



Frequency, Size, Distribution and Clinical Significance of Carabelli's Tubercle in South Indian Population

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ABSTRACT

The aim of the study is to determine the frequency, size and distribution of Carabelli's Tubercle in South Indian Population and to analyze its clinical significance. The objective is to observe and analyse the presence of Carabelli's Tubercle on upper first molar tooth in South Indian Population. The cusp of Carabelli or Carabelli's tubercle is a small additional cusp or tubercle or ridge on the lingual surface at the mesiopalatal line angle of maxillary first molar tooth. The carabelli's cusp of the maxillary molar is frequently considered for anthropological studies. The distribution of carabelli's trait is highly variable among individuals of different places. The study was performed among a total sample size of 60 with 30 male and 30 females in young adult individuals. In all the subjects the presence of Carabelli's Tubercle is checked and analysed on the upper first molar tooth and if found is noted for its shape and size. Out of 60 individuals the tubercle was present in 23 with a percentage of 38.33%. Among this the total number of male with tubercle was 09 (15%) and female was 14 (23.33%). Out of 23 individuals, the presence of this tubercle was prominent only in 3 persons (13.04%). The Carabelli's tubercle is mainly used for differentiation between different populations but it has also significant in clinical dentistry. The carabelli's tubercle can be usefully in establishing phylogenetic relationships between closely related populations.

Keywords: Carabelli's Tubercle, maxillary first molar tooth, anthropology, phylogeny, clinical dentistry.

INTRODUCTION

Human dentition is constantly changing in its form, size and number¹. Teeth are an excellent object for the study of human variation. They are very resistant to post Mortem degradation and mechanical trauma². The cusp of carabelli is a tubercle or an extra cusp present on the mesiolingual surface of the maxillary first molar tooth. The cusp of Carabelli was first described by an Austrian dentist named George Von Carabelli in 1842³. It is separated from the mesiopalatal cusp by a groove known as cusp of Carabelli or Carabelli's groove⁴. He described it as a frequently occurring tubercle or cusp on the lingual aspect of the mesiolingual cusp of the maxillary first permanent molar. It is also referred as the fifth lobe, supplemental cusp, mesiolingual elevation, accessory cusp, tuberculum anomale, tuberculin Carabelli and tuberculin imparon⁵. The cusp of Carabelli is a heritable feature. It is entirely absent in some individuals and present in others in a variety of forms. In some cases this cusp may rival the main cusp in size and shape. Other related forms include ridges, pits or furrows. This cusp is mainly used for differentiation between different populations but it is also significant in clinical dentistry⁵. A Carabelli's cusp has been found in the Australopithecus and Netherland man, where it is only a groove. The distribution of Carabelli's trait is highly variable in different regions and races of the world⁶. Therefore it has been suggested that there has been an evolution in Carabelli's cusp for, a single groove to a well devolved cusp. The Carabelli's tubercle can be usefully in establishing

phylogenetic relationships between closely related populations⁵. A literature review on this trait suggests an ethnic variation and in some cases sexual dimorphism in its expression⁴. Analysing this trait is a good diagnostic tool, as some argue that Carabelli's trait that is increasing in size and frequency to compensate for the overall loss of tooth material, while others suggests that this trait is in the process of reduction and simplification of tooth morphology¹.

MATERIALS AND METHODS

The study was performed among a total of 60 with 30 male and 30 females young adult individuals. The required consent and assent from the patients were obtained after exposing them about the examination method and those willing to participate were included in this study. In all the subjects the cusp of Carabelli is checked and analysed on the upper first molar tooth and if found is noted for its shape and size and then photographed for further analysis.

RESULTS

Out of 60 young individuals the Carabelli's tubercle was present in 23 subjects contributing 38.33%. Among this the total number of male with tubercle was 09 (15%) and female was 14 (23.33%). Out of 23 individuals, the presence of this tubercle was prominent only in 3 persons (13.04%). All these observations were analysed and tabulated in Table 1 & 2 and Figure 1 & 2.

Figure 1 & 2 showing Carabelli's Tubercle



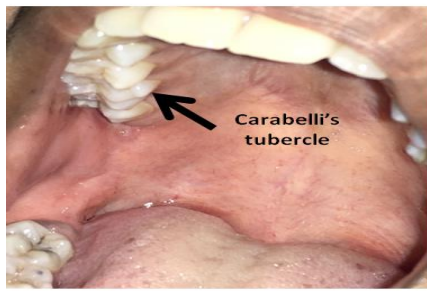


Figure 1

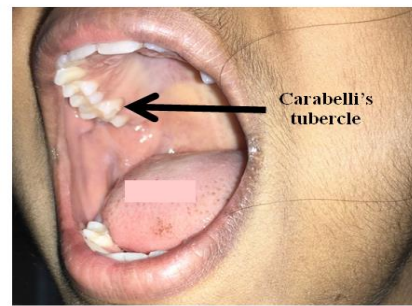


Figure 2

Table 1: Incidence of Carabelli's tubercle

Total Sample Size	Number of individuals with Carabelli's tubercle	Percentage (%)
60	23	38.33%

Table 2: Distribution of Carabelli's tubercle in male & female individuals

Number of individuals with Carabelli's tubercle	Sex		Percentage (%)
	23	Male	09
Female		14	23.33%

DISCUSSION

It is commonly accepted that dental characteristics such as size, shape, presence number of cusp and also the size of the dental arches, are genetically determined. For this reason the above mentioned characteristics differ among races and species and can constantly alter due to natural selection and genetic changes. The most commonly detected dental characteristics are the Carabelli's cusp. This can be used to determine the degree of intercourse between populations with different racial characteristics]. Tooth morphology has a great importance in Clinical Dentistry, Forensic Odontology and Anthropology. Cusp of Carabelli is important for the determination of ethnicity and for Forensic dentistry too. It has also got attention in many Science fields like Anthropology, Genetics and Evolution, as it regards as biological dominant in population ⁷.

The prefabricated molar bands that are commonly used by Orthodontists have no compensation for cusp of Carabelli which results in loose fit. As a result the space that remains between the bands and the tooth is filled by food debris and bacteria and it results in early dental caries and periodontal diseases. The cusp of Carabelli groove is a sensitive area for dental caries, being retentive of food debris. This needs to be kept in mind during pit and fissure sealing. Moreover, the commonly used molar extraction forceps have no accommodation for cusp of Carabelli which sometimes result in fracture of these teeth⁸. The anatomy of teeth can provide information on a population and as they are not influenced by time, they can be studied on skeletons and the development and changes of a population can be followed⁸.

CONCLUSION

The Carabelli's cusp is mainly used for differentiation between different populations but it has also significant in Clinical Dentistry. A Carabelli's cusp can be useful in establishing phylogenic relationships between closely related populations.

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