

Teeth of Royalty from a burial in Jera Lompo'E, South Sulawesi, Indonesia*

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Abstract

Teeth are one of the key to understand disease and cultural influence in the past. This research describes abnormalities and cultural influences found in teeth belongs to Addatuang Sidenreng which is a royalty buried in Jera Lompo'E, South Sulawesi, Indonesia (17th century). The material consists of 13 teeth which currently curated in Laboratory of Bioanthropology and Paleoanthropology, UGM, Indonesia. This research uses bioarchaeological method and macroscopical analysis. The results are the individual age estimation, health status and cultural influences, such as betel chewing and dental filing which still practiced even after Islam enters Sulawesi, Indonesia.

Keywords: dental modification; betel chewing; South Sulawesi; Indonesia

* Authors are responsible for language correctness and content.

Introduction

Bioarchaeology is a scientific method to understand human life in ancient times using their remains (1). It often uses human teeth for its analysis because teeth are made of hard materials that can survive for a long time even in harsh environments (2). Teeth can provide information about oral dental health, diet, occupation, habits, cultural influences, status, economics (3), or even non-metric information, such as “shovel-shaped incisor”, which is a hereditary common traits in Asia continent (2,4). Research using teeth from archaeological context in Indonesia were discussed in multiple topics, such as descriptions of dental modification in individual from Flores (5), and Binangun and Leran (6). Other researches describes the relationship between teeth modification and Mongoloid race (7); correlation between type of dental modification, its distribution and timeline in Indonesia which provides information about migration based on dental modification in Prehistoric Period (8); or even study about dental modification practises from high social status in Classical Period, which shows differences between Prehistoric Period and Classical Period (9). All of those researches were done using Indonesian Prehistoric and Classical periods human remains.

The archaeological periods in Indonesia are separated chronologically into Prehistoric, Classical, Islamic, and Colonial periods. There was a possibility dental modification still existed in different form of modification during Islamic Period, which occurs after Indonesian Classical Period. However, research on teeth associated with archaeological sites from Islamic Period in Indonesia is very rare. The Islamic burial site which discussed in this article is Jera Lompo'E. Jera Lompo'E is a burial complex for Soppeng royalties, located in Dila Village, Lalabata, Soppeng, South Sulawesi, Indonesia. Astronomically, the site lies in $S04^{\circ}20'51.1''$, $E119^{\circ}52'53.6''$ (10), Figure 1. The site is located about 800 meters south of Watansoppeng, which is the capital of Soppeng Regency, on a

hilltop with an altitude 135 meters above sea level. The cemetery is bordered with stone walls, 27 meters in length and 23 meters in width with height about 1.25 meters. There are 30 graves dating between 16th to 19th century, but only 13 graves can be identified (11, 12). The Jera Lompo'E burial site has a high significance value because it is the burial site for Bugis Kings from Soppeng Kingdom. This study aims to examine the health status, abnormalities and cultural influences on teeth recovered from a burial in Jera Lompo'E. The results of this study will provide data on research in Indonesian archaeology, especially in Islamic Period culture and in wider context of Southeast Asian archaeology.

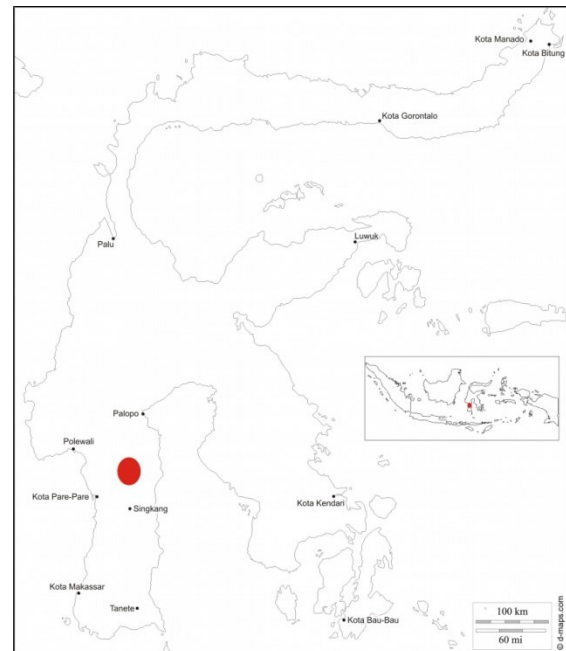


Figure 1. Location of Jera Lompo'E in South Sulawesi, Indonesia.

