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Assessment of dental age in African children aged 5-16 years in Botswana: a comparison of methods by Demirjian, Willems and Chaillet

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Among all biological processes for determining the age of the individual, assessment of mineralization of permanent teeth is one of the most reliable. Results of dental age calculated by procedure according to Demirjian generally overestimated dental age when compared to the chronological age. Studies of specific dental methods for age estimation in children from sub-Saharan Africa are rare and evaluation of the applicability of Demirjian method from 1973 showed that dental age significantly overestimated dental age when compared to chronological age. The aim of this study was to compare the applicability of procedures by Demirjian, 1976, Willems, 2001 and Chaillet, 2005 to estimate the age of the African children from the town of Gaborone, Botswana. The study estimated mineralization stages by Demirjian on total sample of 393 panoramic radiographs (167 boys and 226 girls) aged 5-15 years. Results comparing dental and chronological age in boys showed average overestimation of 0.17 years for the method by Chaillet, 2005 ($p = 0.61$), 0.33 years for the method by Willems, 2001 and the greatest overestimation of 0.57 years for the method by Demirjian, 1976. In girls, Willems, 2001 underestimated dental age by -0.02 years ($p = 0.72$), while Chaillet, 2005 and Demirjian, 1976 overestimated age by 0.33 years ($p = 0.006$) and 0.67 years, respectively.

Keywords: Demirjian method; Willems method; Chaillet method; African children; Botswana