

**Name :** Tamer Mahmoud Ahmed Abd El-Wahab

**Institute :** African Research and Studies

**Dept. :** Anthropology

**Degree :** Ph.D.



**Title of Thesis:** An Orthopantomographic Study for Age and Sex Estimation: A Comparative Study Among Egyptians and Tunisians Adults

**Supervisors :** Dr. Nancy A.F. Khattab and Dr. Azem M.A. Marzouk

**Abstract :**

**Background & Objectives:** Bioanthropological research must be built upon a foundation of accurate age and sex estimates. Age and sex estimation from dental radiographs is a non-destructive, simple method to obtain information. The objectives of the present dissertation were to analyze six dental age and sex estimation methods regarding their comparative validity and practical implementation using 600 digital orthopantomograms. Furthermore, a purpose of the investigation was to supplement the literature with data on dental age and sex estimation in Egyptians and Tunisians individuals. **Methods:** The orthopantomograms were selected based on the inclusion and exclusion criteria set forth for the study. Aging and sexing of modern Egyptian and Tunisian populations as follows: Sex assessment using discriminant Function analysis of mandibular measurements, mandibular ramus flexure and of mandibular canine index, The estimated gender was then compared with the known gender and percentage accuracy of determination was calculated, while age was assessed using orthopantomographic indices of the pulp of mandibular canine namely coronal pulp cavity index, pulp-tooth area index and linear measurement of the pulp cavity. **Results:** The results showed that the mandibular ramus flexure, mandibular canine index and discriminant function analysis for sex determination among the study populations using digital orthopantomogrms can be used to diagnose sex with an average accuracy up to 86%. Similarly the pulp tooth area, the coronal pulp cavity index and linear measurement of pulp were used for age estimation using mandibular canines, statistically significant correlation between age and the study variables was revealed. This work revealed no significant difference between chronological and estimated ages. Different equations for age estimation in the resent research yielded an error of age estimation about 2.5 years as a mean value for both the Egyptians and Tunisians which is much lower than most that of anthropological methods.

Moreover, it was shown that a combination of variables potentially leads to increases of the predictive power beyond the capabilities of each method alone for both age and sex estimation. A new function for sex determination for the Egyptians and Tunisian was derived as population specific method for sex determination that yielded a more accurate sex estimate. **Conclusion:** Consequently, it was concluded that, this research showed promising results for dental age and sex estimation in a non-invasive manner using dental digital orthopantomograms of Egyptian and Tunisians populations. Moreover, population-specific equations were introduced to enhance the accuracy of the estimates. Future research should aim at acquiring larger sample sizes, in order to reduce standard errors of age and sex estimation, and studying the effect of race, culture and pathology on model parameters. Also the application of the proposed methods in forensic and archeological contexts.

**Keywords:**

Orthopantomograms; Age estimation; Sex determination Egyptians; Tunisian; Discriminant Function analysis; Mandibular measurements; Regression equations.