

## Mental Foramen / Canal / and Mental Block Anesthesia

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### Abstract

Fifty Chinese skulls were used in our study thirty one of their mandibles showed mental canals of various length and width extend from the mental foramen outward and the inferior dental canal inward. Also, the opening of the mental foramen is mostly directed upward and posteriorly.

This will affect mental block anesthesia. If the insertion technique of the injecting needle into the mental foramen is not done properly, the anesthetic solution will not flow into the canal. Even the mental nerve is anesthetized and the lip numbs, but there will be no block anesthesia to the continuation of the inferior dental nerve.

This will make confusion when the patient feels numbness of the lower lip whereas there is no nerve block which supplies the premolars and the anterior teeth. Palpation the foramen is not always possible because the opening is oblique and directed posterior-superiorly as reported in most studies.

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### Introduction

The locations of the mental foramen were defined by many studies<sup>1-11</sup>. Its location can vary from the mandibular canine to the first molar<sup>12</sup>.

This foramen is contained entirely within the buccal cortical plate of the mandibular bone<sup>1,2</sup>. The accurate identification of the mental foramen is important for both diagnosis and block mental anesthesia in oral surgery. The radiographic appearance of the mental foramen may misdiagnosis as radiolucent lesion in the periapical area of the mandibular premolars teeth.

The presence of mental canal and its dimension is the purpose of this work. Therefore the mental foramen is defined as an opening in the lateral surface of the mandible at the outer end of the mental canal

### Material and Methods

Fifty Chinese Skulls were used for this study. A fine reamer and a rubber stopper with central hole through it the reamer passed was to measure the depth of the mental canal.

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The reamer was inserted into the canals while the rubber stopper marks the outer opening of the canal. The measurements of the canals were marked from the tip of the reamer to stopper (Fig. 1, 2, and 3); the way of measuring the length and the width is illustrated in fig.2.

Digital periapical radiograph and computer for analysis and interpretations of the radiographs were used. Periapical film folder was used to obtain proper angulations to have more accurate dimensions.

The entire periapical radiograph must follow these criteria:

- 1- High quality with respect to angulations and contrast
- 2- The film must be free from any radiolucent or radio-opaque lesion
- 3- Shouldn't show radiographic exposure inaccuracy or artifacts.

Panoramic radiographs (OPG) to the out patients in the faculty of the dentistry at Ajman University of Science and Technology to evaluate the location of the mental foramen were taken. Also, the patients were examined to finding out the possibility of palpating the foramen.

### Results

The digital radiographs of the fifty mandibles concerning the presence of mental canal and the locations of the mental foramen reveal the following findings (Tab. 1)

- 1- 6% of foramina anterior to the first premolar; none of them shows canal
- 2- 80% of foramina between the two premolars; 62.5% of them have canals
- 3- 14% of foramina posterior to the second premolar; 85.7% of the have canals.
- 4- Out of fifty cases 31 show mental canals, whereas 19 cases didn't show canals, but only a mental foramen directly comes out of the inferior dental canal. The range of the length is 1.8 to 4.4 mm, and width 1.4 to 3.5 mm (Fig. 2).

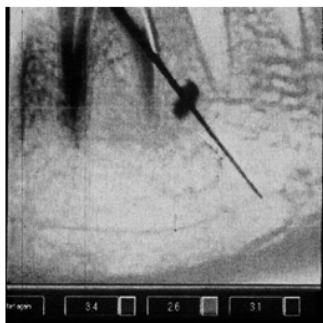


Fig 1 (a)

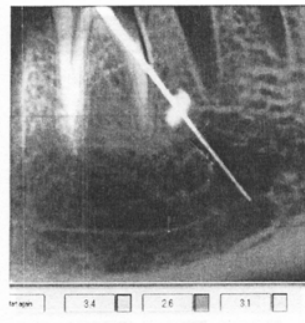


Fig 1 (b)

Radiographs illustrate the length of mental canal, which is between the stopper and the tip of the reamer. Tip is pointing to the inferior dental canal



Fig.2 Showing measurements of length and width of mental canal.

