



### A78 The Use of an Integrated Multidisciplinary Approach to Resolve Non-Identified Human Skeletal Remains in Cyprus

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**Learning Overview:** After attending this presentation, attendees will be familiar with a novel multidisciplinary approach designed to minimize or resolve cases of unidentified human remains in large-scale humanitarian projects. The model proposes a more interactive and continuous use of investigatory information from the early stages of recovery operations.

**Impact on the Forensic Science Community:** This presentation will impact the forensic science community by: (1) introducing attendees to the challenges faced by the Committee on Missing Persons (CMP) in identifying missing persons when the DNA of the recovered remains does not match with any of the Family Reference Samples (FRS); and (2) introducing an integrated multidisciplinary approach for minimizing or resolving cases of unidentified human remains.

In most humanitarian projects, a percentage of the recovered human skeletal materials, after a general search is made in the database of the FRS, remains unidentified. In Cyprus, the list of the missing persons was compiled by the CMP. This was achieved mainly through the cross-checking of the missing persons reported by family members, the army, and by a community member in a position to know all his co-villagers (i.e., the mukhtar of each village). However, soon after the commencement in 2006 of the CMP's Project on the Exhumation, Identification and Return of Remains of Missing Persons, it became evident that not all human remains recovered in the field matched with the FRS related to the initial list of 2,002 missing individuals. By mid-2017, while 886 individuals had been identified, there was a minimum number of 137 individuals that either had no match in the database or did not yield enough scientific evidence to proceed with an identification. Many of these cases remained unresolved for more than a decade in the storage areas of the CMP anthropological laboratory.

This presentation outlines all steps taken to not only reduce this number to one-third in less than two years (current MNI=46), but also to act in advance in order to prevent the occurrence of the no-matches. In this model, the interaction between the investigators and the geneticists was strengthened and included the following: (1) generation of hypotheses on candidates who could be related to a burial site upon recovery of remains, (2) checking the availability of the candidates' FRS even prior to the commencement of the anthropological analyses, (3) revision of all available pedigrees, (4) requests of additional FRS when needed—to accomplish this a project was initiated whereby many skeletal samples were collected from deceased relatives, (5) revision of hypotheses on candidates once the biological profile was completed, and (6) verification of hypotheses once the genetic data was obtained. This resulted in an increased number of the matches during the first round of the genetic database search, thus minimizing the no-match cases and expediting the identifications.

For the generation of the hypotheses, a new approach was introduced whereby missing persons were mapped and linked to events. This led to a better understanding of the context and produced more targeted and limited lists of candidates. In commingled cases, bones were mapped and studied in relation to the identifications/investigative data to produce a better understanding of the expected number of individuals. In addition, in cases in which there was an indication that the remains were not relevant to missing persons (e.g., remains associated with cemeteries or archaeological contexts), the radiocarbon sampling was expedited.

In Cyprus, the human remains recovered by CMP are not always associated with a closed group of missing individuals. By using a multidisciplinary approach, where investigative information plays a central role, it is possible in most cases to either reach an identification or conclusively eliminate the possibility that the remains belong to a reported missing person. Since the genetic identifications have many limitations, such as incidental findings, no available or no informative FRS, partial profiles or very common alleles and so forth, a greater emphasis on the investigatory information can improve the percentage of identifications. Greater awareness on this topic, within the humanitarian forensic world, can reduce the number of unidentified remains.

#### Multidisciplinary Approach, Unidentified Human Remains, Identification of Missing Persons