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RESEARCH ARTICLE

OCCLUSAL MORPHOLOGY OF MANDIBULAR THIRD MOLARS

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ABSTRACT

Background: Dental identification is an important identification tool in Forensic odontology. There is a difference of opinion regarding whether ethnicity influences dental morphology or not. Few studies have shown the associations between these dental features and crown traits in humans. The present study is an attempt to find correlation of occlusal morphology of permanent mandibular third molars with forensic Odontology.

Objective: To determine the prevalence of different occlusal morphological patterns of permanent mandibular third molars.

Methodology: The patients fulfilling the inclusion and exclusion criteria were included in the study which gave a sample size of 64. Direct oral examination was done, and pictures were taken of the permanent mandibular third molars to record the number of cusps and groove patterns of the mandibular third molars.

Result: The general distribution of cusps showed that the most predominant number of cusps was 4 cusps, which was seen in 61(63%) of the study population and "+" groove pattern was the most common which was seen in 55(57%) of the study population. The occlusal morphology with "+4" pattern (47%) were predominant among the study population. On analyzing the gender, the 4 cusps form and the "+" pattern was predominant in males, while the 4 cusps form and the "y" pattern was predominant in females.

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INTRODUCTION

Developmental variations in the dentition are frequently observed during a routine dental examination. These may include anomalies of number, size and form of the teeth. Such anomalies are of interest in anthropology, genetics, pathology and forensic odontology. (King *et al.,* 2010) The large variation in morphological features and their form may not be easily altered; thus, a trait of the human dentition can be a valuable diagnostic tool for anthropological studies in classifying and characterizing different ethnic group. (King *et al.,* 2010) Although tooth morphology may be indicator of genetic distances between populations it should be viewed with caution. The cusps and grooves on mandibular molars were subsequently investigated by Gregory and Hellman. (King et al., 2010) The various morphological traits of the dentition are likely to be inherited; however, the mode of inheritance, of most traits, is at present poorly understood, and may well remain so for a long time. The criterion for determining whether a pattern is a "y" or a "+" is contact of the metaconid with the hypoconid. If contact occurs, the pattern resembles a "y"; if no contact occurs, the pattern resembles a "+". (Ash and Nelson, 2003) The occurrence of the "y" or "+" fissure pattern is independent of the number of cusps. (Jordan *et al*., 1992) Thus, groove pattern and cusp number are considered separately because their evolutionary changes are not well correlated phenotypically. (Devoto and Perrotto, 1972) It is assumed that this trait (fissure pattern) is polygenic and its expression is determined by combinations of alleles at two or more loci. (Jordan *et al*., 1992) It is not known whether ethnicity influences dental morphology. However, it is observed that there are different degrees of expression and frequency in variation of teeth in dentitions of different populations. (Kieser and van der Merwe, 1984) The aims of this study were to determine the prevalence of occlusal morphology of permanent mandibular third molar in South Indian population and its importance for Forensic Odontology.

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MATERIALS AND METHODS

Study area and study population: All the people participated in the study were between the ages of 18-60 years and were

selected at random. The study population were selected mostly from Saveetha Dental College and hospital, Chennai, Tamil nadu, India and few from adjoining areas. All the participants were included in the study after obtaining informed consent. Age, sex and cusp numbers and groove patterns were noted. Previously, many similar studies have used impression and dental cast for data collection. In the present study we have used the photographic method with intraoral examination. Direct intraoral photographs of mandibular dental arch and the permanent mandibular third molars with clear cusp outline and groove pattern were taken. (Dholia and Manjunatha, 2015) A total of 64 participants who satisfied the inclusion criteria were included in the study. The inclusion and exclusion criteria are as follow:

Inclusion criteria

- Mandibular third molars showing clear occlusal outline with all cusps and groove patterns showing.
- Mandibular third molars free from occlusal caries.
- Presence of unilateral completely erupted permanent mandibular third molars.
- Participants belonging to the age groups 20-70 years

