

The Mental Foramen I: Radiographic Study of the Anterior-Posterior Position and Shape in Iraqi Population

Foramen Mental I: Estudio Radiográfico de su Posición Antero-posterior y Forma en Población Iraquí

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SUMMARY: Accurate information regarding the horizontal location and shape of the mental foramen can have clinical significance, such as reducing complications that may occur during maxillofacial surgical procedures involving the mental area. Geographic variations were reported in these variables. The aim was to study the horizontal position and shape of the mental foramen, as seen on panoramic radiographs of an Iraqi sample, to assess difference in these variables between sexes and age groups, and to assess symmetry of the mental foramen. 518 panoramic radiographs of a random Iraqi sample (257 males, 261 females, average age=46.5 years) were evaluated with regard to the horizontal location, shape and symmetry of the mental foramina. The area between the long axes of the two mandibular premolars, and the round type were the most frequent horizontal location and shape of mental foramen, respectively. Age advancement was found to be associated with an increase in the frequency of more posterior positioning and irregular shape. The horizontal position and shape were asymmetrical in 21.6% and 31.6% of cases, respectively. The Symmetry in horizontal location and shape of mental foramina were found statistically significant between sexes ($P=0.041$), and between young and old age groups ($P=0.001$), respectively. The most common horizontal location and shape of the mental foramen on panoramic radiographs in this group are between the two premolars, and the round type, respectively. This is in consistency with the findings of previous studies on other populations. The mental foramina have usually symmetrical horizontal locations and shapes.

KEY WORDS: Mental foramen; Panoramic radiographs; Geographic variation; Iraqi population.

INTRODUCTION

The mental foramen is located on the anterolateral aspect of the buccal cortex of the body of the mandibular bone where the inferior alveolar nerve and artery, after traveling through the inferior dental canal, exit and then provide the mental and nerves and vessels. These vessels and nerves are responsible for blood supply and innervation of the lower lip, the buccal vestibule, and the gingiva mesial to the first mandibular molar (Bavitz *et al.*, 1993; Haghanifar & Rokouei, 2009; Williams *et al.*, 2000). The usual horizontal (anterior-posterior) position of the mental foramen has been reported to be between the apices of the mandibular premolars in some populations (Al-Khateeb *et al.*, 2007; Moiseiwitsch, 1998) and below the mandibular second premolar in others (Al Jasser & Nwoku, 1998; Green, 1987; Phillips *et al.*, 1990; Shankland, 1994; Wang *et al.* 1986). However, individual variation could lead to other locations

ranging from the apex of the canine to the apex of the mesiobuccal root of the mandibular first molar (Fishel *et al.*, 1976; Sweet, 1959). In the same way, the shape of the mental foramen on panoramic radiographs commonly appears as an oval or circular opening on the anteriolateral surface of the mandible. However other rare shapes have been reported in other individuals such as the irregular type (Al-Khateeb *et al.*, 2007). It has recently been reported that these individual variations are present between populations of different geographies (Ari *et al.*, 2005).

Accurate information regarding the horizontal location and shape of the mental canal and its foramen can have very important clinical significance. Accurately locating the horizontal position of the mental foramen would help in achieving successful local anesthesia to the

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terminal branches of the inferior alveolar nerve. Additionally, it may reduce the rate of parasthesia or anesthesia and hemorrhage in the mental region, the lower lip and the gingiva from the mental foramen to the midline of the ipsilateral side. These complications may occur as a result of traumatizing the mental bundle during many oral surgical procedures such as osteotomy, implant surgery and any other invasive surgical procedure involving the mental region (Phillips *et al.*, 1990). The shape and other anatomical characteristics could also be used in evaluating some morphological and paleoanthropologic features of the human mandible and of the facial skeleton in different populations (Hasan, 2011).

