METRICAL ANALYSES OF THE LOCATION OF THE MANDIBULAR CANAL USING CBCT

SAIF YOUSIF ABDULLAH

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Dedicated to:

My father, Yousif
My mother, Na’met
My beloved wife Maryam
My two flowers, Yousif & Teeba
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Saif Yousif Abdullah

1st of July 2011
DECLARATION

I certify that this research report is based on my own independent work, except where acknowledged in the text or by reference. No part of this work has been submitted for degree or diploma to this or any other university.

Dr. Saif Yousif Abdullah
Signature:
Date:

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ABSTRACT

Introduction: The increased neurosensory disturbances and hemorrhage after surgical intervention in the mandibular canal region increased the demand for presurgical planning and proper assessment to avoid those complications.

Aims: Determine the path and course of the mandibular canal of dentate Malaysian patients, mandibular canal diameter, mandibular foramen diameter and the incidence of bifid canal using the Cone Beam Computed Tomography (CBCT).

Materials and Methods: The subjects for this study included imaging of 60 patients (30 males and 30 females) from the Division of Oral radiology, with ages ranging from 20 to 60 years (mean age, 47 years). The samples were selected according to gender, race and age groups. The position of the mandibular canal and mandibular canal diameter were measured at five different locations. Linear measurements were done in the coronal view just posterior to the mental foramen at 10 mm interval (D1, D2, D3, D4 and D5). Mandibular foramen diameter and incidence of bifid mandibular canal were also recorded. The samples were imaged using CBCT and SimPlant software and data analyzed through SPSS (v.12).

Results: In this study the mandibular canal was identified in all samples with 100% good visibility. The measured data were expressed as minimum, maximum, median, K-S value and mean ± standard deviation. The results showed that the position of the right mandibular canal is similar to the position on the left side of the jaw.

Apicocoronal position of the mandibular canal showed that the superior measurements were 14.85 ± 3.64 mm at D1, 13.94 ± 3.85 mm at D2, 12.99 ± 4.08 mm at D3 and 14.22 ± 1.52 mm at D4. The inferior measurements of the canal was 9.37 ± 1.69 mm at D1, 8.24 ±
1.69 mm at D2, 7.96 ± 1.93 mm at D3, 9.65 ± 2.54 at D4 and 15.21 ± 4.18 mm at D5. The buccolingual position were 3.89 ± 1.00 mm (buccal) and 4.33 ± 1.25 mm (lingual), 5.59 ± 1.20 mm (buccal) and 3.35 ± 1.20 mm (lingual), 6.71 ± 1.34 mm (buccal) and 3.25 ± 1.32 mm (lingual), 5.68 ± 1.63 mm (buccal) and 3.08 ± 1.46 mm (lingual), 4.24 ± 1.59 mm (buccal) and 2.12 ± 1.40 mm (lingual) at D1, D2, D3, D4 and D5 respectively.

The minimum mandibular canal diameter recorded was 2.00 mm and the maximum was 3.40 mm. In this study the average mean was 2.16 ± 0.30 mm with the least mean diameter at D2 location (2.01 ± 0.42 mm) and the largest mean diameter at D1 (2.25 ± 0.47 mm) and D5 (2.25 ± 0.43 mm). The average mandibular foramen diameter was measured to be 2.55 ± 0.43 mm.

The incidence of bifid mandibular canal was greatest in Malays (n=18), followed by Indians (n=9), while no bifid canal was noticed in the Chinese.

**Conclusion:** Position of the canal changes due to changes in the mandibular bone. Measurements showed that the mandibular canal curves toward the lingual side the more distal it is away from the mental foramen. Apicocoronal assessment of the canal reveals that it is curving downward towards the inferior mandibular border until D3 and then it curves upwards. This CBCT study reveals there are variations in the position of the mandibular canal. It is highly recommended that careful assessment and planning using computed tomographic imaging is done prior to any surgical intervention in the mandibular canal region to avoid untoward complications.

**Keywords:** Cone Beam Computed Tomography (CBCT), Mandibular Canal, Inferior Alveolar Nerve (IAN), Simplant Software, Malaysian Population, Indian, Chinese, Malays
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