



Physical Anthropology Section – 2005

H50 The Importance of Using Traditional Anthropological Methods in a DNA-Led Identification System

Laura N. Yazedjian, MSc, Rifat Kesetovic, MD, Ana Boza-Arlotti, PhD, and Zeljko Karan, MD, International Commission on Missing Persons, Alipasina 45a, Sarajevo, 71000, Bosnia-Herzegovina*

The goal of this presentation is to demonstrate, using several case studies, that even with the use of advanced DNA technology for the identification of large numbers of missing persons, traditional methods of anthropological analysis are still necessary.

This presentation will impact the forensic community and/or humanity because it is an illustration that commingling, from whatever source, cannot be totally resolved using DNA. Traditional anthropological methods are not only more cost-effective, but they allow more complete resolution of commingled case, as it is not possible to produce a DNA profile for every bone and bone fragment. It is important for the forensic community as well as for non-forensic scientists and laypersons to dispel the myth that using DNA for identification of individuals is the only step in identification.

In Bosnia-Herzegovina, the International Commission on Missing Persons (ICMP) is using a large-scale DNA-led system to identify approximately 30,000 individuals who went missing as a result of the conflict in the 1990's. This has led to a misconception, especially among laypersons, that a positive DNA match between a set of remains and his or her family members constitutes a positive identification of that individual. Unfortunately, due to various taphonomic factors, such as scavenging, deliberate attempts to hide evidence and poor excavation methods, many of these remains are highly commingled.

Cases that have positive DNA matching reports are examined by anthropologists; during anthropological analysis, a complete biological profile of the individual is created in a specially designed database. The methods commonly used for age determination are the Suchey-Brooks and Todd methods for pubic symphysis development, the Iscan-Loth method for the sternal rib end, the Lovejoy method for the auricular surface, the Lamendin dental method and sternal clavicle, vertebral ring and S1-S2 unions. The Trotter and Gleser formulae are used for stature determination. The pathologist then uses this report during antemortem-postmortem comparison, in association with other information such as clothing and personal effects, to reach an identification.

Case 1: A partially complete body from a secondary mass grave near Srebrenica, missing the lower left arm, lower left leg and right femur, and a few other fragments. The age-at-death estimation was 45-55 years; however, the chronological age of the individual represented by the DNA

was 23. The femur, which had been sampled, appeared consistent with the rest of the skeleton, and the articulation of the femoral head with the acetabulum was not inconsistent. A second DNA sample was taken, from the left humerus, confirming that two individuals were present.

Case 2: A virtually complete body from the same secondary mass grave, missing several fragments, including most of the right os coxae. The DNA report on the right femur was for an individual in his early 20s; however, most of the remains belonged to an individual over 60 years old. The results of the second DNA test are pending.

Case 3: A DNA report for a male individual was issued for a partially complete female body. Only the femur which had been sampled belonged to the identified individual with the rest of the skeleton representing a very robust female.

Case 4: Two virtually complete individuals were collected from the field in one body bag. Both were almost the same stature, but one was slightly more robust and one individual was in his early 20s and the other in his mid-30s. Using pair-matching and articulations to separate the uppers and lowers into two individuals, and using the ages to distinguish the skulls, vertebrae and ribs meant only two DNA samples had to be taken from each, one from a femur and one from a humerus, to ensure they were correctly separated.

Examination of the remains and the creation of a biological profile ensure that the remains present belong to only one individual and that the remains are consistent with the individual represented by the DNA matching report. This not only helps to return the correct and most complete remains to family members, it also reduces the number of bone samples that need to be cut to test for DNA.

Forensic Anthropology, DNA Identification, Bosnia-Herzegovina