H5 Skull and Photo Superimposition Technique Used to Aid in the Identification Process

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After attending this presentation, attendees will learn the use of 3D cranial/photo superimposition as a useful tool.

This presentation will impact the forensic community and/or humanity by demonstrating an enhancement method useful for eliminating possible matches to narrow the search field for missing persons.

The mission of the Joint POW/MIA Accounting Command Central Identification Laboratory is to search for, recover, and identify missing U.S. service personnel from past wars. Difficulties present themselves when the skeletal remains are of like biological profiles, as seen routinely at the CIL, and when mtDNA testing is not possible due to preservation of the osseous remains or lack of comparative family reference samples. This poster presentation shows the Skull/Photo Superimposition procedure currently being developed as part of an ORISE Fellowship Research Project. In conjunction with tested identification methods, this procedure may be useful in creating a short list of possible individuals when used as a means of exclusion.

A line-up of photographs for blind analysis is set up with multiple views of each possible individual obtained from military records and families of the MIAs. Using an overlay program, the sagittal plane is aligned for each using the nasion and the base of the nasal spine as points of congruity between the photos and cranium. Adjustments are made by resizing the photo and tilting the skull to coincide with the subject's angle in the photo. Alignment criteria scoring is used to rate the congruity of eight additional features within the superimpositions. Each feature is scored as a +1 good fit, -1 lack of alignment, or 0 for areas not seen in the photo or trauma to the skeletal remains. This scoring process results in a final comparison sum with a maximum of ten points for each photo and skull comparison. Individuals represented by the photos are considered eliminated from the possible list when inconsistencies in congruity cannot be explained. When the photos and skull have no apparent inconsistencies, this analysis may also be a useful tool for confirmation of identifications made by anthropological analysis, dental record, and historical record comparisons.

Missing Persons, Superimposition, Skeletal Remains