



ORIGINAL ARTICLE

The presence/ absence of cusps of the Carabelli in patients presenting to the dental outdoor department in a teaching hospital in Multan, Pakistan.

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Article Citation: Zafar R, Shakoor A, Haider MU, Muhammad U, Baloch N. The presence/ absence of cusps of the Carabelli in patients presenting to the dental outdoor department in a teaching hospital in Multan, Pakistan. Professional Med J 2023; 30(02):281-284. <https://doi.org/10.29309/TPMJ/2023.30.02.7153>

ABSTRACT... Objective: To determine the prevalence of cusps of the carabelli in dental OPD patients. **Study Design:** Descriptive Cross Sectional study. **Setting:** Department of Dental Outdoor, Ibn-e-Sina Hospital Multan. **Period:** June 2021 to July 2021. **Material & Methods:** Consent was taken from the patients and from parents of the children under the age of 10 years. Data was collected on a predesigned proforma. All patients attending the outdoor department of Ibn-e-sihna hospital, Multan were included and were examined on the patient examination chair for the present and absence of cusps of carabelli. A total of 400 patients were included in study during this period that fulfilled the inclusion criteria. **Results:** A total of 400 patients were examined during this period and frequency of carabelli trait is 53.75%. Majority of study population with carabelli trait was females but the difference was not statistically significant with p value of 0.075. Most of the patients have bilateral presence of cusp of carabelli and in unilateral cases, majority were on right side but the difference was not significant (P-Value 0.085). **Conclusion:** So it can be concluded from the study of the carabelli trait common in our population and also that it has regional variation in its prevalence. It is usually bilateral and more common in men and mostly in the form of pit.

Key words: Accessory, Carabelli, Cusp, Maxillary Molar Tooth.

INTRODUCTION

First permanent maxillary tooth is the largest tooth and have function of crushing the food. It normally has four cusps and four fossae. Sometimes it has a fifth cusp which is non-functional called the fifth lobe, accessory cusp and finally cusps of carabelli.¹ A tubercle, cusp or groove commonly present on the first permanent maxillary molar on the mesopalatal side and second deciduous maxillary molar tooth are called cusps of carabelli or carabelli tubercle. Presence of such tubercle on the other molar tooth is less frequent.² These are usually bilateral and are more frequent in men compared to women though the difference is insignificant. So gender does not have any significant association.^{2,3}

Studies have shown that its frequency varies among different populations. It may provide a clue for racial differences.² Literature showed that

its frequency is highest in European population with its frequency varying between 51% to 90%. Its frequency is bit low in African, American, Indian and is lowest in arctic population.³ Most researchers agreed that it is genetically determined. Dietz proposed a single dominant gene for it but because of much variation in its frequency, a more complex inheritance mode is likely.^{3,4,5}

The presence of cusps of carabelli in the neighbouring countries, like in India Saravanan showed the frequency of 72% in Madurai population.⁶ In another frequency of cusps in primary teeth was found to be 38.75% and 23% in secondary teeth. In Iran Mosharraf et al showed frequency of 96.6%.⁷ A study in Saudi Arabia showed frequency of 41.7%.⁸ Local studies in Pakistan has shown frequency of Carabelli trait 32% in Mardan. Molar tooth with carabelli cusp

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Article received on: 31/05/2022
Accepted for publication: 01/10/2022

are at increased risk of caries. So they become more to develop caries early and may result in tooth loss.^{7,8,9}

So the aim of the current study was to know the prevalence of cusps of carabelli and presence of caries and also to see the gender effect. As there is increased risk of caries in the teeth with cusps of carabelli, So patients can be guided to take extra care of their teeth to prevent tooth loss secondary to caries. Tooth loss has much health and psychological effects on the affected person which can be prevented by early detection and management.

MATERIAL & METHODS

It was a descriptive cross sectional study carried out in dental outdoor department from June 2021 to July 2021 after taking approval from the institutional review committee with IRB No. Pub/6/2021. Consent was taken from the patients and from parents of the children under the age of 10 years. Data was collected on a predesigned Proforma regarding study like age, gender, cusps, location. All patients attending the outdoor department for any dental issue were included and were examined on the patient examination chair for the presence and absence of cusps of carabelli. Patients were examined under good light for cusps in maxillary first and second permanent molar with the help of mouth mirror and probe. Patient having gross damage to morphology of first and second molar due to caries, attrition or any other trauma were excluded from study. A total of 400 patients were included in study during this period who fulfilled the inclusion criteria. Each patient was examined by two dentists to confirm the presence or absence of the cusps.

Data Analysis

The data was analysed by using SPSS20 and gender, presence r absence f cusps were analysed by frequency and percentage and chi square test was used to know the significance between groups like between gender and also caries and p value of 0.05 or less was taken as significant.

