

*Oral Radiology***Determination of position and symmetry of mental foramen on OPG in selected Kashmir population**Sanjeet Singh Risam¹, Deeba Hamid²

Abstract

Studies on mental foramen revealed its variation in position in different ethnic groups. Surgical procedures and anaesthesia involving the mental foramen show repeated differences and failures in a given population. The aim of the present study was to determine symmetry and position of mental foramen in Kashmir population in a digital panoramic view (OPG) in 105 patients. Digital panoramic view OPG assessed the relation of apices of premolars with the mental foramen. The results showed that the majority of mental foramen was located mesial to the apices of second premolar and the remaining below the apex of second premolar with no statistical significant difference in sex or age predilection. These findings were different from the majority of studies where it was mentioned that apex of the second premolar is the most common position for mental foramen.

Key Words

Mental foramen, Panoramic view, Ethnic groups.

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Introduction

Confined knowledge regarding the correct position of mental foramen leads to repeated failures during injections and operative procedures.¹ While performing dental surgeries, the dentist should be well aware of the anatomy of the oral cavity and important landmarks in the close proximity. Mental foramen is one such region in the mandibular jaw that causes considerable concern during periapical surgery and its association to the mental nerve. The position of the mental foramen is of significant importance in giving local anaesthesia, treating parasymphysis fractures, osteotomes, for orthognathic and implant placement, giving complete denture. Any damage to the mental bundle during procedures can result in paresthesia or anaesthesia in the area innervated by the nerve.^{1,2}

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.² The average size of the foramen is 4.6 mm horizontally and 3.4 mm vertically on the lateral surface of the mandible.¹ Studies have shown that the position of the mental foramen varies among races and genders. There have been variations in the mental foramen ranging from difference in the shape and position to the presence of multiple mental foramen or even complete absence in some cases.^{3,4,5,6}

This study was aimed to determine the position and symmetry of mental foramen of selected Kashmir population.

Materials and Methods

For the purpose of this study, 105 patients were taken periodically in an imaging centre. These patients had reported to ASYM Government Hospital, Budgam. Their OPGs were collected and analyzed for recording the position of mental foramen. The OPG machine used in this study is 'Newtom Digital Panoramic, 3DCBCT and Cephalometric System' having following specifications: 67 kVp, 6 mA and 9.3 seconds. All patients above the age of 18 were included in the study. The patients were divided into different age groups as 18-24 years, 25-35 years, and 36-50 years. The mental foramen was located as a radiolucency that was traced by following the mandibular canal. The edge of a ruler was used to identify the longitudinal axis of the nearest tooth, and the position of the mental foramen was recorded relative to the axis.

The position of mental foramen was denoted as follows:

A = mental foramen mesial to 4 (1st premolar)

B = mental foramen below 4

C = mental foramen distal to 4

D = mental foramen between 4 and 5 (2nd premolar)

E = mental foramen mesial to 5

F = mental foramen below 5

G = mental foramen distal to 5

Only high quality OPGs with respect to contrast and angulations were included. Only those patients with all mandibular and maxillary teeth from right second premolar to left second premolar were taken. OPGs in which the mental foramen could not be identified clearly were discarded. OPGs showing periodontal lesions in the mandibular dentition were excluded from the study. The statistical analysis was done using IBM SPSS version 20 software. Fisher's exact tests were applied to determine the associations. $p < 0.05$ was taken to indicate statistical significance. The level of significance was set at $P < 0.05$.

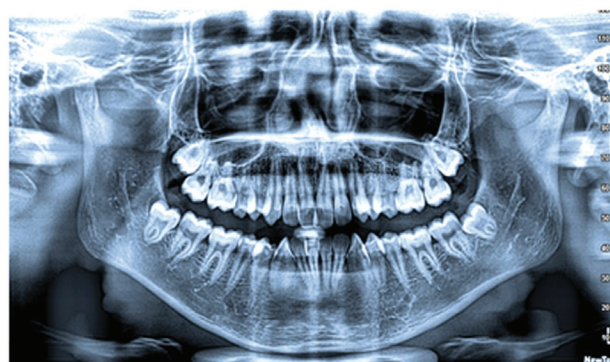


Fig.1: Mental foramen mesial to the apices of 2nd premolar (position E)

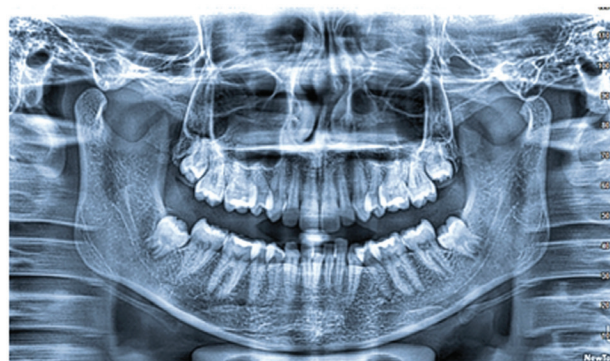


Fig.2: Mental foramen distal to the apices of 2nd premolar (position G)



Fig.3: Mental foramen below the apices of 2nd premolar (position F)

