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The Position of the Mental Foramen In Singaporean Malays and Indians

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The position of the mental foramen of the local Malays and Indians in Singapore was determined from a series of orthopantomograms. The most frequent location does not conform to the position cited in many anatomy, surgery, and dental anesthesia texts as being below and between the apices of the lower premolars. This data has implications in the teaching and practice of dental anesthesia. In both these races, the median location is just below the second premolar.

In a recent report, Green[1] reviewed the status of research on the location of the mental foramen. He concluded that while the typical location, just below the apex of the lower second premolar, was well established, recent texts[2–3] continue to record its location inaccurately whereas others are correct.[4–5]

This brief report, based on patients seen at the National University of Singapore, adds further data on the location of this anatomical landmark in South East Asians. This is of interest, in part, because of the considerable migration of South East Asians recently to other parts of the world.

The population of Singapore is predominantly Chinese (76%) with Malays and Indians comprising 15% and 7%, respectively. As data on the Chinese is already extensive,[1,6–8] this study focuses on the Malay and Indian patient population.

METHODS

One hundred fifty-eight orthopantomograms taken from 1982 to 1988 of Singaporean Indian and Malay patients treated by the students at the National University of Singapore were used. All radiographs were examined. They were viewed in a dark room on an x-ray viewer. The mental foramen was located as a radiolucency that can be traced by following the inferior dental canal (Figure 1).

The method of evaluation was adopted from Green,[1] who related the position of the foramen to the teeth. This was accomplished with the aid of a T marked on a plastic sheet and placed over the mandible on the radiograph. The occlusal plane was aligned to the horizontal bar, and the vertical bar located the position of the mental foramen.

The position of the foramen was recorded in relation to adjacent mandibular teeth, as (1) at the apex of the first premolar; (2) in between the apices of the first and second premolar; (3) at the apex of the second premolar; (4) in between the apices of the second premolar and the first molar; or (5) at the mesial half of the first molar (Table 1).

Readings were obtained from both left and right sides of the mandible. As the position of the foramen was highly dependent on the presence of teeth, cases that were missing multiple posterior teeth or considerable drifting of teeth had occurred, were excluded.

RESULTS

All of the radiographs were of adequate quality and could be read. Three individual foramina were excluded because they did not meet the criterion. Each film was read two times. The percent agreement between ratings was 85.0. Kappa was calculated as a measure of agreement corrected from agreements expected by chance. Kappa was 0.761 ($p < 0.5$) and is considered to represent substantial agreement.[9] Examination of the percentages in Table 1 demonstrates the mental foramen to be most commonly located below the apex of the second preomolar for the right and left sides of both the Singaporean Malays and Indians.

DISCUSSION

This work builds on and extends the seminal work of Green[1] in which he re-analyzed and critically evaluated data from 45 studies of the location of the mental foramen

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Table 1. Position of the Mental Foramen in Singaporean Malays and Indians Seeking Care at the National University, 1982–1988

Sample Population	Size (n)	Distribution (%) 1	2	3	4	5	Median Position*
Indians	Left (96)	5 (5.2)	19 (19.8)	49 (51.0)	20 (20.8)	3 (3.1)	3
	Right (93)	5 (5.4)	17 (18.3)	40 (43.0)	21 (22.6)	10 (10.8)	3
Malays	Left (62)	2 (3.2)	11 (17.7)	43 (69.4)	2 (3.2)	4 (6.5)	3
	Right (62)	1 (1.6)	9 (14.5)	41 (66.1)	6 (9.7)	5 (8.1)	3

* Median test for all comparisons $p > 0.05$.

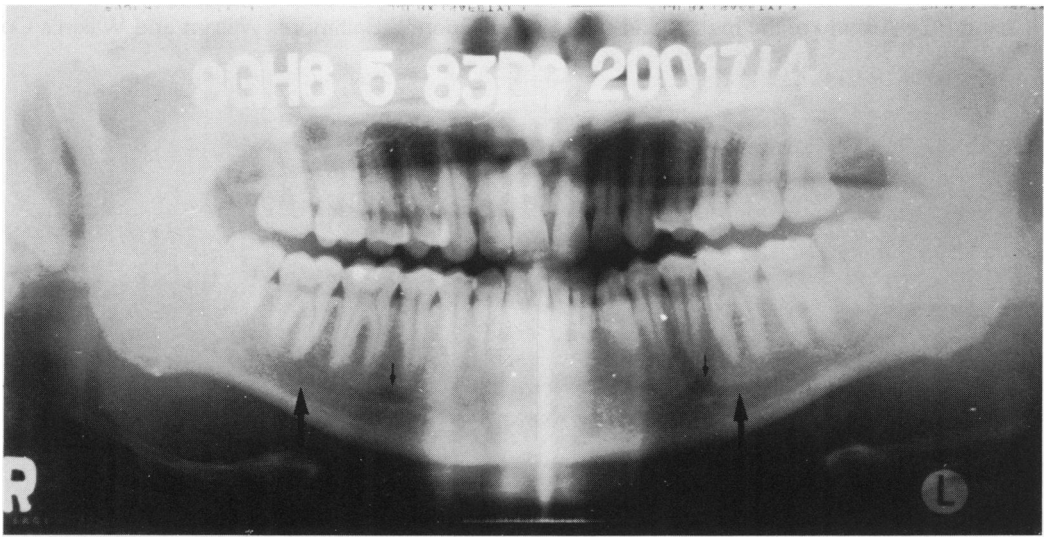

Figure 1. On a radiograph, the mental foramen (see arrows) is located as a radiolucency that can be traced by following the inferior dental canal.

in skulls or on radiographs. His data demonstrates that the most common position of the foramen is just below the apex of the second premolar in nearly every study. Similar findings are also reported here for other racial groups. Moreover, the consistency of measurement between the studies increases the usefulness of findings in an area plaqued by varying methods.

Knowing the site of the mental foramen allows for accurate delivery of local anesthesia for dental procedures and the avoidance of damage to the nerve in surgical procedures. It also aids in interpreting anatomical landmarks in oral pathology and forensics. It is pretty clear from this work that the location of the foramen is not a reliable landmark for distinguishing race.

This study also is an improvement over previous reports in that a measure of reliability (Kappa) is provided and data is presented for the two sides of the mandible separately.

The major limitation of this and previous studies is classification of race. The Malays in Singapore are frequently Javanese or of some other Indonesian origin sharing a common religion and modern language. Their origin is likely complex. The majority of Indians speak Tamil but there are at least 19 groups divided by religion and language, as well as by caste, and some of these are the Malayelee, the Hindi, and the Punjabi. Moreover, intermarriages are on the increase.

Nonetheless, it is time to alter texts on anatomy,[3,10] surgery,[2] and dental anesthesia[11,12] to state the common location of the mental foramen as being below the apex of the second premolar, instead of citing its usual position to be below and between the mandibular premolars without any justification.

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