L2 Operation Lima Sea — Unidentified Remains of a Human Torso in Queensland, Australia: Case Report on the Collaborative Investigative and Novel Anthropological (Forensic) Responses in the Establishment of Identification

Donna M. MacGregor, MSc, Queensland University of Technology, Skeletal Biology and Forensic Anthropology Res Lab, School of Biomedical Sciences, Faculty of Health,, Brisbane, Queensland 4001, AUSTRALIA; Mikaela S. Reynolds, MSc, Level 5 Q Block,, 2 George Street, Gardens Point, Brisbane, Queensland 4001, AUSTRALIA; and Jon E. Birt, BA*, Queensland Police Service, Homicide Investigation Unit, Police Headquarters, 200 Roma Street, Brisbane 4073, AUSTRALIA*

After attending this presentation, attendees will better understand: (1) the extensive contemporary investigative processes involved in the establishment of identification employed by the Queensland Police Service; and, (2) how the integration of novel anthropological and forensic processes assisted the investigation process.

This presentation will impact the forensic science community by demonstrating the tenacity of investigators from the Homicide Investigation Unit, Queensland Police Service to pursue all potential fields of inquiry to establish victim identification or victimology.

In October 2013 at a regional center in Southeast Queensland, Australia, Queensland Fire and Rescue (QFRS) were called to a grass fire. Once extinguished, QFRS located the remains of a human torso. The head and hands had been severed, and the lower body from the mid lumbar region had also been removed. The head, hands, and lower body have never been located. Due to the limited nature of the remains, standard confirmatory identification techniques of fingerprints and dental records could not be utilized in this matter. DNA was collected; however, it did not match any national database. Familial DNA was investigated; this too presented no matches. Toxicology was also conducted for a full drug screening and a number of prescription medications were identified. Investigators conducted exhaustive searches of mobile phone tower activity, Medicare files, immigration files, and interstate missing person searches in an attempt to identify the remains.

The investigators then engaged the services of their police anthropologist to assist in the identification process. Using Multi-Slice Computed Tomography (MSCT) Digital Imaging and Communications in Medicine (DICOM) data (0.5/0.3mm) of the torso collected during the standard pre-postmortem scanning procedure at the Brisbane Mortuary, 3D virtual reconstructions of the bone surfaces, also called isosurfaces, were created. The virtual isosurface models were uploaded into a specialized 3D software program, Geomagic® Design™ X, where virtual measurements were conducted to determine sex and stature. The measurements were conducted using a new and novel protocol developed by the Skeletal Biology and Forensic Anthropology Research Laboratory (SBFAR) at the Queensland University of Technology, Brisbane.1 The virtual measurements were collected from various bones within the torso including the humerii, scapula, and clavicle. An attempt was made to determine age of the individual using the sternal end of the fourth rib; however, the CT resolution and small surface area presented difficulties in age determination other than determining the individual was an adult. Subsequently, discussions between the anthropologist and investigators resulted in an application to the State Coroner of Queensland that was supported to have the sternal rib end of the fourth rib excised from the torso, then macerated (i.e., soft tissue removed from the bone) using dermestid beetles. A final age range, sex, and stature were provided to investigators.

Ultimately in July 2014, the prescription medication information collected from the toxicology report matched with the anthropological information obtained from the CT data and rib maceration and assisted in the identification. The contributions of the "virtual" anthropological input into this matter were a first for Queensland. The utility of CT data proved extremely useful in providing a timely anthropological profile to the investigation team and in reducing the need to macerate the entire torso as would be warranted by traditional anthropological techniques to develop an anthropological profile. This matter also exemplifies the importance of collaboration between the various agencies and specialists involved in homicide investigations to achieve a successful outcome.

Reference(s):

1. Reynolds, Mikaela S. (2014) Stature estimation of a contemporary Australian sub-population: an evaluation of the Trotter and Gleser method using computed tomography of the femur. Masters by Research thesis, Queensland University of Technology.

Unidentified Human Remains, Virtual Anthropology, Investigative Process