Table 1: Position of mental foramen in different age groups

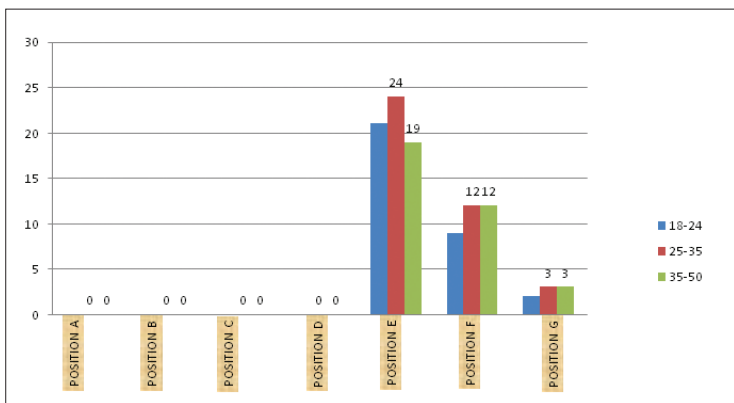
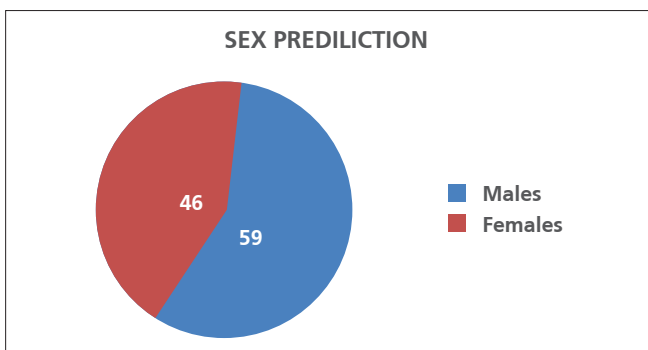


Table 2: Sex Prediliction



Results

Results of the 105 panoramic radiographs that were analyzed, 46 were of female patients and the rest 59 were of male patients (Table 2). The mental foramen was found to be bilaterally symmetrical in 66(62.8%) radiographs with the remaining 39 (37.1%) being asymmetrical.

In between 18- 24 there were 31 patients, 25- 35 years 39 patients and 35 to 50 years 35 patients. In this study, the most common position for the mental foramen in

relation to the premolars was in line mesial to the second premolar (position E) about 60.9% (64), both on the right and left side. The most common location after position E was with the apices of second premolar 31.4% (33) (position F), followed by 7.6% (8) (position G) distal to the second premolar. Position D (mental foramen between 1st and 2nd premolar), Position C (mental foramen distal to the 1st premolar), Position A (mental foramen mesial to 1st premolar) and position B (mental foramen below 1st premolar) were not recorded in any of the cases (Table 2).

No statistically significant differences were seen in different age groups between males and females of the mental foramen position ($p > 0.05$).

Discussion

The present study provides information about the position of mental foramen among the population of Kashmir. There have been many studies for localizing mental foramen in different populations and ethnic groups and researches have proven that there can be a change in position in different groups. No such study has been performed in this part of the world as per the information gathered. Studies done in other populations such as Asian Indian by Shankland (1994), Saudi population by Al Jasser and Nwoku (1998)⁴, Malay by Ngeow and Yuzawati (2003)¹, Kurdish population by AL Talabani et al (2008)⁵ and in Kosovian population by Kqiku L et al (2013)⁷ reported that the mental foramen is most commonly positioned in line with the second premolar tooth as it has been reported in this study.

In a study done on the white population, the location was found to be below the apex of the second premolar and among the Black population it was found between the apex of the 2nd premolar and first molar.⁸ Julian Rp had done a study on the North American white population, he found the position to be between the 1st and 2nd premolar.⁹ Among the Malaysian population, it was found to be below the apex of the 2nd premolar.¹ Similar studies have also been done in India among various states. In the Gujarati population, in a study, they found the position of the mental foramen to be between the 1st and 2nd premolar, similar to the North American white population.¹⁰ On the contrary, studies done in Maharashtra population and South Andhra population revealed the position of the foramen to be below the apex of the 2nd premolar.^{11,12} Hence significant differences have been reported in the

position of the mental foramen in different ethnic groups. Panoramic radiographs were used for the study as they were advantageous over the periapical radiographs, since larger areas of hard and soft tissues were recorded. It also gave a more accurate visualization of the mental foramen and parameters were standardized.¹³

In the analysis of 105 radiographs, the distribution of mental foramen position was localized between the apex of first premolar and distal to the apex of the second premolar. No position was recorded mesial to the apex of first premolar. In our study, we found that 60.9% of the findings were in line with mesial to the second premolar (position E) (Fig.1.), both on the right and left sides. The most common location after position E was with the apices of second premolar 31.4% (33) (position F) (Fig. 3.), followed by 7.6% (8) (position G) (Fig.2.) distal to the second premolar. Position E and Position F accounted for 92.3% of the cases. Gender-wise distribution of the mental foramen position was also analyzed and no measurable difference was observed. Majority of the patients in both groups recorded the mental foramen location mesial to the 2nd premolar. Most of the studies have shown that the most common position of mental foramen is below the second premolar but our study revealed that in Kashmir population mesial to the second premolar is the most common.

Conclusion

Position of mental foramen is vital for clinical as well as diagnostic purposes. The mental foramen is an important anatomical landmark in the orofacial region. This study concludes that the most prevalent location of the mental foramen among the population of Kashmir is mesial to the apex of the 2nd premolar.

Our results are in variance with the results of similar studies on other ethnic groups reported in the literature. The distribution of the mental foramen was not always bilaterally symmetrical in every individual. This needs to be worked on a much bigger sample to get the facts. The knowledge of the variations of the mental foramen is important for the dental surgeons while they perform periodontal surgeries, dental implantations and other endodontic and orthognathic surgeries.

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