



Morphological and morphometric study of mental foramen South Indian mandibles

Hussain Saheb Shaik¹, Muralidhar P Shepur², S.D Desai³,
S.T Thomas⁴, G F Maavishettar⁵ and Haseena S⁶

^{1, 2, 4 & 5} Department of Anatomy, JJM Medical College, Davangere, Karnataka- 577004, India

^{1, 3} Department of Anatomy, Shri BM Patil Medical College, Bijapur, Karnataka - 586 103, India

⁶Department of physiology, Shri BM Patil Medical College, Bijapur, Karnataka - 586 103, India
anatomyshs@gmail.com*

Abstract

The mental foramen is a funnel like opening located on the anterolateral aspect of the mandible, which marks the termination of the mandibular canal, mental nerve and vessels exits through it. The mental foramen is an important landmark to facilitate diagnostic, surgical local anesthetic and other invasive procedures of the oral and maxillofacial region. Totally 70 mandibles were used for this study. It was found that, the mean transverse diameter was 3.19 ± 0.82 mm and the mean longitudinal diameter 2.50 ± 0.61 mm. The location of mental foramen was found 72.43% in line with the longitudinal axis of the second molar teeth, 13.57% was present in between first and second molar teeth. In relation with location the mean distance between symphysis menti and foramen was 26.62 ± 4.89 mm on right side and left side it was 26.40 ± 4.32 mm. The mean distance between mental foramen and alveolar margin was 13.80 ± 3.56 mm on right side and 13.21 ± 3.75 mm on left. The mean distance between mental foramen and lower border of mandible was 12.40 ± 2.70 mm on right side and 12.21 ± 2.89 mm on left. The shape of foramen was oval in 65%. The knowledge of mental foramen is very important for blockage of mental nerve.

Key words: Mental foramen, Dental surgeries, Symphysis menti

Introduction

Mental Foramen is an important anatomical landmark to facilitate surgical and anesthetic blockage procedures involving the mental nerve. The mental foramen is situated bilaterally on the anterolateral aspect of the mandible, at an equal distance from its superior and inferior edge, near the tip of the premolars and between the 1st and 2nd premolars (McMinn et al., 1995), by which the mental vessels and nerves emerge through it (Dangelo & Fattini, 2000). An anterior loop of the mental nerve may be present medial to the mental foramen and its location and the possibility needs to be considered before any surgery in the foramina area in order to avoid any nerve damage (Cutright et al., 2003). There is an opening towards backward and upward as an oblique angled, still presenting the

foramen in a raised crest at the inferior-internal part of its shape (Marzola, 1989). The mental nerve is a terminal branch of the inferior alveolar nerve coming out of the mental foramen on the tip of mandibular premolars. The nerve blockage is basically used for procedures in the soft tissues of the mouth, like sutures of lacerations (Malamed, 2001).

Materials and methods

70 dry adult human mandibles constituted the material for the present study. The mandibles belong to the Department of Anatomy, JJM Medical College, Davangere, Karnataka, India. Each was studied for the morphological and morphometric study of mental foramen.

Results

Total 70 mandibles were used for this study. It was found that, the mean transverse diameter was 3.19 ± 0.82 mm and the mean longitudinal diameter was 2.50 ± 0.61 mm (Table 1). The location of mental foramen was found 72.43% in line with the longitudinal axis of the second molar teeth and 13.57% was present in between first and second molar teeth. In relation with location the mean distance between symphysis-menti and foramen was found to be 26.62 ± 4.89 mm on right side and 26.40 ± 4.32 mm on left side. The mean distance between mental foramen and alveolar margin was found to be 13.80 ± 3.56 mm on right side, 13.21 ± 3.75 mm on left and the mean distance between mental foramen and lower border of mandible was 12.40 ± 2.70 mm on right side and 12.21 ± 2.89 mm on left. The shape of foramen was oval in 65%.

