ORIGINAL RESEARCH

Morphometric Measurements Of Mandibular Canal And Mandibular Foramen In Relation To Age And Gender

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Received: 22 June, 2023 Accepted: 26 July, 2023

ABSTRACT
The knowledge of the morphology and topography of the mandibular canal is important for performing dental treatment as preservation of the mandibular canal can get easily involve or damaged during extraction of mandibular third molars, implant surgeries, orthognathic surgeries, and reduction and fixation of fractures. The aim of this study was to evaluate morphometric analyses of the mandibular canal in relation to the age group and gender by using panoramic radiography. The mean values of all measurements are greater in males than females and the ratio between the distance are seen greater in females in R1 and R3 and in males R2 is greater than males. Panoramic radiography was efficient for making the measurements and evaluating the course of mandibular canal

Keywords: Panoramic radiography, mandibular canal, mental foramen

INTRODUCTION

The mandibular canal (MC) is an important anatomical landmark which has been studied in detail since ages with respect to its location and course as well as the anatomical variations because ofits diverse configurations. The mandibular canal comprises of mandibular foramen and one end(distal) runs within the mandibular body beneath the molars and premolars and ends at mental foramenbilaterally. Mandibular canal carrying the inferior alveolar nerve, artery, andvein.[1] The knowledge of the morphology and topographyof the mandibular canal is important for performing dental treatment as preservationof the mandibular canal can get easily involve or damaged during extractionof mandibular third molars, implant surgeries, orthognathicsurgeries, and reduction and fixation of fractures. Radiography is the only option to identify these vital structutres before performing such procedures. OPG orpanoramic radiograph is one of the easily available and less cost effective modality which gives a wider vision of jaws.

AIM

Morphometric analyses of the mandibular canal in relation to the age group and gender byusing panoramicradiography.

MATERIAL AND METHOD

This retrospective radiographic study will be done in the Department of Oral Medicine and Radiology, GDC Srinagar. Around 300 patients will be selected in this study according to selectioncriteria.

INCLUSION CRITERIA

1. Age ranges from 18-65years
2. Bilaterally visualization of mandibular canal on OPG.

EXCLUSION CRITERIA INCLUDED

1) Presence of osteolytic lesion in the lower jaw such as large cysts and tumors.
2) Presence of fibroosseous lesions effecting lower jaw.

Panoramic radiographs of patients of both genders divided into four groups:

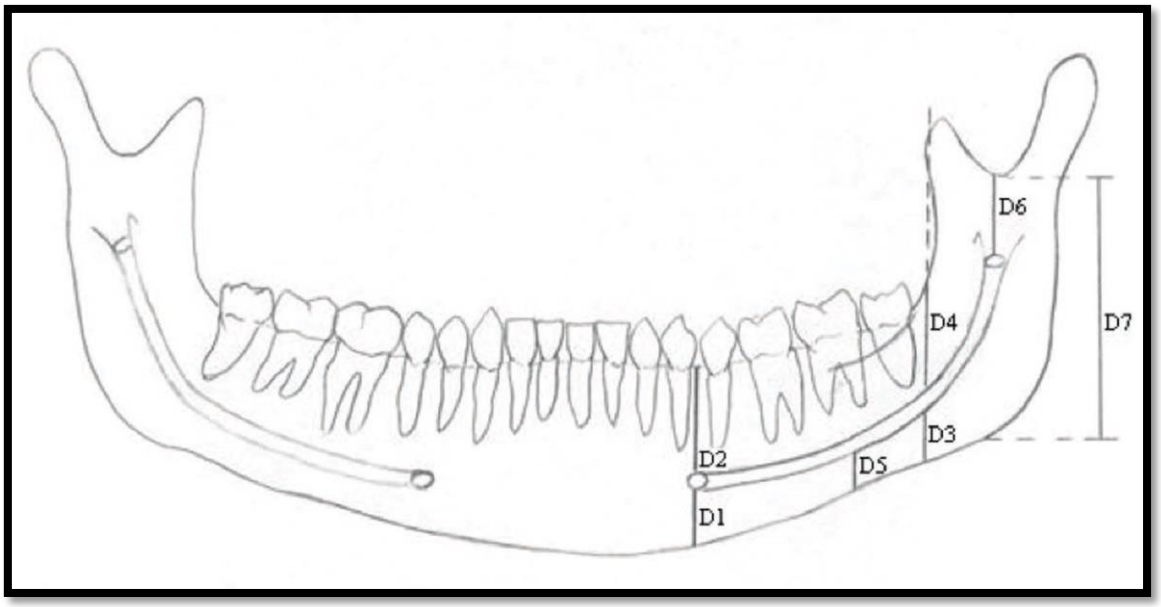
F1- women between the ages of 18 and 40 years
F2- women between the ages of 41 and 65 years.
M1 - men, between the ages of 18 and 40 years
M2 -men between the ages of 41 and 65 years.

