



F43 Morphometric Analysis of Third Molar Development: A Comparison of Albanian and Italian Sample Populations

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The goal of this study was to investigate the differences between third molar root development in Italian and Albanian populations when determining the age of adults.

This presentation will impact the forensic science community by underlining the importance of using morphometric analysis in age estimation while also taking into account the differences that exist between various ethnic groups

Introduction: Determination of adult age by tooth analysis is an important issue in forensics and has significant implications in determining criminal liability. It also plays a critical role in issues regarding young illegal immigrants and refugee children. Moreover, the results of such analyses play a substantial role in areas related to school attendance, social benefits, adoption procedures, employment, and marriage as related to international protections guaranteed by the United Nations High Commissioner for Refugees (UNHCR).

The study was conducted on digital orthopantomographs (OPG) and was based on identification criteria using morphometric analysis with the goal of overcoming the limits associated with using morphological analysis alone. This investigation also served to verify the existence of differences in third molar development among Italian and Albanian populations.

The goal of the study was to test the possibility of applying the results of a previous morphometric analysis conducted on an Italian sample population (Forensic Sci. 2008 Jul; 53(4): 904-9) to an Albanian sample population: Albanians are the second most populous ethnic group in Italy after Italians.

Materials and Methods: OPGs were obtained by systematic digital analysis using specialized dental software. In the first phase of the study, the confidence intervals obtained from the Italian sample were applied to a sample of 140 Albanians whose OPG ages were between 16 and 19 years. This was done in order to ascertain the feasibility of using these confidence intervals. Preliminary results revealed the risk of age overestimation in 15% of the sample when these confidence intervals were applied to the Albanian sample. As a result, another analysis was carried out on a sample of 100 third molars with fully developed roots, all belonging to Albanians, in order to investigate the existence of a constant crown-to-root ratio (C/R).

After recording the measurements, a statistical analysis aimed at identifying the arithmetic mean of the ratios, and standard deviation was carried out. This resulted in an average C/R ratio value equal to 0.560, slightly higher than the average values obtained from the Italian population, and a standard deviation of 0.07.

In the second phase of our study, 494 third molars were analyzed with developing roots belonging to Albanian individuals (from Tirana and Valona) aged between 16 and 19 years, and subdivided by sex. The values obtained from the first phase of the study were used in the subsequent phase, thus establishing that when the crown height (h) of the third molar, with developing roots, is known, the root length (lt) of the molar, when it is fully developed, may also be known.

After establishing the length of the developing root, and based on the constant ratio established in the first phase, the lengths of the incomplete roots (ir) were calculated and the complete roots according to growth estimates (cr). Final Ratio (fr): ir/cr incomplete root/complete root beginning with root size values, a preliminary macro identification was made for both sexes that distinguished minors from those whose ages were 18 years or older. Analysis was made with 90%, 95%, and 99% confidence intervals, obtaining two limit values (lower and upper) of the ir/cr ratios in subjects under 18 (i.e. 16 and 17 years old), and over 18 in our sample, according to sex.

A comparison of the results obtained from the two populations was carried out.

Results: The Albanian sample showed higher developmental asymmetry of the left and right inferior third molars than the Italian sample. The Albanian sample showed a higher crown-to-root ratio as well as a higher growth index than the Italian sample. There was not an over estimation of the predicted root length in any of the cases. This is an important consideration when seeking to avoid the risk of over-estimating age. **Age Estimation, Third Molar Development, Forensic Odontology**