G28 Method Differences, Population Differences, or Examiner Differences: Which Affects the Age Estimation the Most?

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Learning Overview: After attending this presentation, attendees will be able to take a more critical look at the concepts of accuracy and precision as they relate to dental age estimation. In addition, attendees will be able to understand that method selection, utilization of population-specific databases, and failure to calibrate examiners have different effects on the accuracy in reporting of age estimation interval.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by demonstrating the importance of not only applying the correct testing methodology on dental age assessment technique, but this presentation will also encourage the community to take a more critical look at comparing the effects of examiner calibration versus the use of population-specific databases in the reporting of an accurate age estimation interval.

Although dental age assessment methodologies have been extensively researched, tested on different populations, and modified throughout the years, there is still contradictory evidence as to what are the key parameters to consider when selecting the appropriate reference database to use on an individual case. One area of concern is that there is a belief that there are significant differences between different geographic and ancestral populations, and it is critical that population-specific databases be utilized by age assessment techniques. In the past, differences expressed by researchers between test groups have universally been interpreted as proof that population differences exist. Unfortunately, most researchers have failed to look critically at the possibility that other factors, such as examiner calibration and bias, and not population or sex differences, may have had a greater influence on these differences

The goal of this study was to compare the interpretation of results and particularly differences between three dental age estimation methods, Moorrees, Fanning, and Hunt's stages of dental development, Demirjian's dental development scores, and the London Atlas of Human Tooth Development and Eruption, to determine the sources of variances when taking into account subjectivity and user bias.[1-3] An additional goal was to take a more critical look at the concepts of accuracy and precision as they relate to dental age estimation when a technique is tested.

Conclusion: Differences in most published research between dental age techniques and population differences actually falsely attribute these differences to population variance when they should be attributed to the testing methodology of that technique. Measures of performance, study design, and reporting of results when a technique of dental age assessment is being tested need to be revised, especially when measuring population variance.

Reference(s):

1. Moorrees C.F., Fanning E.A., Hunt E.E., Jr. Age variation of formation stages for ten permanent teeth. *J Dent Res* 1963: 42: 490–502.
2. Demirjian A., Goldstein H., Tanner J.M. A new system of dental age assessment. *Hum Biol* 1973: 45 (2) (May): 211-27.
3. AlQahtani S.J., Hector M.P., Liversidge H.M. Brief communication: The London Atlas of Human Tooth Development and Eruption. *Am J Phys Anthropol* 2010: 142: 481–490.

Dental Age Estimation, Accuracy, Population Variance

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