

**TITLE: MEASUREMENT OF PULPAL RATIO IN SEX DETERMINATION USING
MANDIBULAR LEFT CANINE IN SOUTH INDIAN POPULATION.**

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Abstract:

Background: Canine tooth is the predominately used tool collected from the oral cavity for gender identification. It is the most reliable object in order to take anthropological measurements, odontometric analysis, etc. The morphological changes that occur in the pulp cavity are promising sex estimation indicators that are often used.

Aim: The aim of this study is to identify the sex of an individual by assessing their mandibular canine pulp.

Method: In this study, 50 patients of Chennai aged between 20-50 years were selected for the study. OPG radiographs were made and have been used for interpretation of Pulpal ratio of mandibular canine. Then the measurements were calculated by using SPSS software further results.

Conclusion: We have concluded this study as per the limitations, that the MAE and SD value is more reliable for this population. Henceforth with the larger sample size the study can be taken in different populations for more reliable results.

Keywords: Pulpal ratio, mandibular left canine, sex determination

Introduction:

A tooth is a very good biological marker in order to measure the age of an individual because they still remain in the skull even after death. In forensic dental science, the age estimation of children is relatively simple compared to adults since children age estimation is based on development stages of the tooth(1). Each tooth can be used to determine the age, but canines are predominantly suitable structures for age estimation since they can be found commonly in older ages, have a long root and also a large pulp(2).

Mandibular canines are significantly considered as a “key tooth” in the oral cavity since they are less affected than other teeth by oral diseases, and better likely to survive trauma such as air diseases, etc(3). Current studies have proved that the mandibular canine is the most dimorphic tooth and it can be an immense medicolegal use in identification(4). Although degree of dimorphism varies among various populations, and sexual variation in human skeleton and dentition is of great concern of interest for the anthropologist and forensic investigators(5).

Tooth pulp is encased in a hard tissue casting, where it may be protected from detrimental effects of impact, trauma, and heat(6). By using the CBCT imaging technique, the pulp to the tooth volume ratios were calculated in single rooted teeth with the use of primitive custom-made software program which helps in determining both age and sex of an individual(7).

The aim of the study was to concentrate on the calculation of Pulpal area ratio of the South Indian population.

Materials and Methods:

The present study was conducted in Saveetha Dental College and Hospitals ,Chennai. OPG scans were obtained for various reasons such as impacted teeth, dental anomalies, implant planning or orthodontics. Single maxillary central, lateral, canine and mandibular canine, first and second premolar teeth were assessed retrospectively from patients with known CA. Teeth with caries, filling or crown restorations, periapical pathologies, anomalies or pulpal pathosis were excluded. Ethical clearance and informed consent were obtained.

Statistical Method:

The data was entered into MS excel followed by the analysis using SPSS version 23 (Statistical Package for the Social Sciences 23). The demographic characters such as age, gender etc were represented using arithmetic mean, standard deviation and proportions. The p value of <0.05 was considered as statistically significant.

Result:

Graph 1: The graph below depicts the accuracy of the percentage between males and females under the age group of 20-50 years.

