



## G15 Accuracy of the Third Molar Index for Assessing the Legal Majority of 18 Years of Age in the Turkish Population

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After attending this presentation, attendees will better understand age assessment based on the apical formation of third molar teeth as well as the third molar index as an indicator for legal majority. Attendees will be aware of age assessment by using teeth, jaws, and Orthopantomographs (OPGs) as alternative techniques in forensic science.

This presentation will impact the forensic science community by validation of a simple method for assessing adult age in the Turkish population with a specificity value of 100%. The method was introduced in 2008 and tested on various populations.

The age of majority is the age at which the law considers a person to have reached adulthood and attained full legal citizenship and whose decisions no longer require the oversight of a parent or guardian.<sup>1</sup> The Turkish Civil Code considers a person to be an adult at the age of 18 years; therefore, individuals aged  $\geq 18$  years are judged according to general criminal laws.<sup>2</sup> In this context, it is necessary to use non-invasive methods with high accuracy and precision for age estimation because of specific legal requirements. An important type of error in age assessment is the false adult; this is the worst and least desirable error and can have critical and unacceptable legal consequences. In 2008, Cameriere et al. developed a new method for assessing adult age based on the ratio between age and normalized measurements of the open apices and the length of the third molar ( $I_{3M}$ ).<sup>3</sup> A cut-off value of  $I_{3M}=0.08$  was determined to assign an individual to either a juvenile or adult age classification.<sup>4</sup>

The goal of this cross-sectional study was to test the accuracy of the cut-off value of 0.08 for the third molar index ( $I_{3M}$ ) protocol to assess legal adult age determination in a sample of Turkish children and young adults. Digital OPGs of 293 healthy Turkish children and young adults (165 females and 128 males) between 14 years and 22 years of age were analyzed. Concordance correlation coefficient ( $\rho_c$ ) and Cohen's kappa coefficient ( $\kappa$ ) statistics indicated that repeatability and reproducibility are high for both intra- and inter-rater error. The analysis resulted in sensitivity of 85.9% and specificity of 100% for females, and sensitivity of 94.6% and specificity of 100% for males. The calculated positive and negative predictive values and the likelihood ratios for both females and males also verified the accuracy of the Cameriere cut-off of 0.08.

In conclusion, the specificity values of 100% for both females and males showed the absence of false negatives and the correct classification of all minors; however, the third molar cut-off method should be applied carefully, and it is recommended that a combination of several methods be performed to determine whether an individual should be considered as a legal adult ( $\geq 18$  years) or a juvenile.

### Reference(s):

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### Third Molar Index, Legal Majority, Turkish Population