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Abstract

Occur study for period from 2012-2013 for Knowing the position of mental foramen is very important specially in the recent development in the dental implantology specially in the lower premolars and molars area to choose the proper area for the implant or for surgical procedures in this area during removal of cystic and pathologic swelling or in endodontic surgery in the posterior mandible to avoid the mental nerve injury.

During this study 312 digital panoramic radiographs are examined for the position of the mental foramen in a sample from Holly Kerbela population, from the age of 15-50 years sample was randomly selected and who have the complete dentition or at least who have the mandibular premolars, in a healthy condition, the results analyzed for both left and right sides of the jaw and for both the symmetrical and unsymmetrical and added to the results.

(174 female and 138 male) the most frequent position of the mental foramen between the two mandibular pre molars in 148 patients that represent 47.435% of the whole sample followed by 116.5 patients below the 2nd premolar which represent 37.339% of the whole sample, below the 1st premolar found in 26.5 patient 8.49% of the whole sample and in 21 patient the mental foramen found distal to the 2nd premolar 6.73% of the whole sample.

Keywords: (Holly Karbala. Mental Foramen. Panoramic Radiography)

Introduction
the mental foramen is a very important landmark in the mandible specially in the recent new technology of implantation in the posterior mandible, the surgeon should be aware about the exact position of the foramen to avoid damaging the mental nerve resulting in a persistent numbness in the area due to the damage to the trunk of the mental nerve, also during surgical operation in this area, and during root canal therapy and endodontic surgery in premolar area, also during the anesthesia of the mental and incisive nerve block.

According to (Navya et al., 2009) nerve damage can result from the nerve being stretched, compressed, and partially or totally transected. Parasthesia (numb feeling), hypoesthesia (reduced feeling), hyperesthesia (increased sensitivity), dysthesia (painful sensation), or anesthesia (complete loss of feeling) of the teeth, the lower lip, or surrounding skin and mucosa may be encountered during an osteotomy. It is not surprising that venous or arterial bleeding can also occur. Other terms used to describe nerve injuries are: 61

Neurapraxia: The nerve has been stretched or undergone blunt trauma. No loss of continuity of the nerve occurs. The parasthesia will subside and feelings will be returned in days to weeks.

Axonotmesis: There is nerve damage, but the damage is not severe. Feelings will be returned within 2 to 6 months.

Neurotmesis: There is severe nerve damage. It is a poor prognosis for resolution of paresthesia. (Al-Juboori et al., 2011) Knowing the location of the mental foramen is very important when considering placing implants or any other surgical procedure in the foraminal region. The complications, such as altered sensation, numbness and pain can be avoided if the mental foramen is located and evaluated. There are variations in the location, the number of foramina, and the possibility that an anterior loop may be present mesial to the mental foramen in different populations (Wei and Yuzawati, 2003). The mental nerve is a terminal branch of the inferior alveolar nerve that passes through the mental foramen, supplying sensory innervation to the lower lip, buccal vestibule, and gingival mesial to the first mandibular molar. The mental foramen has been reported to vary in position in different ethnic groups. The mental bundle can be traumatized during surgical procedures, such as periapical surgery, extraction of impacted teeth, enucleation of cyst or tumor, and so on, resulting in paresthesia or anesthesia in the area innervated by the nerve. (Wei Cheong et al., 2003)

Knowing the site of the mental foramen allows for accurate delivery of local anesthesia of terminal incisive branches of the inferior alveolar nerve. It also aids in interpreting anatomical landmarks in oral pathology and forensics. (Ngeow. and Yuzawati, 2003) Although it is often possible to identify the mental foramen radiographically or by palpation, it is essential to have knowledge of the normal range of the possible locations. Panoramic radiography is often used in dental practice because it provides an excellent view of the anatomical structures of the teeth, jaws, and temporomandibular joints. Additionally, when performing local anesthesia and surgical procedures in the maxillofacial area, it is important to consider the locations of the supraorbital, infraorbital, and mental foramina neurovascular bundles. Understanding this anatomy helps prevent injuries to the neurovascular bundles. (Farzaneh et al., 2005)

