

# The irony of age estimation in an edentulous subject by dentists, and methods and techniques used in such a case

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## ABSTRACT

This poster presents an unusual case of an adult, completely edentate, female subject who presented to a dental school for age estimation. Specifically, age assessment was necessitated to claim retirement benefits and the request made was to determine whether the subject was  $</\geq$  60 years-old. Considering the complete absence of teeth, the odontologist considered it best to use one of the parameters of the skull/mandible as visualized on radiographs for non-invasive age prediction. Therefore, the gonial angle was measured on a lateral cephalogram for the purpose. An in-house digital method developed for measuring the gonial angle on radiographs was applied. The method comprised of opening the lateral cephalogram in Adobe® Photoshop® computer software, and drawing a line along the lower border of the mandible using the Ruler/Measure Tool in Photoshop's toolbox to rotate the radiograph and orientate the lower border of the mandible horizontally. Next, Photoshop's built-in rulers were activated along the top and left margins of the radiograph (by holding down the Ctrl+R keys in the keyboard; Command+R keys in Macintosh computers). The cursor was clicked and dragged from within the built-in ruler along the top of the radiograph, and placed along the now horizontal lower border of mandible. Next, once again, the Ruler/Measure Tool was used to draw a line along the posterior border of ramus, and the angle noted in the Option Bar of Photoshop. This is the gonial angle. The gonial angle derived in this case was 99.2°. The measurement was substituted in a population-specific formula derived from raw data shared by the principal author in Upadhyay et al. [J Forensic Dent Sci. 2012;4(1):29-33] and using logistic regression analysis (LRA). LRA is a statistical analysis which allows group prediction of an individual, in this case whether the female subject belonged to  $<60$  year- or  $\geq 60$  year-old age group. The formula was derived from gonial angle measurements of 48 male and female subjects of age 51-70 years—19 subjects aged 51-59 years formed part of the  $<60$  year-old group, while 29 subjects in the age range of 60-70 years formed part of the  $\geq 60$  year-old group. The logistic regression formula developed gives a probability of the subject being either  $<60$  years or  $\geq 60$  years old. When the aforementioned gonial angle was substituted in the formula, a probability of 95.7% was obtained, indicating that there was a 95.7% probability of the subject being  $\geq 60$  years old. While the gonial angle may not be used as a routine method in adult age

estimation owing to relatively higher error rates, the case presented here represents a rare example wherein the option of applying dental age estimation methods in living individuals was not feasible and, therefore, craniofacial parameters such as the gonial angle—familiar to dentists and forensic odontologists alike—may serve as a method of choice in the absence of other alternatives.