

Assessment of mental foramen position in dentate subjects

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Abstract

Mental foramen shares its significance in various fields of dentistry. Being a strategically eminent landmark, an understanding of the variation of its position is important. **Aim:** To evaluate frequently occurring position of mental foramen and its distance with reference to the lower premolars using panoramic image. **Method:** Total 215 panoramic image of patients taken for different diagnostic purpose, using Planmeca X-ray unit ProMax, The position of the mental foramen was recorded according to the categories which were put forward by Jasser and Nwoku. **Result:** The most common position was found to be between the two premolars approximately 60.5% for both gender, followed by below the second premolar approximately 34.9% .**conclusion:** The most common location was reported to be between the two premolars, with a definite bilateral symmetry on both left and right sides. No gender preferences were observed.

Key words: Mental foramen, panoramic image, Position.

Introduction

The mental foramen (MF) is a bilateral opening localized on an anterior surface of the mandible, The mental nerve a branch of the inferior alveolar nerve together with corresponding arteries and veins exit through the MF⁽¹⁻²⁾. The mental foramen is a funnel-like opening located on the surface of the anterolateral aspect of mandible⁽¹¹⁾. The inferior alveolar nerve conducts unilaterally the sensory stimuli to the lower lip, labial mucosa, lower canine, and premolar, whereas blood vessels supply soft tissues of the lower jaw^(3, 4). Successful and complication-free dental procedures such as curettage, root canal treatment, periapical surgery, orthognathic surgery, and effective anesthesia during nerve blocks depend on knowledge of an operator⁽⁵⁾.

An implant placement in an inter foramina area is strictly related to the location of the MF, because it determines a position of most distal implants. Many studies indicate that a minimum distance between MF and an implant should amount up to 6 mm^(6, 7). Any invasive procedure performed in this region may damage the neurovascular bundles and cause serious complications such as parenthesis⁽⁸⁾.

human skull, the mental foramen is regarded as a stable landmark on the mandible⁽¹⁰⁾.

The nerves and vessels transmitting through it provide sensory innervations and blood supply to important facial structures; these nerves are susceptible to injury during administration of local anesthesia and surgery⁽¹²⁾. Variation in the position of mental foramen is common, which can result in complications during surgical procedures⁽¹³⁻¹⁴⁾.

In our retrospective study on the variability of mental foramen position using 215 digital panoramic image and

to compare the results with those reported for other population.

Material and Method

Total 215 panoramic image of patients taken for different diagnostic purpose at Al_Mahmodia specialized dental center, and examined by two well-practiced examiner. The range age of the selected patients was between 18 - 45years old.

All of the sample matches the inclusion criteria which include the presence of minimum 22 teeth, including lower canine, premolars ,and first molar, panoramic image with high resolution which clearly showed the mental foramen, and no pathological lesion in the area of interest Fig 1.

All panoramic image were taken by using Planmeca X-ray unit ProMax 3D (tube potential:84 KV, tube current:16mA , exposure time:14.5S) Fig 2.

Long axes of the premolars served as the vertical references. The position of the mental foramen was recorded according to the categories which were put forward by Jasser and Nwoku [22], which were 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.



Fig 1 Mental foramen in panoramic radiograph



Fig 2 Planmeca X-ray unit

Results and Discussion

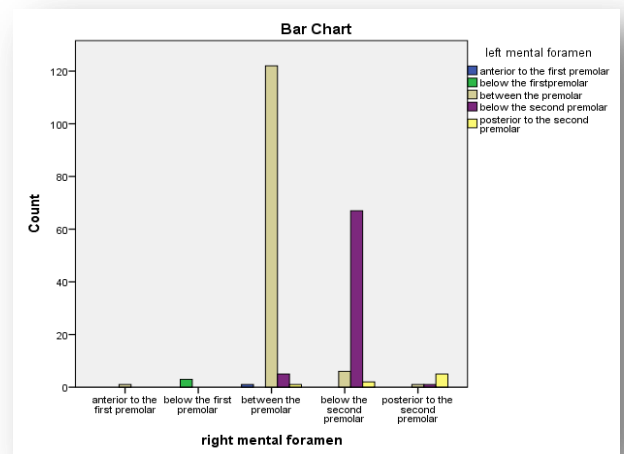
The 215 panoramic image which were evaluated, were grouped into those 99 male, and 116 female. The most common position was found to be between the two premolars position 3 approximately 60.5% for both gender, followed by the position 4 below the second premolar approximately 34.9% .

(Table 1):Demonstrate means ,Std, median, for right and left MF positioning in both gender and total

Gender		right mental foramen	left mental foramen
male	Mean	3.48	3.45
	N	99	99
	Std. Deviation	.629	.627
	Median	3.00	3.00
female	Mean	3.31	3.35
	N	116	116
	Std. Deviation	.566	.548
	Median	3.00	3.00
Total	Mean	3.39	3.40
	N	215	215
	Std. Deviation	.601	.586
	Median	3.00	3.00

