



Mandibular canal measurements in relation to the lower first molar and base border of the mandible

Dr. Fatin Kh. Abbas, B.D.S., M.Sc.,Rad.

Abstract

The mandibular canal appears below or superimposed over the apices of the mandibular molar teeth but it has some variations regarding its distance to both lower first molar and the base border of the mandible that may make a problem specially for the oral surgeon in his work during operations like implantation, so, this study was done to estimate the position of the mandibular canal and its relation to the lower first molar and the base border of the mandible by the aid of digital panoramic radiographs.

The sample of this study was collected from patients who attended Al-Karama specialized center for dentistry. Forty patients were selected in this study with the age range between 20-60 years (males and females) that divided in to four groups according to a special criteria. Forty digital views (OPG) were taken for Iraqi patients, using computerized digital panoramic x-ray machine. All radiographs were examined and then the position of the mandibular canal for each patient was estimated.

The results revealed that the mandibular canal is most commonly located away from the root apices of lower first molar, and the distance between the mandibular canal and the base border of the mandible is indirectly proportional with age.

Key: Mandibular canal, lower first molar, base border of the mandible, digital OPG

Introduction

The mandibular canal is a tube-like passageway through bone that travels the length of the mandible. The mandibular canal extends from the mandibular foramen to the mental foramen and houses the inferior alveolar nerve and blood vessels.

On a mandibular periapical radiograph the mandibular canal appears as a radiolucent band. The mandibular canal is outlined by two thin radiopaque lines that represent the cortical walls of the canal. The mandibular canal appears below or superimposed over the apices of the mandibular molar teeth. ⁽¹⁾.

The relationship of the mandibular canal to the roots of the lower teeth may vary, from one in which there is close contact with all molars and the second the second premolar to one in which the canal has no intimate relation to any of the posterior teeth. In the usual picture, however, the canal is in contact with the apex of the third molar, and the distance between it and other roots increases as it progresses anteriorly ⁽²⁾.

On panoramic x-ray observation, the root apex of the mandibular second molar was in close proximity to the mandibular canal while the apices of

the mesial and distal roots of the mandibular first molar were farthest from the canal. ^(3,4,5);

Aim of the study

To estimate the position of the mandibular canal, its relation to the lower first molar and to the base border of the mandible.

Materials and method

Forty patients were selected from patients, attending AL-Karama specialized center for dentistry, according to a special criterias:

- 1- Presence of lower first molar on each side and is vital.
- 2- The age of the patients ranged between 20-60 years (males and females).

The samples were divided into four groups regarding age as the following:

- First group 20-30 years (18 patients).
- Second group 31-40 years (6 patients).
- Third group 41-50 years (7 patients).
- Fourth group 51-60 years (9 patients).

Forty digital views (OPG) were taken for Iraqi patients, using computerized digital panoramic x-ray machine, all radiographs were examined and then the position of the mandibular canal for each patient were estimated.

The distance between mandibular canal and the following were measured:

- 1- The base border of the mandible.
- 2- The apex of the mesial root of the lower first molar.
- 3- The apex of the distal root of the lower first molar.

The relation of the mandibular canal to the mesial and distal root apices of the lower first molar was classified as follows:

- 1- The mandibular canal is close to the root apices of the lower first molar (the distance 2-4mm).
- 2- The mandibular canal is away from the root apices of the lower first molar (the distance 4.1-10mm).

These measurements were done by using ruler on the computer monitor. Readings were obtained from both left and right sides of the mandible.

Results

- Mandibular canal position in relation to the base border of the mandible:

The results show that the distance between the mandibular canal and the base border of the mandible, for (first age group), for males, the mean value 19.39mm and for females, the mean value 19.29mm, for the (second age group), for males, the mean value 14.54mm and for females, the mean value 15.42mm, for the (third age group), for males, the mean value 13.29mm and for females, the mean value 12.83mm, for the (fourth age group), for males, the mean value 11.76mm and for females, the mean value 12.32mm as show in table (1) , fig. (1).

- Mandibular canal position in relation to the mandibular first molar:

The results show that for the mesial and distal root (males and females), when the distance between the mandibular canal and mesial root and distal root of the lower first molar was (2-4mm), the number was 24 and , when the distance between the mandibular canal and mesial root and distal root of the lower first molar was (4.1-10mm), the number was 56, as show in table (2) , fig. (2).

The differential percentages of the relation of the lower first molar root

apices (mesial and distal) to the mandibular canal are shown in fig. (3) in which 24% of the radiographs showed that the mandibular canals were close to the root apices of lower first molar while 56% of the radiographs showed that the mandibular canals were away from the root apices of the lower first molar.

Discussion

Knowledge of the anatomical locations and variations of the mandibular canal is important to dental professions for local anesthetic administration, differential diagnosis of mandibular radiolucencies in endodontic treatment, periodontal, oral and maxillofacial surgery.^(3,6,7,8)

Such variations have been noted by some authors and so every effort should be made to prevent nerve injuries due to surgical treatments since injuries to inferior dental and mental nerves have been reported.^(9,10,11,12,13,14)

Mandibular canal position in relation to the base border of the mandible:

The results show that the distance between the mandibular canal and the base border of the mandible proportionate indirectly with the age of the patient (for males and females) and the distance is decreasing with aging and this may be due to bone resorption that cause thinning of the base border of the mandible, this agreed with^(15,16,17,18)

The result show that the apices of mesial and distal roots of the lower first molar are far from the mandibular canal in high percentage, this result agreed with^(3,4,5)

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Table (1): comparison between groups for the position of mandibular canal in relation to the base border of the mandible.

