

# A Radiographic study to compare the Shape, Appearance, Position, and Morphometric variations of the mental foramen among the Indian, Chinese, and Malay population attending AIMST Dental Care Centre.

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## Background

Mental Foramen is a bilateral funnel-like opening located anterolateral aspect of the body of mandible gives path to mental nerve and vessels. Assessing the mental foramen helps to avoid mental nerve injury during dental treatment procedures.<sup>1</sup> In a country like Malaysia, with diversity in population, because of differences in racial and ethnical background, variations in the shape, appearance and shape of the mental foramen might result among various population groups.

## OBJECTIVE

To detect the variation in shape, appearance, position and morphometric variations of MF in digital panoramic radiographs among the three different ethnic groups.

## Materials and Methods

Cross sectional retrospective study conducted on 30 Indian, 30 Chinese and 30 Malay patients digital panoramic radiographs of AIMST University, taken using Sordex digital X-ray unit with tube potential: 60-80 kV, tube current: 4-12 mA, focal size: 0.5 mm, exposure time: 11.3 s and magnification factor of 1:1.25.

The Shape of mental foramen was determined as either round or oval.. Appearance of mental Foramen was determined as:

Type I - Mental foramen being continuous with mandibular canal.

Type II - Foramen being distinctly separated from the mandibular canal.

Type III - Foramen being diffused with an indistinct border

Type IV - Unidentified type, in which the mental foramen not be identified on panoramic radiographs.

Position of mental foramen was detected by horizontal and vertical reference lines. Horizontal reference was obtained by measuring the line which connected the gonion and lower most point of lower border of mandible vertical reference was obtained by measuring the Long axes of the premolars as follows:

Position 1: Anterior to the first premolar,

Position 2: Below the first premolar,

Position 3: Between the premolars,

Position 4: Below the second premolar,

Position 5: Posterior to the second premolar,

In terms of the perpendicular distance between the arbitrary center of mental foramen and the reference line.<sup>2</sup>

Morphometric parameters will be determined as follow:

AC: distance of alveolar crest to upper margin of mental foramen.

BD: distance from lower border of mandible to lower margin of mental foramen.

AB: distance from alveolar crest to lower border of mandible.

VD: vertical diameter of foramen= AB – (AC+BD)

WY: distance from symphysis menti to medial margin of mental foramen.

XZ: distance from posterior border of ramus of mandible to lateral margin of mental foramen.

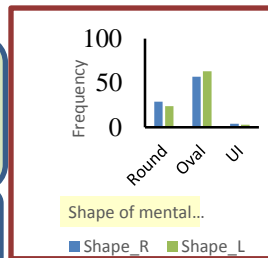
WX: distance from symphysis menti to posterior border of ramus of mandible.

### Inclusion criteria

1. Age range from 18 – 88
2. Presence of bilateral mandibular teeth which includes canine, 1st and 2nd premolars, 1st molar.

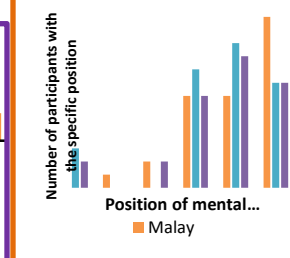
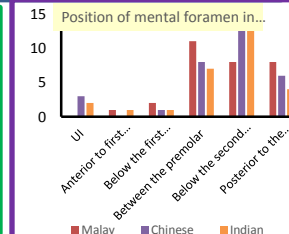
### Exclusion criteria

1. Patients under 18 years of age
2. Flare and screws in the premolar region
3. Orthodontics appliance
4. Radiograph with radiolucent or radiopaque (intra body) lesion in the premolar region.

