

VARIATION OF CUSPS IN MANDIBULAR SECOND PREMOLAR TEETH AMONG PATIENTS VISITING DENTAL OPD AT BACHA KHAN MEDICAL COLLEGE MARDAN, PAKISTAN

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ABSTRACT

BACKGROUND: Mandibular second premolars vary in types of cusps. This tooth may exhibit a two cusps type (bicuspid) or a three cusps type (tricuspid). Previous Studies have found that tricuspid form is more common than bicuspid form. Current study was conducted to determine the frequency of two variants of mandibular second premolar cusps unilaterally or bilaterally in male and female patients visiting dental section of Bacha Khan Medical College, district Mardan, of Khyber Pakhtunkhwa province of Pakistan.

METHODS: The descriptive cross sectional study was conducted in dental section outpatient department of Bacha Khan Medical College Mardan, Pakistan. The study was approved by ethical committee of the college A total of 100 questions were asked (50 from males and 50 from females) using convenient sampling technique through a customized structured questionnaire. Data was cross checked for errors and analyzed using SPSS version 17. Descriptive statistics were conducted and Chi-Square test was used to find the p value and statistical difference among groups.

RESULTS: Two cusp types in mandibular second premolar were seen in 73% patients having bilateral presentation. This bilateral presentation was seen more significantly in females (57%). Similarly in the right quadrant the frequency of bicuspid was more common in females (56%) while males showed tricuspid phenomenon more (68%) on the same side of the arch. Statistically it was found that frequency of two cusps in right mandibular premolar is significantly more in females than males while the frequency of three cusps type in right mandibular premolar is significantly more in males than females. No significant difference on the left side of the arch was seen in males and females. Female patients were also exhibiting more of bicuspid and tricuspid variety in lower second premolars with (n=42, 57%) and (n=6, 55%) respectively than male patients. P value showed that bilateral presentation of two cusps in lower second premolars is more significant in females than males however no significant difference in the frequency of bilateral presentation of three cusps type was seen in male and female patients.

CONCLUSION: Bilateral two cusps presentation of mandibular second premolar is more common and is more pronounced in females than males. Females showed two cusps while males presented with three cusps in unilateral presentation on right side of the dental arch No significant difference is seen on left side of the dental arch with regards to number of cusps.

KEYWORDS: Mandibular, Cusps, Tricuspid, Bicuspid, Second Premolar.

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INTRODUCTION

A trait exhibited in human dentition can be a valuable diagnostic tool for anthropological studies in classifying and characterizing different ethnic group^{1,2}. The cusps, ridges and grooves that constitute the crown also differs in different species along with the number and forms of the tooth root². The mandibular second

premolar is the fifth tooth from the center in mandibular arch and is in contact with mandibular first premolar on mesially and distally it is joined by mandibular first molar. The tooth converges slightly on the lingual side and cusps are positioned in way that the lingual cusp/s are well developed and functional³. From the facial side, the crown of the tooth looks similar to mandibular first premolar. Premolars

though generally are classified as bicuspid but mandibular premolars do not strictly follow these criteria. The tooth may exhibit either three cusps with two lingual cups or two cusps with one lingual cusp³. Literature review shows tricuspid (mandibular second premolars) are more common than bicuspid (mandibular second premolars), along with variations in occlusal pattern of these premolars⁴.

The tricuspid mandibular second premolar have a functional buccal cusp whereas two lingual cusps in which mesio-lingual cusp is larger than disto-lingual which is usually small and non-functional. These tricuspid are relatively large mesio-distally than the bicuspid second premolars^{4,5}. Literature review shows that mandibular second premolar shows one large buccal cusp having well developed independent apex, however the lingual cusp/s shows considerable variations^{6,7}. In case of multiple lingual cusps, one of them is regarded as primary lingual cusp while other is known as accessory lingual cusps⁷. The occlusal morphology of mandibular second premolar is important not only for clinical dentistry but also has implications in forensic dentistry. Limited studies have been conducted to evaluate the occlusal morphology of mandibular second premolar teeth in Khyber Pakhtunkhwa province of Pakistan. This study was conducted to determine the frequency and distribution of mandibular second premolar cusps in male and female patients visiting outpatient department of dental section of Bacha Khan Medical College Mardan, Pakistan.

MATERIAL & METHODS

This descriptive cross sectional study was conducted in outpatient department of Bacha Khan Medical College Mardan, Pakistan from January to March 2018 after getting formal approval from the ethical committee of Bacha Khan Medical College Mardan. Data was collected by team of trained enumerators. The study subjects were interviewed and their basic information was recorded by enumerators followed by clinical assessment of the mandibular cusps. Verbal consent was taken from participants of the study and data confidentiality was explained to them. They study subjects were also informed that the data will be presented as a group data and will be only used for research purpose. Hundred patients (50 males and 50 females) were enrolled and selected on random basis who ever attended the OPD till the required number was reached. Patients with caries, frac-

tured, trauma, attrition, abrasion and erosion mandibular second premolars were not included in the study. One male patient was excluded (outlier) because of irregular findings. Data was cross checked, double coded to make sure it was free of error. Analysis was done using SPSS version 17. Descriptive statistics were used to analyze the data. Chi square test was done to find the p value and statistical difference among groups.

RESULTS

Hundred participants were interviewed followed by clinical assessment of mandibular cusps. The frequency of three cusp type in second premolars was higher in females (56%) when compared to males (44%) participants as illustrated in table 1.1. On the other hand the three cusp type

was more common in males (68%). The left side of dental arch showed that females (51%) were exhibiting slightly increased trait of bicuspid when compared with males (49%) patients of the same side of lower second premolars. The three cusp type however was same in both male and female patients as in table 1.2. During the bilateral examination it was found that females exhibited more bicuspid and tricuspid variety in second premolars with (n=42, 57%) and (n=6, 55%) respectively when compared with male participants. Our study shows that (n=73, 73%) was having bicuspid presentation and p value was calculated which confirms that the frequency of bilateral two cusps types in lower second premolars is significantly more in the sample.

