

A Comparative Study of Morphological Variation in Maxillary Lateral Incisor in North and South Indian Population

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Abstract:

Objective: The objective of this study is to assess the morphological variation of maxillary lateral incisor among the North and South Indian population.

Methods: 50 casts each from North and South Indian population was taken and mesiodistal width of maxillary lateral incisor measured with Vernier calliper of pitch 0.001 cm.

Results: Based on the findings it was clear that there was no significant variation in maxillary lateral incisor among the North and South Indian population.

Conclusion: a distinct morphological variability was not noted among the North and South Indian population, which may be due to less number of samples taken. The study should be done by taking large number of study samples to evaluate the significant variations.

Keywords: Maxillary lateral incisor; Developmental anomaly; Morphological variations; South and North Indian population.

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I. Introduction

Forensic odontology plays a key role in identification of persons in crime investigations, ethnic studies, and identification of decomposed and disfigured bodies. The maxillary lateral incisor has a variable tooth morphology. This variability can be made use of in forensic identification. This tooth mostly shows reduction in size¹⁻² but it can occasionally be large as the central incisor³⁻⁴. This tooth also shows different crown morphologies, for example, peg-shaped, cone-shaped, barrel-shaped and canine-shaped¹⁻². Reduced size or shape or the other morphological variations of the maxillary lateral incisor often reflects the interaction of genetic, epigenetic and environmental factors⁵⁻⁶. In this study we compare the morphological variation of maxillary lateral incisor seen in North and South Indian population which in turn can help in personal identification.

II. Materials And Methods

This is an observational analytical study of 100 maxillary casts. The casts were obtained from the 50 patients from the South India population and 50 patients from the North Indian population.

The patients were selected randomly. The impression was made with alginate impression material and the casts were made using Type III dental stone. Only the maxillary impression was taken. The study was conducted in the department of oral pathology and microbiology, Government Dental College, Thiruvananthapuram.

The inclusion criteria involved clinically sound lateral incisor of patients that were 15 years of age and above as by this time all the permanent teeth would have erupted. The exclusion criteria were the following; patients with clinically missing lateral incisor, any systemic anomaly, carious involvements of teeth and teeth showing regressive alterations like attrition and periodontally involved teeth. The mesiodistal width of the maxillary lateral incisor was measured with Vernier calliper of pitch 0.001 cm. The width of the maxillary lateral incisor was measured from the incisal one third of crown.

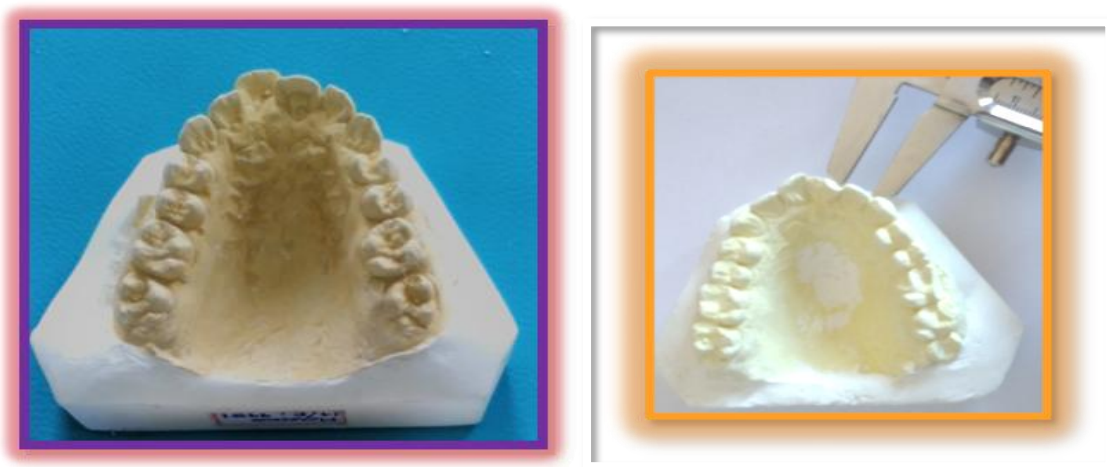


FIG 1.1 – maxillary cast showing the measurement of mesiolingual aspect of lateral incisor

III. Observation And Results

The mesiodistal width of both right and left lateral incisor was calculated and entered in the excel sheet. Descriptive statistical analysis was done using non- parametrical tests with the computer software, Statistical Package for Social Sciences (SPSS) version 16 for Windows Operating System. Quantitative variables was expressed as mean and standard deviation. The mean mesio-distal diameter of maxillary lateral incisor of people of North Indian origin was found to be 0.763 (right = 0.756, left = 0.77) and standard deviation was 0.0824(right) & 0.07626(left). The mean mesio-distal diameter of maxillary lateral incisor of South Indian origin was found to be 0.7362 (right = 0.7304, left = 0.742) and standard deviation was 0.08196(right) and 0.07884(left). The p value for the MD diameter between the right and left lateral incisor of North Indian population is 0.347, which is statistically not significant. The p value for the MD diameter between the right and left lateral incisor South Indian is 0.4725, which is statistically not significant. The p value for the MD diameter among North and South Indian is 0.966 which is not statistically significant.