Exclusion criteria

- Mandibular third molars with restorations and prosthesis.
- Mandibular third molars with occlusal caries.
- Injuries of jaws and teeth.
- Participants below the ages of 20

RESULTS

Table 1 represents the Distribution of males and females among the entire study population which was 64 people. The total number of males were 36(56%) and females were 28 (44%) (Figure 1). The number of mandibular third molars examined were 96. Table 2 represents the cusp pattern Distribution. Out of 96 mandibular third molar examined, 61 (63%) of the mandibular third molars had 4 cusp pattern whereas 34(35%) of them had 5cusp pattern. Only 1 (1%) showed 3 cusp pattern. (Figure 2) Table 3 represents the groove pattern Distribution in the mandibular third molars examined. Out of 96 mandibular third molar examined, 55(57%) showed "+" pattern and 41(43%) showed "Y" groove pattern. (Figure 3) Table 4 represents data of the distribution of no. of cusps and groove pattern in the permanent mandibular third molars examined. Out of 96 mandibular third molar examined, 46(47%) showed 4+ pattern, 29(30%) showed 5Y pattern, 18(19%) showed 4Y pattern, 3(3%) showed 5+ pattern, 1(1%) showed 3+ pattern and 0 mandibular third molars showed 3Y pattern. (Figure 4) Table 5 represents data of the distribution of cusps in the mandibular third molars of the male population. Out of 54 mandibular third molar examined in males, 36(67%) of them had 4 cusp pattern whereas 18(33%) of them had 5 cusp pattern. No one showed 3 cusp pattern amongst the males. (Figure 5) Table 6 represents data of the distribution of groove pattern in the mandibular third molars of the male population. Out of 54 mandibular third molar examined in males, 33(61%) of them had "+" pattern and 21(39%) of them showed "Y" groove pattern. (Figure 6) Table 7 Represents data of the distribution of cusp number in the mandibular third molars of the female population. Out of 42 mandibular third molar examined in females, 25(59.5%) of them had 4 cusp pattern whereas 16(38%) of them had 5 cusp pattern. 1(2%) had 3 cusp. (Figure 7) Table 8 represents data of the distribution of groove pattern among the female population examined. Out of 42 mandibular third molar examined in females, 20(48%) of them showed "+" pattern whereas 22(52%) showed "Y" pattern. (Figure 8) Overall in our study, the general distribution of cusps showed that the most predominant number of cusps was 4 cusps, which was seen in 61(63%) of the study population and "+" groove pattern was the most common which was seen in 55(57%) of the study population.

Table 1. Total number of males and females in the study with mandibular third molars

Gender	Number	%
Male	36	56
Female	28	44

Table 2. Distribution of cusps in permanent mandibular third molars

	38	48	Total (%)
3 CUSP	1	0	1(1%)
4 CUSP	24	37	61(63%)
5 CUSP	16	18	34(35%)

Table 3. Distribution of groove pattern in permanent mandibular third molars

	38	48	Total (%)
'+'	24	31	55(57%)
'Y'	20	21	41(43%)

Table 4. Distribution of no. of cusps and groove pattern in permanent mandibular third molars

	38	48	Total	%
3+	1	0	1	1
3Y	0	0	0	0
4+	19	27	46	47
4Y	12	6	18	19
5+	1	2	3	3
5Y	14	15	29	30

Table 5. Distribution of cusps in permanent mandibular third molars of males

	38	48	Total	%
3 CUSPS	0	0	0	0
4 CUSPS	15	21	36	67
5 CUSPS	8	10	18	33

Table 6. Distribution of groove pattern in permanent mandibular third molars of males

	38	48	Total	%
'+'	16	17	33	61
'Y'	10	11	21	39

Table 7. Distribution of cusps in permanent mandibular third molars of females

	38	48	Total	%
3 CUSPS	1	0	1	2
4 CUSPS	16	9	25	59.5
5 CUSPS	8	8	16	38

Table 8. Distribution of groove pattern in permanent mandibular third molars of females

