F17 Human Third Molars Development: Comparison of 13 Country Specific Populations

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After attending this presentation, attendees will be informed on the detected differences in third molar development comparing 13 country specific population samples.

This presentation will impact the forensic science community by increasing awareness on how the comparisons of third molar development between individuals from different countries revealed distinctions in speed and onset of development, but although reaching statistical significance, these differences were small and not constant over the considered age range.

Dental age estimations in the sub-adult age group are mainly based on the development of the third molar(s). In forensic practice, these age estimations are primarily requested to advise legal authorities in their judgments related to the age of unaccompanied young asylum seekers. Although the majority of age estimation models based on third molar development are constructed on reference samples with ethnically and/or geographically well-described and outlined origin, these studies can rarely be compared for the evaluation of possible ethnical or geographical influences on third molar development.

In an ongoing data collection, previously nine country specific samples (Belgium, China, Japan, Korea, Poland, Thailand, Turkey, Saudi Arabia, and South India) were investigated on third molar development. In the present study, four new country specific datasets (Brazil, Italy, Malaysia, and United Arab Emirates) were added, analyzed, and compared. The goal of this study is to collect country specific databases of third molar development and to evaluate and compare third molar development between the collected countries.

A total of 10,117 panoramic radiographs from subjects out of the previously listed 13 countries were collected. For each country, the individuals were homogeneously distributed in the age range between 16 and 22 years and in sex. Third molar development of all present third molars was registered, according to the ten stages technique of Gleiser and Hunt, modified by Köhler.[1,2] 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 a factor score for each subject, 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 subjects from the 13 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. Among 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 will result in underestimated age predictions. This is the best judicial reference if country specific reference information is lacking. Indeed, legally speaking, an advantage is then provided of the doubt for the individual under examination.

In conclusion, no evidence was detected for important differences in degree of third molar development between the 13 examined countries. This implicates that geographical differences between examined individuals are of minor influence on the age predictions based on third molars development.

References:

1. Gleiser I, Hunt E. The permanent mandibular first molar: its calcification, eruption and decay. *Am J Phys Anthropol* 1955;13:253-83.
2. Köhler S, Schmelzle R, Loitz C, Püschel K. Development of wisdom teeth as a criterion of age determination. *Ann Anat* 1994;176:339-45.

Age Determination, Third Molar Development, Country Specific Population

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