



H86 An Interdisciplinary Approach to Data Collection of Unidentified Juvenile Remains at the Georgia Bureau of Investigation (GBI)

Jonathan Eisenstat, MD, Georgia Bureau of Investigation, Decatur, GA 30034-3830; Alice F. Gooding, PhD, Kennesaw State University, Kennesaw, GA 30102*

Learning Overview: After attending this presentation, attendees will understand some of the challenges facing the identification of juvenile skeletal remains and learn about the effectiveness of a multi-step protocol for the collection of biometric and biological data from juvenile remains.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by showcasing how an interdisciplinary approach in the medical examiner's setting is vital to aiding in the identification of a large collection of unidentified individuals.

The GBI houses the skeletal remains of unidentified individuals ($N=272$) dating back to the 1960s. Legislation was passed in 2016 to allow for the burial of these individuals. Prior to internment, it was decided that a thorough examination of every case was necessary to create a robust case file in the event that a lead on identification should arise. Of these cold cases, anthropological analyses were used to determine that approximately ten percent ($n=26$) were juvenile (e.g., skeletally immature). Long bone length, the appearance and union of epiphyses, and the development and eruption of the dentition were used to approximate the age at death of each individual, ranging from 20 weeks *in utero* to 25 years of age.

The identification of juvenile remains is particularly difficult because many of the other standard components of an anthropological analysis, such as biological sex and ancestry estimation, are less reliable before skeletal maturity. Further, the condition of these remains varies. While some cases are largely complete skeletons, others are comprised only of bone fragments or else the present bone is in extremely poor condition due to weathering or burial. As a result, a uniform approach to analyses would be ineffective. In response, this study developed a diverse, multi-step, interdisciplinary protocol to collect a large range of biometric data and biological specimens from each individual before internment. Each set of remains was photographed, inventoried, and analyzed using gross morphological techniques. Metric measurements of all present elements were also collected. In addition to traditional DNA comparison, bone samples were extracted for stable isotope analysis. Unique isotopic signatures (carbon, nitrogen, oxygen, and strontium) in bone may be distinguished based on regional differences in drinking water supply. For individuals in which the cranium was fully formed, crania were scanned at 0.5mm intervals with a peripheral Quantitative Computed Tomography (pQCT) scanner at Kennesaw State University. The completed Digital Imaging and Communications in Medicine (DICOM) stacks will subsequently be used to print 3D models for forensic artistic reconstruction. While all cases in the GBI's unidentified collection will receive a thorough examination, this study argues that this multi-step data collection protocol using new technological developments is key to the potential identification of juvenile individuals.

Unidentified, Juveniles, Anthropology