารับการรักษาที่กลุ่มงานทันตกรรม โรงพยาบาลราชวิถี จำนวน 519 ราย จากการศึกษาพบว่า อุบัติการณ์การเกิดปุ่มกระดูกงอกที่เพดานแข็งร้อยละ 58.7 และอุบัติการณ์การเกิดปุ่มกระดูกงอกที่กระดูกขากรรไกรล่างด้านในร้อยละ 25.43 มีความแตกต่างกันทางสถิติ ปุ่มกระดูกงอกที่เพดานแข็งพบในเพศหญิงมากกว่าเพศชาย (64.46% เทียบกับ 42.96%, $p<0.05$) และส่วนใหญ่มีขนาดเล็กกว่า 2 เซนติเมตร (91.45%) ตำแหน่งที่พบบ่อยคือบริเวณฟันกรามน้อยถึงฟันกรามใหญ่ (86.84%) ส่วนปุ่มกระดูกงอกที่กระดูกขากรรไกรล่างด้านในพบว่า ไม่มีความแตกต่างกันทางสถิติในเพศ ตำแหน่งที่พบบ่อย คือ บริเวณฟันหน้าถึงบริเวณฟันกรามน้อย (58.33%)

คำสำคัญ: ปุ่มกระดูกงอกที่เพดานแข็ง, ปุ่มกระดูกงอกที่กระดูกขากรรไกรล่างด้านใน