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. 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.

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%). This cusp was mainly used for differentiation between different populations but it has also significance in clinical dentistry.

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...
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).

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 Rusmah 6, 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.

<table>
<thead>
<tr>
<th>Gender</th>
<th>Cusp of Carabelli</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Male</td>
<td>82 (31.9%)</td>
<td>175 (68.1%)</td>
</tr>
<tr>
<td>Female</td>
<td>37 (25.9%)</td>
<td>106 (74.1%)</td>
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<tr>
<td>Total</td>
<td>119 (29.7%)</td>
<td>281 (70.3%)</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Gender</th>
<th>Unilateral</th>
<th>Bilateral</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>Male</td>
<td>22 (28.8%)</td>
<td>60 (73.2%)</td>
<td>82 (68.9%)</td>
</tr>
<tr>
<td>Female</td>
<td>7 (18.9%)</td>
<td>30 (81.1%)</td>
<td>37 (31.1%)</td>
</tr>
<tr>
<td>Total</td>
<td>29 (29.7%)</td>
<td>90 (75.6%)</td>
<td>119 (100%)</td>
</tr>
</tbody>
</table>

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

TABLE 2: UNILATERAL AND BILATERAL DISTRIBUTION OF CUSP OF CARABELLI

Prevalence of cusp of carabelli in permanent teeth in a group
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.

REFERENCES

9    Haris EF. Carabelli’s trait and tooth size of human maxillary first molar; American journal of physical Anthropology 2007, ISSN 0002-9483.
11   Falomo OO. The cusp of carabelli: frequency, distribution, size, and clinical significance in Nigeria. PMID; 12665277 (Pub Med-Indexed for MEDLINE).