Panoramic radiography (PR) shows greater part of maxilla-facial skeleton as a continuous image, thus allowing for a more accurate localization of both mental foramina in both vertical and horizontal dimensions. (Anshuman et al., 2010)
the panoramic radiography is widely used in the dentistry and one of the important methods used for the detection of the position of mental foramen. The mental foramen is defined as the entire funnel-like opening in the lateral surface of the mandible at the terminus of the mental canal. The mental foramen marks the termination of mandibular canal in the mandible, through which the inferior alveolar nerve and vessels pass. Position of the mental foramen is important when administering regional anesthesia (Moiseiwitsch, 1991).

Most studies and textbooks describe its common location as either below the apex of the second premolar or in between the apices of the first and second premolar. Others reported that both locations are common. According to Moiseiwitsch, individual variation could place the MF anywhere from below the canine to between the roots of the first molar. However, no investigator stated its common position below the canine or first molar or even first premolar. (Ahmed, 2003) Despite the advanced imaging, the panoramic radiographs are commonly used especially to study the mandible, since advanced imaging cannot be used routinely because of high radiation exposure, cost and availability. Knowledge of the position of the mental foramen is important both when administering regional anesthesia and performing periapical surgery in the mental region of the mandible. Studies by Moiseiwitsch in a North American white population, (Fishel, 2007) adults have shown that the most common location of the mental foramen to be between the first and second premolars. However, studies performed in other populations such as Malays, Asian Indians, Kenyan Africans, and Saudis have indicated that the mental foramen was most commonly positioned in line with the second premolar tooth. (Jamil et al., 2010).

Materials and Methods

Occur study for period from 2012-2013 and during this study 312 digital panoramic radiographs for a sample of patients from holly Kerbela aged from 15-50 years old were examined for the position of the mental foramen, the examination was done by using a plastic T-bar as shown in figure (1), the bar has two arms horizontal arm and vertical arm placed on the occlusal surface of the posterior teeth and the vertical arm passes through the longitudinal aspect of the teeth and the end of this arm passes through the mental foramen, the position of the mental foramen is classified into four types:

Position 1 (p.1st) : the mental foramen below the apex of the first mandibular premolar.

Position 2 (bet) : the mental foramen below the area between the mandibular premolars.

Position 3 (p.2nd) : the mental foramen below the apex 2nd mandibular premolar.

Position 4 (d.2nd) : the mental foramen distal to the area below the 2nd mandibular premolar.

Also the radiographs are examined for the right and left position of the mental foramen in relation to the mandibular lower premolars, for both males and females and for age groups.
The symmetrical and asymmetrical results in the position of mental foramen between left and right are also recorded.

Fig.(1)
Plastic T-par

Fig.(2)
Position of mental foramen between the pre molars
Fig. (3)
Position of mental foramen distal of the second pre molars

Fig. (4)
Position of mental foramen below the first pre molars
Fig.(5)
Position of mental foramen below the second premolar
Results
This study was performed to determine the position of the mental foramen relative to the apices of the lower premolar teeth based on panoramic radiographs in a Karbelian population. After evaluation of each panoramic radiograph, the position of the mental foramen on each side was recorded, also analyzed gender differences and the symmetrical and asymmetrical for both sides right and left, also for the age groups of location within individuals, for the total sample the most frequent position of the mental foramen is between the premolars found in 148 patients.
(47.435%), followed by 116.5 patients below the apex of 2nd premolar (37.339%), below the 1st premolar found in 26.5 patients (8.49%) of the sample, distal to 2nd premolar found in 21 patients (6.73%) of the sample. 290 patients the results are found symmetrical for both sides (92.94%), and 22 patients are found asymmetrical (7.06%) the asymmetrical finding in the results responsible for the fraction in some of these results.

