Evaluation of the reliability of age estimation using Cone Beam Computer Tomography (CBCT)

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ABSTRACT

Introduction: Age estimation of both the living and the dead is one of the most important sub disciplines of forensic sciences and is of supreme importance in medicolegal issues. It can be used as a presenting evidence in court for individuals of unknown birth records for matters of medical jurisprudence and social norms. The identification and age estimation of the dead when information regarding the deceased is unavailable is important from both legal and humanitarian aspect. It is also important in the setting of a mass disaster or crime investigation.

Aim: To estimate the age of individuals using three methods: Third molar calcification, height of the mandibular condyle and the length of the mandibular body; to compare the estimated age with the chronological age of the individual and to identify the most reliable method for age estimation.

Materials and method: The CBCT scans of 100 patients were included in the study. The scans were divided into two gender specific groups and further sub-divided into two smaller groups of 12-18 years and above 18 years. The chronological age of the subject was recorded based on his/ her date of birth. The third molars from all the four quadrants were assessed and categorized into their respective developmental stages given by the modified Demirijian's chart. The length of the mandibular body was obtained by measuring the length between the points Gonion (Go) and the Gnathion (Gn). The height of the condyle was obtained by measuring the distance between the maximum condylar height and the minimum height at the sigmoid notch. The values obtained were subjected to statistical analysis. Age estimation formula for each parameter was derived by simple linear regression analysis.

Results: The standard error in age estimation with third molar calcification, length of mandibular body and height of condyle was 6.146, 7.511 and 7.504 respectively. Among the three variables used third molar calcification showed least standard error (i.e. 6.146).

Conclusion: With the number of samples analysed and the results obtained, it can be concluded that the third molar calcification could be a comparatively reliable method for age estimation among the three parameters used in the study.