

G14 The Effects of Third Molar Impaction Parameters on Third Molar Development and Related Age Estimation

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Learning Overview: After attending this presentation, attendees will understand how third molar impaction parameters affect third molar development and related age estimations.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by providing proof that third molar impaction parameters have a clinically small effect on third molar development. This implies that in forensic practice, no distinction is necessary between impacted and non-impacted third molars for age estimation.

Third molar development is used to estimate age in subadults. However, the incidence of third molar impaction is high.¹ If third molars are impacted, their development may be affected, and it may have consequences for the performed age estimations.²

The goal of the current study was to evaluate the effect of third molar impaction parameters on third molar development and related age estimations. Parameters, such as contact between third and corresponding second molar, retro-molar space availability, and angulations between third and corresponding second molar, were examined on 5,279 panoramic radiographs. The radiographs were selected from 1,031 subjects (473 male, 558 female) with ages ranging between 3.2 and 23.5 years old. Based on the measured status of contact and angulations between third and corresponding second molar, an impaction status was assigned. All present third molars were staged according to the Köhler et al. staging technique.³ A linear model was used to evaluate the difference in age between third molars with and without impaction. The model contained fixed effects of impaction (no/yes), stage, and sex. The same model was used to compare age as a function of contact between third and corresponding second molar and retro-molar space availability. For angulations between third and corresponding second molars, a quadratic function was used to describe the relation with age. The model has been fit separately for each third molar position. Significant differences were found in mean age as a function of presence of contact between third and corresponding second molar and retro-molar space availability, depending on third molar position and on stage. There was a significant linear relation between angulations and age, depending on stage. An impaction status was assigned to third molars in contact with the corresponding second molar and with angles between third and second molar $< -22^\circ$ or $> 18^\circ$ for the upper third molars and $< -17^\circ$ or $> 12^\circ$ for the lower third molars. There was a significant difference in age between impacted and non-impacted third molars. However, all the differences were clinically small (≤ 0.65 years) and, for each third molar, the overall age of third molars with impaction was younger than third molars without impaction. Therefore, impacted third molars can be examined for age estimation purposes equally as non-impacted third molars.

Reference(s):

1. American Association of Oral and Maxillofacial Surgery, Impacted Teeth. *Oral Health* 88 (1998) 31-32.
2. R.E. Friedrich, C. Ulbricht, L.A. Baroness von Maydell. The Influence of Wisdom Tooth Impaction on Root Formation. *Ann. Anat.* 185 (2003) 481-492.
3. S. Köhler, R. Schmelzke, C. Loitz, K. Püschel. Die Entwicklung des Weisheitszahnes als Kriterium der Lebensaltersbestimmung. *Ann. Anat.* 176 (1994) 339-345.

Forensic Odontology, Dental Age Estimation, Third Molar Impaction