

REGULATION OF CUSPS AND ROOTS MORPHOLOGY OF UPPER WISDOM TOOTH

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ABSTRACT

The objective of this study was to evaluate the regulation of cusps and roots morphology of upper wisdom tooth. This Descriptive cross sectional study was conducted at Department of Oral Biology Akhtar Saeed Medical and Dental College, Lahore from September 2020 to February 2021. Total 100 extracted 3rd molars were gathered. Informed consent was taken from the patients. The teeth with carious lesions and damaged crown were excluded from the study. Data was collected and entered into SPSS for the calculations of percentage and frequencies. A total of 110 maxillary 3rd molars were collected. Among maxillary upper 3rd molar cusp 33.64% were tricuspid, followed by four cuspid 32.72%, five cuspid 4.54% and 29.09% had enamel spherical projections. The types of root morphology in maxillary third molar: unique 53.5%, bifida 11.4%, trifid 3.5%, three roots 28.1% and four roots 3.5%. Morphology of the upper wisdom teeth vary greatly from tricuspid to five cuspid teeth. Roots also show great variation from bifida to trifid, three roots to four roots.

Key words: cusps, roots, upper wisdom tooth, morphology.

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INTRODUCTION

A third molar, usually named as “wisdom tooth”, commonly appears inside the oral cavity in 17 years to 25 years of age.¹ It is the last tooth which erupts in the oral cavity. However, the initial hardening of tissues (calcification) of the tooth begins in age of 7 years to 10 years of age. There is high level of variations observed in third molars regarding morphological features in individuals in different quadrants.²

The development of a tooth is a complex event in which epithelial mesenchymal interaction occurs. There are expression of signaling proteins within developing teeth which are responsible for crown patterns.^{3,4} Maxillary 3rd molars predominantly exhibit 3 cusps or four cusps in its occlusal table. There are usually four cusps

on maxillary 3rd molars, two buccal and two palatal. Nonetheless, for this tooth, there are great variances among third molars, and a true specific description is still yet to know in the case of 3rd molars.⁵

There is a great advantage of the natural feeding to effect the development of its element and make sure the development of the dental maxillary apparatus.⁶ The industrial development has now a day changed the fibrous diet to the refined one. The need for strong mastication has been reduced which has also reduced the lengths of the jaws. These evolutionary changes have a great impact on the need of research on the masticatory apparatus.^{7,8}

Anthropological studies need the determination of these structural variations in and it should be determined in different population or a race. Previous studies reported that the variation in the morphology of the tooth is the indicator of genetic disturbances.⁹ A study reported a maxillary 3rd molar having six cusps along with dens evaginatus.¹⁰ Signaling protein during the development of teeth determine the location and patterning of teeth.¹¹

The rationale of the study is that there is dearth of local literature on this topic in Pakistan to the best of our knowledge. So we conducted this research to determine the regulation in the cusps and roots of maxillary 3rd molar.

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MATERIALS AND METHODS

This descriptive cross-sectional design study was conducted at Department of Oral Biology Akhtar Saeed Medical and Dental College, Lahore from September 2020 to February 2021. Ethical consent was taken from the ethical committee. Convenient sampling was done, patients who visited for the extraction of maxillary 3rd molar were included in the study. Patients with no history of extraction of the 3rd molars and sound maxillary third molar were included in the study. Patients having the history of 3rd molar extraction and maxillary third molars with carious lesion and damaged crown morphology were excluded from the study. Informed consent was taken from the patients. Maxillary 3rd molars were collected after the extraction is done in the maxillofacial surgical department. Data was collected and entered in SPSS and the percentage, frequencies were calculated.

RESULTS

Among maxillary upper 3rd molar cusp 33.64% were tricuspid, followed by four cuspid 32.72%, five cuspid 4.54% and 29.09% had enamel spherical projections as shown in Table 1. Table 2 presents the morphology of types of root in maxillary upper third molar: 53.5% unique, 11.4% bifida, 3.5% trifold, 28.1% three roots and 3.5% four roots as shown in table 1.