Number of females was 174 the position of the mental foramen most frequently between the premolars in 84 patients (26.923%) of the total sample, then below the second premolar in 65.5 patients (20.994%) of the whole sample, below the 1st premolar was 13 patients (4.1666%) of the whole sample, distal to the second premolar 11 patients (3.526%) of the whole sample, results for males in the sample were (between the premolars found in 64 patients (20.513%), below the 2nd premolar 51 patients (16.346%), below the 1st premolar 13.5 patient (4.327%), distal to 2nd premolar 10 patients (3.205%). According to the age groups from 15-25 years, position of the mental foramen between the premolars found in 72 patients (23.077%), below the 2nd premolar in 42 patients (13.462%), below the 1st premolar in 13 patients (4.166%) , distal to 2nd premolar in 4 patients (1.282%) , from the age of 26-35 years the most frequent position of the mental foramen was between the premolars in 54 patients (17.308%), below the second premolar in 41 patients (13.141%) , below the 1st 5 patients (1.603%) , distal to the 2nd premolar 5 patients (1.603%) , from the age of 36-50 years the most frequent position of mental foramen is found below the second premolar in 23 patients (7.372%) , between the premolars 13 patients (4.166%) , distal to 2nd premolar in 12 patients (3.846%) , below the 1st premolar in 3 patients (0.962%) for the whole sample.

Table(1):-shows the position of mantel foramen for the total sample and for the right and left side

<table>
<thead>
<tr>
<th></th>
<th>b.1st</th>
<th>Bet.</th>
<th>b.2nd</th>
<th>d.2nd</th>
</tr>
</thead>
<tbody>
<tr>
<td>From</td>
<td>312</td>
<td>26.5</td>
<td>148</td>
<td>116.5</td>
</tr>
<tr>
<td>%</td>
<td>8.49%</td>
<td>47.435%</td>
<td>37.339%</td>
<td>6.731%</td>
</tr>
<tr>
<td>Right</td>
<td>26</td>
<td>148</td>
<td>117</td>
<td>21</td>
</tr>
<tr>
<td>Right%</td>
<td>8.333%</td>
<td>47.435%</td>
<td>37.5%</td>
<td>6.73%</td>
</tr>
<tr>
<td>Left</td>
<td>27</td>
<td>148</td>
<td>116</td>
<td>21</td>
</tr>
<tr>
<td>Left%</td>
<td>%8.654</td>
<td>%47.435</td>
<td>%37.179</td>
<td>%6.73</td>
</tr>
</tbody>
</table>
Table (2):- shows the position of mental foramen for both males and females for the sample

<table>
<thead>
<tr>
<th></th>
<th>d.2\textsuperscript{nd}</th>
<th>b.2\textsuperscript{nd}</th>
<th>Bet.</th>
<th>b.1\textsuperscript{st}</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>13.5</td>
<td>64</td>
<td>51</td>
<td>10</td>
</tr>
<tr>
<td>Male%</td>
<td>%4.327</td>
<td>%20.513</td>
<td>%16.346</td>
<td>%3.205</td>
</tr>
<tr>
<td>Female</td>
<td>13</td>
<td>84</td>
<td>65.5</td>
<td>11</td>
</tr>
<tr>
<td>Female%</td>
<td>4.1666%</td>
<td>%26.923</td>
<td>%20.994</td>
<td>%3.526</td>
</tr>
</tbody>
</table>

Table (3):- shows the symmetrical and asymmetrical in the sample for both sides left and right

<table>
<thead>
<tr>
<th></th>
<th>symmetrical</th>
<th>asymmetrical</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>290</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>92.949%</td>
<td>7.051%</td>
</tr>
</tbody>
</table>

