A79 The Role of Third Molar Impaction on Dental Development and Age Estimation in Males

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After attending this presentation, attendees will understand how third molar impaction influences dental development and estimates of age as part of the biological profile.

This presentation will impact the forensic science community by evaluating the utility of impacted third molars in the age estimation of males.

Numerous dental development charts exist to aid in overall age estimation from the dentition.[1-3] These charts incorporate the third molar; however, this tooth is often treated separately to establish independent methods of age estimation. While there is substantial variation in third molar development, it is still a useful measure of age in late adolescence, when other teeth are fully developed. Third molar development may also prove effective in conjunction with other age indicators in determining if an individual has attained the age of majority, which could have legal ramifications.

While a clear relationship between chronological age and third molar development has been established, the effect of impaction on crown and root development is not well understood. The vast majority of impacted teeth are third molars, and a worldwide survey found that approximately 24.4% of the population has impacted third molars.[4] While prophylactic extraction of the third molars is exceedingly common in the United States, there is growing debate over the necessity of this procedure, and the presence of third molars may become more common in forensic casework. The goal of this study is to investigate the effect of third molar impaction on development and its concomitant impact on age estimation methods.

Data were collected on radiographs of individuals who were analyzed in the Central Identification Laboratory within the Defense POW/MIA Accounting Agency. Due to the unique mission of this agency, the vast majority of individuals recovered are males; therefore, this study is only comprised of males (n=90). Radiographs of skeletonized individuals were taken by forensic odontologists. These radiographs were then scored for dental development according to the stages defined by Demirjian et al.[5] Two cohorts were created from this sample, individuals with impacted third molars (n=38) and those without impacted third molars (n=52). Age was assigned based on the appropriate ancestry-based method.[6-7] Differences between identified age and predicted dental age in each group were assessed to determine if molar impaction affected root development and age estimations.

In the cohort with third molars that were not impacted, age was correctly assigned in 90.1% of third molars. In the cohort with third molar impaction, age was correctly assigned for 66% of impacted teeth and 61.5% of non-impacted teeth. In every case of incorrect age assignment, the individual was estimated to be younger than his identified age.

Based on this research, individuals with at least one impacted third molar tend to have underdeveloped third molars, even in those that are not impacted. Therefore, care should be taken in age estimates of individuals who display any impacted third molars; however, more work is needed to explore the effect of impacted molars and development among females and other ancestry groups.

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Molar Impaction, Age Estimation, Dental Development