	38	48	Total	%
'+'	8	12	20	48
'Y'	10	12	22	52

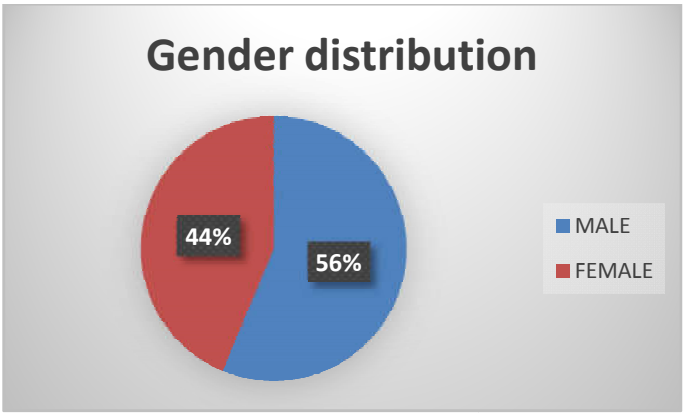

Figure 1. Gender distribution

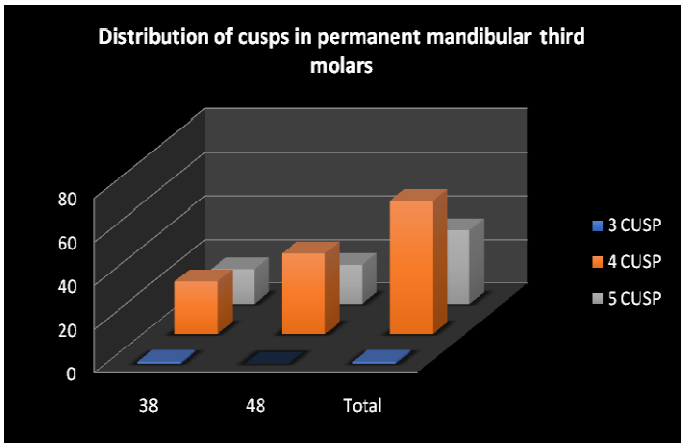

Figure 2. Distribution of cusps in permanent mandibular third molars

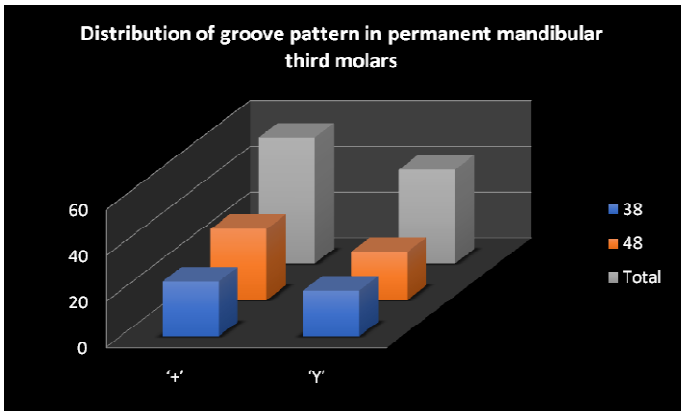

Figure 3. Distribution of groove pattern in permanent mandibular third molars

The occlusal morphology with "+4" pattern (47%) were predominant among the study population. On analyzing the gender, the 4 cusps form and the "+" pattern was predominant in males, while the 4 cusps form and the "y" pattern was predominant in females