Age groups	No	Male		No.	Female		t-test	P-value
		Mean	SD		Mean	SD		
20-30	8	19.39	1.48	10	19.29	1.164	0.87	0.397 NS
31-40	4	14.54	1.34	2	15.42	1.053	1.226	0.308 NS
41-50	4	13.29	0.29	3	12.83	0.404	1.04	0.921 NS
51-60	4	11.76	0.426	5	12.32	0.329	0.204	0.807 NS

*P>0.05 Non significant

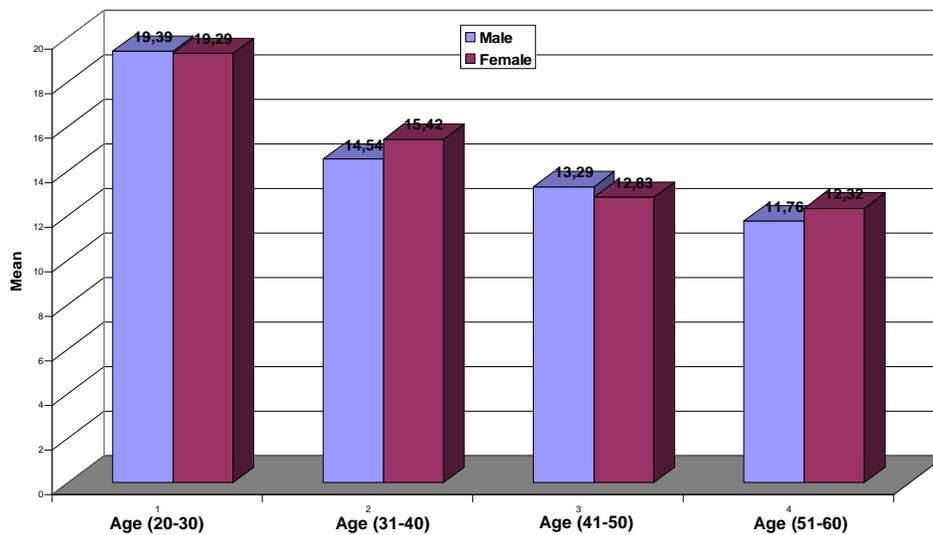


Fig. (1): comparison between groups for the position of mandibular canal in relation to the base border of the mandible.

Table (2): comparison between groups for the position of mandibular canal regarding lower first molar roots (mesial and distal root).

distance between mandibular canal and lower first molar roots	No. of radiographs for the distance between mandibular canal and mesial root of 6		No. of radiographs for the distance between mandibular canal and distal root of 6	
	No.	%	No.	%
2-4	24	30	24	30
4.1-10	56	70	56	70
Total	100	100	100	100

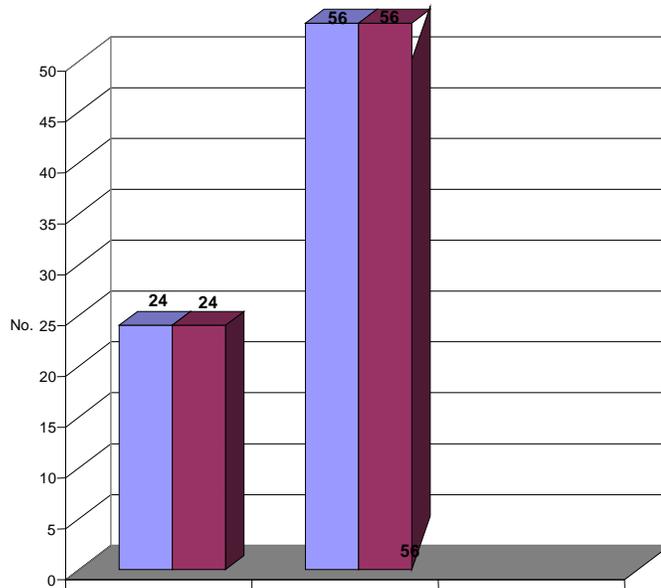


Fig. (2): comparison between groups for the position of mandibular canal regarding lower first molar roots (mesial and distal root).

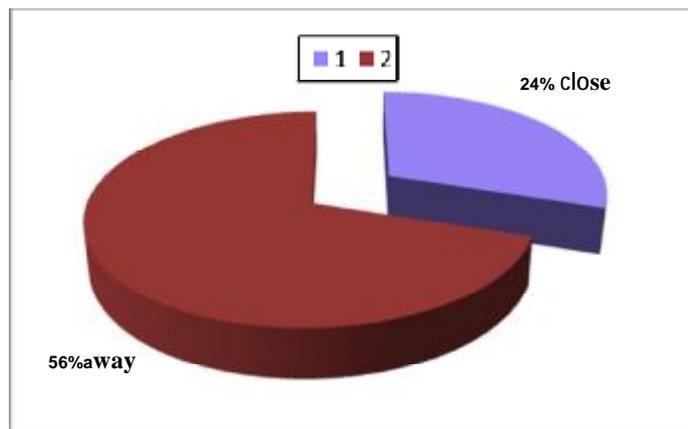


Fig. (3): Relation of lower first molar roots (mesial and distal root) to the mandibular canal.