Determination of Mesiodistal and Cervico – Incisal dimensions in permanent maxillary lateral incisors as an aid in gender determination.

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Abstract:

The Purpose of this study is to examine the mesiodistal and cervico-incisal dimensions of maxillary lateral incisors among the population of Lucknow. Total of maxillary permanent lateral incisors in 50 Males and 50 Females were examined. It was found that Males have larger sized teeth than Females. Sex determination is considered as an important step in reconstructing the biological profile of unknown individuals in forensic investigations.

Keywords: Mesiodistal,Cervico-Incisal, Maxillary lateral incisors, gender determination, Lucknow, Maxillary Lateral Incisor.

The anterior teeth are esthetically important as they are readily seen during eating, speech,mastication and facial gesticulation. The lateral incisor is a tooth which morphologically shows variation. The crown outline is less symmetrical than the Central Incisor. This tooth frequently shows development of morphological characteristics for example peg-shaped, cone-shaped, barrel-shaped and canine-shaped teeth. Reduced size or shape of the maxillary lateral incisor reflects the interaction of genetic, epigenetic and environmental factors [(1)].

The introduction of Dentogenics concept by Fisher and Frush has made the selection of teeth more appropriate; with respect to sex, personality and age of the patient. Genealogical contrast in the maxillary incisal teeth have been documented in a literature. For example, prevalence of shovel shaped incisors have been observed in Mongoloids, inclusive of numerous groups of Amerinds [(2)]. Caucasian and Negros are reported to have less frequent occurrences of these characteristics. Shovel-shaped is the word regularly used to designate incisor teeth that have prominent marginal ridges and deep fossa on their lingual surfaces. The data and information derived from the teeth have often been successfully used in interpersonal identification in forensics.

Most studies done in this area do not include the population of Asia and India, with large populations therefore we undertook this study with measuring mesio-distal and cervicoincisal width of permanent maxillary lateral incisor in Lucknow population.

Why we have undertaken this study?

Lateral Incisors are one of the teeth of permanent dentition which shows varied morphology. Lack of previous documented literature in this area inspired us to undertake this study to assess mesio-distal and cervicoincisal dimensions of Lateral Incisor in the local population.

Aims and Objectives

1. To assess cervico-incisal and mesio-distal dimensions of permanent maxillary Lateral Incisor crown dimensions in Lucknow population.
2. To compare cervico-incisal and mesio-distal dimensions of permanent maxillary Lateral Incisor crown dimensions between right and left sides.
3. To compare the cervico-incisal and mesio-distal dimensions of permanent maxillary Lateral Incisor crown dimensions between Males and Females in Lucknow population.

The study was conducted on 100 subjects ranging from 18 to 30 years of age in Lucknow.

Inclusion criteria-

- Subject was willing to participate in the study.
- Male and female aged from 18 to 30 years.

Exclusion criteria-

- Fractured teeth
- Congenital or acquired abnormalities
- Attrition

Armamentarium (Figure 1)

Divider (sterilized), Scale, Cotton, Dettol, Gloves, Mask

Figure 1 : Armamentarium

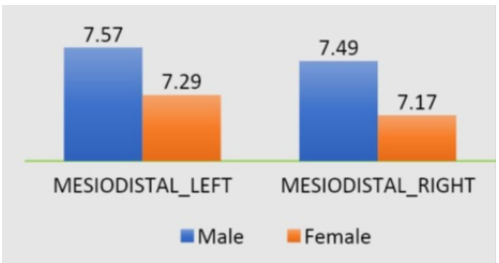
After obtaining consent from the subjects, the measurements (mesio-distally & cervico-incisally) were taken with the help of manual divider and scale.

How to Measure?

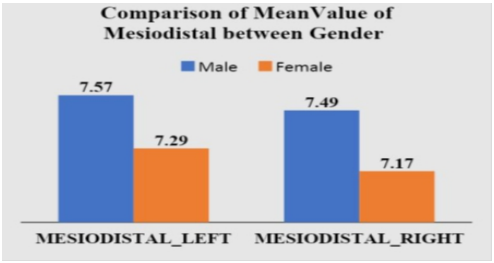
- Mesiodistal dimension: Measured from the maximum crest of curvature on the mesial and distal outlines..
- Cervicoincisal dimension: measured from the highest point of convexity on the cervical line to the incisal ridge.
- The examination was performed by two of the investigators on same subject and mean value was considered.(Figure 2a, 2b)

Figure 2a, 2b Examination was performed by two of the investigators on same subject

Result after applying t-test, at 95% confidence level, 'p' value for MD dimension was found to be significant (Pd"0.05) whereas CI dimensions were not significant (Pd"0.05). Show in (Graph 3a, 3b)



Graph-3a: Comparison of mean value of cervico - incisal between gender.



Graph-3b: Comparison of mean value of mesiodistal between gender.

Teeth provide exemplary material in living and non-living populations for anthropological, genetic, odontological and forensic investigations.[3][4][5]

- According to Wheeler's, the cervicoincisal length of crown in permanent maxillary lateral incisor is 9 mm(which was 8.61 in our study) and mesio distal length of crown is 6.5mm(which was 7.57 in the present investigation).[6]
- Julian B. Woelfel documents the crown width cervicoincisally as 11.2mm and mesio-distal length of crown as 8.6mm; both of which were greater than the present study.[7]
- According to Indian author RamyaRajkumar, the cervico-incisal length of crown in permanent maxillary lateral incisor is 9.0 mm and mesio-distal length of crown id 6.5 mm.

  Height and width of Lateral Incisor teeth (Wheeler's & Julian B. Woelfel) suggests that Lateral Incisors are rectangular with longer cervicoincisal and comparatively lesser Mesiodistal dimension. We found that in Lucknow population, the teeth are more towards square shape or less rectangular with respect to the western population. This maybe due to difference in ethnicities or racial profiles.

  Results of our study was similar to Ramya Rajkumar's data which infers that among Indians the cervicoincisal dimension are less with respect to western population. The teeth have overall smaller size.
- In our study most subjects , right side tooth is bigger than left side which depends on the person is right handed or left handed which probably depends on prominent hemisphere of the brain.[8]
- In males the crown size is larger as compare to females (multifactorial variable , X- linked

  Inheritance controls the mesiodistal tooth size, growth period is longer in Males than Females)
- Wheeler's and Woelfel's studies are very very old. As the time has passed we consume more refined foods , don't

need much force to chew so so the size of jaws have become smaller and the size of teeth have followed the situation.

We believe, such studies should be undertaken at regular intervals because inter-ethnic marriages and changes in lifestyle have caused evolutionary, like third molar being called a vestigial organ, size of teeth increasing with jaws gradually decreasing over the years. Updating these data among population groups can help in :

- Indians may need teeth of different size (artificial teeth).
- Orthodontic Brackets can be custom made for populations.
- Prefabricated crowns sizes can be regulated.

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Conflict of interest : Nil

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