H63 Fingering a Murderer: A Successful Anthropological and Radiological Collaboration

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After attending this presentation, attendees will appreciate the validity of small, but unique, trabecular patterns in bones or bone fragments for purposes of positive identification of unknown burned remains.

This presentation will impact the forensic community by emphasizing the value of radiological evaluation of incinerated skeletal fragments where DNA extraction is impossible, and the meticulous anthropological work essential to provide identifiable specimens for radiological study.

A 24-year-old man reported missing by his mother was last seen on a rural "horse farm" in New Hampshire in the company of the somewhat reclusive female owner. She had a history of multiple tumultuous relationships and a previous assault charge. A warrant was obtained to search the property. Burned bones, a burned mattress, a burn-barrel and other burn sites were eventually discovered, yielding 30 five-gallon buckets-full of burned material. After initial screening by the New Hampshire Medical Examiner's Office, several hundred burned bone fragments and other artifacts were sent for analysis to a physical anthropology team in an adjoining state.

Several hundred hours were consumed in separating and photographing human bones and teeth fragments from those of at least eight non-human species. There was evidence that there had been intentional mixing and scattering of remains between the several burn sites. This substantially increased the difficulty of the anthropological task. When feasible, the fragments were identified as to anatomic site and laterality, individually numbered and labeled, packaged in small plastic specimen bags for DNA-protocol handling, individually boxed and labeled, then sorted for analysis by odontology, radiology, and mitochondrial DNA.

Anthropological examination produced the biological profile of a male, in his early 20s, of indeterminate stature and ancestry, with no evidence of pathology or perimortem trauma. The odontologist found the dental remains to be consistent with the presumed victim's age and previous dental radiographs, but insufficient for positive matching. Least burned fragments of bone and teeth were sent for mitochondrial DNA testing, but too much organic material had been lost to produce a signal.

Antemortem radiographs of the missing person were obtained including images of the dental arches, facial bones and lower half of the skull, the right shoulder, the lumbosacral spine and the left hand and wrist. All were normal. These were sent along with the boxed and labeled fragments for radiological evaluation. Each specimen was visually compared with the antemortem images. Promising fragments were painstakingly positioned to replicate the projection of that part on the antemortem study. Since the victim had been young and healthy, there were no skeletal features of disease, degeneration, tumor or trauma. Therefore, comparison was limited to the external configuration and internal trabecular pattern of each specimen. Most of the fragments were devoid of even these features when radiographed with fine detail using a mammography x-ray unit and film. After multiple re-positioning and re- examination of fragments, positive matches were found in unique trabecular patterns in the terminal phalanges of the index and ring fingers and a partial fragment of the middle phalanx of the index finger. Thus, the victim was positively identified with absolute medical certainty.

Shortly before trial, the defendant stipulated to the murder and to the identity of the victim; a plea of insanity was entered. A jury found her sane and, therefore, guilty of first-degree murder.

Murder, Identification, Burned Remains

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