Original Article

The Frequency of Unilateral and Bilateral Distribution of Cusp of Carabelli in Maxillary Permanent First Molars in Patients Visiting Peshawar Dental Hospital, Peshawar

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ABSTRACT

Objective: To determine the gender wise frequency of unilateral and bilateral distribution of cusp of Carabelli in maxillary permanent first molars in patients visiting OPD of Peshawar Dental Hospital.

Study Design: Cross sectional study.

Place and Duration of Study: This study was conducted at the OPD of Peshawar Dental Hospital, Peshawar from July 2020 to December 2020.

Materials and Methods: A total of 300 patients (125 males and 175 females) were selected through consecutive sampling technique. Age group selected was from 13 to 30 years. Both genders having fully erupted maxillary permanent first molars on both sides of the jaw were included in the study and teeth were examined using mouth mirror under proper illumination and standard protocols. The data were analysed through SPSS version 20 and statistical analysis was done using Chi Square test. P value of ≤0.05 was considered significant.

Results: 118 patients (39.3%) presented the cusp of Carabelli on maxillary permanent first molars. 24.7% of the patients had cusp present on both right and left molars while 10.3% of patients presented cusp only on right maxillary molars while in 4.3% of patients, it was located on left molars. Gender differentiation of the cusp did not show a statistically significant difference (p-value 0.140).

Conclusion: Common distribution of the cusp was bilateral on palatal surface of mesiolingual cusp of permanent maxillary first molars with the finding more evident in females (68.9%) as compared to males (31%). However unilateral distribution is commonly found on the right side.

Key Words: Cusp of Carabelli, Unilateral and bilateral distribution, Maxillary permanent first molars

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INTRODUCTION

Accessory cusps and variations in root morphology frequently occur in human teeth[1,2]. Three types of accessory cusps are clinically seen in teeth i.e. cusp of Carabelli in molars (52- 68%), Talon Cusp in incisors (1-7.7%) and Leong's Tubercle in premolars (8%)[2]. The Cusp of Carabelli is commonly studied trait which is characterized by a small cuspule or tubercle found on the palatal surface of mesiopalatal cusp of maxillary permanent first molars near the mesiolingual line angle[3,4,5].

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This cusp was discovered by Austrian Dentist George Von Carabelli[4,6,7].

The exact etiology of cusp of Carabelli is not known but evidence shows involvement of both genetic and exogenous factors[8,9,10]. The presentation of cusp of Carabelli is mostly bilateral and its frequency is reported to be higher in Europeans (70-90%) than in Asians (35-45%)[11-14]. A study conducted in Peshawar, showed that bilateral distribution of cusp of Carabelli was more common than its unilateral distribution[3].

The purpose of the present study was to descriptively determine the frequency of unilateral and bilateral distribution of cusp of Carabelli in maxillary permanent first molars in patients visiting the OPD of Peshawar Dental Hospital and to evaluate gender wise distribution of the cusp.

MATERIALS AND METHODS

This study was approved by the ethical review committee of Peshawar Medical & Dental College. Written informed consent was taken from all participants who were included in the study.

A descriptive cross-sectional study was conducted on patients visiting the Oral Diagnosis Department of Peshawar Dental Hospital. Sampling technique used in the study was Consecutive Sampling. A total of 300 patients were included in the study in which 125 were males and 175 were females. Two teeth per patient were examined, thus the total number of teeth was 600.. Age group specified for the patients was 13 to 30 years. Both genders having fully erupted permanent maxillary first molars bilaterally were included in the study.

The exclusion criteria were:

1. Presence of any congenital dental disease which affects the morphology of maxillary permanent first molars.
2. Carious or restored maxillary permanent first molars.

A specially designed proforma was made to record the data of the patients. Each patient was seated in a dental chair and thorough clinical examination of both maxillary permanent first molars was carried out under proper illumination using mouth mirror.

The collected data was scrutinized using computer programme SPSS version 21. Pearson's Chi-Square test was used to see significance of variation from the mean. For p-value to be considered significant, its value ≤ 0.05 was set.

RESULTS

Of total 300 patients recruited in the current study, there were 175 females (58.3%) and 125 males (41.7%) (Fig 1). Two teeth per patient were scrutinized so the total number of teeth was 2×300 = 600. The age group chosen for the included subjects was 13-30 years with a mean age of 22.46 ± 5.1 years.

Table No.1: Gender-wise distribution of Cusp of Carabelli in the sample population

Gender	CC **Absent** in patients N (%)	CC **Present** in patients			Total N (%)
		Right N (%)	Left N (%)	Both N (%)	
Male	83(45.6)	12 (38.7)	7 (53.8)	23 (31)	125 (41.6)
Female	99 (54.3)	19 (61.2)	6 (46.1)	51 (68.9)	175 (58.3)
Total	182 (100)	31(100)	13 (100)	74(100)	300 (100)

P value = 0.140 as calculated by Pearson's chi square test. df = 3. Total number of patients having CC: Males = 42 (35.5%), Females = 76 (64.4%)

Table No.2: Gender-wise distribution of cusp of Carabelli in MPFM teeth

Gender	CC absent in MPFM teeth n (%)	CC present in MPFM teeth		Total n (%)
		Right n (%)	Left n (%)	
Males	185 (45.3)	35(33.3)	30 (34.4)	250 (41.6)
Females	223 (54.6)	70(66.6)	57 (65.5)	350 (58.3)
Total	408 (100)	105(100)	87 (100)	600 (100)

Total number of MPFM having CC = 192 (32%); Number of MPFM in males having CC = 65 (33.8%), in females number of MPFM having CC = 127 (66.1%).