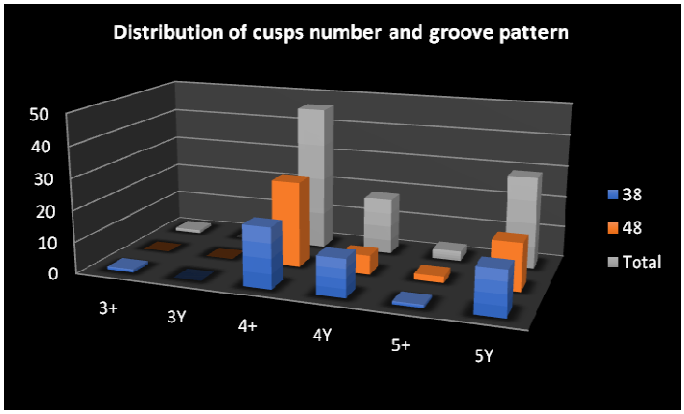

Figure 4. Distribution of no. of cusps and groove pattern in permanent mandibular third molars

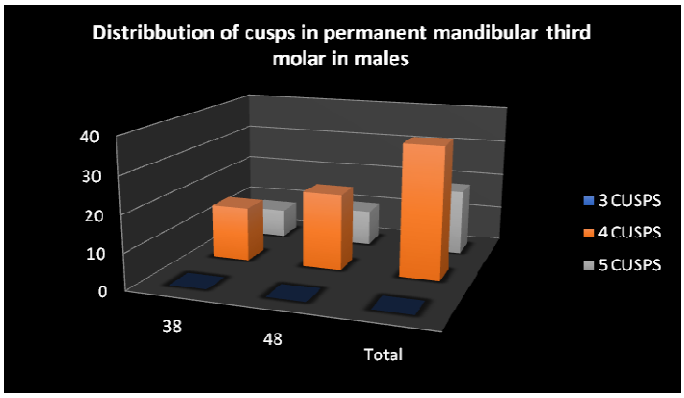

Figure 5. Distribution of cusps in permanent mandibular third molars of males

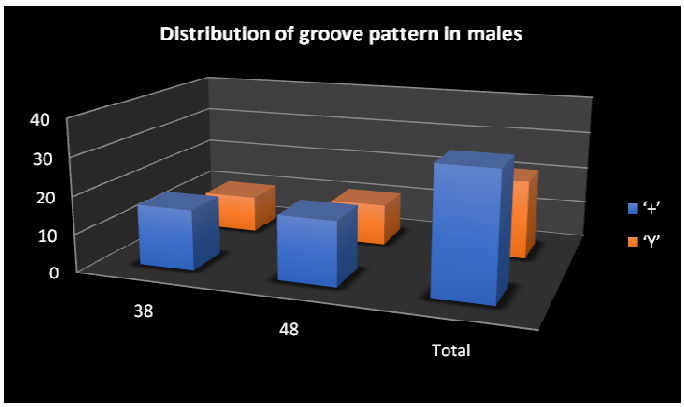

Figure 6. Distribution of groove patterns in mandibular third molars of male

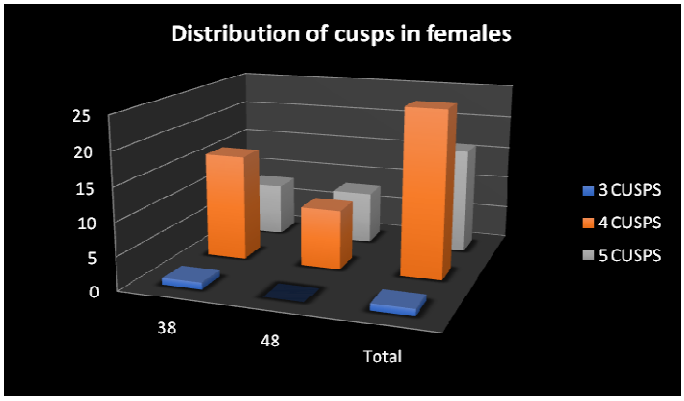

Figure 7. Distribution of no. of cusps in permanent mandibular third molars of females