The horizontal location and shape of mental foramen have been studied in different populations by clinical radiographs (Al Jasser & Nwoku, 1996; al-Khateeb *et al.*, 1994; Laster *et al.*, 2005; Olasoji *et al.*, 2004; Phillips *et al.*, 1992a, 1992b; Yosue & Brooks, 1989a, 1989b) or by examining collections of dried skulls (Agthong *et al.*, 2005; Berge & Bergman, 2001; Cutright *et al.*, 2003; Igbigbi & Lebona, 2005; Mbajiorgu *et al.*, 1998; Mwaniki & Hassanali, 1992; Ngeow & Yuzawati, 2003; Phillips *et al.*, 1992a, 1992b; Sawyer *et al.*, 1998; Souaga *et al.*, 2004). Since the Gulf war in 1991, a dramatic increase of Iraqi population in Jordan, especially in the capital city Amman, has been noticed by the Jordanian immigration authority which reported more than half million of them entering and leaving Jordan since 1990 up to March 2007 (Wikipedia). Thus, Iraqi patients could form a considerable percentage of patients in any dental practice in Jordan given that the total population of Jordan was estimated to be about 6.5 million in 2012, of those 2.2 million are in Amman. The aim of the present study was to study the panoramic horizontal position and shape of the mental foramen in Iraqis, and to compare our findings with international values; it has been investigated for the first time in this population.

MATERIAL AND METHOD

Six hundred panoramic radiographs were randomly selected from over-many-year records of Iraqi patients referred to and treated in a referral dental care center in Iraq (Martyr Adnan Kair Allah Teaching Hospital for Specialized Surgeries) and in the Jordan University Hospital in Amman, the capital city of Jordan where most Iraqis in Jordan are present. The radiographic system and criteria used and exposure time for all chosen radiographs were different between the two canters. However, their viewing qualities were regarded to be optimal and deemed of a good diagnostic quality. This was because the manufacturer's operation

manuals were followed. The 518 panoramic radiographs were the final number of radiographs included in the present study after excluding 82 radiographs due to various reasons:

1. Patients aged less than 18 years.
2. The presence of a radiolucent lesion or periodontal lesions, or a missing or an impacted tooth, or a crowding and spacing anywhere in the area extending from the lower right first molar to the lower left first molar.
3. Patient with history of orthodontic treatment of lower arch crowding and spacing.
4. Poor film quality.

A data collection form was designed and used to record the anterior-posterior position and shape of mental foramen on radiographs which are already scanned on the computer. This was done by two observers (maxillofacial senior residents) and in standard viewing conditions such as adjusting the brightness and contrast of the computer's screen in a dark room to make radiographs appear clearer. Some differences were found between the two observers and resolved by agreement with the opinion of the maxillofacial radiology consultant in Jordan University Hospital.

Anterior-posterior position of the mental foramen. A longitudinal axis of each mandibular premolar was drawn on both sides utilizing the drawing ruler of the software. Using the same definitions found in the literature (Al-Khateeb *et al.*, 2007; Haghanifar & Rokouei, 2009), the anterior-posterior position of each mental foramen was then recorded in relation to the longitudinal axis of the nearest tooth as follows:

- Position 1: Anterior to the first premolar
- Position 2: In line with the first premolar
- Position 3: Between the first and second premolars
- Position 4: In line with the second premolar
- Position 5: Between the second premolar and first molar
- Position 6: In line with the first molar

Shape of the mental foramen. The shape of the foramen was recorded as round or oval or irregular. This was achieved by using the drawing ruler of the software to outline the external circumference of each mental foramen.

Statistical analysis. SPSS version 17.0 (SPSS Inc., Chicago, IL, USA) statistical software program was used to undertake the statistical analysis. Frequency distributions and cross tabulation were obtained, and chi-square test was used to perform analyses of the mental foramina's anterior-posterior position, shape and symmetry according to patients' age and sex. P-value of <0.05 was considered as significant.

RESULTS

The included 518 panoramic radiographs were analyzed on both sides, and were 257 for males and 261 for females with a 1:1.02 female-to-male ratio. The average age of selected subjects was 46.5 with standard deviation of 13.8 years, ranging from 18 to 79 years. Table I and II detail the horizontal position and the shape of the mental foramen.

Horizontal (Anterior–posterior) position. The most common horizontal position for the mental foramen in this Iraqi sample was in the area between the long axes of mandibular premolars (48.6%) (Fig. 1: left side), with the position in line with the long axis of second mandibular premolar being the second most common (43.7%) (Fig. 2). A position for the mental foramen anterior to the first premolar was not observed. The most frequent horizontal position was noticed to be not different between right and left sides (Table I), and among males and females (Table II). Age advancement was noticed to position the mental foramen in more posterior locations (Fig. 3).