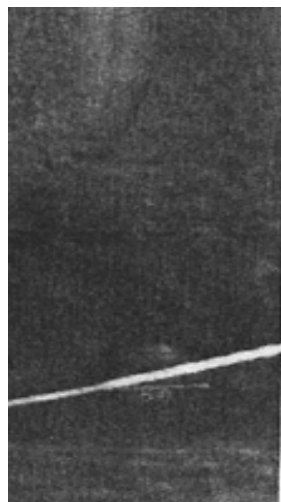


Fig. 3 No mental canal are illustrated.

### Discussion

The locations of the mental foramen were defined by many studies<sup>1-12</sup>. Our results conformed these locations of the foramen; our examination of fifty dry Chinese skulls showed (80%) of the mental foramen were between the premolars; this is in consistent with previous studies. While (6%) of the foramen were found anterior the first premolar and (14%) posterior to the second molar. Beside this the opening of mental foramen showed various directions, but mostly upward and posteriorly as reported<sup>1</sup>.

Our observation of the Chinese skulls agrees with pervious studies of the locations and

the directions of the openings of the mental foramina.

This study clearly demonstrates the presence of mental canal, and the digital periapical radiograph and computer analysis interprets various dimensions of the mental canal, which is between the mental foramen externally and the inferior dental canal internally (Fig. 1, 2).

From these finding mental block anesthesia needs direct injection of anesthetic into the mental foramen/canal/ to block the continuation of the inferior dental nerve to its end. Failure to achieve this then anesthetic solution will not flow into the mental canal especially when the foramen is directed upward and posteriorly.

	Mental Foramen Locations			Presence and Dimensions of Mental canal		
	Anterior to 1 <sup>st</sup> premolar	Between Premolars	Posterior to 2 <sup>nd</sup> premolar	Presence of Canal	Length of Canal in mm	Width of Canal in mm
1	Yes			No canal	0	-
2	Yes			No canal	0	-
3	Yes			No canal	0	-
4		Yes		Yes present	3	2.8
5		Yes		=	4.4	2.5
6		Yes		=	3.1	3
7		Yes		=	3.1	3
8		Yes		=	3.7	2.2
9		Yes		=	2.8	2.1
10		Yes		=	3.4	3.1
11		Yes		=	2.8	2.9
12		Yes		=	4.1	3.2
13		Yes		=	3.7	2.1
14		Yes		=	3.3	2.6
15		Yes		=	3.5	2.8
16		Yes		=	3.9	3.1
17		Yes		=	2.8	2.8
18		Yes		=	3	2.3
19		Yes		=	1.8	2
20		Yes		=	2.7	2.4
21		Yes		=	3.6	3.1
22		Yes		=	3.7	1.4
23		Yes		=	4.2	2.7
24		Yes		=	3.3	2.1
25		Yes		=	2.9	2.1
26		Yes		=	4.2	3.1
27		Yes		=	2.5	2
28		Yes		=	3.1	3.5
29		Yes		No canal	0	-
30		Yes		No	0	-
31		Yes		No	0	-
32		Yes		No	0	-
33		Yes		No	0	-
34		Yes		No	0	-
35		Yes		No	0	-
36		Yes		No	0	-
37		Yes		No	0	-
38		Yes		No	0	-
39		Yes		No	0	-
40		Yes		No	0	-
41		Yes		No	0	-
42		Yes		No	0	-
43		Yes		No	0	-
44			yes	Yes	3.4	2.6
45			yes	Yes	3.3	2.6
46			Yes	Yes	3.8	2.6
47			Yes	Yes	2.2	1.8
48			Yes	Yes	3.6	2.4
49			Yes	Yes	3.7	2.6
50			Yes	No canal	-	-

Tab. 1 shows: various locations of mental foramen, and presence of mental canals in 31/50 Chinese mandibles.

Then there will no block anesthesia to the continuation of the inferior dental nerve, but only anesthesia the mental nerve outer to its exist from the mental foramen, This will make confusion when the patient feels numbness of the lower lip whereas there is no nerve block which supply the premolars and the anterior teeth.

### Conclusions

This study showed the presence of different lengths of mental canal in about two third of the Chinese mandible and the presence of mental foramen anterior to the first premolar, between the premolars and posterior to the second premolar teeth. This variation has to be consideration in the mental block anesthesia. Therefore the mental foramen is an opening in the lateral surface of the mandible at the outer end of the mental canal.

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