# THE TRIPLE TEST: AGE ESTIMATION PROTOCOL FOR UNACCOMPANIED FUGITIVES DEVELOPED AT THE KU LEUVEN, BELGIUM

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*Most of the forensic dental age estimations need to be performed within the context of migration and asylum procedures. Based on the children's rights (Resolution 44/25, 1989) the protective status as a child has to be given to immigrating unaccompanied children. Related to immigrating people the age of onset of maturity as defined in the country of arrival has to be considered. The authorities of the countries in which immigration is requested, have the right to check the age of the applicant. Hence medical age estimation tests are used. As an example the age examination protocol for unaccompanied young fugitives developed at the Katholieke Universiteit Leuven (KU Leuven) and applied in Belgium, is described. The protocol is mainly based on dental age estimation and integrates at least three gender-specific tests. Therefore, it was named the "Triple Test".*

*The Triple Test is performed after obtaining an informed consent from the applicant. It starts with a clinical dental examination to exclude diseases or syndromes possibly influencing tooth and skeletal development. Furthermore, this examination allows to obtain a clinical impression of the dental age of the applicant. Consequently, the number of teeth, the amount of decay, stain, and restorations, the positions of the periodontal attachment, the degree of attrition, especially on molars, and the dental occlusion are evaluated. The examiner registering the clinical impression is biased seeing and clinically examining the applicant. Therefore, all other parts of the Triple Test are also performed by a second examiner, independently. In case the final results of both examiners are in disagreement, the tests are reconsidered until a full consensus is reached.*

*Next a dental panoramic radiograph is taken and evaluated. If developing permanent teeth (except third molars) are observed, the age is estimated based on the registered developmental stages of the mandibular left permanent teeth using the Willems et al. (2001) method. In case all*

*permanent teeth (except third molars) are mature, the age is estimated based on the registered developmental stages of the available third molars and taking into consideration the missing third molars. Therefore, the Bayesian method developed by Thevissen et al. (2009) is used. Besides, the latter method allows to calculate the probability of an applicant being older or younger than the age of maturity (18 years according to Belgium's law).*

*Additional to the panoramic radiograph, a hand wrist radiograph of the non handedness side is taken to verify the obtained dental test result. Therefore, the ossification of the hand wrist bones, in particular, the ossification of the radius and ulna is considered with use of the Greulich and Pyle atlas (1959).*

*On the occasion that the hand wrist bones are mature, supplementally sterno-clavicular radiographs (frontal and oblique) are taken to observe the ossification of the medial part of both clavicles. Accordingly, the age is estimated based on the Schmeling et al. (2004) method. The evaluation of the clavicles allows to estimate an age, even when all available third molars are completely mature.*

*The Triple Test considers different age related biologic variables and the obtained test results eventually allow, to define the estimated age more accurately, to evaluate a wider age range and to get confirmations between test results. Due to biologic variance between persons, scientifically unexplainable discrepancies between the test results can exist. In that situation, doubt about the estimated age exists, and the Belgium law prescribes that the medical test delivering the youngest age result has to be taken into account (Wetgeving, 2002).*

*KEYWORDS***:** Forensic Odontology, Age Estimation, Triple Test.