

PREVALENCE OF CUSP OF CARABELLI IN PERMANENT TEETH IN A GROUP FROM KHYBER PAKHTUNKHWA, PAKISTAN

¹DILA BAZ KHAN, BDS, MCPS, M.Phil (Resident)

²MANZAR ANWAR KHAN, BDS, MSc D USA

³MUSHTAQ KHATTAK, BDS, FCPS

ABSTRACT

The aim of this study was to determine the prevalence of cusp of carabelli in permanent teeth in a sample from the population of Khyber Pakhtunkhwa. A special proforma was developed to collect the data. A total of 400 subjects (patients attending Khyber College of Dentistry hospital and students of Khyber College of Dentistry) were included in the study. Cusp of Carabelli was present in 29.7% of the study population in maxillary first permanent molar and was totally absent in maxillary second permanent molars. Prevalence in males (31.9%) was slightly greater than females (25.9%). Similarly unilateralism was also greater in males than females. It was concluded that the prevalence of cusp of Carabelli is lowest in the population sample of Khyber Pakhtunkhwa as compared to other similar Asian population's samples. However, unilateralism was at par with other Asian studies. In permanent teeth the Cusp of Carabelli occurs only on maxillary first molar.

Key words: Cusp of Carabelli, Unilateralism, Khyber Pakhtunkhwa

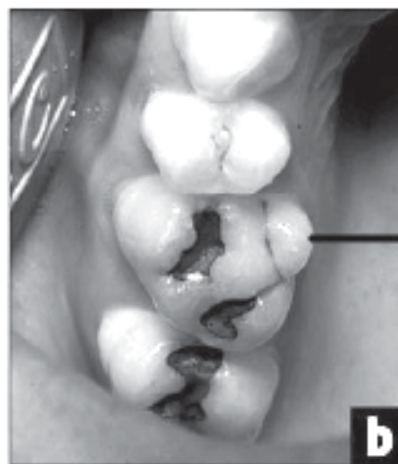
INTRODUCTION

The cusp of carabelli is a nonfunctioning mini cusp or tubercle or groove or furrow that occurs on the mesiopalatal cusp at mesiopalatal line angle in maxillary first permanent molar but does not occur on maxillary second deciduous molar. This cusp was first described by George Carabelli in 1842 and was named so.¹ It is separated from mesiopalatal cusp by a groove which is also named as cusp of carabelli groove.

Cusp of carabelli 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. Other related forms include ridges, pits or furrows.²

The cusp of carabelli is a heritable feature. It has been proposed that homozygosity of a gene is responsible for a pronounced tubercle, whereas, the heterozygote show as slight grooves, pits, tubercles or bulge. It is most common among Europeans (75-85% of individuals) and rarest in pacific islands (35-45%).³ This cusp

was mainly used for differentiation between different populations⁴ but it has also significance in clinical dentistry.



cusp of carabelli

METHODOLOGY

This descriptive study was carried out on patients and students of first and second year BDS, Khyber College of Dentistry, Peshawar after getting approval

¹ Assistant Professor & Head Oral Biology, KCD, Peshawar. Res; H 89, St #-9 Sector-J2, Phase-2, Hayatabad Peshawar. E mail: drdilabaz@hotmail.com. cell # 03005964891

² Assistant Professor & Head Community Dentistry, KCD, Peshawar

³ Assistant Professor, KGMC, Peshawar

from the ethical committee of the college. Duration of the study was five months (January 2011 to May 2011). Consent was taken from each patient included in the study. A special proforma was designed to collect the data. Patients attending outpatient department and students of Khyber College of Dentistry, Peshawar were examined in the ordinary chair for the presence or absence of cusp of Carabelli on maxillary first and second permanent molar using torch light, mouth mirror and probe. Subjects having maxillary first and second permanent molars bilaterally without gross damage to morphology by caries, attrition or any other trauma were included in the study. Exclusion criteria were patients or students belonging to other provinces of Pakistan or foreigners.

Total of 1650 patients (1040 male and 610 female) were examined. Out of these 400 patients (257 male and 143 female) were fulfilling the inclusion criteria and were included in the study.

Each patient was examined by two researchers to confirm the presence of cusp of carabelli or otherwise. The data was analyzed using tables and percentages.

RESULTS

In this study, a total of 400 subjects were examined for the presence or absence of cusp of Carabelli. Out of these 257 (64.2%) were males and 143 (35.8%) were females. Cusp of Carabelli was present in 119 (29.7%) subjects. Out of 257 males, this cusp occurred in 82 (31.9%) subjects while in females the occurrence was 37 (25.9%) out of 143 subjects (Table 1).

Unilateralism occurred in 29 (24.4%) subjects as compared to bilateralism which occurred in 90 (75.6%) subjects. In males unilateralism and bilateralism was found in 22 (26.8%) and 60 (73.2%) respectively. In female subjects, the figures were 7 (18.9%) and 30 (81.1%) (Table 2).

TABLE 1: PREVALENCE OF CUSP OF CARABELLI IN MALES AND FEMALES

Gender	Cusp of Carabelli		Total
	Yes	No	
Male	82(31.9%)	175(68.1%)	257
Female	37(25.9%)	106(74.1%)	143
Total	119(29.7%)	281(70.3%)	400

TABLE 2: UNILATERAL AND BILATERAL DISTRIBUTION OF CUSP OF CARABELLI

Gender	Unilateral	Bilateral	Total
Male	22(28.8%)	60(73.2%)	82(68.9%)
Female	7(18.9%)	30(81.1%)	37(31.1%)
Total	29(29.7%)	90(75.6%)	119(100%)

Out of 400, none of the subjects had cusp of Carabelli on maxillary second permanent molar.

DISCUSSION

Prevalence of the cusp of carabelli is variable in different regions and races of the world. In this study an attempt was made to determine the prevalence of cusp of Carabelli in the group hailing from Khyber Pakhtunkhwa.

The prevalence of cusp of carabelli was 29.7% (119 cases) in this study. These findings were in agreement with those of Hassanali⁵ who reported the prevalence of this cusp to be 26–27% in Asian school children but deviated widely from the studies by Rusmah⁶, Salako⁷, and Kannapan⁸ where the prevalence of cusp of carabelli was reported to be 52.2%, 58.7% and 52.7% respectively.

In this study more males had cusp of Carabelli (31.5%) than females (26.5%). This was in agreement with the report by Haris.⁹ The reason for more males having cusp of Carabelli was reported to be the more complex nature of crowns in males than females

The most common form of this cusp observed in this study was a small tubercle (variations in size were noted). In some of the patients a prominent cusp was present on one side, while on the other side no signs of this cusp were seen. These findings were in agreement with the study by Falomo¹¹ who reported unilateralism in 25.99% of cases but differed from the study carried out by Alvesalo¹⁰ who stated that if there was no structure on one side of the jaw, the other never showed the cusp.

In the present study maxillary second permanent molar was also included to see the occurrence of the cusp of Carabelli on this tooth but none of the study subjects showed this cusp on maxillary second permanent molar.

Clinical significance of cusp of carabelli

Tooth morphology has importance in clinical dentistry, industries (for manufacturing instruments and dental materials), forensic odontology and anthropology. 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 which remains between the band and the tooth is filled by food debris and bacteria and it results in early 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 teeth.

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