Out of the total 300 patients, 118 (39.3%) showed cusp of Carabelli on MPFM (Maxillary permanent first molars) (Fig 2). Among the subjects who displayed the cusp 24.7% of them had cusp present on both right and left MPFM while 10.3% of patients had CC present only on right maxillary molars and in 4.3% of patients, it was located on left molars (Fig 2). Gender differentiation of the cusp did not show statistically significant difference which is depicted by p-value of 0.140. Of the total 31 patients having cusp of Carabelli on right MPFM, there were 12 males (38.7%) and 19 females (61.2%). In case of left maxillary molars, the total number of patients having cusp was 13 out of which 7 (53.8%) were males and 6 (46.1%) were females. 23 (31%) males and 51 (68.9%) females had CC present bilaterally (Table 1).

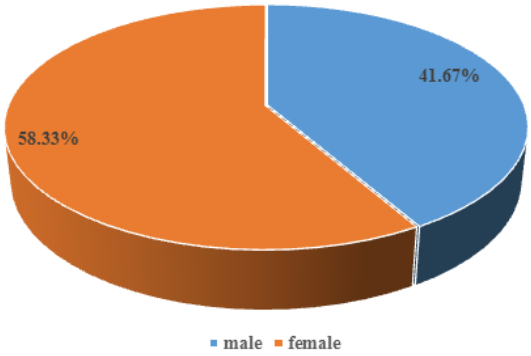

Figure No.1: Gender distribution of patients

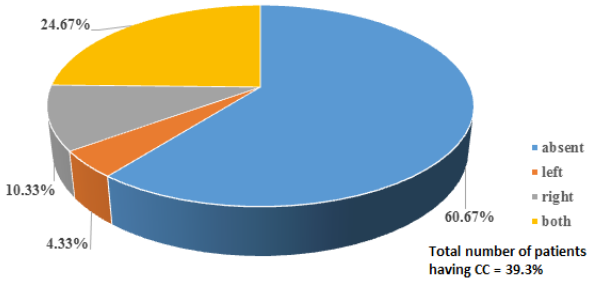

Figure No.2: Frequency of cusp of Carabelli on maxillary first permanent molars

DISCUSSION

The overall frequency of CC on maxillary permanent first molars in the contemporary group was found to be 39.3% (Fig 2) which is concurrent with the findings of Khan et al (29.7%)[3], Saadatullah et al (41.7%)[20], Dissayanke et al (38%)[15] and Kirthiga et al (40.5%)[17]. Contrary to these findings, Nepalese population and Kerala population showed 68.3% and 17.78% frequencies respectively[16,18].

The contemporary group revealed no difference between genders for the distribution of cusp of Carabelli as shown by p-value of 0.140. However bilateral occurrence of cusp was more evident in females (68.9%) as compared to males (31%) (Table 1). These findings are in accordance with Ramin Mosharraf (2013) who reported a female dominance for bilateral distribution of the cusp[12]. In contrast to the present study, frequency of cusp in another research done in Peshawar reported that more males (31.9%) had the trait than females (25.9%) but bilateral distribution was more in females (81.1%) as compared to males (73.2%) which is in agreement to findings of the current study[3]. The bilateral distribution of CC was seen in another study conducted on Libyan population[19]. A study conducted on a local population in Mardan documented a frequency of 32% for the presence of CC with unilateral expression of cusp to be more common and number of males having cusp of Carabelli (69%) was more than females (31%)[5]. King et al (2010) also proposed a higher frequency of the trait in males (53.9%) than in females (47.1%) in a randomly selected group of 12-years old children from Hong Kong[8]. According to Sadatullah et al, bilateralism was seen in 82.2% subjects with no gender predilection while the contemporary group had frequency of 24.7% for bilateral distribution of cusp with no significant difference between males and females[20].

The limitations of this study include: small sample size; hospital-based single-centered study; results were based only on intra oral examination of the participants; no radiographs or dental casts were obtained due to ethical issues; various forms/expressions of cusp of Carabelli were not noted.

Further studies should be made upon the extension of pulp to cusp of Carabelli, thickness of enamel and dentin of the tooth exhibiting this cusp and measuring the thickness of crowns of teeth exhibiting accessory cusps as molars with larger crown size may have a greater chance of exhibiting CC. Studies on a larger representative sample of KP population and various forms of the cusp in our local population are needed. Furthermore, importance of accessory cusps should not be neglected in clinical dentistry.

CONCLUSION

There is no significant difference between males and females for the distribution of cusp and is commonly found bilaterally. In case of unilateral distribution of the trait, more patients had cusp on right side (10.3%) as compared to left molars (4.3%).

Author's Contribution:

Concept & Design of Study:	Sana Arbab
Drafting:	Sana Arbab, Imran Khattak
Data Analysis:	Imran Khattak, Momena Rashid
Revisiting Critically:	Sana Arbab, Munawar Aziz Khattak
Final Approval of version:	Sana Arbab, Munawar Aziz Khattak

Conflict of Interest: The study has no conflict of interest to declare by any author.

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