In 406 cases (78.4%), the position of mental foramina anterioposteriorly were symmetrical (Fig. 2) and the remainder 112 cases (21.6%) were asymmetrical (Fig. 4). In the present sample, males (82.1%) and young age group (11-40 years) (80.6%) recorded more symmetrical position for the mental foramen than females (74.7%) and old ages (>40 years) (76.9%), respectively. However, only the male-female difference in symmetry of the horizontal location of mental foramen was found to be statistically significant ($P=0.041$) (Table III).

The shape of mental foramen. The most common (51%) shape of the mental foramen in this Iraqi sample was round type (Fig. 1), with the oval one being the second most common (41%) (Fig. 2). This most frequent shape was not different between right and left sides (Table I), and among males and females (Table II). Age advancement was noticed to provide more irregular shape of the mental foramen (Fig. 5).

Table I. Distribution of the horizontal position and shape of mental foramen on both sides by sex (n=1,036 sides).

Radiographic features of the foramen		Sex								Total	%
		Male				Female					
		Right	%	Left	%	Right	%	Left	%		
AP position	Anterior to LP1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	In line with LP1	4	1.6	7	2.7	6	2.3	10	3.8	27	2.6
	Between LP1 and LP2	126	49.0	113	44.0	128	49.0	137	52.5	504	48.6
	In line with LP2	111	43.2	119	46.3	116	44.4	107	41.0	453	43.7
	Between LP2 and LM1	15	5.8	17	6.6	11	4.2	7	2.7	50	4.9
	In line with LM1	1	0.4	1	0.4	0	0.0	0	0.0	2	0.2
	Total	257	100.0	257	100.0	261	100.0	261	100.0	1036	100.0
Shape	Round	144	56.0	119	46.3	134	51.3	134	51.3	531	51.0
	Oval	87	33.9	114	44.4	114	43.7	110	42.1	425	41.0
	Irregular	26	10.1	24	9.3	13	5.0	17	6.5	80	8.0
	Total	257	100.0	257	100.0	261	100.0	261	100.0	1036	100.0

AP= anterior-posterior; LP1= lower first premolar; LP2= lower second premolar; LM1= lower first molar.

Table II. Frequency of the horizontal position and shape of mental foramen (by sex) as seen in the present study (n=1,036 sides).

Radiographic features of the foramen		Sex				Total	%
		Male		Female			
		Male	%	Female	%		
AP position	Anterior to LP1	0	0.0	0	0.0	0	0.0
	In line with LP1	11	2.2	16	3.1	27	2.6
	Between LP1 and LP2	239	46.5	265	50.3	504	48.6
	In line with LP2	230	44.7	223	42.7	453	43.7
	Between LP2 and LM1	32	6.2	18	3.5	50	4.9
	In line with LM1	2	0.4	0	0.0	2	0.2
	Total	514	100.0	522	100.0	1036	100.0
Shape	Round	263	51.0	268	51.0	531	51.0
	Oval	201	39.0	224	43.0	425	41.0
	Irregular	50	10.0	30	6.0	80	8.0
	Total	514	100.0	522	100.0	1036	100.0

AP= anterior-posterior; LP1= lower first premolar; LP2= lower second premolar; LM1= lower first molar.

Table III. The horizontal position and shape of mental foramen by sex and symmetry (n=518 cases).

			Symmetrical	%	Asymmetrical	%	P
Sex difference	Anterior-posterior position	Male	211	52.0	46	41.1	0.041*
		Female	195	48.0	66	58.9	
		Total	406	100.0	112	100.0	
	Shape	Male	176	49.0	81	50.9	0.687
		Female	183	51.0	78	49.1	
		Total	359	100.0	159	100.0	
Age groups	Anterior-posterior position	11-40	170	41.9	41	36.6	0.315
		> 40	236	58.1	71	63.4	
		Total	406	100.0	112	100.0	
	Shape	11-40	129	35.9	82	51.6	0.001*
		> 40	230	64.1	77	48.4	
		Total	359	100.0	159	100.0	

P= P value of Chi-square test;* = Statistically significant at the 0.05 probability level.