TABLE 1: VARIATIONS IN CUSPS IN RIGHT MANDIBULAR SECOND PREMOLAR

Sr. No	Variation in right mandibular second premolar cusps	Males percentage (n)	Females percentage (n)	P-Value
1	Two cusps type (Bicuspids)	44% (n= 34)	56% (n=43)	0.047*
2.	Three cusps type (Tricuspids)	68% (n=15)	32% (n= 7)	

*The p-value of 0.047 suggest that frequency of two cusps in right mandibular premolar is significantly more in females than males while the frequency of three cusps type in right mandibular premolar is significantly more in males than females.

TABLE 2: VARIATIONS IN CUSPS IN LEFT MANDIBULAR SECOND PREMOLAR

Sr. No	Variation in left mandibular second premolar cusps	Males in percentage	Females in percentage	P-Value
1	Two cusps type (Bicuspids)	49% (n=41)	51% (n=42)	0.965**
2.	Three cusps type (Tricuspids)	50% (n=8)	50% (n=8)	

**P-value of 0.965 indicates that there is no significant difference in the number of cusps in mandibular left premolars in both males and females

TABLE 3: VARIATIONS IN MANDIBULAR SECOND CUSPS BILATERALLY

Sr. No	Mandibular second premolar cusps	Males	Females	P-value
1	Two cusps type bilateral only	43%	57%	0.003***
2.	Three cusps type bilateral only	46%	55%	0.500****

***P value 0.003 suggest that two cusps type bilaterally is more significant in females than males

****P value 0.500 suggest that there is no significant difference in the frequency of three cusps type bilaterally was seen in males and females

TABLE 3: VARIATIONS IN MANDIBULAR SECOND CUSPS BILATERALLY

Sr. No	Mandibular second premolar cusps bilaterally	Total	P-Value
1	Two cusps type bilateral only	73%	0.000
2.	Three cusps type bilateral only	11%	

DISCUSSION

The mandibular second premolar is comparatively larger than mandibular first premolar⁸. Ash and Nelson have found high prevalence of tricuspid mandibular second premolars as cited by Sunil⁸. The tricuspid mandibular second premolar looks more angular than bicuspid mandibular second premolar from occlusal aspect⁸.

This study found that the existence of bicuspid trait in mandibular second premolars (bilaterally) was more common (73%) than tricuspid. Our study is in agreement with a similar study being conducted in another district Peshawar of Khyber Pakhtunkhwa province of Pakistan where the frequency of bicuspid form was 61.7% while 38.3% reported to have tricuspid form of mandibular second premolars⁹. Similarly the findings of our studies were also supported by studies conducted on Singaporean Chinese origin patients exhibiting 66.3% bilateral 2-cusp forms and study by Ludwig who defined seven traits of mandibular second premolars in Caucasoid, Mangoloid, Negroid and Caucaso-Mongoloid; the findings showed variations in the frequency of lingual cusps in the segment of population and the predominant form of lower mandibular second premolar in the study group

was found to be bicuspid (2 cusps) form which exhibits one buccal and one lingual cusp^{5,10}. Therefore it could be generalized from the studies that Khyber Pakhtunkhwa province of Pakistan share somehow similar traits of mandibular second premolar with Mangoloid, Negroid and Caucaso-Mongoloid. Further research to explore this area is recommended.

The findings of our study differentiate from a study conducted in Punjab province of Pakistan found the tricuspid (62.4%) variety more common than bicuspid (37.5%) in mandibular second premolars teeth of urban and rural school going children in district Lahore⁴. Likewise different findings were different when compared with Jordan where the three-cusped Lower second premolar was found in 61.40% while the two-cusped Lower second premolar was found in 38.60% of the observed subjects⁷. Though the sample size of study conducted in Punjab province of Pakistan was substantial when compared with our study but the study failed to prove the results statistically. Commonly attributed fact to this differentiation reported and cited in several studies is association of heavy physique and complexity of crown forms associated with the western population and morphological variations like culture, diet, condition of life, adaptation process

and genes seems to play a significant role^{4,9,11}.

Our findings statistically proved that frequency of two cusps type is more prevalent in mandibular second premolar bilaterally in females. Male patients of our study showed three cusps type on the right side of lower arch while statistically no difference was seen in the number of cusps on the left side of lower arch. The findings of our study are in contrary to the study in Peshawar by Khan DB also elaborates that tricuspid form was more pronounced in females (41.54%) than males (36.52%) and have attributed the fact of high prevalence of tricuspid in female to for higher frequency of malocclusion (overcrowding) but both studies fail to prove statistically^{4,9}. The findings of the study are unique to an extent that it highlights a new area of study where one finds very limited studies being conducted and the authors suggest to further elaborate this area. The study also has implications not only in clinical dentistry but also in forensic dentistry. Very limited studies have been conducted in Pakistan on this subject and the author didn't find any study in local context which proved the results statistically.

CONCLUSION

Bicuspid form of mandibular second premolar is more common in and exhibit bilateral presentation more than unilateral presentation. The frequency of two cusps in mandibular right second premolar is more in females however males present more with three cusps type on the same side of the arch. No significant difference is seen on left side of the dental arch with regards to number of cusps. Similarly bilateral presentation of mandibular second premolar is seen more in females.

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CONFLICT OF INTEREST

None declared.

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NIL

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.