The following measurements were taken (Fig 1- Amorim M et al- 2009)[2]

D1 - Vertical distance of the most inferior point of the imageof the inferior edge of the mental foramen to the image ofthe inferior limit of the mandible base.
D2 - Vertical distance of the most superior point of theimage of the superior edge of the mental foramen to theimage of the superior limit of the alveolar crest of the regionbetween the mandibular premolars.
D3 - Vertical distance of the image of the inferior corticalof the mandibular canal to the inferior limit of the mandiblebase, in the height of the image of the anterior edge of themandibular ramus.
D4 - Vertical distance of the image of the superior corticalof the mandibular canal to the inferior limit of the imageof the oblique line in the height of the image of the anterioredge of the mandibular ramus.
D5 - Vertical distance of the most inferior point of the image of the inferior cortical of the mandibular canal to the inferiorlimit of the mandible base.
D6 - Vertical distance of the most inferior point of the imageof the mandibular notch to the image of mandbular foramen.
D7 - Vertical distance of the most inferior point of the imageof the mandibular notch to the image of the inferior edgeof the mandibular ramus.

Based on the measurements, the following ratios were calculated:

R1 - Ratio between the measurements D1 and D2.
R2 - Ratio between the measurements D3 and D4.
R3 - Ratio between the measurements D6 and D7.



STATISTICAL ANALYSIS

The collected data will be subsequently processed and analyzed using latest SPSS version and ststistical significance will be evaluated between gender and age groups.

RESULTS

The results are seen in Tables 1 and 2. The mean values of all measurements are greater in males than femalesand the ratio between the distance are seen greater in females in R1 and R 3 and in males R2 is greater than males. The mean values of all measurements in two different age group are also represented in the given tables.

Table 1:- Mean values of the relative measurements of the mandibular canal course in age groups F1, F2, M1 and M2.

Gender	Age group	D1	D2	D3	D4	D5	D6	D7
Males	M1	11.5	14.4	7.4	21.5	6.8	14.2	48.4
	M2	11.9	13.8	7.1	19.7	7.2	14.7	47.0
Females	F1	10.9	13.4	6.6	19.6	5.6	13.2	43.2
	F2	10.4	11.9	6.1	18.9	5.2	13.6	42.8

Table 2:- Ratio of relative measurements of the mandibular canal course.

Gender	Age group	R1	R2	R3
Males	M1	0.79	0.35	0.29
	M2	0.86	0.36	0.31
Females	F1	0.81	0.34	0.30
	F2	0.87	0.32	0.31

DISCUSSION

Mental foramen is an important anatomical structure in mandibular body , which is presnt between or around mandibular premolars roots and is one of the structure of intrest before putting dental implants in this particular region irrespective of age. the quantity as well as the bone volume available in superior and inferior direction of mental foramen should be assessed before any decision making prior to implant placement. Therefore, surgical planning for this purpose can be done accurately in order to reduce the risks of procedure failure. Neiva *et al (*2004)[3] stated that the mental foramen can be used as a point ofreference because of its stable relation with the base of this bone . In our study, the mean values of the distancesbetween the mental foramen and lower border of mandible (D1), and from mental foramen to the alveolar crest (D2) showedno statistically significant differences between the age groups of both genders(Table 1), which further confirming the stability of mental foramen irrespective of age. Moreover theratio R1 (D1/D2)in all groups also showed no statistical significant difference which further support the statement of its constant position in mandibularbody (Table 2). Wang *et al* (1986)[4]affirmed that this foramen islocated in an average point between the alveolar crest and themandible base and Teerijoki-Oksa*et al*(2002)[5] showed that the mental foramen presentsa position close to the mandible base.

The average values of R2 (D3/D4) that is vertical distance of the image of the inferior cortical of the mandibular canal to the inferior limit of the mandible border and height of the anterior edge of the mandibular ramus showed no statistically significantdifferences between the studied groups,which means that thisrelation also remains constant throughout the individual's adultlife.Therefore there is constant relationship of inferior alveolar canal with the mandible border and alveolar crest. D5 also showed no statistically significant differences between the studied groups of both gender suggesting that it remains stable in the adult phase.

The distance from the mandibular foramento the sigmoid notch (D6) and the total length of the mandibular ramus (D7)presented no statistically significant differences in relationto the studied age groups. Studies done by Afsar*et al (*1998)[6],*and* Amorim,M. et al (2009)[2]confirming the recorded in our study.

Although all measurements are slightly larger in males which can be because of bone growth is regukated by many genetic, hormonal and environmental multiple factors. Moreover these measurements can be quiteuseful in terms of extractions of mandibular teeth especillay mandibular third molar which presents a wide range of realtioship with the canal. Blaeser*et al(*2003)[7] stated that close relation withthe mandibular third molarroots and proximityof the mandibular canal increasesthe risk of damage to the canal by 0.5% to 5%.

CONCLUSION

Panoramic radiography is an efficient tool for makingthe measurements and evaluating the course and morphometric reations of mandibular canal. This description about the various linear relations of the mandibular canal and its anatomicalrelations can contribute in surgical planning in number of dental proceduresin different age groups.

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