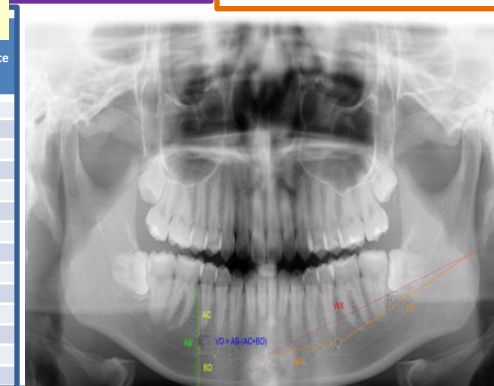


Appearance	Ethnicity Groups			p-value
	Malay (n=30)	Chinese (n=31)	Indian (n=29)	
Right	40.23	52.89	43.05	.109
Left	44.13	46.37	45.98	.932

## Results



Parameters	Malay (n=30)		Chinese (n=31)		Indian (n=29)		p-value	Significance
	Mean	SE	Mean	SE	Mean	SE		
R_AC	14.91	0.47	13.50	0.75	13.00	0.83	0.140	NS
R_BD	10.56	0.51	11.07	0.65	9.29	0.64	0.108	NS
R_AB	28.49	0.66	26.78	1.35	25.45	1.41	0.203	NS
R_VD	3.02	0.13	2.21	0.15	3.15	0.24	0.000	a,c,d,f
R_WY	28.59	1.26	27.11	1.45	23.03	1.44	0.018	b,e
R_XZ	55.30	1.18	56.82	2.88	55.81	2.98	0.906	NS
R_WX	85.02	2.05	84.97	4.16	81.60	4.30	0.754	NS
L_AC	14.88	0.52	14.55	0.70	12.79	0.82	0.079	NS
L_BD	10.33	0.50	11.13	0.57	8.68	0.57	0.008	d,f
L_AB	28.45	0.56	28.04	1.03	25.35	1.39	0.082	NS
L_VD	3.24	0.13	2.36	0.11	3.89	0.30	0.000	a,c,d,f
L_WY	27.00	0.95	29.36	1.42	22.06	1.59	0.001	b,d,e,f
L_XZ	56.14	0.86	58.51	2.21	54.19	2.95	0.374	NS
L_WX	85.98	1.29	88.57	3.08	78.60	4.19	0.065	NS



## Results and Discussion

Among the 90 samples from fig 1 significant percentage of patients fall under the oval shape category and no statistical significant difference was observed in the shape of mental foramen between three major ethnic groups. Our results are in accordance with the study conducted on polish population by Polakowska ZE<sup>1</sup> and on kosovarian Population by Kqike L et al.<sup>3</sup> were in the majority of mental foramen are oval in shape.

In Figure 2 and figure 3 shows the result of appearance of mental foramen and its relationship with inferior alveolar nerve canal in the right and left among three major ethnic groups. No significant difference was observed in the appearance of mental foramen between three major ethnic groups. This was not in accordance with a study conducted by Chen Z<sup>4</sup> significant relation has been observed between the location of the mental foramen and the presence of the anterior loop of the inferior alveolar nerve.

Figure 4 and Figure 5. Our study concluded that no significant difference is observed in the position of the mental foramen between three major ethnic groups. This was in accordance with the previous studies<sup>1,5</sup> which do not have statistically significant differences in the antero- posterior position of the mental foramen.

Morphometric variations showed a significance difference in the distance from lower border of mandible to lower margin of mental foramen (BD) especially on the left side of mandible in Chinese and Indian population (p=0.08). This was in correlation with the study conducted by Chung et al<sup>6</sup> that showed variation in Korean ethnic groups. Gerschenson et al<sup>7</sup> in his study has reported significant variation. A significant difference in distance from symphysis menti to medial margin of mental foramen (WY) was found right side (p=0.018) and left side (p=0.001) between the three ethnic groups. This was in accordance with study conducted on dentulous and edentulous mandibles by Moogala S et al<sup>8</sup> the author concludes that in many instances the mental foramen cannot be localized without a fixed reference point.

## Conclusions

Our results reaffirm that there is no association in shape, appearance and position of mental foramen among Chinese, Indians and Malay population using digital panoramic radiographs. There is variability in the morphometric variables of mental foramen and this explains the fact that there is a significant variation in the among the ethnic groups and it is important to consider these parameters while performing dental treatment procedures so as to avoid the injury to the mental nerve within the mental foramen.

## References

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