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COMPARISON OF TOOTH CROWNS AND ROOTS BETWEEN BANJARESE AND JAVANESE PATIENTS AT GUSTI HASAN AMAN DENTAL HOSPITAL

Bayu Indra Sukmana¹, Huldani², Anugrah Qatrunnada Hakim³

¹Departement of Oral Radiology, Faculty of Dentistry, Lambung Mangkurat University Banjarmasin

²Departement of Physiology, Faculty of Medical Lambung Mangkurat University Banjarmasin

³Faculty of Dentistry, Lambung Mangkurat University, Banjarmasin

ABSTRACT

Background: Comparison between crowns and roots of the teeth has an important role in determining treatment planning in orthodontics and prosthodontics field. Indonesia, an archipelagic state with diverse ethnicities, is dwelled by 1.300 ethnic categories distributed in various islands including Kalimantan and Java based on the 2010 population census. Javanese is one ethnicity classified in Deutro-Malay sub-race as the result of miscegenation between Proto-Malay sub-race and Mongoloid race. Banjarese, contrarily, is derived from Proto-Malay race which based on Radam theory is originated from a low-lying area adjacent to rivers. There is an urge to examine the comparison of tooth crowns and roots between Javanese and Banjarese due to different racial origin that may greatly influence the treatment plan and prognosis of dental care. **Objective:** To analyze the differences in roots and crowns length of teeth between Javanese and Banjarese. **Methods:** All medical records of outpatients in all departments in GustiHasanAman Dental Hospital from 2018 to 2019 were examined and status card from Javanese and Banjarese patients were preferred. **Result:** The result of tooth roots and crowns comparison in Javanese and Banjarese outpatients at GustiHasanAman Banjarmasin Dental Hospital showed that there were differences in root and crown length between Javanese and Banjarese patients. Comparison of tooth roots and crowns between Javanese was 0.719 and Banjarese was 0.838. It can be concluded that there is a significant difference in the comparison of tooth crowns and roots between Javanese and Banjarese in GustiHasanAman Banjarmasin Dental Hospital.

Keywords: Crowns, Banjarese, Javanese, roots.

Correspondence: Bayu Indra Sukmana, Faculty of Dentistry, Lambung Mangkurat University Banjarmasin Jalan Veteran No.128B, Banjarmasin, Kalsel, email : drg_bayuindra@yahoo.co.id

INTRODUCTION

Comparison of crown and root length holds an important role in determining treatment planning in orthodontics and prosthodontics fields. Patients with shorter root than average length may increase the risk of root exposure in orthodontic treatment as well as degradation in the prognosis of fixed partial denture treatment. This study compares crowns and roots of permanent incisors which are deployed as incisors possess the lowest crown and root ratio compared to other teeth based on Wang, *et al* study in 2019. Any

variation of crowns and roots ratio occurred in teeth is strongly influenced by race, gender and ethnicity.^{1,2,3.}

Indonesia is an archipelagic state with diverse ethnicities. The 2010 population census reported that there are 1.300 ethnic groups remarked in the country and the vast arrays of Indonesian ethnics are widely distributed in various islands of Indonesia including Kalimantan. Javanese is the largest ethnic in Indonesia presenting 64% of the national population. They are mostly concentrated in the island of Java while also dispersed in other regions of Indonesia. Javanese is classified in Deutero-Malay sub-race as the result of

miscegenation between Proto-Malay sub-race and Mongoloid race. Kalimantan is the largest island in Indonesia which consists of 5 provinces and one of which is South Kalimantan. The native of South Kalimantan Province is Banjarese who comes from three different tribal groups living as one. According to Radam's theory, Banjarese is originated from the lowlands adjacent to river mouths by the sea. This group belongs to Proto-Malay race.^{2,4,5}

Until now, there is still a little information about tooth crowns and roots comparison between Banjarese and Javanese. There is an urge to examine the comparison of crowns and roots in Javanese and Banjarese due to different racial origins of both groups in addition to the great influence towards treatment plans and prognosis of dental care.

