

CARABELLI'S CUSP IN MIXED DENTITION PHASES AND PERMANENT DENTITION EARLY PHASE

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ABSTRACT : Carabelli's cusp is one of the non-metric dental traits that most commonly investigated. The highest frequency of this trait was Caucasian or Western Eurasia, but the frequency of this trait at the people who fall into the Sunda Pacific was not low. Identification was usually performed in adults and appeared to have not been done in children, whereas the database of dental traits at an early age was also required. To know the present of Carabelli's cusp on Javanese at mixed dentition phases until the early phase of the permanent dentition. The sample was a model of the upper jaw, consists of 31 models of the Javanese boys in Surabaya aged 8, 10, and 12 years. The 93 models was observed 3 times by intra-observer to see Carabelli's cusp on the mesiopalatal region of the permanent upper first molar. Then Carabelli's cusp was divided into pronounced, weak, and none. In the group of children aged eight years, pronounced Carabelli's cusp was 16.13%, weak Carabelli's cusp was 25.8%, and no Carabelli's cusp was 58.07%. In children aged ten years, pronounced Carabelli's cusp was 12.9%, weak Carabelli's cusp was 19.36%, and no Carabelli's cusp was 67.74%. Whereas in children aged 12 years, pronounced Carabelli's cusp was 22.58%, weak Carabelli's cusp was 45.16%, and no Carabelli's cusp was 32.26%. Carabelli's cusp in the early phase of the permanent dentition is easier to observe.

Key words : Carabelli's cusp, Javanese, mixed dentition phase, permanent dentition early phase, human health.

INTRODUCTION

Carabelli's cup is one of the dental traits in the form of additional bulges in the mesiopalatal area of the maxillary permanent first molar that was first discovered by George Carabelli in 1842 (Khan *et al*, 2011; Mavrodisz *et al*, 2007). These bulges can be in the form of pits, grooves, smooth protrusions without free ends to cusp-like formations (Dissayanake *et al*, 2004), but they can also be unilateral or bilateral. Genetic factors are thought to play a role in influencing the size and shape of Carabelli's bulges. The shape of the cusp appears very clearly in the homozygote state, whereas the groove or pit shape is usually found in a heterozygote state (Khan *et al*, 2011).

The highest frequency of the presence of Carabelli's cusp is found in the Caucasoid population, whereas in the Mongoloid population the frequency is low (Hsu *et al*, 1999; Khan *et al*, 2011). Population division based on the state of the teeth proposed by Scott and Turner (2000), states that the Caucasoid population is included in the Western Eurasian group, while the Mongoloid population is divided into Sino America (proto Mongoloid) and Sunda Pacific (southern Mongoloid). Indonesian

regions like other Southeast Asian regions are classified in the Sunda Pacific. According to Scott and Turner (2000) cited by Artaria (2010), Sunda Pacific does not have the highest frequency of dental traits that can be used to differentiate from other population groups. Even the frequency of the Carabelli's cusp in the Sunda Pacific group is almost the same as Western Eurasia. The shifting phase is a transition from the primary gear phase to the permanent dentition phase (Setijanto *et al*, 2019). This phase is marked by the eruption of the first permanent tooth, which generally begins with the eruption of the first permanent molar (Marjianto *et al*, 2019). The first molar erupts permanently at around five to six years (Sofyanti *et al*, 2018). The tooth replacement phase ends when the date of the last deciduous tooth (Rahardjo, 2009). Ulfa (2009) states that the phase of transitional teeth or also called mixed teeth is the phase when deciduous and permanent teeth are together in the oral cavity (Achmad *et al*, 2019; Yunus *et al*, 2018). This phase is divided into two levels, namely the first phase before the eruption of the permanent first molar between the ages of 6-7 years and the second phase between the ages of 9-11 years when there is a change in canine teeth, the first molar,

and the second deciduous (Purwanti *et al*; Ulfa, 2009).

The purpose of this study was to determine the presence of the Carabelli's cusp of the Javanese population in the initial and final phase of mixed dentition and the initial phase of the permanent teeth.

MATERIALS AND METHODS

The sample of this study is a maxillary mold of a Javanese population boy, which was a private collection. Based on the data, the boy who had taken the maxillary mold was a Javanese population who lived in Surabaya and there were no mixed marriages for up to two generations, thus it was expected to minimize bias.

The total sample is 93 maxillary mold consisting of 31 Maxillary mold of boys aged 8 years (age range 7.5 - 8.5 years), which belonged to the early phase of mixed dentition group, 31 Maxillary mold of boys aged 10 years (age range 9.5 - 10.5 years), which includes the final phase of the mixed dentition group and 31 models of maxillary molds for boys aged 12 years (age range 11.5 - 12.5 years) which includes the initial phase of permanent teeth.

Carabelli's cusp was observed three times to see its presence in the mesiopalatal of maxillary permanent first molar which was then divided into: none, weak and pronounced. Carabelli's is categorized as weak, if it is only a very smooth groove or protrusion.

The results obtained are then percentage and then tabulated so they can be compared between groups.