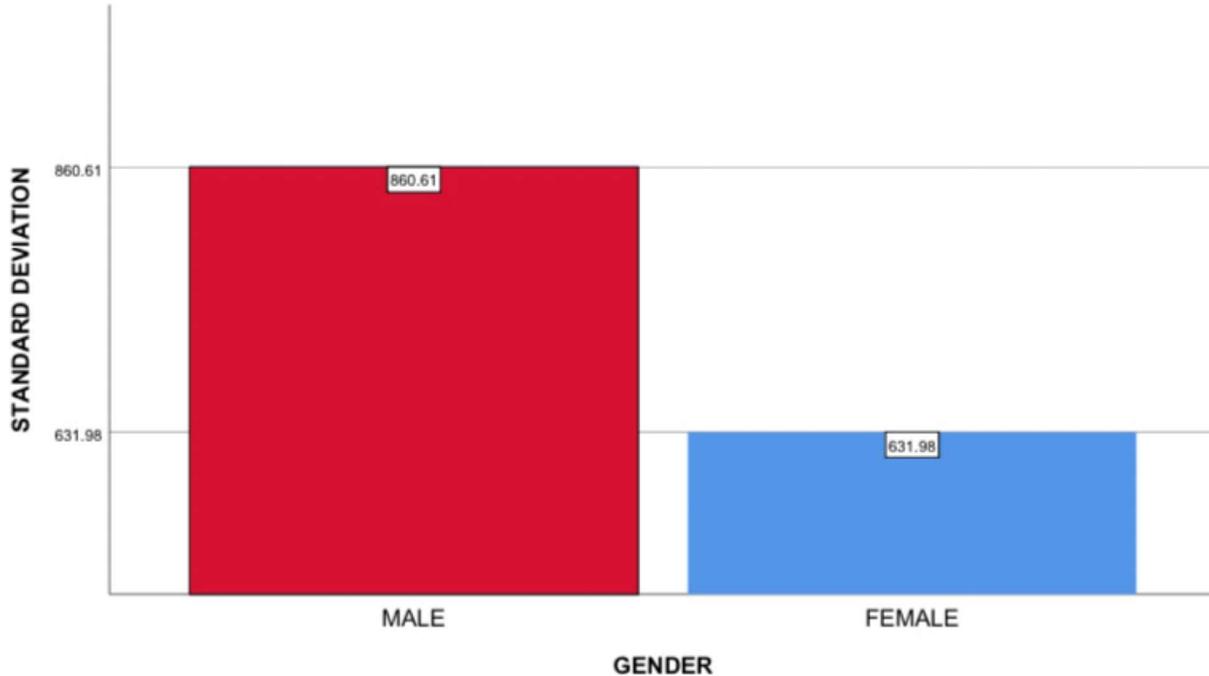


Table 1: The table below depicts that the total number of samples which are taken is 25 for both male and female population. The standard deviations for males are ± 8.6001716 and for females it is ± 6.3198532 , which shows that the standard deviations for males are higher compared to females. The mean absolute error for males is 1.78776 and for females it is 2.08512, therefore it depicts that the mean absolute error for females is higher compared to males.

	N	Minimum	Maximum	MAE	Std. Deviation
Male	25	135	3316	1.78776	8.6001716
Female	25	1294	3188	2.08512	6.3198532

Discussion:

Sex determination is of broader importance in forensic medicine, not only for identification purposes of the deceased, but also for living subjects(8). In living adults, the number of sex determination methods is greatly reduced because the skeletal processes and dental maturation are completed. In this situation, physical examination, hormone dosage for females and some dental methods can be used.(9)

After tooth eruption, the formation of secondary dentine causes PV to decrease. This change is considered as a valuable dental age predictor for adults and measured from dental radiographs. Pulp area ratio as an indicator of age was presented by Cameriere.(9,10) This method requires a radiographic image of an examined tooth, computer-aided drafting software and trained personnel.

In addition, unlike other tomographies, the radiation for the CBCT is less, it has better quality than other CT. In the present study, we observed a significant relation between PTR and the age for the axial sections in both the genders. It was also observed that for the axial section, the predictive power was more than the sagittal.(11) Our findings are in agreement to the study by Rai et al. This can be due to the axial area having lesser forces occlusally. There is also lesser deposition of the secondary dentine in this axis. Our findings are contrary to the study of Lee et al. wherein, they found the sagittal sections better than the axial sections for the estimation of the age.(11–13)

The smaller size of the other single-rooted teeth leads to less clear measurement of the pulp/root ratio. In multi-rooted teeth, pulp changes are clear in the canal but less evident in the root. In addition, in adult subjects, molars and premolars are often missing or damaged as a result of wear.

Conclusion:

The experimental groups in our study were unique. The accuracy in determining sex from dental pulp from both males and females among Chennai population. We could achieve the sex determination from the pulpal ratio. The MAE and SD value is more reliable for this population. Henceforth with the larger sample size the study can be taken in different populations for more reliable results.

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Conflict of Interest:

The authors declared that there are no conflicts of interest in this present study.

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