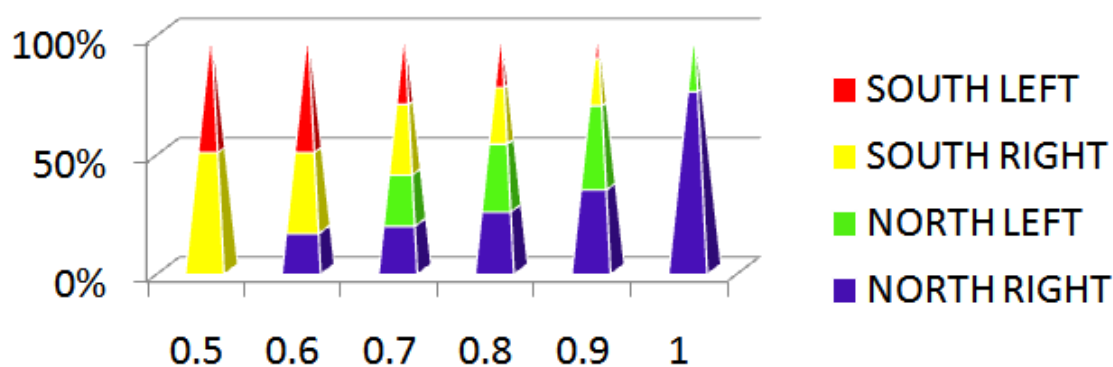


TABLE 1.1 – graph showing the comparison of the mesiodistal diameter of lateral incisors in North & South Indian population

IV. Discussion

50 casts each of people of North Indian and South Indian origin by domicile and birth were studied. The results showed that there was no significant variation in maxillary lateral incisor among the North and South Indian population. This is in contrast to the findings of Kondo et al⁴, Kure et al⁷ who found significant variation. However, this study was done in Japanese population.

Developmental dental anomalies are an important category of dental morphologic variations. They can result from many factors including genetic and environment. Certain genetic defects are the most important etiological factors in the prenatal and post-natal periods have also been seen in the anomalies affecting tooth dimensions, position, and number. Absence of one or few teeth arises as a result of disturbance early in the tooth formation process during initiation or proliferation of tooth bud. However abnormalities in the tooth size, shape, and structure result from disturbances occurring during the morpho-differentiation stage of development⁸⁻⁹.

Reductions in the number of teeth and size of the jaws have been occurring throughout human evolution, along with a decrease in the surface area needed for mastication. It is believed that this evolution will continue. The types of teeth reported missing vary in different ethnic groups. In Turkish and American population, the maxillary lateral incisors are most frequently missing. Similarly, studies done by Gupta SK et al observed a significant number of missing maxillary lateral incisors (1.69%) in Indian population⁹. The absence may be either unilateral or bilateral. Graber et al, while reviewing the congenital absence of teeth, reported that it actually results from one or more-point mutations in a closely linked polygenic system. It is mostly transmitted as an autosomal dominant pattern with incomplete penetrance and variable expressivity¹⁰.

The different morphological forms of lateral incisor seen is peg shaped, barrel shaped talon cusp etc. Peg shaped lateral incisors show a pointed incisal one third and less mesiodistal dimensions.

Talon cusp consists of enamel, dentin with varying extensions of pulp. Around 75% of all reported cases of talon cusp are seen in permanent dentition, predominantly affecting the permanent maxillary lateral incisors. Early diagnosis and management are necessary to avoid complications like caries, periapical lesions, irritation of tongue during function and occlusal interference which can lead to accidental cusp fracture, displacement of the affected tooth, temporomandibular joint pain and periodontal problems because of excessive occlusal force¹¹.

The prevalence pattern of the different anomalies affecting the maxillary lateral incisor in this study indicates that agenesis of maxillary lateral incisor was less common than peg and small size lateral incisors, the same pattern was also observed¹²⁻¹³ in previous studies. A previous study done among Nigerian subpopulation showed that maxillary lateral incisor was the most prevalent congenitally missing tooth. These variations seen in prevalence values of these anomalies in different parts of world could be because of racial differences of the different groups studied, differences in sampling methodologies, the diagnostic criteria and methods used, as well as variations in sample sizes¹⁴. In the present study, females showed a higher predilection than males in all anomalies investigated.

In some cases reduction in size of the maxillary lateral incisor has been seen associated with palatally displaced canines, second premolar agenesis, third molar agenesis and infraocclusion of deciduous molars. This was explained on the basis that maxillary lateral incisor agenesis and palatally displaced canines share a common genetic background¹⁵⁻¹⁶. This has clinical significance as early diagnosis of this anomaly of the maxillary lateral incisor may disclose a potential risk of position and eruption anomalies of the maxillary permanent canines. Other aesthetic problems associated with the abnormality of maxillary lateral incisor include mediandistoma, spacing, midline shift, overretention of maxillary deciduous lateral incisor, ectopic eruption of canines. Early management of missing maxillary lateral incisors is done in order to restore aesthetic and function in affected individuals¹⁷.

V. Conclusion

To conclude not much morphological variations were noted among the south and north Indian populations. Although some difference in the dimensions was noted but they are not statistically significant, which may be because of less number of sample size taken. Future studies required in this area to find any significant results.

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