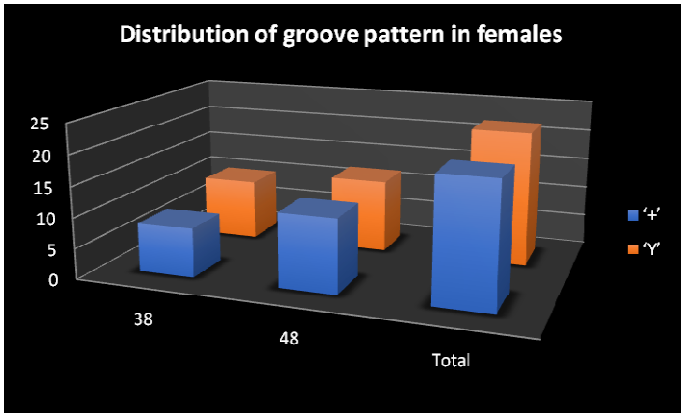

Figure 8. Distribution of groove pattern in permanent mandibular third molars of females

DISCUSSION

The mandibular third molar varies considerable in different individuals and presents many anomalies both in form and position. It supplements the second molar in function although the tooth is seldom well developed, the average mandibular third molar showing irregular development of the crown portion with undersized roots, more or less malformed. However, it's designed conforms to the general plan of all mandibular molars, conforming more closely to that of the second mandibular molars in the number of cusps and occlusal design than it does to the mandibular first molar. Occasionally mandibular third molars are seen that are well formed and comparable in size and development to the mandibular first molar. Many instances of mandibular third molars with five or more cusps are found with the crown portions larger than the second molar. In these cases the alignment and occlusion with other teeth is not normal because insufficient room is available in the alveolar process of the mandible for the accommodation of such a large tooth and the occlusal form is too variable. In our study, majority of the participants were male. 56% of the study population was male and 44% were female. The general distribution of cusps showed that the most predominant number of cusps was 4 cusps, which was 63%. "+" groove pattern was the most common which was seen in 55(57%) of the study population. The most frequent occlusal surface configuration was the "4+" with 47%. On analyzing the gender, the 4 cusps form and the "+" pattern was predominant in males, while the 4 cusps form and the "y" pattern was predominant in females.

Conclusion

Result of the study in not showing any significance to use for gender determination but defiantly further studies with larger sample size may give some favourable results regarding forensic odontology. (Dholia and Manjunatha, 2015) Furthermore, knowing common variations in dental anatomy and morphology about each individual tooth can help in performing some dental treatments such as restorative, endodontic and orthodontic treatments. Therefore, the results of this anatomical study can be used in both anthropological researches and clinical aspects of dental sciences. (Ash and Nelson, 2003; Jordan *et al*., 1992)

REFERENCES

Ash MM, Nelson SJ, editors. 2003. Wheeler's dental anatomy, physiology and occlusion. St. Louis: Saunders.

Devoto FC, Perrotto BM. 1972. Groove pattern and cusp number of mandibular molars from Tastilian Indians. *J Dent Res*., 51:205.

Dholia B, Manjunatha BS. 2015. Occlusal morphology of permanent mandibular first and second molars in Gujrati population. *J Forensic Dent Sci*., 7:137-41

Jordan RE, Abrams L, Kraus BS. 1992. Kraus's dental anatomy and occlusion. St. Louis: Mosby- year book, Inc.

Kieser JA, van der Merwe CA. 1984. Classificatory reliability of the Carabelli trait in man. *Arch Oral Biol*., 29:795-801.

King NM, Tsai JS, Wong HM. 2010. Morphological and numerical characteristics of the Southern Chinese dentitions. Part II: Traits in the permanent dentition. *Open Anthropol J*., 3:71-84.

King, Nigel M., Jennie S.J. Tsai, and H. M. Wong. 2010. "Morphological and Numerical Characteristics of the Southern Chinese Dentitions. Part I: Anomalies in the Permanent Dentition". *The Open Anthropology Journal*, 3.2 54-64. Web.

King, Nigel M., Jennie SJ Tsai, and H. M. Wong. 2010. "Morphological and numerical characteristics of the southern chinese dentitions. part II: traits in the permanent dentition." *The Open Anthropology Journal*, V. 3, p. 71-84

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