F42   Readability of Oral Radiographic Age (Bone and Dental Age) to Determine Chronologic Age: Preliminary Results on an Italian Population

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After attending this presentation, attendees will appreciate the importance of the use of oral radiographic age to determine the chronologic age in critical forensic cases, especially those where young people are involved.

This presentation will impact the forensic science community by presenting a different method to determine the chronologic age is proposed in critical forensic population.

It is always an ongoing task to establish the chronological age of unknown individuals who are guilty or under suspicion for a specific crime. In these cases the judge need to ascertain the exact age to proceed in the trial, especially when young people are involved. The most used method to study the maturation degree is to consider the bone age, which means the examination of the shape and the mutual position of the bones that can be observed in different development degrees at different ages. But it is well known that the correspondence between skeletal and chronological age is very rarely established appropriately. The aim of this research is to evaluate if Oro-Cervical Radiographic Score (ORS), obtained by the combination of cervical vertebral maturation method and dental age, correlates with chronological age (CA) in an Italian sample.

Material and methods: 60 Italian individuals (21 males, 39 females) from 8 to 25 years old, divided respectively into three groups according to their chronological age (G1=8-14; G2=14-18, G3=18-25), were enrolled. Two different researchers, blindly, retrospectively examined panoramic X-rays (OPT) and lateral cephalometric radiographs (LCR) already taken for orthodontic reasons. Chronological age (CA) of the individuals was already known. Radiographic exams have been selected according to quality and presence of all left lower elements. The ORA was determined for each participant combining Demirjian's method for dental age calculation,[1] third molar development for age estimation,[2] and cervical vertebral maturation method for skeletal age calculation (CVM)).[3,4] A liner regression model was used to evaluate the correlation between ORS and CA.

Results: The mean CA was 15.74 years (Standard Deviation (SD) = 4.80; range 8-25 years), while the mean ORS was 2.71 years (SD=1.93: range 0-5). There was a significant correlation between the ORA and CA (Slope=0.213, $p<0.001$, R-squared= 0.24). The correlation remained significant when the sample was stratified by sex (Female: Slope=0.23, $p<0.001$, R-squared= 0.356 - Male: Slope=0.2, $p<0.05$, R-squared= 0.07).

Conclusions: In this sample, ORS correlates with CA and can be a useful tool for forensic medicine. Maturation stage of left lower third molar is mandatory when determining the age of subjects older than 14 years, but this evaluation can be influenced by several individual variations (i.e., agenesia, malformations, impaction). The introduction of CVM can add more information especially for those individuals with the third molar missing. Further studies must be carried out to enlarge the sample and to determine the influence of many possible confounding factors (i.e., race, socio-economical status, nutrition).

References:

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