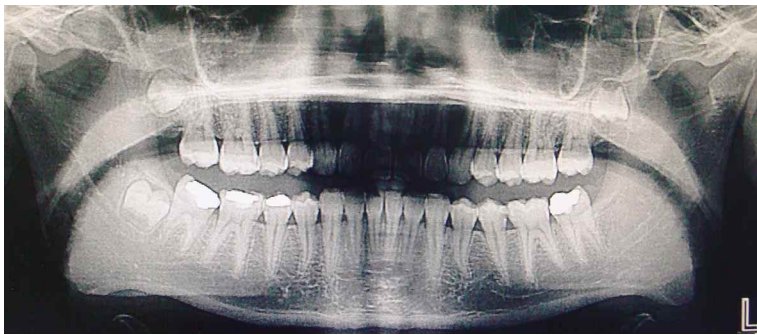


Fig. 1. A panoramic radiograph showing asymmetrical anterior-posterior location and symmetrical shape of mental foramina.



Fig. 2. A panoramic radiograph showing the mental foramina symmetrically shaped, as an oval type, and located at the apical level of mandibular second premolar teeth.

In 359 cases (69.3%), mental foramina in both sides were symmetrical in shape (Fig. 2) and the remainder 159 cases (30.7%) were asymmetrical (Fig. 4). Females (70.1%) recorded more symmetry in the shape of mental foramina than males (68.5%) but the difference was statistically insignificant (Table III). In contrast, statistical significant difference was found in the symmetry of the shape of mental foramina when the young (61.1%) and old age (74.9%) groups were compared (P=0.001). This difference was in favor of the older one (Table III).

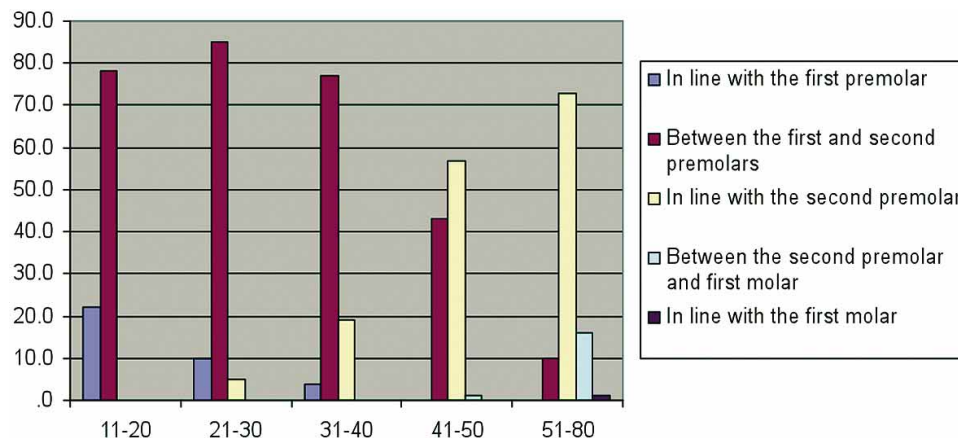


Fig. 3. A clustered graph showing the effect of advancing age on the anterior-posterior location of the mental foramen (n=1,036 cases).



Fig. 4. A panoramic radiograph showing asymmetric anterior-posterior position and shape of mental foramina.

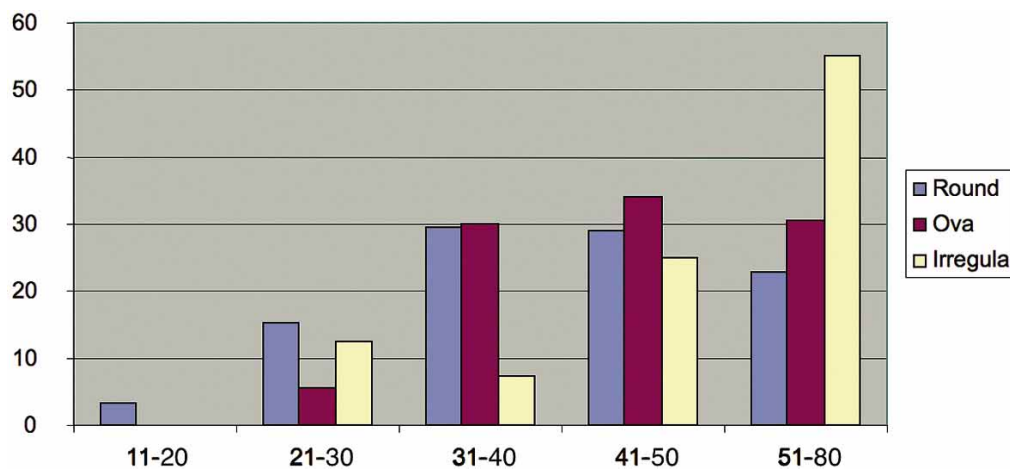


Fig. 5. A clustered graph showing the effect of advancing age on the shape of the mental foramen (n=1,036 cases).

