Forensic Dentistry and its Application in Age Estimation from the Teeth using a Modified Demirjian System

Matthew R. B. Blenkin, BDSc

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In loving memory of
my son
James Matthew Blenkin

Abstract

The estimation of age at time of death is often an important step in the identification of human remains. If this age can be accurately estimated, it will significantly narrow the field of possible identities that will have to be compared to the remains in order to establish a positive identification. Some of the more accurate methods of age estimation, in the juvenile and younger adult, have been based on the assessment of the degree of dental development as it relates to chronological age. The purpose of this current study was to test the applicability of one such system, the Demirjian system, to a Sydney sample population, and to develop and test age prediction models using a large sample of Sydney children (1624 girls, 1637 boys). The use of the Demirjian standards resulted in consistent overestimates of chronological age in children under the age of 14 years by as much as a mean of 0.97 years, and underestimates of chronological age in children over 14 years by as much as a mean of 2.18 years in 16 year-old females. Of the alternative predictive models derived from the Sydney sample, those that provided the most accurate age estimates are applicable for the age ranges 2-14 years, with a coefficient of determination value of R-square=0.94 and a 95% confidence interval of ±1.8 years. The Sydney based standards provided significantly different and more accurate estimates of age for that sample when compared to the published standards of Demirjian.

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List of Abbreviations

AI	Amelogenisis Imperfecta
CA	Chronological Age
CI	Confidence Interval
CPA	Canadian Predicted Age
CT	Computerised Tomography
DMS	Demirjian Maturity Score
DVI	Disaster Victim Identification
LBW	Low Birth Weight
MRI	Magnetic Resonance Imaging
NBW	Normal Birth Weight
NSWDOFM	New South Wales Department of Forensic Medicine
OPG	Orthopantomagram
PA	Predicted Age
SD	Standard Deviation
SEE	Standard Error of Estimate
SMS	Simple Maturity Score
VLBW	Very Low Birth Weight