

FREQUENCY OF BICUSPID AND TRICUSPID FORM OF MANDIBULAR SECOND PREMOLAR AT KHYBER COLLEGE OF DENTISTRY PESHAWAR

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ABSTRACT

Objectives: To determine the frequency of the two morphological forms of mandibular 2nd premolar (bicuspid & tricuspid) for academic and clinical purposes.

Materials and Methods: This study was carried out in the Oral Biology Department of Khyber College of Dentistry, Peshawar from January 2011 to May 2011. A total of 372 participants (patients attending Khyber College of Dentistry and students of Khyber College of Dentistry) were included in the study. Participants were examined in the ordinary chair using torch light and mouth mirror. The findings were noted on the special proforma developed to collect the data. The study was approved by the ethical committee of Khyber College of Dentistry.

Results: The frequency of bicuspid and tricuspid form of mandibular 2nd premolar was 61.55% and 38.45% respectively.

Conclusion: More than one-third of the mandibular 2nd premolars were tricuspid. The frequency of tricuspid form of mandibular 2nd premolar was more in females than males.

Key Words: Mandibular, second premolar, bicuspidate, tricuspidate.

INTRODUCTION

Mandibular 2nd premolar is 5th tooth from midline and occupies the mid central position in both right and left halves of the mandible. It is a succedaneous tooth replacing the mandibular 2nd deciduous molar. It occurs in two morphological forms, bicuspidate (two cusps) and tricuspidate (three cusps). Literature shows that 45% of individuals have two while 55% have three cusps form^{1,2,3}. In two cusps form there is one large buccal functioning cusp and one small lingual cusp, the buccal inclined planes of which are functional while the lingual inclined planes are non functional. In three cusps form, there is one largest buccal functioning cusp and two lingual cusps, mesiolingual and distolingual. The buccal half of mesiolingual cusp (which is the 2nd largest cusp) is functional while the lingual half is non-functional. The distolingual cusp which is the smallest of three is totally non functional³. Mandibular 2nd premolar is the commonest missing tooth after maxillary lateral incisor⁴. This tooth is also remained impacted or erupt

malposed because of its late eruption in anterior teeth mesial to mandibular 1st permanent molar.

The number of cusps to be formed in a tooth is determined by enamel knot, which is a temporary tissue formed during cap stage of odontogenesis and a source of signaling proteins such as, BMP2, BMP4, BMP7, Fgf-4, Fgf-9, Wnt-10b, slit-1 and Shh⁵.

The size of mandibular 2nd premolar is predicted before its eruption by mixed dentition analysis^{6,7,8}. Mixed dentition analysis is carried out to predict the sizes of permanent canine and premolars before their eruption and to compare the predicted required space with the actual space available for these teeth in the jaw. It does not take account of the bicuspid or tricuspid forms of mandibular 2nd premolar. The two cusps and three cusps forms of mandibular 2nd premolar is important as it will disturb the whole process of prediction due to the difference in size of two cusps and three cusps forms. The three cusps form (tricuspidate) is considerably larger than the two cusps form⁹.

This study is carried out with an attempt to determine the frequency and distribution of bicuspid and tricuspid forms of mandibular 2nd premolar in the population of Khyber Pakhtunkhwa.

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MATERIAL AND METHODS

This descriptive cross sectional study was carried out on patients and students of 1st and 2nd year BDS, Khyber College of Dentistry, Peshawar from January 2011 to May 2011 after getting approval from the ethical committee. Total 372 individuals were included in present study. Data was collected by probability convenient sampling using proforma designed for this study. Participants were examined in the ordinary chair to look for bicuspid or tricuspid form of mandibular 2nd premolars. Participants having undefected mandibular 2nd premolar bilaterally with normal morphology were included in study. Mandibular 2nd premolar with caries, fractured with trauma, showing attrition, abrasion or erosion were excluded from the study as were individual. Foreigner or participants not belong to KPK Data were analyzed using SPSS version 20.

RESULTS

Out of 372 participants, two hundred and thirty were males and one hundred and forty two were females. The total number of participants (male and female) having bicuspid were 229 (61.55%) while participants having tricuspid were 143 (38.45%). (Table 1)

Table 1: Frequency of bicuspid and tricuspid form of mandibular second premolar

Gender	Bicuspid	Tricuspid	Total
Male	146(63.48%)	84 (36.52%)	230
Female	83(58.46%)	59(41.54%)	142
Total	229(61.55%)	143(38.45%)	372

DISCUSSION

The knowledge of tooth morphology is employed in clinical dentistry (facial esthetics, chewing/mastication, phonation), manufacturing dental instruments and materials, forensic odontology and anthropology. Comparative studies are rare in this area of research and only few people have worked on it. The frequency of bicuspid and tricuspid forms of mandibular 2nd premolar varies in different populations.

In our study, the frequency of bicuspid and tricuspid form was 61.7% and 38.3% respectively. The results of our study differ with that of Bath-Balogh M, and Fuller JL, who reported the prevalence of bicuspid and tricuspid forms to be 45% and 55% respectively^{1,3}. This difference may be due to the heavy physique and complexity of the crown form of the western population. The frequency of tricuspid form of mandibular 2nd premolar is higher in females (41.54%) than males (36.52%) in present study, although the complexity of crown has been reported

to be greater in males than females¹⁰. The higher frequency of tricuspid form of mandibular 2nd premolar in females in this study may be the reason for higher frequency of malocclusion (overcrowding) in females than males. Greater prevalence of malocclusion especially overcrowding in females have been reported by Suma S, et al in Indian school children¹¹ and Matilda M Taya in Tanzanian School children¹².

The results of this study are in agreement with those of Sunil S et al who reported the frequency of bicuspid and tricuspid form of mandibular 2nd premolar to be 52.8% and 44.4% respectively (2.8% teeth were missing) in the population of Kerala India¹³. In a study in Singaporeans with Chinese origin, the prevalence/ frequency of bicuspid and tricuspid form of mandibular 2nd premolar was reported to be 66.3% and 25.4% respectively (8.3% were mixed)¹⁴. This follows the trend of the present study.

CONCLUSION

In conclusion, the studies on frequency of bicuspid and tricuspid forms of mandibular 2nd premolar in Asians follow the same trend as against the Europeans where the trend is opposite (more subjects with tricuspid). A procedure need to be devised to take account of the tricuspid form of mandibular 2nd premolar during mixed dentition analysis.

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