Table (4):- shows the position of mental foramen according to the age groups

<table>
<thead>
<tr>
<th>Age.</th>
<th>p.1\textsuperscript{st}</th>
<th>bet</th>
<th>p.2\textsuperscript{nd}</th>
<th>d.2\textsuperscript{nd}</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-25</td>
<td>13</td>
<td>72</td>
<td>42</td>
<td>4</td>
</tr>
<tr>
<td>%</td>
<td>4.166%</td>
<td>23.077%</td>
<td>13.462%</td>
<td>1.282%</td>
</tr>
<tr>
<td>26-35</td>
<td>5</td>
<td>54</td>
<td>41</td>
<td>5</td>
</tr>
<tr>
<td>%</td>
<td>1.603%</td>
<td>17.308%</td>
<td>13.141%</td>
<td>1.603%</td>
</tr>
<tr>
<td>36-50</td>
<td>3</td>
<td>13</td>
<td>23</td>
<td>12</td>
</tr>
<tr>
<td>%</td>
<td>0.962%</td>
<td>4.166%</td>
<td>7.372%</td>
<td>3.846%</td>
</tr>
</tbody>
</table>
Diagram(1):- shows the position of mantel foramen for the total sample and for the right and left side

Diagram(2):- shows the position of mental foramen for both males and females for the sample
Diagram(3): shows the position of mantel foramen for the total sample and for the right and left side.

Diagram(4): shows the position of mental foramen for both males and females for the sample.
Diagram (5): shows the position of mental foramen according to the age groups.

Diagram (6): shows the position of mental foramen according to the age groups.
Diagram(7): shows the symmetrical and asymmetrical in the sample for both sides left and right.

Diagram(8): shows the symmetrical and asymmetrical in the sample for both sides left and right.
Discussion

Mental foramina are usually symmetrically located either in between first and second premolars or below the second premolars and rarely appear below the 1st premolar or distal to second premolar. Anatomically, the mental foramen is the opening of the short mental canal, a branch of the mandibular canal (Moiseiwitsch, 1995).

Although on most standardized panoramic radiographs, the radiographic landmarks of the mental foramen can be seen, the appearance of these landmarks varies without any change of radiographic quality, in this study it seems that the most common location of the mental foramen is between the apexes of the mandibular premolars while in African and south east Asian population the most common location is below the 2nd premolar. There is some similarity between this study and the results of the Iranian study, that seems because of the similarity in both Iranian and Iraqi population that different from the other races (Navya et al., 2009). Study done by Lazem (2010) in Kosovarian population who states that the most common position of the mental foramen between the first and the second premolar with distinct tendency to be positioned near to second mandibular premolar.

The ratio of the asymmetrical to the symmetrical position of the mental foramen is 0.08%, comparing between this study and the Indian study, during this study the symmetrical between the left and right found in 92.94%, while in the Indian study the symmetrical found in 64.8%, while in Malay population study the symmetrical found in 80.70%, in Moroccan population the symmetrical found in 79% of the sample studied, symmetrical in Kosovarian population found in 80% of the sample examined (Ahmed and El Wady, 2003).

Differences in the bilateral positions of the mental foramen may occur if the mental foramen is funnel shaped in the buccal cortex of the mandible. The mental canal passes from the posterior to the superior border of the mandible. Variation in the position of the mental canal seems to be due to developmental disturbances of the mandible during the fetal period (Anshuman et al., 2010). Additionally, the mental foramen position can change due to dental loss and aging.

Panoramic radiographs are 2D imaging that cannot give us the real cause of the asymmetrical in the position and the shape of mental foramen that may be due to individual variation of the funnel shape short mental canal or due to the variation in the thickness of cortical bone over (Farzaneh et al., 2003) the mental canal this will give us a new suggestion for a new study to determine the real cause of the asymmetrical position of the mental foramen on panoramic radiographs by using the aid of cone beam computed tomography to assist in the determining the asymmetry between the left and right in the same patient (Al-Juboori et al., 2011).

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