



Physical Anthropology Section - 2014

H127 Refining Postmortem Interval Estimates in the Northeast

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After attending this presentation, attendees will be familiar with new outdoor scene data-collection protocols used to improve postmortem interval estimates for human remains found in the woods of Pennsylvania and the Northeast.

This presentation will impact the forensic science community by standardizing data collection protocols at outdoor body recovery scenes that will result in significant improvements in the estimation of postmortem intervals, critical to forensic investigations of unidentified remains.

When human remains are found at outdoor forensic scenes, reliable assessments of Postmortem Interval (PMI) become a critical component of forensic investigations. During the first hours or days after the death, forensic pathological indicators of decomposition provide the best estimates. However, after that initial time frame, the forensic anthropologist is expected to provide reliable estimates based on taphonomic analysis. During the past few decades, experimental studies have served to improve our knowledge on the subject, although serious limitations to the sample sizes and environmental regimes at which comprehensive studies can be carried out still remain.

Case studies, therefore, become especially relevant to guide and complement experimental studies. Most PMI estimates rely largely on the forensic anthropologist's personal case experiences in very specific geographical areas. A major problem is that case studies have rarely been compared and systematized. This is partly explained by the fact that in order to take into account the multiple taphonomic factors affecting the remains, scientific estimates of PMI must include detailed consideration of the context in which the remains were found. Collecting the necessary contextual data is only possible when the scene is processed through forensic archaeological techniques, still a rather uncommon occurrence.

This study proposes that these problems are similar to those faced by clinical trials for diseases with low incident rates, in which no single hospital receives enough patients to provide an appropriate sample size and, consequently, it is necessary to share and combine data from different healthcare facilities. The key in these situations is the standardization of treatment, research, data collection, and coding protocols employed by multiple institutions.

In this study, a series of case studies compiled during the past two decades are presented, paying particular attention to the types of contextual data collected and the techniques used to collect them. Discussion includes their potential utility for obtaining reliable PMI estimates in Pennsylvania and surrounding environs.

Mercyhurst University forensic archaeological teams have been documenting outdoor crime scenes from a forensic taphonomic perspective for nearly 20 years. A previous presentation in 1995 (Dirkmaat and Sienicki 1995) provided a basic outline for determining PMI in Pennsylvania based on the analysis of 15 outdoor forensic scenes. It was determined from this study that even after a full summer outside, some soft tissue remains associated with the bones. At least two summers on the surface were required to remove all soft tissue.

The current study expands this analysis to include nearly 40 additional outdoor forensic cases of known PMI from three states (Pennsylvania, New York, and Ohio) since 1995. Discussed are not only the cases themselves, but the different layers of information added to documentation protocols, especially the recordation and measurement of numerous taphonomic factors such as burial vs. surface scatter, the role of scavengers on the rate of decomposition, the amount of shade, site slope, and others. Detailed hand-drawn plan view and profile maps of these scenes allow for the analysis of scattering patterns and other spatial distribution of evidence factors. Geographic Information Systems (GIS) software was used to collect data at larger scales in order to include such factors as local topography, site altitude, soils, tree cover, and others.

These field data were complemented with laboratory documentation and photographs of the condition of the soft tissue by body region. Factors that play a part in decomposition regimes include the amount and location of clothing and personal effects. This data collection strategy permitted the fine-tuning of PMI estimates to include the role of season or month of initial deposition of the body, among other factors. It is proposed that the exchange and discussion of similar protocols and information among forensic archaeology teams can play a critical role in advancing our understanding of decomposition rates and ultimately improve PMI estimates in a variety of different regions and under different conditions.

Postmortem Interval Estimates, Forensic Taphonomy, Forensic Archaeology