H91 Diverse Stature Estimation Formulae Applied to a Bosnian Population

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The goal of this presentation is to evaluate the application of three different stature estimation formulae to a Bosnian population. This research project tests the accuracy of Trotter (1970), Ross and Konigsberg (2002) and Sarajlic (2002) formulae for stature estimation as applied to a Bosnian population.

This presentation will impact the forensic community and/or humanity by demonstrating how correct stature calculation could be crucial to solve the problem of establishing positive identification in mass fatality situations involving related individuals.

In cases where a deoxyribonucleic acid (DNA) report is generated on two, three or even four bothers that did not have children and cases with mixed remains from mass graves, especially secondary mass graves, accurate biological profiles, including stature estimation are critical to sorting the remains. Establishing which brother the remains represent, or (in mass graves) to find that part of the body that does not belong to the individual, or that only the bone from which the sample was taken belongs belong to the individual while other bones to somebody else can be assisted by correct stature estimations.

There are still more than 14.000 missing persons in Bosnia and Herzegovina from the recent war who are believed to be dead. The process of recovery and identification of the deceased will inevitably take the next several years. Besides the estimation of sex and age, stature estimation is the next most important factor contributing to the individuation of unidentified persons.

Since 1996, the Trotter (1970) formulae, developed on American Whites, have been used almost without exception to determine the stature of the population in Bosnia and Herzegovina. Experience in the recovery, anthropological examination and identification processes showed that those formulae have not always produced adequate results. In 2002, Ross and Konigsberg presented new formulae for stature estimation for Balkans, using bones from unidentified Bosnian and Croatian males who were victims of the recent war. Because the actual statures of those persons were not known, the authors used the mean and standard deviation of stature for 19-year-old males from the literature. The same year, 2002, in his master thesis, Sarajlic also presented formulae for stature estimation of Bosnian population. The research was undertaken on male cadavers. The cadaver length was measured directly and the length of the long bones was obtained from radiographs.

An additional problem in Bosnia and Herzegovina is lack of records for either measured or reported height of the missing. The majority of military records containing such data were destroyed during the war. Therefore, in more then 95% of cases data about height of missing persons were obtained from family members. Since there are still many missing persons in Bosnia and Herzegovina the identification of exhumed skeletal remains could benefit from using accurate formulae for stature estimation. Given the absence of antemortem data for height of the missing, estimated forensic stature (by close relatives) has to be considered as equivalent to biological stature in this situation.

The sample for this research consists of long bones (humerus, femur, tibia and fibula) and was obtained from 400 males exhumed in Bosnia and Herzegovina. The maximum length of the long bones was measured. In each case, the identity of deceased persons was provided by DNA and confirmed by the comparison of antemortem with postmortem data. All individuals in the study were aged from 19 to 58 years. In only 4% of the cases there were either military or medical records for stature of those persons. In 2% of the cases family members reported exact stature of the missing person. In all other cases, data about height was recollected by family members. In each such case measurements of a surviving male cousin, who were mature before the war, were taken and the height of the missing person was estimated according to their height.

Ross and Konigsberg showed in their research that formulae based on Trotter (1970) systematically underestimate stature in the Balkans. Sarajlic stated that the Trotter formulae underestimate the stature of tall people in Bosnia. In his study, the comparison with Trotter's method was made with the same sample from which the new formulae were derived. However, none of these formulae were tested on the bones from exhumed persons. This study compares all three methods on a large independent sample in order to determine which formulae provide the most accurate stature estimation for the male population in Bosnia and Herzegovina.

This research conducted on Bosnian remains from the recent war (1992-1995) might be helpful not only in the identification of the missing from the war, but for new forensic cases in Bosnia and Herzegovina as well.

Forensic Anthropology, Human Identification, Stature Estimation

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