



A138 Differential Recovery Rates of Skeletonized Human Remains

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After attending this presentation, attendees will better understand the differential recovery rates of human skeletonized remains encountered in outdoor forensic contexts with and without the assistance of forensic anthropologists.

This presentation will impact the forensic science community by demonstrating the utility of incorporating forensic anthropologists into the recovery phase of outdoor forensic scenes.

The field of forensic anthropology has historically been a lab-based discipline, often with law enforcement dropping off a box of bones at the forensic anthropologist's laboratory. The anthropologist's sole role was typically restricted to estimating a biological profile for identification. The field remained largely lab-based until the 1990s, when the rise of forensic archaeology and forensic taphonomy changed the role of forensic anthropologists. Dirkmaat and colleagues suggest that these two developments, along with DNA Polymerase Chain Reaction (PCR), the *Daubert* ruling, forensic trauma analysis, and improvement in quantitative methods, have significantly altered the trajectory of forensic anthropology within the past three decades.¹ Dirkmaat et al. said it best when they noted that "today less than at any point in the past, forensic anthropologists cannot be considered forensic 'sidekicks,' who may be useful advisors when forensic pathologists or law enforcement step into an unusual case or situation, but the most appropriate, and most logical first choice professionals in cases involving all manner of outdoor crime scenes and commingled or severely altered human remains."¹ This study hypothesized that the higher rate of evidence recovery by these experts conducted in a timely fashion surpasses those efforts conducted of law enforcement and coroner/medical examiner officials and, ultimately, significantly benefits the investigation. The primary purpose of this research was to compare recovery rates of skeletonized human remains from outdoor contexts between forensic anthropologists, who are extensively trained in human osteology and in recognizing taphonomically altered bone, versus recovery rates by law enforcement and coroners/medical examiners. The ultimate goal of this research is to demonstrate the value of incorporating forensic anthropologists into the recovery phase, especially in outdoor scenes where remains are often heavily modified by taphonomic agents.

A total of 56 cases were identified from 40 years of forensic casework contained within the Mercyhurst Forensic Case Database and conducted by Dr. Dennis Dirkmaat. Only cases that were completely skeletonized and recovered from outdoor contexts were included in this research. Approximately 60% ($n=33$) of these cases were recovered by forensic anthropologists, Dr. Dirkmaat and his Mercyhurst Forensic Scene Recovery Team, while the remaining 40% ($n=23$) of cases were recovered by law enforcement or medical examiner/coroner's offices. The skeletal inventory for each of these cases were charted in homunculi diagrams of the anterior view of the body, then layered to generate density maps using a Geographic Information System (GIS). Each skeletal element was coded as present or absent and bones that were present were further coded into fragmentary versus complete elements to compare recovery rates. For the cases recovered by forensic anthropologists, the recovery rates of burial versus surface-scattered remains were also compared with consideration given to the Postmortem Interval (PMI).

When skeletal elements were analyzed by type or skeletal region (for example, long bones, hands/feet, ribs, vertebrae, skull, upper limb, and lower limb), the forensic anthropology team recovered a higher percentage of total elements than the police/coroner/medical examiner, with the exception of the lower limb and rib fragments. Of note, the forensic anthropology team recovered a higher percentage of the crania, mandible, and pelvis (innominates and sacrum), which is especially important given that these elements are the most informative for estimating ancestry, sex, and age from human skeletal remains. For the forensic anthropology cases, higher recovery rates were found for all regions and bone type in surface-scattered remains, with the exceptions of the small bones of the hands and feet, when compared to recoveries from burial features. The results are not surprising given that the average known PMI for burial cases was 9.3 years, while for surface scatters, the average PMI was only 3.2 years. In conclusion, the incorporation of the forensic anthropologists into the recovery phase of outdoor scenes results in a higher recovery rate of nearly all skeletal elements/regions and especially those areas of the body that are most informative for estimation of the biological profile.

Reference(s):

1. Dirkmaat D.C., Cabo L.L., Ousley S.D., Symes S.A. New perspectives in forensic anthropology. *Yrbk Phys Anthropol.* 2008;51:32-52.

Forensic Archaeology, Recovery, Skeletal Remains