DISCUSSION

Knowledge concerning the exact anterior-posterior location and shape of the mental foramen is of great clinical importance. It would lead to an accurate local anesthetic technique needed in many dental procedures and would protect the mental neurovascular bundle in different oral surgical procedures. Additionally, good interpretation of anatomical landmarks in oral pathology and forensics can be aided (Neo, 1989). For all of the above mentioned reasons, the horizontal location and other characteristics of the mental foramen have been studied utilizing panoramic radiographs or dry skulls. Although studies reported a strong correlation and insignificant differences between measurements using comparative studies on dry skulls and those using radiographs (Al Jasser & Nwoku, 1998; Phillips *et al.*, 1990; Wang *et al.*; Yosue & Brooks, 1989a), a cautious use of panoramic radiographs in reporting absolute measurements or relative comparisons has been advised (Laster *et al.*, 2005).

In this study, the anterior posterior position and shape of the mental foramen in a selected Iraqi population were studied using panoramic radiographs rather than other plane films such as periapical radiographs which would not provide the wide field of mandible view. Consequently, more accurate interpretation of shape and location of the mental foramen in both the horizontal and vertical dimensions are allowed by using panoramic radiographs (Yosue & Brooks, 1989b; Phillips *et al.*, 1992a, 1992b). Similarly, our exclusion criteria aimed to avoid any factor that may affect accurate determination of the horizontal location or shape of the mental foramen such as periodontal lesions or history of orthodontic treatment which could lead to tooth migration. Poor film quality could also provide inaccurate or distorted shape of the foramen. In the same way, only patients over the age of 18 years were included because we needed patients with completed skeletal growth.

Studies reported in the literature concerning the anterior-posterior localization of the mental foramen have been used in two different methods namely by relating the foramen to adjacent teeth or to the mandibular body. Relating the mental foramen position to the teeth is more popular in all over the world (Al Jasser & Nwoku, 1998; Aktekin *et al.*, 2003; Cutright *et al.*; Green; Matheson *et al.*, 1986; Moiseiwitsch; Mwaniki & Hassanali; Ngeow & Yuzawati; Olasoji *et al.*; Phillips *et al.*, 1990, 1992a, 1992b) and more convenient clinically (Green) but may be influenced by congenital or environmental factors such as race, diet, and age which have their detrimental effects on teeth alignment (i.e. malocclusion) or size (i.e. mesiodistal width). The other method is more reliable as it relates the foramen to specific points and ratios on the mandible (Apinhasmit *et al.*, 2006; Laster *et al.*; Oguz & Bozkir, 2002). However, this later method is more time-consuming which is not convenient for busy clinicians.

Different anterior-posterior positions and shapes of mental foramen have recently been reported to be existed between population of different or even of the same geography (Ari *et al.*; Igbigbi & Lebona; Mbajjorgu *et al.*; Souaga *et al.*). Additionally, positions of the mental foramen other than the two most common described above and consequently variable characteristics were attributed to the possible lag in developmental changes in its location during postnatal life. This attribution was drawn because the very early position of the mental foramen was found to be in the alveolar bone between the primary canine and first molar (Kjaer, 1989).

In our series of 518 panoramic radiographs the anterior-posterior location of the mental foramen was most commonly (48.6%) in the area between the long axes of first and second mandibular premolars, with (43.7%) the position in line with the long axis of second mandibular premolar being the second most common; thus 92.3% of foramina lie at either these two positions. Therefore, about 92% success rate of the mental or incisive nerve block, compared to 95% reported on a sample of northern Jordanians (Al-Khateeb *et al.*, 2007), could be expected if the needle insertion point is placed at either of or between these two points. Studies on a North American white population (Moiseiwitsch), Northern Nigerian adults (Fishel *et al.*; Olasoji *et al.*), Iranian adults (Haghanifar & Rokouei), northern Jordanian adults (Al-Khateeb *et al.*, 2007) and most Caucasian populations from different countries (Cutright *et al.*; Laster *et al.*; Moiseiwitsch; Phillips *et al.*, 1990, 1992a, 1992b) reported the area between the two premolars as the most common location of the mental foramen. These findings agree with our results but disagree with studies done on other populations such as Saudis, Malays, Asian Indians, Kenyan