RESULTS

Present study also noted the different age groups, with mean age of 16.12±08. Most of the study population was from the age group 21-30 years but n significant difference with respect to age by chi square as in the Figure-1 below.

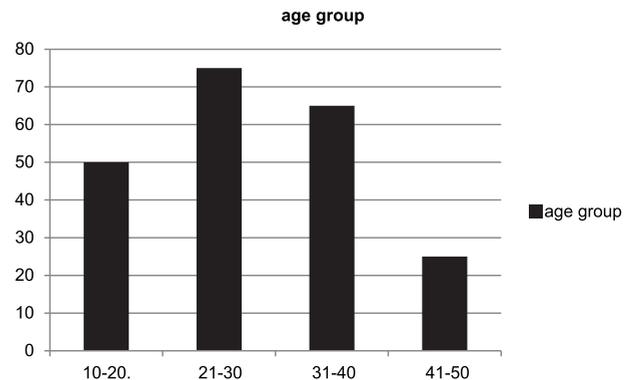


Figure-1. Age groups of study population. (P-Value 0.057)

Majority of the study population with the carabelli trait was females and frequency was 51.1% and 49.1% in females and males respectively as shown in Table-I. but the difference was not statistically significant with P-value of 0.075.

Gender	Number (%)	Cusps Frequency
Male	80 (37.20%)	51.1%
Female	135 (62.80%)	49.1%

Table-I. Gender distribution of study population P-Value 0.075

A total of 400 patients were examined during this period and frequency of carabelli trait is 53.75% as shown in Table-II below.

Carabelli Trait	Number (%)
Presence	215 (53.75%)
absence	185 (46.25%)
Total	400 (100%)

Table-II. Frequency of patients with Carrabelli Trait.

Most of the patients have bilateral presence of cusp of carabelli and in unilateral cases, majority were on right side but the difference was not significant (P-Value 0.085). Table-III.

Location	Number (%)
Bilateral	115 (53.48%)
Right	70 (32.55%)
Left	30 (13.95%)

Table-III. Unilateral and bilateral distribution of cusps of carabelli (P value 0.085)

Most of the patients have carabelli trait in the form of pit and the least common type was large cusp as depicted in the Figure-2.

Frequency of the type Carebelli trait

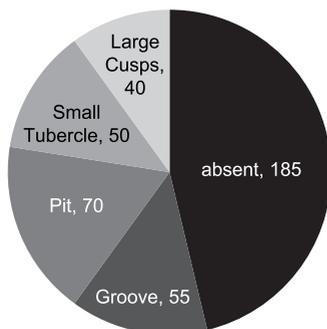


Figure-2. Types of carabelli trait.

DISCUSSION

Cusps and grooves are two fundamental landmarks of tooth crown.¹ In the present study most frequent subtype of carabelli trait was pit and more common in females with no gender significant difference.

The frequency of cusps is studied by different researchers and found to be quite high in European population (70% - 90%) and least in Asians population (35%- 45%).¹ In current study frequency of cusps was found to be 53.75 % which was more than described in previous local studies. One study in Islamabad by Maham Niazi et al showed cusps' frequency of 35.1 %¹⁰ and another study in Mardan showed frequency of 32%.⁹ One study conducted in Khyber Pakhtunkhwa has frequency of 29.7%.¹¹ As cusps showed frequency difference between various racial groups we do not have local study to compare. This may be the reason for high frequency is current study as no previous study to compare. Current findings are in agreement with studies conducted by Rusnah, Salako and Kannanpan which was 52.2%, 58.7% and 52.7% respectively.

National and international data showed that frequency of cusps is slightly more in females compared to males but the difference is not statistically significant. Current study also have noted the same findings. One study conducted

in Mardan showed that cusps of carabelli are significantly more in males compared to females with p value of 0.01. But in other studies significant relation couldn't be found.^{9,10,11}

When data of neighbouring countries was analysed, a study in Iran showed frequency of 72% in primary and 62% in secondary teeth which is higher than findings of the present study.¹⁵ Two studies from India had prevalence of cusp of carabelli 72% and 45.6% and its was more common in males and the difference is not significant.^{6,7}

In current study it was found that majority patients have bilateral cusps which is in agreement with the previous local and international studies. It was also observed that cusps of carabelli are more common on right side as described in previous studies for example as showed by Niazi et al.¹⁰ Though right sided cusp trait predominate but right and left distribution difference is not significant as described by Mukhopadhyay et al.⁷ These findings are also described by other researchers like Aminzadeh et al¹⁵, Kazak², Mukhopadhyay⁷, and Saravanan.⁶

Studies have shown that carabelli trait can be used for forensic purposes.¹⁶ The carabelli trait is found in the form groove, pit or tubercle. In the present study it was found that most common form was groove. This was in agreement with the previous studies.^{7,15}

CONCLUSION

So it can be concluded from the study carabelli trait is also common in our population and also that it has regional variation in its prevalence. It is usually bilateral and more common in female. Mostly in the form of pit. But these differences with respect to gender and right and left distribution is not statistically significant. As teeth with carabelli trait are at increased risk caries so patients can be warned about it so they can take extra care about their teeth.

