



JOURNAL of FORENSIC ODONTO-STOMATOLOGY

VOLUME 31 Supplement 1 October 2013
Abstract book IOFOS Conference 2013 Firenze

COMPARING 14 COUNTRY-SPECIFIC POPULATIONS ON THIRD MOLARS DEVELOPMENT: CONSEQUENCES FOR AGE PREDICTIONS OF INDIVIDUALS WITH DIFFERENT GEOGRAPHIC AND BIOLOGICAL ORIGIN

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The authors declare that they have no conflict of interest.

Due to the migration aspect, frequently the age of an unaccompanied young fugitive with a particular geographical and biologic origin was estimated using methods or models developed on a reference sample, including subjects with unlike origins. Since dental age estimations in the sub-adult group are based on third molar development, it has to be investigated whether differences in third molar development between populations with different geographic and biological origin exist. Furthermore the consequences on the age prediction performance, estimating the age of an individual from a different geographic and biological origin as the reference sample has to be examined.

In an ongoing data collection, previously 9 country specific samples (Belgium, China, Japan, Korea, Poland, Thailand, Turkey, Saudi-Arabia and South-India) were investigated on third molar development (Thevissen et al., 2010a,b). In the present study 5 new country specific datasets (Brazil, Italy, Malaysia, United Arab Emirates and Croatia) were added, analyzed and compared. The aim of this study is to collect country-specific databases of third molar development, to evaluate and compare third molar development between the collected countries and to detect the impact on the age prediction performance, using a validation sample from a different geographic and biological origin as the reference sample..

A total of 11.250 panoramic radiographs from subjects out of the above described 14 countries were collected. For each country the individuals were, sex specific, homogenously distributed in the age range between 16 and 22 years. Third molar development of all present third molars was

registered, according the ten stages technique of Köhler et al. (1994). Missing third molars received a zero score. Consequently each subject received a third molar score sequence for the upper right, upper left, lower left and lower right third molar respectively. To obtain for each subject a factor score, representing the degree of third molar development in the total dataset, a generalized linear mixed model for multivariate ordinal data was fitted on the third molar score sequences of all subject from the 14 countries. Differences in degree of third molar development between countries were analyzed using gender specific regression models for these factor scores with age and country as predictors.

Comparisons between countries revealed differences in speed and onset of third molar development. Over the different ages the degree of third molar development changed between countries in an unordered way. No clear patterns of differences in degree of third molar development could be distinguished between the countries. Compared to all other countries, Belgium subjects were generally developing fastest. As such, using for age estimations purposes, third molar development information from Belgium instead of country specific information results in under estimated age predictions. This is the best judicial reference if country specific reference information is lacking. Indeed, legally spoken an advantage of the doubt for the individual under examination is then provided.

No evidence was detected for important differences in degree of third molar development between the 14 examined countries. This implicates that geographical differences in third molar development between examined individuals are of clinically negligible influence using age predictions based on third molars development.

KEYWORDS: Forensic Odontology, Age prediction, Third Molar Development, Population Influence.