Skeletal maturation in Indonesian and white children assessed with hand-wrist and cervical vertebrae methods

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Introduction: The purpose of this study was to describe the stages of skeletal maturity of Deutero-Malay Indonesian children according to the hand-wrist and cervical vertebrae methods and to compare them with white children. **Methods:** The study included 2167 patients with hand-wrist radiographs and lateral cephalometric radiographs. Of these, there were 648 Indonesian boys, 303 white boys (age range of boys, 10-17 years), 774 Indonesian girls, and 442 white girls (age range of girls, 8-15 years). The skeletal maturation index (SMI) was used to evaluate the stages of skeletal maturity from hand-wrist radiographs, and the cervical vertebrae maturation (CVM) index was used to evaluate the stages of skeletal maturity from lateral cephalometric radiographs. One observer made all observations, and a repeatability study was undertaken. **Results:** Box-and-whisker plots were used to show the age distribution on attainment of each maturation stage based on the SMI and CVM. On average, both the SMI and the CVM showed that white children attained each maturation stage about 0.5 to 1 year earlier than their Indonesian peers, although the differences were less obvious in girls than in boys. Multiple regression analysis was used to predict the SMI from the chronologic age. Both the Indonesian and the white boys groups showed a good relationship between predicted SMI and chronologic age ($R^2 = 0.728$ and 0.739, respectively), as did the Indonesian and white girls groups ($R^2 = 0.755$ and 0.748, respectively). Further multiple regression analyses used to investigate the differences in the ages of attainment of skeletal development between Indonesian

and white subjects indicated that, across the age ranges investigated, on average for a particular age, the white boys were 1 SMI stage ahead of the Indonesian boys, and the white girls were about 0.5 SMI stage ahead of their Indonesian peers. Because the CVM has only 5 categories, it was not considered appropriate to use this form of multiple regression analysis. **Conclusions:** The findings confirmed marked variations in the chronologic ages for each skeletal maturity stage and also showed differences between the timing of skeletal maturity with both the SMI and the CVM between the sexes and the ethnic groups. These differences should be considered during orthodontic diagnosis and treatment planning.