G17   A Forensic Age Estimation From the Pulp/Tooth Area Ratio (PTR) of the Canines: A Forensic Odontological Study

Jagmahender Singh Sehrawat, PhD*, Panjab University, Department of Anthropology, Chandigarh 160014, INDIA

Learning Overview: After attending this presentation, attendees will be more aware of the crucial role of radiological methods in forensic age estimation.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by scrutinizing the role of radiological techniques in forensic odontological identification.

Teeth are among the hardest structures of human body that remain well preserved for forensic investigations for comparatively longer periods of time as they can resist all sorts of physical, chemical, biological, and taphonomic destructions or traumatic insults. The formative, degenerative, and histological changes in human dentition after death make teeth the most reliable and significant forensic anthropological evidence for establishing identity of the deceased, such as age, sex, ethnicity, or pathological status of the deceased. For age estimations, a number of methods have been suggested by different researchers, based either on gross tooth specimens or the radiographs of the deciduous or permanent teeth, either fitted in the jaw sockets or dislocated. Radiological analysis is a non-invasive technique that has played a pivotal role in forensic age estimations of both living and dead individuals required for various purposes. The radiographic method has its own advantages, being less time-consuming, non-destructive in nature, and providing precise estimates.

The present study used radiographs of human canines recovered from human skeletal remains, exhumed from a unused well present underneath a religious structure at Ajnala, Amritsar, in April 2014.[1] From more than 6,000 human teeth of different types, anatomically sound canines were selected for the present investigation. Though there are some historically written versions about the identity of these non-scientifically excavated human remains, this study scrutinized the scientific validity and authenticity of various hypotheses put forth by various amateur historians and other stakeholders in an attempt to endorse or refute the written facts about the remains from their forensic anthropological examinations. The unscientific excavations have seriously challenged forensic identifications of these remains; still, there are some sound opportunities and analyses that can help to establish their identity.

The present study was conducted with the goal of estimating the age of Ajnala victims from their Pulp Tooth area Ratio (PTR) calculated from the area of the tooth surface and its pulp chamber. The morphologically intact dislocated canines were radiographed at the university health center with Siemens' digital X-ray machine and the images were stored digitally. The outline surface area of each canine and its pulp cavity was marked with the help of the computer-aided drafting program ImageJ, and their ratios were calculated. The calculated values were put into the regression equations proposed by previous researchers for PTR among different population groups.[2] Analysis of results and their comparisons showed that only a very few Indian studies could provide positive results when PTR values of the present study were put into their regression equations. It was found that the average age of the majority of teeth was 17–30 years or more; only 14 teeth were found to be subadults (below 14 years of age) when compared with previous studies.[3]

Reference(s):
1.   Cameriere R., Ferrante L., Cingolani M. Variations in pulp/tooth area ratio as an indicator of age: a preliminary study. *J. Forensic Sci.* 49 (2014):317–319.
2.   Babshet M., Acharya A.B., Naikmasur V.G. Age estimation from pulp/tooth area ratio (PTR) in an Indian sample: A preliminary comparison of three mandibular teeth used alone and in combination. *J Forensic Leg Med.* 18(2014):350- 354.
3.   Sehrawat J.S., Pathak R.K. Non-scientific archaeological recovery of human remains from an ancient well in India: Challenges in their identification. *Archaeol Environ Forensic Sci*, 2017; 1(1): 79-92.

Forensic Odontology, Age Estimation, Pulp-to-Tooth Area Ratio