(Table2):Demonstrate percentage of right foramen position in both gender

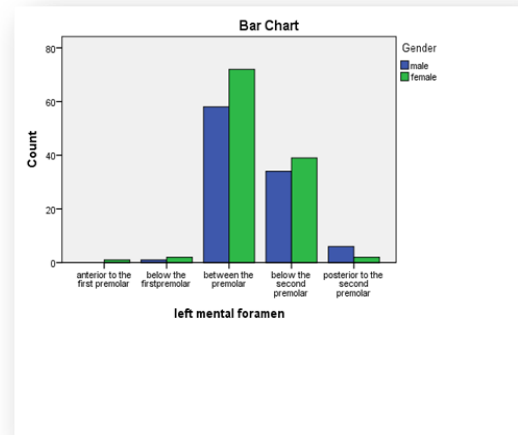
Right mental foramen				
right mental foramen position		Gender		Total
		male	female	
1	Count	0	1	1
	% within Gender	0.0%	0.9%	0.5%
2	Count	1	2	3
	% within Gender	1.0%	1.7%	1.4%
3	Count	55	74	129
	% within Gender	55.6%	63.8%	60.0%
4	Count	37	38	75
	% within Gender	37.4%	32.8%	34.9%
5	Count	6	1	7
	% within Gender	6.1%	0.9%	3.3%
Total	Count	99	116	215
	% within Gender	100.0%	100.0%	100.0%



(Chart1):Demonstrate percentage of right mental foramen position in both gender

(Table 3): Demonstrate percentage of left mental foramen position in both gender

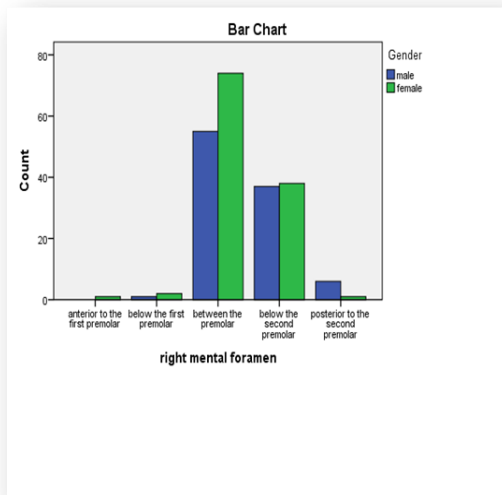
left mental foramen					
left mental foramen position		Gender		Total	
		male	female		
1	Count	0	1	1	
	% of Total	0.0%	0.5%	0.5%	
2	Count	1	2	3	
	% of Total	0.5%	0.9%	1.4%	
3	Count	58	72	130	
	% of Total	27.0%	33.5%	60.5%	
4	Count	34	39	73	
	% of Total	15.8%	18.1%	34.0%	
5	Count	6	2	8	
	% of Total	2.8%	0.9%	3.7%	
Total	Count	99	116	215	
	% of Total	46.0%	54.0%	100.0%	



(Chart 2): Demonstrate percentage of left mental foramen position in both gender

(Table 4): Demonstrate right & left mental foramen positioning percentage.

right mental foramen * left mental foramen							
right mental foramen		left mental foramen					Total
		1	2	3	4	5	
1	Count	0	0	1	0	0	1
	% of Total	0.0%	0.0%	0.5%	0.0%	0.0%	0.5%
2	Count	0	3	0	0	0	3
	% of Total	0.0%	1.4%	0.0%	0.0%	0.0%	1.4%
3	Count	1	0	122	5	1	129
	% of Total	0.5%	0.0%	56.7%	2.3%	0.5%	60.0%
4	Count	0	0	6	67	2	75
	% of Total	0.0%	0.0%	2.8%	31.2%	0.9%	34.9%
5	Count	0	0	1	1	5	7
	% of Total	0.0%	0.0%	0.5%	0.5%	2.3%	3.3%
Total	Count	1	3	130	73	8	215
	% of Total	0.5%	1.4%	60.5%	34.0%	3.7%	100.0%



(chart 3): Demonstrate right & left mental foramen positioning percentage

DISCUSSION

Mental foramen is considered an imperative anatomical landmark, the position of which assists surgical, local anesthetic, and other invasive procedures for maxillofacial surgeries. Its location should be taken into account before any surgery in this region to avoid any injury to the neurovascular bundles passing through these foramina. Occasionally, mental foramen is misdiagnosed as a radiolucent lesion situated in the apical area of the mandibular premolar teeth. Therefore, knowledge of accurate anatomical position of mental foramen is of paramount importance in periodontal surgery or flap surgery, especially in mandibular premolars, surgical orthodontics, and retrograde amalgam fillings⁽¹⁵⁾. There are significant differences reported in the location of MF among different ethnic groups Igbigbi and Lebona⁽¹⁶⁾ in Malawians and Mbajjorgu et al.⁽¹⁷⁾ in Zimbabweans mandibles reported position IV as the commonest followed by position V; however, Santini and Land⁽¹⁸⁾ in British and Green⁽¹⁹⁾ in Chinese mandibles observed position III being the commonest followed by position IV. In other studies Ngeow and Y. Yuzawati⁽²⁰⁾ in Malay populations found the most common position was IV followed by position III, AL-SHAYYAB et al found that The most common

horizontal location and shape of the mental foramen on panoramic image in Iraqi population are between the two premolars⁽²³⁾, in our study The most common position was found position III followed by position IV, so we agree with Santini and Land in British and Green in Chinese AL-SHAYYAB et al, and disagree with Igbigbi and Lebona in Malawians, Mbajjorgu et al. in Zimbabweans mandibles and Ngeow and Y. Yuzawati in Malay population. Variability in MF position may be related to different feeding habits subsequently affecting mandibular development⁽²¹⁾. Prior knowledge of common positions in local populations may be helpful in effective nerve blocks and surgeries in those regions. Thus, the position of the mental foramen attributes to variations in different population.

Conclusion

The most common location was reported to be between the two premolars, with a definite bilateral symmetry on both left and right sides. No gender preferences were observed.

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