

**A STUDY TO DETERMINE THE LOCATION AND
MORPHOLOGY OF INCISIVE CANAL AND FORAMEN**

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ABSTRACT

Objectives:

(1) To obtain the mean dimensional measurements of the incisive canal structures and anterior maxillary bone thickness and the incisive foramen location of Malaysian Malays and Chinese. (2) To determine and compare incisive canal length and width between the Malays and Chinese. (3) To measure and compare the incisive foramen diameter and nasal foramina diameter between the Malays and Chinese. (4) To measure and compare maxillary bone thickness anterior to the incisive canal between the Malays and Chinese. (5) To determine and compare incisive foramen location between Malays and Chinese. (6) To classify and compare incisive canal according to its direction between Malays and Chinese. (7) To classify and compare the canal according to the number of channels in the middle portion between the Malays and Chinese. (8) To determine the effects of advancing age on the dimensions of the incisive canal and related structures.

Materials and Methods

Ninety-four Cone Beam Computed Tomography (CBCT) images were selected based on the inclusion and exclusion criteria. From sagittal views the incisive canal morphology, location and the anterior maxillary bone thickness were identified and evaluated using CBCT. The length of the canal was measured as a distance between the nasal foramen and the incisive foramen, and the inner width of the canal measured at three levels (the mean was calculated). The anterior maxillary bone thickness was measured from the outer canal wall to the outer cortical plate of the buccal bone. While the location of the incisive canal was the measured distance between the incisive foramen and the most antero-inferior point of the maxillary buccal bone. A horizontal cross-section slice was studied in the middle portion of the canal to determine the

number of channels. Subsequently, employing the interactive SimPlant software the incisive canal direction and course were studied and classified.

Results

The mean length of the canal was 16.24 (± 2.96) mm. The right incisive canal was longer than the left canal (the mean of the right canal-16.65 (± 4.46) mm and the mean of the left canal-15.98 (± 4.71) mm). Incisive canal was wider in males than females especially in Malays (the mean in males- 4.05 (± 1.57) mm and the mean for female- 3.16 (± 0.77) mm). The mean anterior maxillary bone thickness - 7.54 (± 1.65) mm with Chinese females having a thickness of 6.76 (± 1.41) mm. However, there was a reduction of the bone thickness with age affecting the position of the incisive foramen. When gender comparisons were made, the general bone thickness was greater in males than females, especially in Chinese (the mean bone thickness in males=8.21 (± 1.82) mm and in females=6.76 (± 1.41) mm). The majority of the cases had slanted-curve canal with one channel at their middle portion.

Conclusion

There are many anatomical variations in morphology and location of the incisive canal and foramen. The right incisive canal is always longer than left canal regardless of gender, ethnicity and age group. Malay males exhibit large canals, thereby causing thin maxillary bone when compared with Chinese males. Interestingly Chinese females have the thinnest anterior maxillary bone thickness. The majority of the Mongoloid population have slanted-curve canal with one channel at the middle portion of the incisive canal. These findings may be of clinical importance during surgical procedures, especially implant placement. For that reason, a careful assessment of this area during the pre-operative planning procedures is important.

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I dedicate this project to all the people for it is with their support and prayers that I have been able to accomplish this project. My great father and my wonderful mother. I hope that I have achieved part of their dreams.

DECLARATION

I certify that this dissertation is based on my own independent work, except where acknowledgment in the text or by reference.

No part of this work has been submitted for a degree or diploma to this or any other university.

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