Table 1. Morphometric Measurements of Mental foramen

Measurement	
Transverse Diameter	3.91 ± 0.82 mm
Longitudinal Diameter	2.50 ± 0.61 mm

Discussion

The mandibular canal, through which the inferior alveolar nerve and vessels pass, bifurcates and forms the mental and incisive canals (Shankland, 1994). The mental foramen is an important anatomical landmark and is a funnel-like opening located on the anterolateral aspect of the mandible which marks the termination of the mental canal, to facilitate diagnostic, surgical, local anesthetic and other invasive procedures of the oral and maxillofacial region. The mental nerve and vessels radiate through the mental foramen and supply sensory innervation and blood supply to the soft tissues of the chin, lower lip and gingiva on the ipsilateral side of the mandible (Williams et al 2000). Knowledge of the precise location of mental foramen is important in performing effective mental nerve block and which in turn will invariably

reduces the relative risks during these procedures (Zide, 1998).

The standard anatomy text books states that the mental foramen is most commonly found between the apices of the first and second lower premolar (Williams et al 2000). The mean distance between the mental foramen and mandibular midline was also shown to be varied among populations such as Thai (Boonpiruk, 1975), Chinese (Santini, 1990), Black and Whites (Cutright *et al.*, 2003). Generally, the mental foramen is difficult to localize (Phillips et al 1990) as there are no absolute anatomical landmarks for reference. As the mental foramen cannot be clinically visualized or palpated in clinical situations, it is localized in relation to the lower teeth. In such cases, mental foramen can be accurately localized if the distance from the symphysis menti is known. According to Aktekin et al (2003) normally mental foramen is located under and between the apexes of the two premolars, at a little angle towards the back.

Wang et al. (1986) showed that the location of the mental foramen under the apex of the lower first premolar was the most common location in 58.98% cases, on the average the distance of the most anterior portion of the anterior border of the foramen to the mandibular symphysis was 28.06 mm, between the most anterior portion of the anterior border of the foramen to the posterior border of the mandible was 74.14 mm, between the inferior portion of the foramen to the inferior border of the mandible was 14.70 mm and between the superior portion of the foramen to the crown of the second lower premolar was 2.50 mm. The most common position of the foramen was inferior to the crown of the second premolar and of approximately 60% of the distance from the point of the vestibular cuspid of this tooth to the inferior border of the mandible, confirming also some of our findings. Santini & Land (1990) studied the anterior-posterior portion of the mental foramen in 68 Chinese mandibles and in 44 British mandibles. The position of the mental foramen in Chinese mandibles was

the longest on the longitudinal axis of the second pre molar while in the British mandibles it was located between the apexes of the first and the second premolars.

According to Mbajorgu et al (1998) by the anatomical transverse sectional study in 32 mandibles of black adults from Zimbabwe the mental foramen was found to be a round shape in 14 of the 32 mandibles (43.8%) and of an oval shape in 18 mandibles (56.3%). The distance to the upper border was 13.6 mm on the right side and 14.62 mm on the left side. The horizontal dimension of the mental foramen was 2.93 mm on the right side and 3.14 mm on the left side. The vertical dimension was 2.38 mm and 2.64 mm on the right and left sides respectively. Souaga et al (2004), studied 61 dry mandibles in which, for the male sex, the mental foramen was found 14.89 mm above the lower border of the mandible and 16.16 mm below the alveolar ridge. In the feminine mandibles the foramen was located 14.21 mm above the lower mandible border and 15.66 mm below the alveolar ridge. The precise identification of position of the mental foramen is important in both diagnostic and clinical procedures of the mandible. Clinically, mental nerve bundle emerging from the mental foramen may get injured during surgical procedures with resulting anesthesia along its sensory distribution (Phillips et al, 1990). During the early prenatal life mental foramen is located in the alveolar bone between the primary canine and first molar (Kjaer, 1989). The opening of the mental canal was postero-superiorly in majority of the subjects (92%) (Mwaniki, 1992). The knowledge of mental foramen location and measurements are very helpful for blockage of mental nerve in facial and dental surgeries

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