METHODS AND MATERIALS

The method used in this research was observational analytic with cross sectional approach in which the analysis and the collection of data were carried out simultaneously. The tools and materials used in this study were pencils, rulers, and cameras. At the initial stage of the study, all medical records at the GustiHasanAman (GHA) Banjarmasin Dental Hospital were piled and all patients from Javanese and Banjarese ethnicities with periapical radiographs of maxillary incisors would be subsequently selected. The length of crowns and roots were measured using a ruler. The data was then applied into the following formula:

$$ATL = \frac{ACL \times RTL}{RCL}$$

Note :

ATL = Actual Tooth Length

ACL = Actual Crown Length

RCL = Radiographic Crown Length

RTL = Radiographic Tooth Length

Statistical analysis using Shapiro-Wilk test and Levene's Test variance homogeneity test was performed. It was revealed that the data were normally distributed and homogeneous ($p > 0.05$) therefore they are further analyzed using independent parametric t-test with a confidence level of 95%.

RESULTS

This research had been conducted by taking data from periapical radiographs of Javanese and Banjarese outpatients at GustiHasanAman Banjarmasin Dental Hospital. The study deployed 10 periapical X-ray radiographs from Banjarese patients and 10 periapical X-ray radiographs from Javanese patients. The data obtained were then calculated using the actual tooth length measurement formula. Data of tooth crowns and roots length from the formula were compared and the comparison result of tooth crowns and roots was acquired.

Table 1. Mean value of crown and root length ratio of Banjarese and Javanese

Group	N	Mean \pm SD Scoring (10^3 sell/ 10^9m^3)	95% Significance Value
Javanese	10	0.838 \pm 0.09468	0.008*
Banjarese	10	0.719 \pm 0.08329	0.008*

Ket: Unpaired t-test. *Significant ($P < 0.05$)

Table 1 demonstrated that the mean ratio of tooth crown and root length in Javanese group was significantly higher ($p = 0.008$) than those in Banjarese group. The results of unpaired t-test showed that there was a significant difference in the comparison of tooth crowns and roots between Javanese and Banjarese.

DISCUSSIONS

The study of tooth crowns and roots in Javanese and Banjarese patients at GustiHasanAman Banjarmasin Dental Hospital was resulted in significant differences in the length of tooth crowns and roots between Javanese and Banjarese outpatients. Comparison of crowns and roots length in Javanese patients obtain p value equal to 0.719 while in Banjarese patients was 0.838. The difference in crown and root length between the two ethnics may be generated by several factors including genetic, environment, nutrition, ethnicity and race.^{6,7,8,9.}

Genetic factors exhibit ninety-percent role in determining tooth anatomy. These factors include several facets that are regulated through heredity. Gene derives hold an important role in the process of

craniofacial growth and odontogenesis hence they strongly influence tooth anatomy, such as the shape and the length of the teeth. The genetic traits of each individual are carried by 23 chromosomes where DNA is located at the core to translate individual characteristics to the offspring. In genetic theory, this concept is known as genotype and phenotype. Genotype is the interpretation of DNA genetic code while phenotype is the visible characters of the genotype. Apart from genetic factors, tooth anatomy is also influenced by environment. Environment exerts influences in genetic diversity which determines the variance of tooth anatomy. Tooth anatomy will continue to vary as human remains to evolve.^{8,10,11,12.}

Nutrition in human growth and development also holds a significant role in determining the size and shape of the teeth. According to Yonemochi (2012) study, the sufficient amount of glucose preserved during tooth development period is crucial for size and shape formation of the teeth. Moreover, this research also claimed that microdontia or small-sized teeth is more common in children who experience nutritional deficiencies.^{5,13,14}

Diverse ethnicities in Indonesia may also contribute to the variation of tooth length and anatomy. This prompts as the result of different genes and contrasting habits from each ethnic which may affect the growth of the teeth. Javanese is classified in Deutero-Malay sub-race which is the combination of Proto-Malay sub-race and Mongoloid race. Physical characteristics of Deutero-Malay race include moderate height, straight hair and yellowish brown skin. Banjarese is the native of South Kalimantan Province which was established from the unification of three different ethnic groups. This group belongs to the Proto-Malay race.^{15,16,17}

This study indicates that there are differences obtained from tooth crown and root comparison between Javanese and Banjarese patients. This difference may affect the formulation of treatment plans in the field of dentistry. Orthodontics and prosthodontics fields consider crown and root length as pivotal aspect in determining treatment plans and prognosis. Shorter root length may increase the risk of root exposure in orthodontic treatment as well as deterioration in the prognosis of fixed partial denture. In conclusion, there are significant differences in the comparison of tooth crowns and roots between Javanese and Banjarese patients at Gusti Hasan Aman Banjarmasin Dental Hospital. This study will assist appropriate selection of treatment planning in

consideration of tooth size and crown-and-root ratio from each ethnicity.

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