We observed total seven design in term of orientation of roots which are mentioned in table 2, curved distally mesiobuccal root tip, distobuccal root tip curved in the direction of palatal and mesial root with the tip bent towards the vestibular (12.5%); three straight roots, to some extent divergent (43.75%); these three roots have curvy tips in the direction of the distal (15.62%); distobuccal and mesiobuccal curved roots tips in the direction of the distal and palatal root straightforward (6.25%); straightforward and combined distobuccal and mesiobuccal roots and the curved tip of palatal root in the direction of the distal (9.37%); distobuccal and mesiobuccal roots sutured and somewhat curved in the direction of the palatal and distal root.

DISCUSSION

In different populations, several studies have been conducted on the expression of cusp and roots morphology. Present study outlines the frequency of cusp and roots morphology of upper wisdom tooth in a local population. Wide variations of cusp have been reported by different studies in different races representing its racial and ethnic linkage. The morphology of the third molar is sometimes more important particularly in those situations where the endodontist and the prosthodontist wants to conserve it due to early loss of 1st and 2nd molars. The wisdom tooth is the last molar whose agenesis is common in 25 to 40% of the

TABLE 1: MAXILLARY RIGHT 3RD MOLAR CUSPS AND ROOTS

Cusps Morphology		
Types of cusps	Frequency	Percent
tricuspid	37	33.64
Four cuspid	36	32.72
Five cuspid	5	4.54
Enamel spherical projections	32	29.09
Total	110	100.0
Roots Morphology		
Types of roots	frequency	Percent
unique	59	53.5%
bifida	13	11.4%
trifold	4	3.63%
three roots	31	28.1%
four roots	5	4.54%
Total	110	100.0

TABLE 2: CATEGORIES OF MORPHOLOGY OF ROOTS FOR THE 3RD UPPER MOLARS

Orientation of roots as per its design		
Types of roots	Frequency	Percent
Straight roots, slightly divergent	48	43.75%
Roots presenting curled distal apexes	17	15.62%
P curved vestibular apex	14	12.5%
P curved distal apex	10	9.37%
P straight	9	8.18%
P slightly curved distal apex	7	6.25%
P curved vestibular apex	5	5.54%
Total	110	100.0

population.¹²

The genes influence the development of teeth and their morphology. The present study revealed different cusps patterns in maxillary 3rd molars. Accessory or supernumerary cusps are common variations of tooth morphology that are occasionally encountered clinically. In the crown morphology of maxillary 3rd molar six cusps have been reported in the literature.¹³ Variation in the cuspal morphology is not unusual in upper wisdom teeth.¹⁴ Tetra cuspid and tricuspid 3rd molars are commonly observed in the crown morphology of the present study. This may be due to ethnic, geographical as well as genetic differences amongst the population.

In China Yang et al. revealed prevalence of fused roots in maxillary 3rd molars.¹⁰ In that study, it was also observed that C shaped roots were common in the Chinese population along with 51% of the maxillary third molars had three separate roots; the other half had fused or conical roots.¹⁰ Our study revealed the same findings. In contrast to this study maxillary third molar with four roots was also reported in a previous study.¹⁵ This may be due to ethnic, geographical as well as genetic differences amongst the population. Our results are also comparable with Sidow et al. who evaluated in his study 150 extracted maxillary upper third molars and reported that one root was present in 15 % of the teeth, two roots 32%, three roots 45% and 7% maxillary upper third molars had four roots. The most uncommon morphology was noted in single root teeth, the number of canals alternating from 1 to 6.

Pécora et al. study presented that 68% maxillary third molars had 3 canals and 34% maxillary third molars had 4 canals.¹⁶ Another research presented that 34% of maxillary third molars had 4 root canals.¹⁷ A research by Ng et al. revealed that in maxillary third molars the frequency of mesiobuccal roots having two canals was 39%.¹⁸ Cosić et al. noted that 83.9% of upper molars had 3 roots and 75.1% had three canals.¹⁹

CONCLUSION

Morphology of the upper wisdom teeth vary greatly from tricuspid to five cuspid teeth. Roots also show great variation from bifida to trifid, three roots to four roots.

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