Relationship of inferior alveolar canal to the apices of lower molar teeth radiographically

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Abstract
The mandibular foramen (MF) is located on the medial surface of the ramus of mandible, leading into the inferior alveolar canal (I.A) which accommodates the inferior alveolar neurovascular bundle, in this study sixty periapical radiographs were taken to examine the approximity of the canal to mandibular molar apices, and it has been found the mean distance of mesial and distal roots of molar teeth to the canal as follows, for the first molar were (5.63), (6.16) respectively. While for the second molar were (2.3), (3.08) respectively, the recorded results reinforce the cases neuralgia, and numbness due to injury of (I.A) canal particularly in complicated extraction for the lower second molar teeth.

Key words: inferior alveolar canal, radiographs, relationship.

Introduction
The inferior alveolar canal (I.A) is of great importance in dental surgery, due to its close relation to mandibular molar teeth (1). The inferior alveolar canal starts from the MF, descends obliquely in the ramus of mandible, then runs horizontally forwards in the body of Mandible below the dental alveoli and opens into the mental foramen (2). Langlias et al (3) define the inferior alveolar as a position apical and lingual to the the third and second molar teeth, and vestibular to the roots of the premolars until the nerve emerges from mental foramen.

Racjchel and Ellis (4) found the greatest distance from the cortical zone vestibular to the mandibular canal between the first and second molar, with vestibular displacement of the nerve at second molar level towards the mental foramen.

Another study done by Zoografo et al (5) in panoramic radiographs, described three types of mandibular canal distributed as follows in order of increasing frequency: type III (canal below the mandibular margin), type II (canal between the apex of second molar and mandibular margin), and type I (canal in intimate contact with the apices of first and second molars).

Inferior alveolar nerve injury can follow certain surgical procedures in the mandible, since the proximity of roots lower first and second molars to the inferior alveolar canal exposes the inferior alveolar nerve to injury during extraction of these teeth (6) and in cases of repositioning and manipulation of inferior alveolar nerve during placement of endosseous implants in the position of molar teeth is a risk of nerve injury, also parasthesia of inferior alveolar nerve after obturation in endodontic treatment (7).

From above the objective of this study is to examine the relationship of lower molar roots to the inferior alveolar canal, due to its importancy, to be aware or take care to the position of the canal specially during molar surgical procedures.

Materials and Methods
Sixty periapical radiographs of sixty male adults of age ranging from (20-30) years, these subjects didn’t suffer from periapical resorption of molar roots due to periapical abcess or cyst.

The radiographs were taken for the lower right molar area, focused on lower right first and second molars, using bisecting technique, with Belmont radiograph machine. The distance of roots apex to the border of inferior alveolar canal was measured using ordinary flexible ruler, as seen in figure (1).

Results
The inferior alveolar canal appears in radiographs as continuous radiolucent canal below the apices of the molar and premolar teeth, of 2-5 mm, sometimes the boundary of the canal is demarcated by a
definite fine layer of cortical bone, others appears without cortical demarcation, as shown in figure (1).

For the mandibular first molar: There was relatively constant distance of distal and mesial roots from the I.A canal, since the mean of distance of distal and mesial roots were (5.63) and (6.16) respectively. As seen in table (1).

For the mandibular second molar: table (1) shows the mean of distal and mesial roots, the mean were (2.3) and (3.08) respectively, for the measurements of distal root there were four cases in which the distal roots penetrates the I.A canal in 1-3 mm, two cases in which the mesial roots penetrate the I.A canal, reveals for the close and intimate relation between the canal and distal and mesial roots.

**Discussion**

The mandibular canal perhaps is the only longest bony canal harboring thick nerve and vessels, one of the pioneer worked on its position in the mandible reported that the canal and consequently the neurovascular bundle normally traverse close to the dental roots (8).

The results recorded in this study done by Denio et al (9) in which the canal was very close to the mandibular second molar and far from the mandibular first molar, in cotrast to another study that reported the canal is commonly close to the inferior border and away from the apices of the mandibular second molar (8). Indicating difference in this trait of ethnic groups.

Also this study disagreed with the results recorded by Zoografos et al (5) from the point of the canal with mandibular margin, while in this study reveals an intimate, frequent relation to the second molar firstly, & secondly to the molar teeth, this disagreement may be related to the sample of the study taken by the author since the mandibular canal is likely to be located near mandibular margin in younger age groups. In contrast to adults, & aged groups the canal is relatively higher in position (10).

Thus from the obtained data it gives an explanation for the cases of injury of I.A canal & subsequent nerve disturbance as neuralgia & parasthesia, is related to be followed complicated surgical extraction or other dental surgeries in mandibular second molar than those done to mandibular first molar.

**References**

5- Zoografos j, Kolokoudias M, papdakis E . the types of the mandibular canal .Hell period stomata ganthopathoprosopike cheir (1990); 5: 17-20.
6- Kipp Dp, Burton HG, and Weiss WW.Dythesia after mandibular third molar surgery: a retrospective study and analysis of 1377 surgical procedures JADA (1980); 100:185-192
Table (1): The distance of root apex of mandibular first & 2\textsuperscript{nd} molar to I.A canal expressed in millimeters (mm).

<table>
<thead>
<tr>
<th>Type of root</th>
<th>Mean ± S.D of mandibular first molar</th>
<th>Mean ± S.D of mandibular 2\textsuperscript{nd} molar</th>
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<tbody>
<tr>
<td>Distal root</td>
<td>5.63 ± 2.74</td>
<td>2.3 ± 3.08</td>
</tr>
<tr>
<td>Mesial root</td>
<td>6.16 ± 2.84</td>
<td>2.97 ± 3.18</td>
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</table>

Figure (1): Radiographs show the inferior alveolar canal (I.A), its relation to distal & mesial roots of mandibular first and second molars, Note the radiolucent canal under the root apices.