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**THIRD MOLAR DEVELOPMENT STAGING:  
CROWN-ROOT LENGTH RATIO AS  
REFERENCE FOR OPTIMALLY STAGING ROOT  
DEVELOPMENT**

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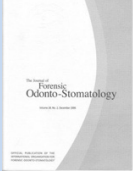
*The authors declare that they have no conflict of interest.*

*Multiple tooth development staging techniques were reported, based on the described and considered borderlines between succeeding stages. Anatomic tooth features or predictions of future tooth part dimensions are used to identify the thresholds between the established stages. The need to estimate completed tooth part dimensions in the latter is seen as a drawback to use this staging technique for age estimations. Searching the overall ratio between the crown and root length provides a tool for undisputable staging third molar root development with the technique based on future tooth parts.*

*The aim of this study was to measure the crown and root length of fully developed third molars and to calculate their ratio, enabling to consider the observed root length as a proportion of the already completely developed crown length.*

*On a sample of 1000 dental panoramic radiographs, the root and crown lengths of all present third molars were digitally measured using image ameliorating software (Adobe® Photoshop®, Adobe Systems Incorporated, San José California, United States America). The radiographs were collected from the dental clinic files of the Katholieke Universiteit Leuven (Belgium). The included subjects were equally distributed in sex, and their age ranged between 22 to 40 years. Three landmarks were defined for standardized measurements, namely two occlusal planes, the cement enamel junction and the root apice(s). Ratios of crown root lengths were statistically evaluated related to gender, and third molar position. After 1 month 100 panoramic radiographs were selected randomly from the main sample and the landmark setting and measurements were repeated to measure observer reliability.*

*An overall crown-root length ratio of 1/2.1 (0.48) was detected. As such, in case of doubt during third molar root development staging, the observed root length can be measured and related to the measured crown length for uniform classification. (e.g. an observed developing third molar with measured crown length 8.40 mm will have on average a completed root length of 17.64 mm,*



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*implicating that a measured root length bigger than 4.41 mm and smaller than 8.82 is classified as root ¼ completed).*

**KEYWORDS:** Forensic Odontology, Age estimation, Root Development Staging..

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