B66 Human Remains in Southern Italian Cemeteries: When the Type of Burial Influences the Results of DNA Extraction

Ciro Di Nunzio, MFS, PhD, Magna Graecia University, Viale Europa, Germaneto, Legal Medicine, Catanzaro 88100, ITALY; Isabella Aquila, MD*, Viale Europa, località Germaneto, Policlinico Universitario, S Venuta-Medicina Legale, Catanzaro 88100, ITALY; Maurizio Saliva, MD, Via Carlo Maria Rosini 51, Pozzuoli 80078, ITALY; Michele Di Nunzio, BS, Università Magna Graecia, Viale Europa, Località Germaneto, Catanzaro, ITALY; Francesco P. Busardo, MD, Viale Regina Elena 336, Rome, ITALY; Vittorio Fineschi, MD, PhD, University of Foggia, Forensic Pathology Dept, Ospedale Colonnello D'Avanzo, Foggia I-71100, ITALY; and Pietrantonio Ricci, Viale Europa-Località Germaneto, Catanzaro, ITALY*

After attending this presentation, attendees will better understand how the type of burial influences DNA extraction.

This presentation will impact the forensic science community by demonstrating the importance of the treatment of remains in southern Italian cemeteries and how this may promote the preservation of human bones and the success of DNA analysis.

Death causes the definitive transition from one social status to another. Understanding the nature of bodies and their status after death helps us appreciate this transition, which is encountered every time someone dies. Burial rituals are among the few visible forms of practice that may hint at beliefs about an afterlife. The practices, which include social, physical, body treatment, grave location, and cemetery organization, are determined by a complex mix of factors.

In the Sud Italian popular culture, prior to burial the deceased is in a transitional stage between life and death. After the 18th century, a double burial procedure was performed in order to verify this successful transition. In the first step, according to Presidential Decree 285/90, cemetery staff buried the corpse in a sealed wooden coffin. In the second step, after a period of five to ten years, the same staff exhumed the corpse. Family members washed and disinfected the remains, then wrapped them in a bed sheet and buried them in a stone niche for their final resting place.

Analyzed human remains were made available by judicial authorities for genetic identification or parental testing. The remains were in several decomposition stages due to different exposures to biotic and abiotic factors. The remains were collected from: (1) fire crime scenes where people killed by gun shots were burned to destroy evidence; (2) open spaces such as forests where missing people were found after a focused search; and, (3) cemetery areas were the remains were buried.

A correct analytical process is essential in order to perform DNA extraction from recovered human remains. Although DNA extraction can be carried out on any body part, compact femur bone represents the most suitable tissue, especially when DNA is degraded due to postmortem degenerative phenomena. The effects of decomposition on quality and concentration of DNA extracted from these mortal remains as well as the quality of obtained electropherograms were reviewed retrospectively on 100 femur fragments analyzed during the period of 2001 to 2014. The quality and quantity of extracted DNA, understandably, were often low, but the Short Tandem Repeat (STR) genetic profiles were acceptable for forensic purposes. In relation to the decomposition stage, the analyzed remains were grouped into four distinct stages: (1) fresh; (2) bloat; (3) decayed skeleton; or, (4) mummified.

The goal of the study was to observe that the treatment of the Sud Italian cemetery remains may promote the preservation of human bones and the success of the DNA analysis. The persistence of good bone condition in the burial environment is unusual as is the persistence of biomolecules in bone, but mummification is a common phenomena in South Italy cemeteries, where remains are buried in wooden coffins only for a limited time. After the disinterment, remains are co-located in stone niches. This procedure tends to protect bone as it appears much less deteriorated with respect to that collected from graves in which bodies are in contact with the ground.

Forensic Science, Human Identification, DNA Testing

*Presenting Author