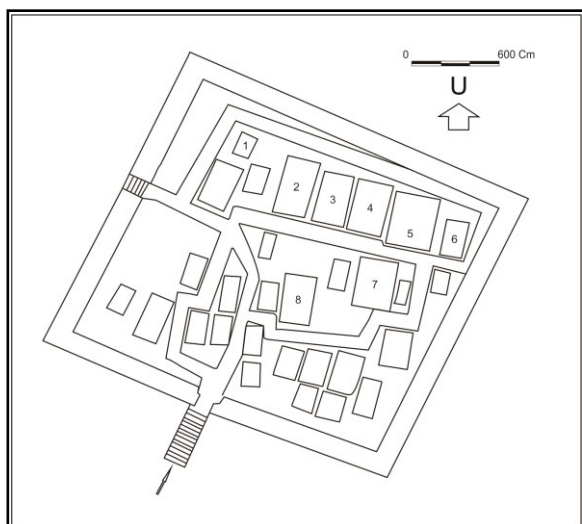


Figure 2. Grave location for Addatuang Sidenreng, number 2. (Source: Ambarly, 1985: 167).

Materials and methods

The material used in this study is teeth belonged to Addatuang Sidenreng, a royalty from Sidenreng Kingdom and buried in north side region of Jera Lompo'E, South Sulawesi (10). The teeth collection is now curated in Laboratory of Bioanthropology and Paleoanthropology, Gadjah Mada University, Indonesia. This collection is a result from excavation result by National Paleoanthropological Research project in 9 December 1979. It was obtained from 290 centimeters below the surface. However, there

are no other reports or studies have been found which describe the findings.

This teeth collection is in a relatively good condition and can be observed macroscopically. The entire crown of the teeth are complete and only small post-mortem damage. There are several root missing post-mortem but did not interfere with the observation and identification process.

This research uses macroscopic analysis method without using any destructive methods. This research only describe age at death, abnormalities and also cultural impact to the teeth.

Results and discussion

The result from this research cannot determine the sex of the individual. There are no evidence of caries and dental calculus, which are common dental diseases. This indicates the individual practised a good teeth hygiene, either consciously or unconsciously. Based on teeth identification (Table 1), it can be seen that almost all of them are from maxilla (12 teeth) and one from mandibula. It is also to be noted that there is no third molar from both sides of the maxilla, meanwhile premolar, first molar and second molar from left and right side are complete.

Right								Left							
M ³	M ²	M ¹	PM ²	PM ¹	C	I ²	I ¹	I ¹	I ²	C	PM ¹	PM ²	M ¹	M ²	M ³
	4	5	11	10		6	8	7		9	13	12	1	3	Maxilla
											2				Mandible

Table 1. Teeth identification table from Jera Lompo'E.

Estimated Age

All of the teeth are permanent teeth that belonged to an adult, based on size comparison between root and crown. Determination age at death in this study is using the Lovejoy's age estimation using dental attrition (13). It shows that this individual has an age at death between 40-45 years.

Dental abnormalities

Dental attrition

Dental attrition is a result that occurs due to friction and collision between the maxillary and mandibular teeth in mastication process. The attrition occurs on the occlusal surface of the teeth and it is a natural thing to be found in teeth which associated with archaeological site (14). In modern society, dental attrition is not as

heavy as in the past because of the food processing becomes better than before (3).

In this study, dental attrition can be seen on all occlusal surfaces, especially premolars and molars. Attrition also can be seen in incisors, but it is not as clear as molars because of the post-mortem damage. The high degree of molar occlusal wear indicates that this individual often used his teeth in the mastication process.

Shovel-shaped teeth

Shoveled teeth from this site can be seen on incisors number 6, 7 and 8. Shoveled teeth is a condition where incisors were shaped like shovel. The tooth is concave on lingual and has a slightly elevated portion on mesial and distal (25). Shoveled-shaped incisors most likely found in upper incisors and occasionally in lower incisors. These non-metric tooth traits usually found in individuals from Asia or Native American and it is a condition which passed by hereditary (2, 14, 15). Its presence in Indonesia is estimated to be 93% in maxilla (16).

Shoveled incisors are also present in other sites in Indonesia, such as Gilimanuk in Bali, Leang Codong in South Sulawesi (17, 18), Plawangan (19) and Liangan which located in North Java (20).