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REFERENCES

- Owens BM, Phebus JG, Blen BJ, Redmond DC. **Cusp of carabelli: Observations of an odontogenic trait.** *Gavin J Dent Sci.* 2016; 2016:1-7.
- Kazak m. **Evaluation of carabelli's trait in a group of Turkish patients.** *Cumhuriyet Dental Journal.* 2018; 21(3):224-9. DOI:10.7126/cumudj.414992
- Alvesalo L, Nuutila M, Portin P. **The cusp of carabelli: Occurrence in first upper molars and evaluation of its heritability.** *Acta Odontologica Scandinavica.* 1975; 33(4):191-7.
- Khurana A, Gupta N, Chauhan U, Dewan R. **Prevalence of dental morphology anomalies in greater Noida population.** *International journal of science and healthcare research.* 2021; 6(1): 148-156.
- Sarpangala M, Devasya A. **Occurrence of cusp of carabelli in primary second molar series of three cases.** *Journal of clinical and diagnostic research: JCDR.* 2017; 11(3):ZR01-ZR02.
- Saravanan R. **Prevalence of cusp of carabelli in Madurai population.** *International Journal of Recent Scientific Research.* 2020; 11(06): 38805-38807. DOI: <http://dx.doi.org/10.24327/ijrsr.2020.1106.5381>
- Mukhopadhyay P, Mukhopadhyay S. **Carabelli's trait: Frequency and expression in primary and permanent dentition.** *SRM Journal of Research in Dental Sciences.* 2020; 11(1):11.
- Sadatullah S, Odusanya SA, Mustafa A, Razak PA, Wahab MA, Meer Z. **The prevalence of fifth cusp (cusp of carabelli) in the upper molars in Saudi Arabian school students.** *International journal of morphology.* 2012; 30(2):757-60.
- Qamar W, Qayum M, Ali A, Idrees S. **Frequency and trends of cusp of carabelli in maxillary first molars of patients visiting dental teaching hospital in Mardan, Pakistan.** *Pakistan Orthodontic Journal.* 2018; 10(1):27-9.
- Niazi M, Najmi Y, Qadri MM. **Frequency of cusp of carabelli in orthodontic patients reporting to Islamabad Dental Hospital.** *Pakistan Orthodontic Journal.* 2016; 8(2):85-8.
- Khan DB, Khan MA, Khattak M. **Prevalence of cusp of carabelli in permanent teeth in a group from Khyber Pakhtunkhwa, Pakistan.** *Pakistan Oral & Dental Journal.* 2011; 31(2):409-411.
- Rusmah M. **The cusp of carabelli in Malaysian.** *Odontostomatol* 1992; 15: 13-15.
- Salako NO, Bello LL. **Prevalence of the carabelli trait in Saudi Arabian children.** *Odontostomatol Trop* 1998; 21: 11-14.
- Kanappan JG, Swaminathan S. **A study on dental morphological variation.** *Tubercle of carabelli.* *Indian Journal of Dental Research.* 2001; 12: 145-49.
- Aminzadeh A, Jafarzadeh S, Aminzadeh A, Ghodousi A. **Prevalence and distribution of carabelli cusp in maxillary molars in deciduous and permanent dentition and its relation to tooth size in a group of Iranian adult and pediatric dental patients.** *International Journal of Medical Toxicology and Forensic Medicine.* 2019; 8(1):11-144. [http://dx.doi.org/10.22037/ijmtfm.v8i1\(Winter\).18858](http://dx.doi.org/10.22037/ijmtfm.v8i1(Winter).18858).
- Hassan S, Nadaf A, Raina R. **The Prevalence of cusp of carabelli in maxillary molars among the Kashmiri population.** *Journal of Advanced Medical and Dental Sciences Research.* 2020; 8(1):42-4.

AUTHORSHIP AND CONTRIBUTION DECLARATION

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3	M. Usman Haider	2,4	<i>M usman haider</i>
4	Ummad Muhammad	Study design, statistic analysis, result interpretation, manuscript writing and revising it critically for important intellectual content.	<i>Ummad M</i>
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