

# Analysis of the Tooth Length of Maxillary Incisors in Indonesian Mongoloid Race Population Based on Periapical Radiography

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**Abstract**—Accurate assessment of the tooth length of maxillary incisor determines the success and prognosis of an endodontic treatment outcome. Periapical radiography is a method that can be used in determining the tooth length. This study was done to determine the average of the tooth length of maxillary incisors radiographically. Descriptive with cross sectional approach was used using eighty samples and samples selected by purposive sampling and the data were collected by questionnaire and x-ray photographs using periapical radiography. The research was conducted in Radiology Unit, Dental Hospital, Faculty of Dentistry, Universitas Sumatera Utara, on July and September 2017. The tooth length of maxillary incisors in Indonesian Mongoloid races population radiographically was 21-22 mm and all incisors had a single root (100%). It can be concluded that average of the tooth length of maxillary central incisor radiographically is 22.03 mm and lateral incisor is 21.23 mm.

**Keywords**—tooth length, maxillary incisor, periapical radiography

## I. INTRODUCTION

The knowledge of the tooth is important for dentists before endodontic treatment, especially to determine the working length. Tooth length and number of roots is one part of the external morphology. Errors in the determination of tooth length may cause endodontic instruments to go beyond the apical foramen, resulting in extravasation of irrigating solutions and restorative material into the periradicular tissues [1].

Periapical radiography is a commonly used radiograph during endodontic treatment. The use of periapical radiographs before, during, and after treatment is essential in order to identify and monitor anatomical details, canal length, obturation quality, and tooth and bone pathology [2].

Most of the available literature shows that endodontic treatments are frequently performed in maxillary incisors [3-5]. Research published by Ingle & Bakland was done in Caucasian people, and there is no information available supporting the use of tooth length in non-Caucasian especially in Malayan Mongoloid sub races. Therefore researchers are interested in

conducting a research on the tooth length of maxillary incisors in Indonesian Mongoloid race population by using periapical radiography.

## II. MATERIALS AND METHODS

The method of this research is descriptive with cross sectional approach. Eighty samples are selected from a population of Mongoloid race in the city of Medan, Indonesia. Inclusion criteria were aged 18-24 years and a pure from Mongoloid race for two generations. Exclusion criteria were fractured tooth, tooth with pulpitis, tooth that has undergone endodontic and orthodontic treatment. This research used purposive sampling and the data were collected from questionnaires. Periapical radiography technique was done in the maxillary incisor on right and left side. The length of incisors was measured using a viewer box and a digital caliper to an accuracy of 0.01 mm. The entire tooth length was measured at its longest point from the incisal tip to the root apex.



Figure 1. The method of measurement the tooth length (TL).

### III. RESULT

TABEL 1. THE PERCENTAGE OF THE NUMBER OF MAXILLARY INCISOR ROOTS

No	The teeth	Number of roots (%)	
		1 (one)	>1 (More than one)
1	Maxillary central incisor	100 %	-
2	Maxillary lateral incisor	100 %	-

TABEL 2. THE AVERAGE OF THE LENGTH OF MAXILLARY INCISOR TEETH

No	The teeth	Average of the length (mm)
1	Maxillary central incisor	22.03
2	Maxillary lateral incisor	21.23

### IV. DISCUSSION

The population investigated in this study consisted of the population from Mongoloid races in Medan city, Indonesia, who were attending Dental Hospital, Faculty of Dentistry, Universitas Sumatera Utara, for the first time for a periodic checkup or required general dental treatment. The sample was selected according to the inclusion and exclusion criteria, periapical radiographic are performed on maxillary incisors on the left and right side.

Several studies have been done to assess the tooth length of maxillary incisors by using direct method and radiography technique. According Jayawardena et al, the mean of the tooth length on central incisors was 23.12±1.69 mm and lateral incisor was 22.05±1.47. Their research sample is from Sri Lankan Sinhalese and the method was direct measurement with digital calipers on extracted teeth [6]. Another method is with cone beam computed tomography (CBCT) that Choi et al. used in samples from Korean population. The tooth length on that study is maxillary central incisor 22.8±1.15 mm and maxillary lateral incisor 21.6±1.0 mm [7]. Research by Harris et al showed the tooth length of central incisor was 26.26±2.49 mm (males) and 25.21±2.14 mm (females), and lateral incisor was 25.15±2.42 mm (males) and 23.78±1.95 mm (females). Periapical radiography method was used and the samples are White American adults [8].

In the present study, samples were obtained from Mongoloid race and method was done using periapical radiography. All sample had a single root (100%). The length tooth of maxillary central incisors was 22.03 mm and lateral central incisor was 21.23 mm. The tooth length in this study was not much different from the

study done by Choi et al. but differs from the study done by Jayawardena et al. and Harris et al. According to Edgcomb et al., the root length of Asian teeth is shorter than Caucasian, Hispanic, and African American. The difference generally occurs in the maxillary central incisors, the mandibular central and lateral incisors and mandibular second premolars [9].

In conclusion, the average of the tooth length of maxillary central incisor radiographically is 22.03 mm and lateral incisor is 21.23 mm. The races can influence the tooth length and periapical radiography can be used to estimate the tooth length better than other two dimensional radiography.

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