Africans, Saudis, and on other Sino-American and Sub-Saharan African populations, from different countries, which reported more posterior positions of the mental foramen (Agthong *et al.*; Aktekin *et al.*; Al Jasser & Nwoku; Apinhasmit *et al.*; Cutright *et al.*; Igbigbi & Lebona; Mbajjorgu *et al.*; Mwaniki & Hassanali; Ngeow & Yuzawati; Oguz & Bozkir; Wang *et al.*) or specifically in line with the second premolar tooth (Al Jasser & Nwoku, 1996, 1998; Berkovitz *et al.*, 2002; Liebgott, 2001; Mwaniki & Hassanali; Ngeow & Yuzawati; Phillips *et al.*, 1992a, 1992b; Shankland, 1994; White & Pharoah, 2004; Woelfel & Scheid, 2002). On the other hand, some studies have reported that both locations are common (Malamed, 2004; Williams *et al.*).

In this study, we have found no case with a horizontal position of the mental foramen anterior to the first premolar. This agrees with previous studies in some regional countries such as Jordan (Al-Khateeb *et al.*, 2007), Saudi Arabia (al-Khateeb *et al.*, 1994) and Iran (Haghanifar & Rokouei). Some of these previous studies (al-Khateeb *et al.*, 1994, 2007) reported that in males the most frequent anterior-posterior position of the mental foramen was between the first and second mandibular premolar teeth, and in females along the line of the second mandibular premolar with no reference to the differences between right and left sides, as the right and left sides were not considered separately. Other previous studies (Al Jasser & Nwoku; Haghanifar & Rokouei) reported that on the right side, the commonest position of the mental foramen was between the first and second premolars, and on the left side it was in line with the second premolar. Additionally, they (Haghanifar & Rokouei) reported that the position in line with the second premolar was the most common one among males and the position between the first and second premolars was the most common one among females. However, these previous studies disagree with our findings which have indicated that the most frequent anterior-posterior position was not different between right and left sides, and among males and females. This might indicate geography related differences in the degree of bilateralism and sexual dimorphism in the horizontal location of the mental foramen (Ari *et al.*).

Regarding the effect of age on the anterior-posterior location of the mental foramen, Age advancement was noticed to position the mental foramen in more posterior locations. Our later finding also agrees with those of previous studies (Agthong *et al.*; Al-Khateeb *et al.*, 2007) which attributed this posterior shift in positioning to the anterior tooth drift that occurs due to the expected age-related attrition of interproximal surfaces of teeth.

We have found that the position of the mental foramen was asymmetrical anteroposteriorly in about one fifth

of the cases. This figure of frequency of asymmetry is higher than that reported in Saudi Arabia (Al Jasser & Nwoku, 1998) and North America (Moiseiwitsch) but lower than that reported in Jordan (Al-Khateeb *et al.*, 2007) where sex and age differences, and the statistical significance of these differences were not considered. In this study, difference in the rate of symmetry in the anterior-posterior location of mental foramen was found to be statistically significant differences between males and females. This disagrees with previous studies on other populations (Haghanifar & Rokouei) where no statistically significant difference was found between males and females in symmetry of the horizontal location of mental foramen.

In the present study, we observed a round-shaped mental foramen in 51% of the cases and an oval-shaped foramen in 41%. These figures are very close to those reported in some regional countries (Al-Khateeb *et al.*, 2007) and agree with results reported on some populations in other parts of the world (Singh & Srivastav, 2010). However, our findings disagree with studies on other populations (Agarwal & Gupta, 2011; Gershenson *et al.*, 1986; Igbigbi & Lebona; Mbajiorgu *et al.*; Probodra & Nanayakkara, 2006; Souaga *et al.*), which showed that the most frequent shape was oval. Additionally, we have found that this most frequent shape was not different between right and left sides, and among males and females. However, age advancement was noticed to provide an increase in the frequency of more irregular shape of the mental foramen. These later results found in this study concerning side, sex and age differences were not investigated in most of the previous studies on various populations (Al Jasser & Nwoku, 1998; al-Khateeb *et al.*, 1994, 2007; Mbajiorgu *et al.*; Oguz & Bozkir; Olasoji *et al.*; Phillips *et al.*, 1990, 1992a; Yosue & Brooks, 1989a). However, some of these studies (Al-Khateeb *et al.*, 2007) only showed that the most frequent shape of the mental foramen (round) was more common in females than males which disagree with our findings. On this regard, it is important to mention that the remarkable portion of round-shaped mental foramen was attributed by some (Schulze *et al.*, 2000) to possible technical problems that could occur during taking panoramic radiographs such as magnification and positioning inaccuracies. Alternatively, the most common shape of the mental foramen might be geography-related (Ari *et al.*).

