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Frequency and trends of cusp of Carabelli in maxillary first molars of patients visiting dental teaching hospital in Mardan, Pakistan

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Abstract

Introduction: Tooth variation has always been an area of interest to explore. The cusp of Carabelli is a small tubercle and is considered as a morphological change on palatal surface of the mesio-palatal cusp of maxillary permanent molars. The study was conducted with an objective to determine the frequency and trends of cusps of Carabelli in in permanent maxillary first molars of patients visiting dental OPD of a teaching hospital in Mardan.

Material and Methods: Hundred patients were examined between 11-55 years old attending the dental OPD of a teaching hospital in Mardan in a descriptive cross sectional study. Patients with severely carious, restored or missing upper first or second maxillary molars on any side were excluded. The maxillary first molars were examined for cusp of Carabelli.

Results: The frequency of cusps of Carabelli was seen in 32% of study population. All the subjects showed unilateral presentation and 69% of males showed expression of cusp of Carabelli when compared with females (31%). P value of 0.01 shows that the cusp of Carabelli is significantly more in males than females in maxillary molars

Conclusions: It was concluded that our study population had unilateral expression of cusp of Carabelli in maxillary first molar which was more pronounced in males than females.

Keywords: Permanent dentition; cusp of carabelli; dental anomaly

Introduction

The cusp of Carabelli or Carabelli tubercle or tuberculum anomaly of Georg Carabelli is a morphological variation usually seen as fifth cusp in molars.[1] The accessory cusp is usually found in first molar on palatal surface of the mesio-palatal cusp of maxillary permanent molars and can be seldom seen on second or third molars.[2] The cusp may present with different expression and range from pits, grooves, tubercles, cusp or altogether completely absent.[2] Though the etiology of the cusp is unknown but over activity of dental lamina is usually suggested as one of the cause. Similarly, genetic and exogenous factors seems to play a vital role on formation of cusp.[3] The cusp are more pronounced on maxillary first molars and usually presented bilaterally. No sexual dimorphism was seen but variations in size of this structure has reported.[4] Shethri examined 276 male Saudi patients for cusps of Carabelli and found the prevalence of Carabelli trait in selected Saudi population to be 57.6%. The trait was associated with increased carries prevalence.[2] Another study conducted on 320 Malaysian children concluded bilateral occurrence of the Carabelli trait (52.2%) and no sexual dimorphism was seen.[5] Kannapan studied models of 648 subjects for the presence of the trait and found 67.5% of maxillary deciduous second molars and 52.77% of maxillary permanent first molars with the trait. Maxillary deciduous second molars were predominantly seen in females.[6] Not many studies have been conducted on frequency and pattern of cusp of Carabelli in Pakistan. The study was conducted to determine the frequency and trend of cusp of Carabelli in permanent maxillary first

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molars of patients visiting dental OPD of a teaching hospital in Mardan.

Material and Methods

The descriptive cross sectional study was conducted in a teaching hospital in Mardan where hundred patients were examined for presence of cusp of Carabelli. The study was conducted from January to March 2018 on patients between 11 – 55 years. Patients with carious, restored or mussing first maxillary molars were excluded from the study. Convenient sampling was done and whoever visited the outpatient department suiting the inclusion criteria during the time of study was included in the study sample. The study was approved by ethical committee of the hospital and informed consent was taken from the patients. The patients were explained the purpose of the study and were informed that data will remain confidential and will only be presented as group data for research purpose. The permanent maxillary first molar was examined carefully by the study team who were qualified dental surgeons for the occurrence of caries. From occlusal aspect using a mouth mirror and dental explorer under efficient light the cusp was explored. Only the cusp prominence was recorded, the depression or groove was not considered in the study. Data was cross checked, double coded to make sure it was free of error. Analysis was done using SPSS version 17. Descriptive statistics were used to analyze the data.

Results

Thirty-two percent of study population had cusp of Carabelli with unilateral presentation in maxillary first molars. Surprisingly, none of the subjects showed bilateral presentation. In unilateral presentation males were found to have this trait more commonly (69%) as compared to female counterparts (Table I).

Chi Square test was applied and p-value was calculated which showed that cusp of Carabelli was significantly more prevalent in males than females.

Table I :Prevalence of cusp of Carabelli in male and female patients

Structure	Males row percentage (n)	Females row percentage (n)	P-value
Unilateral expression of cusp of Carabelli in maxillary first molar	69% (n=22)	31% (n=10)	0.01

Discussion

Cusp of Carabelli is a variation which could be seen more commonly on maxillary first molars in the form of groove or a cusp. The cusp may vary and can be presented in a person unilaterally, bilaterally or may be absent.[7]

The present study reveals that almost one third of our study population had a degree of expression of Carabelli structure (cusp only) unilaterally as shown in Table 1. Our findings were somehow contrary to a study conducted in Finnish rural population where cusp of Carabelli in first molar was found to be 79%, but 20% showed "positive cusps" and structure was bilateral with varying degrees of asymmetry.[8] Interestingly the same study reported that no sexual dimorphism occurred and the trait was more common in males than females. This supports our findings.[7,8] Our study findings were also close to Nigerian population where prevalence of cusp of Carabelli in maxillary molars was found to be 17.43%. The same study reported unilateralism in the maxillary first molars which accounted for 25.99%. This is in agreement with our findings. When compared with Shethri, study of Saudi population, the prevalence of Carabelli structure was reported more than one half of Saudi population with a bilateralism presentation mostly (91.2%). Study by Kannapan, J.G found that 52.77% of maxillary permanent first molars exhibited the Carabelli trait and the results were different as compared to the present study.[2,6]

Studies conducted in another province of Pakistan found the same findings as our study where 35.1% reported presence of cusp of carabaelli and unilateralism was found in 24.9% of subjects.[7] Another study is also in agreement with the present study where prevelance of cusp of Carabelli was found to be 20.9% and was more prononced in males than females.[7,9] Most of the studies failed to show any sexual dimorphism either in the occurrence or in the degree of expression of the character [4,5,8] but some found sex linked pattern.[7,9,10] Our study is in line with the study conducted in Khyber Pakhtunkhwa, Pakistan.[9] Although Alvesalo L study suggests low heritability of this character but geographical distribution seems to play a role in having this cusp or otherwise.[8]

Conclusions

Frequency of cusp of Carabelli was low in Khyber Pakhtunkhwa province of Pakistan. The trait is exhibited unilaterally more often than bilaterally and is more common in males than females. Further studies comparing other province of Pakistan is suggested by authors.

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