



A50 A Multidisciplinary Approach to Identifying Unaccounted Service Members From the Battle of Tarawa in 1943

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After attending this presentation, attendees will better understand the interdisciplinary approach necessary to resolve unknown commingled remains associated with a World War II battlefield.

This presentation will impact the forensic science community by highlighting the collaborative efforts and multiple lines of evidence required to identify United States service members from the commingled Battle of Tarawa assemblage.

In November 1943, United States forces captured Betio Island, Tarawa Atoll, Republic of Kiribati (previously the Gilbert Islands), which contained a Japanese-controlled landing strip essential to the United States Pacific campaign. The battle resulted in more than 1,100 United States and more than 6,000 Japanese and Korean casualties on a ~381-acre island; many individuals were buried in temporary mass graves. Approximately ~48% (~500) of all United States burials were recovered after World War II, including Unknowns (Minimum Number of Individuals (MNI)=114) interred in 94 caskets at the National Memorial Cemetery of the Pacific (NMCP). Since World War II, local residents, Defense POW/MIA Accounting Agency (DPAA) recovery teams, and non-governmental organizations have regularly recovered human remains from Betio Island. The Tarawa commingled assemblage consists of remains from past and ongoing field recovery operations and disinterred Unknown Tarawa casualties from the NMCP. The actions of hasty, but necessary, interment after the battle with later disinterment, transport, and reinterment resulted in the loss of identity and commingling of the Tarawa casualties.

Commingled projects have largely relied on DNA analysis for segregation and identification of remains; however, the Schofield Central Identification Laboratory (Schofield-CIL) treated the Tarawa remains with embalming powder prior to their interment at the NMCP, which blocks primer-binding locations. Next Generation Sequencing (NGS) improves the ability to yield DNA sequence from chemically treated remains, but the average time for NGS results combined with the amount of samples required to rectify commingling can take years. In addition, low Family Reference Sample (FRS) coverage of ~68% for both mitochondrial and nuclear references complicates Tarawa identifications. In order to counter these limitations, dental record comparisons and historical records were used to create initial short lists of potential individuals in lieu of DNA as the first step.

These historical or dental short lists serve as the basis for all subsequent analyses (e.g., chest radiograph (CXR) comparisons, development of the biological profile, and osteometric sorting). Antemortem chest radiographs are available for ~25% of all Tarawa casualties, thus providing an additional line of evidence for identification. When a potential CXR match is made from the short list, DNA sequence data obtained from earlier field accessions, which are comprised of primarily small bones of the hands and feet, are examined for association with NMCP disinterments.

If there are elements that match the FRS on file for a potential service member from the dental short list or a chest radiograph match, these elements are compared to the disinterred remains via articulation, osteometric sorting, and pair-matching. These methods use osteometric data to compare elements statistically, enabling the association and segregation of field accessions and NMCP disinterred remains. Through the association/segregation process, a biological profile of the remains is developed for sex, age, ancestry, and stature, which are compared to antemortem records of the proposed individuals. This data provides a means of exclusion and inclusion between those individuals on the short list, thereby facilitating identification.

The Tarawa Project has successfully identified 18 of the NMCP Unknowns using this process. Seven of these cases involved matching remains from field excavations to remains disinterred from the NMCP using this strategy. The initial reliance on other, non-DNA driven methods for casualty associations has freed the NGS DNA sampling queue for cases in which an effective dental short list cannot be generated.

These efforts have allowed this study to determine possible relationships between disinterred remains and field recoveries, focus the DNA sampling strategy employed, and determine future recovery locations on Betio Island. Thus, identifications being made from the Tarawa Project rely on the totality of evidence and interdisciplinary collaborations from geneticists, historians, archaeologists, odontologists, and anthropologists; no one scientist works in a vacuum.

The views of these authors do not necessarily reflect those of the Department of Defense or the United States government

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