We have found that the shape of the mental foramen was asymmetrical in about one third of the cases. This figure of frequency of asymmetry is higher than that reported in Saudi Arabia (Al Jasser & Nwoku, 1998) and Jordan (Al-Khateeb *et al.*, 2007) where age related differences and their statistical significance were not investigated. However, they only reported higher frequency of asymmetry in the shape of mental foramen in Jordanian males than females (Al-

Khateeb *et al.*, 2007). In this study, statistically significant difference was found between old and young age groups in the frequency of symmetry of the shape of mental foramen, in favor of the older group.

Generally, the developmental and functional facts are likely to explain the variability and asymmetry in the horizontal position and shape of mental foramen. The mandible from developmental and functional point of views consists of several skeletal subunits; a primary neural subunit and secondary functional subunits (Sperber, 2001). Regarding the asymmetry of the mental foramen position, it is attributed to different functional secondary subunits such as the alveolar, coronoid, angular, condylar process, and chin. These secondary functional subunits are attached to the nearly symmetric primary neural subunit which is a representation of the bone surrounding the mandibular nerve or the primitive mandible. This primitive mandible is formed in the first branchial arch as the first osteogenic center of the mandibular body that arises lateral to the Meckel's cartilage and to the mandibular nerve, and rapidly forms a groove that surrounds the nerve (Captier *et al.*, 2006).

Finally, although research results and, functional and developmental facts may explain the variability and asymmetry in the anterior-posterior position and shape of mental foramen, the reason of this variability and asymmetry between people of different races, geographies, ages and sexes has probably not clearly explained yet. Additionally, the study is not without limitations. It was a cross-sectional, epidemiologic retrospective study, and we selected only one area in Iraq due to limitation of time, funds and communication with Iraqi universities and hospitals. The small sample size was an additional limitation. Therefore, we feel that broad generalizations of the findings are not possible, and a further study incorporating a nationally representative sample is needed to confirm the results of the present study.

In conclusion, the most common horizontal location and shape of the mental foramen on panoramic radiographs in this group of Iraqis are between the two premolars, and round type respectively. This is consistent with the results of previous studies in other populations. The mental foramina, in the present Iraqi sample, have usually symmetrical horizontal location and shapes on both sides of the mandible.

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RESUMEN: Información precisa sobre la ubicación horizontal y forma del foramen mental puede tener importancia clínica en la reducción de complicaciones durante procedimientos quirúrgicos maxilofaciales que involucran el área mental. Fueron reportadas variaciones geográficas en relación a estas variables. El objetivo fue estudiar la posición horizontal y forma del foramen mental, a partir de 518 radiografías panorámicas de una muestra aleatoria en sujetos de Irak (257 varones, 261 mujeres; edad media=46,5 años), quienes fueron evaluados con respecto a la posición horizontal, forma y la simetría de los forámenes mentales. En individuos de edad avanzada se encontró una asociación con un aumento en la frecuencia de un posicionamiento posterior y con forma irregular. La posición horizontal y forma del foramen fueron asimétricos en 21,6% y 31,6% de los casos, respectivamente. La diferencia hallada en relación a la simetría en posición horizontal y forma de los forámenes mentales fue estadísticamente significativa entre sexos ($p=0,041$), y entre los grupos de edad jóvenes y mayores ($P=0,001$), respectivamente. Se encontró con mayor frecuencia la posición horizontal entre los ejes longitudinales de los dos premolares mandibulares, y la forma circular, en relación a la posición antero-posterior y forma del foramen, respectivamente. Estos fueron resultados similares a estudios anteriores sobre otras poblaciones. Los forámenes mentales son simétricos, respecto a su ubicación horizontal y su forma.

PALABRAS CLAVE: Foramen mental; Radiografías panorámicas; Variación geográfica; Población Iraquí.

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