Cultural impact on teeth

Betel chewing

Dental discoloration can be seen in this individual by its dark brown colours at all of the crown surface. The entire labial incisors are filled with reddish-brown colour and it also presents in occlusal premolars and molars. It indicates betel consumption which this individual chewed bundles of betel with molar and premolar and used the bundles to colour the labial portion of the incisors.

Betel consumption is a habit mostly done by people in Southeast Asia and South Asia, with some communities in the Pacific and Madagascar (21). This habit still exists in modern days, although it is not practiced by everyone, mostly by older people. In the past, this activity is not to be bound by gender, age or social status (21).

Historical records from European travelers who came to Indonesia, such as Antonio Pigafetta from the Magellan expedition, reports betel consumption in Indonesian people. On his explorations to Borneo and Molucca, Pigafetta saw the chief of a tribe in Borneo had a wooden vase of betel, betel nut, lime, jasmine and covered with yellow silk (23), King of Molucca

had people carrying boxes filled with betel leaves and nuts (23), and he also reported betel consumption was not limited to kings or adults but also children (23).

The main ingredients for betel chewing are betel leaves, betel nut (*Areca catechu*) and lime. Sometimes tobacco, cardamom, or cloves are added to provide additional taste (21, 22). To consume, a person need to wrap betel nut and lime using betel leaves to make a bundle, and then chewed it. When chewing, the mouth will release saliva and creates red colour as reaction (22). After chewing, the bundle is used to colour the labial incisor, then placed inside the cheek or behind lower lip about 5 to 30 minutes (22). The quantity of betel nut consumption varies greatly, from 2 to 15 bundles per day (22). After tobacco is introduced, pieces of tobacco leaves are used to clean teeth a few minutes after chewing (22).

Some of the benefits of chewing betel are it can acts as mouth cleanser, sweet giver, to improve and clean voice, clean tongue, teeth, jaws and provides sense of taste. Betel also useful as a digestive and dental medicine, stamina enhancer and good for concentration and relaxation. Some additional effects are improving mood, reducing hunger and also serve as aphrodisiac (24).

Dental modifications

Dental modification is a condition where the teeth of an individual are modified intentionally or unintentionally caused by health, using teeth as tool, trauma or cultural influence (3). The modifications in this study were made due to cultural influence which also known as dental filing. There is no sex difference in dental modifications, but it can be ascertained that all the individuals who had dental modification were adults.

Addatuang Sidenreng dental modification, present in left maxillary canine tooth. The modification shows two grooves on the buccal surface, which is the result of dental filing process. The lower groove lies on the border between the crown and the root, meanwhile the upper groove lies on the buccal portion of the dental crown. There are no signs of modification in other parts or other teeth.

Differential diagnoses for this grooves is dental caries which can form a cavity and does some damages to the teeth. However, dental caries is very unlikely to form two parallel grooves on the teeth. In addition, there is a part of the groove which shows sharp angle as the result of dental

filing process. The smooth edge most part of the grooves indicates the modification process had been done long before this individual died.

Dental filing is also found in several sites in Indonesia, such as Leran, Binangun, Semawang and Gilimanuk (6, 8), which were usually done by sharpening the canine teeth to be shaped like a flower bud. However, most of the sites which show evidence of dental modification were Prehistoric and Classical Periods, and never Islamic period. There is possibilities that this parallel form was common in the 16th century, and it makes this topic needs further studies, to discuss the tradition of dental filing in Indonesia, especially Sulawesi after 16th century, Figures 3 - 6.

Conclusion

The teeth from Jera Lompo'E show that it belonged to Addatuang Sidenreng, a royalty from Sidenreng Kingdom. Age at death shows between 40-45 years old. This individual also consumed betel, which was an activity done by all sexes, races, ethnicity and social status in 16th to 19th centuries in South Sulawesi.

Moreover, the canine shows dental modification in form of dental filing. This shows evidence that dental filing still existed in the community of Soppeng even after Islam entered South Sulawesi. It proves that dental modification is a continuous tradition from Prehistoric Period to Islamic Period.



Figure 3. 3rd molar occlusal with high degree of attrition and evidence of betel chewing.



Figure 4. First incisor maxilla (number 7). Lingual side.



Figure 5. The evidence of teeth blackening using betel on labial incisor number 7.



Figure 6. Canine number 9 with evidence of dental mutilation on labial side (red line).

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