

The Position of Mental Foramen in Relation To Mandibular Premolars and Molars on Panoramic Radiograph in South Indian Population- A Hospital Based Study

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Abstract

Objective: The purpose of this study was to assess the location of mental foramen in relation to mandibular premolars and molars, variations in the types of the mental foramen in dentulous, partially edentulous and edentulous patients and to determine age and sex related variations in the types of the mental foramen on panoramic radiograph. This study provides an insights in assessment of the extent of mental foramen to help clinicians prior to orthognathic surgeries, placement of mandibular implants and construction of artificial dentures. **Study Design:** The panoramic radiographs of 560 subjects were evaluated. In 60 subjects mental foramina could not be identified on the panoramic radiographs so they were not included for statistical analysis. The study population included subjects of all age groups. The maximum subjects were in 20-29 years age group followed by 30-39 years and 40-49 years age groups. The data were analyzed using one way ANOVA (Analysis of variance), Duncan's Multiple Range test , Posthoc analysis of ANOVA and T-test. **Results:** The present study confirms that most common location of mental foramen was in line with second premolar (36.8%) followed by between first and second premolar (29.4%), between second premolar and first molar (25.4%), in line with first molar (4.2%), in line with first premolar (3.8%) and anterior to first premolar (0.4%). The most common type of mental foramen was separate type (54.4%) followed by continuous type (30.4%) and diffuse type (15.2%). The separate type mental foramina were most common in edentulous group while continuous and diffuse type mental foramina were most common in dentulous group. The distribution of all 3 types of mental foramina in all age groups were significantly associated with age (p value<.05, p value<.01). The distribution of all 3 types of mental foramina was not significantly (p value > 0.05) associated with gender of subjects. **Conclusion:** The location of mental foramen in horizontal plane shows some ethnic and racial variations. The location of the mental foramen shown in our study corresponds to what have been documented in most previous studies. However further studies are required to know most common position of mental foramen in other ethnic and racial groups in India and World.

Key words: Mental Foramen; Panoramic Radiograph; Mandible; Premolars; Molars.

Introduction

A radiograph is an essential diagnostic tool in the identification of disease process. The radiographic recognition of disease requires a sound knowledge of radiographic appearance of normal structures.

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Intelligent radiographic diagnosis cannot be attempted without an appreciation of the wide range of variation in the appearance of normal anatomic structures. Panoramic radiograph is most often used where broad coverage of the jaws is required. The recognition of normal anatomic structures on panoramic radiographs is frequently challenging because of the complex anatomy of the region and the multiple superimposition of various anatomic structures and the changing projection orientation. Mental foramen is one among the normal anatomic landmarks whose image is quite variable.

Mental foramen is an intraosseous foramen which opens on the lateral surface of the body of the mandible on each side below and between the roots of first and second premolars and at times below the second premolars[1] .It may be round, oblong, slit like or very irregular and partially or completely corticated[2,3]. Mental foramen appears as an oval

or round radiolucent area [4,5] in the mandibular first molar and premolar region [4]. The mental foramen is seen about halfway between the lower border of the mandible and the crest of the alveolar process usually in the region of the apex of the second premolar[2].

However recent studies indicate that the most common position for the foramen is on a vertical line passing through the mandibular second premolars[6]. The foramen is sharp only at its antero-inferior circumference whereas its posterior superior margin slants in gradually from the outer surface to the mandibular body[1]. Rarely there may be multiple mental foramina[6]. In deciduous dentition the mental foramen opens below the first deciduous molar and is directed forwards. The coronoid process projects above the condyle[7].

In old age the bone is reduced in size as teeth are lost and the alveolar region resorbed the mandibular canal and mental foramen is nearer to the superior border. Both may even disappear exposing the inferior alveolar nerve. The ramus become oblique, the angle about 140° and the neck inclined backwards. Absorption affects chiefly the thinner alveolar wall and after completion a linear alveolar ridge is left at the superior border of the mandible. In the mandible the labial wall is thinner in incisor and canine regions and the lingual wall in the molar region. The mandibular alveolar ridge hence is within the line of teeth but intersecting it near the premolar[7].

In the recent times there is an increased awareness among people regarding advanced dental treatments like implant supported prosthesis, orthognathic surgeries etc. Prior to procedures like orthognathic surgeries, mandibular implant placement, construction of artificial dentures there is strong need for assessing extent of the mental foramen to prevent any further complications caused by the damage to the structures passing through the mental foramen. Further limited knowledge of the radiographic appearance of the mental foramen can lead to unnecessary surgical exploration.

Materials and Methods

A study of mental foramina on panoramic radiographs was conducted in the Department of Oral Medicine and Radiology, Government dental college, Trivandrum during the period January 2008 to December 2008. The study subjects were selected from the radiology clinic reporting for routine panoramic radiograph. Detailed history and

indication for panoramic radiograph was taken and the clinical examination was carried out. The panoramic radiographs of 560 subjects were evaluated. In 60 panoramic radiographs mental foramina could not be identified so they were not included for statistical analysis. The remaining 500 subjects of total study population were divided into 8 age groups.

The subjects with the following conditions were not included in the study:

- 1) Subjects with developmental malformations of the jaws.
- 2) Subjects with systemic conditions affecting the growth.
- 3) Subjects with clinical or radiographic evidence of pathologies, fractures etc.
- 4) Subjects in which mental foramina could not be identified on the panoramic radiographs.

Statement of Clinical Relevance

The present study provides an insight into the variations in the types and positions of mental foramen in relation to mandibular premolars and molars. It also helps clinicians in assessment of the extent of mental foramen prior to orthognathic surgeries, placement of mandibular implants and construction of artificial dentures.

Materials

1. For Panoramic Radiography

- A. 6 inches x 12 inches TMG (T mat green sensitive) Kodak films (Eastman Kodak, Rochester, New York). (Fig 1)
- B. 6 inches x 12 inches cassette, Siemens, Germany with Kodak Lanex intensifying screens.
- C. Planmeca PM 2002 cc Proline Panoramic X-ray unit (Helsinki , Finland) with provision for automatic exposure parameters with variable Kvp 0f 60-80 V, variable current of 7-10 mA (constant) and 18 second of exposure time (constant) (Fig.2)
- D. Lead Apron, lead markers
- E. Occlusal disposable envelope
- F. Sterile gloves
- G. Bite blocks