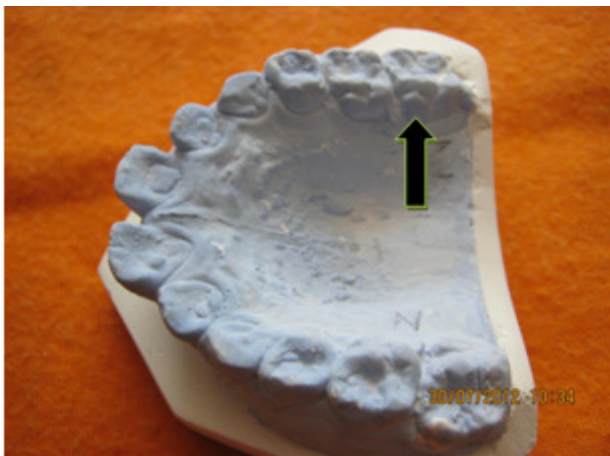


Fig. 1 : Carabelli's cusp (arrows) in the mised dentition phase.

RESULTS

After observing the three groups, the results are as shown in Table 1.

No Carabelli's cusp is the largest percentage in the early and final phase of mixed dentition (age 8 and 10 years). Whereas when compared with the other two groups, the biggest percentage for Carabelli's cusp that is clearly visible is in the early phase of permanent dentition group (age 12 years).

DISCUSSION

The sample used in this study was limited only to a maxillary mold of male children in order to avoid bias, because according to research conducted by Hsu *et al* (1999) in the Chinese population in Taiwan, there were significant differences in the presence of Carabelli's cusp between male and female, namely that in males the percentage of the presence of Carabelli's cusp is higher than females. Although, Falomo (2002) states there is no sexual dimorphism, both in frequency and expression of the Carabelli's cusp.

This study used a maxillary mold of the Javanese population, Javanese population included in the Mongoloid population group and is considered to have a lower frequency of presence of Carabelli's cusp when compared to Caucasoid populations. Research conducted by Hanihara (1976) shows that in Caucasian populations the percentage of Carabelli's cusp is higher (39%) compared to American Negro (16.3%), Aboriginal (15.7%), Eskimo (13%) and Japanese (6.5%). This study shows that in the phase of replacement teeth the absence of Carabelli's cusps is the largest percentage, ie 58.07% in the initial phase of the mixed dentition and 67.74% in the final phase of the mixed dentition. These results are consistent with research conducted by Hsu *et al* (1999), which states that of the 297 samples aged 12-15 years only 36.8% showed the presence of a Carabelli's cusp, while the rest were not visible. Research conducted by Falomo (2002) in the Nigerian population revealed that out of a total of 2604 subjects studied, only 17.43% indicated the presence of a Carabelli's cusp. Likewise the study conducted by Khan *et al* (2011) on the population of Pakistan showed that of the 400 samples, 70.3% of them did not indicate the presence of a Carabelli's cusp.

Table 1 : Percentage of Carabelli's cus[in the initial and final phase of mixed dentition and the initial phase permanent dentition.

Age	n	No Carabelli's cusp	Weak Carabellis'cusp	Pronounced Carabelli's cusp
8 years	31	58.07%	25.8%	16.13%
10 years	31	67.74%	19.36%	12.9 %
12 years	31	32.26%	45.16%	22.58%

The results of this study also showed that compared to the two mixed dentition phase, in the initial phase of permanent dentition, the percentage of no Carabelli's cusp to be much lower (32.26%), while the percentage of weak Carabelli's cusp (45.16%) is higher compared to the initial phase of the mixed dentition, which was only 25.8% and the final phase of mixed dentition was only 19.36% (Table 1). Although the difference is not so large, the percentage of the presence of Carabelli's cusp in the initial phase of permanent teeth is greater than the two groups of the mixed dentition phase, which is 22.58%.

So far, observations of the existence of Carabelli's cusp rarely consider the age of the subjects studied. The study is mostly done at adulthood, although there are also studies conducted at adolescents 12-15 years with consideration that if observed at adulthood will affect the shape and size of the Carabelli's cusp due to attrition ie wear and tear caused by the use of teeth (Hsu *et al*, 1999). Observation of the existence of Carabelli's cusp in this study was carried out in the mixed dentition phase and the initial phase of permanent teeth to observe whether the shape and size of Carabelli's cusp differed between these phases. This difference is probably due to the fact that during the initial phase of mixed dentition, the eruption of the permanent first molar was incomplete. Calcification of the first permanent molar begins at birth, then the crown is perfect at 4 - 5 years old. The first permanent molar will begin to erupt at the age of 6-7 years and its roots are perfect at the age of 9-10 years. The eruption phase will end when the tooth has occupied its occlusion in the jaw. Because the size and shape of the teeth is more determined by genetic factors, the biggest possibility of differences in the results of whether or not Carabelli's cusp appears between the three phase groups in this study is mainly due to imperfect eruption.

CONCLUSION

The conclusion that can be drawn from this study is that the presence of Carabelli's cusp in the mixed dentition phase and the initial phase of the permanent teeth is equally low, but it is easier to observe in the initial phase of the permanent teeth. This is evident from the percentage of the presence of Carabelli cusp, which is greater than the other two groups.

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