Morphometric Analysis of Mandibular Canal Course and Position in Relation to Gender and Age of Iraqi Sample Using Digital Panoramic Imaging

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Abstract

The knowledge of the course and position of the mandibular canal in relation to anatomical landmarks of the jaw is of great importance in certain dental interventions, therefore it involves preservation of the anatomic structures that pass through it. Morphometric study by means of digital panoramic radiography reveals the differences and inherent alterations between genders or ages, it has become a useful tool in research that analyzes the craniofacial complex development process, which are important for planning the dental, clinical and surgical procedures.

This study was undertaken to analyze mandibular canal morphology and position along its course and its relation to mandibular anatomical landmarks by using digital panoramic radiography, with the purpose of determining the possible alteration in relation to the age and gender.

The present study reports the findings of the use digital panoramic radiographic images of 300 subjects, (150 male and 150 female), out of 319 participants attending to the Maxillofacial Radiology Department at Al-Karkh Hospital in Baghdad for purposes other than mandibular fractures or other pathological conditions affecting the course of the mandibular canal . Age distribution of them was ranging between (20-49) years old, factors considered included the age and sex of the patients. The participants were divided to 3 groups according to age:

First group: Subjects from (20-29) years of age (50 male & 50 female).

Second group: Subjects from (30-39) years of age (50 male & 50 female).

Third group: Subjects from (40-49) years of age (50 male & 50 female).

Each subject was subjected to digital panoramic radiography. The selected radiographic images are imported by (the DIMAX3 digital software) with specific tools for making linear measurements in images of the mandibular jaw.

Ten linear vertical measurements were performed on the radiographic image of each subject on both right and left sides of the mandible (600) sides, to evaluate the position of the mandibular canal along its course, and its relations with the anatomic structures of jaw. The horizontal position of the mental foramen and relation of proximity between the mandibular canal and the roots of the mandibular posterior teeth were also evaluated.

The mandibular canal was almost bilaterally symmetrical, there were no statistically significant differences observed between the right and left sides of the mandible. Statistically significant differences were observed in six of the linear measurements between genders, males almost have higher measurements than females. However, no significant linear trend was evident between age groups of the same gender for any of the measurements. The most frequent position of the mental foramen was between the two mandibular premolars, 45.3% in male and 44% in female; the mandibular canal presented a relation of proximity to the roots of the mandibular third molar, moving gradually away from the roots of the other posterior teeth in 83.7% of subjects, the mandibular canal tends to be slightly lower in females than that in males. The mandibular foramen vertical position almost located on the middle of the mandibular ramus independent on gender or age.

The results suggest that the measurements related to the mandibular canal performed in this study can be influenced by the gender but are independent of age; linear measurements that related to the mandibular foramen vertical position used in this study can be used as best parameters to predict male gender differentiate it from female.