A126 The Relative Compositional Changes of Buried Juvenile Porcine Ribs and Ulnae in the Early Postmortem Interval

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After attending this presentation, attendees will better understand the compositional changes that different bones of the juvenile skeleton undergo within the early postmortem period in a buried environment, as illustrated by the analysis of ribs and ulnae.

This presentation will impact the forensic science community by demonstrating that bone breakdown and time-since-death estimations from juvenile bone can potentially be influenced by, or vary according to, the skeletal element that is analyzed.

Estimation of postmortem interval is an important aspect of forensic investigations involving human skeletonized remains. Current methods are relatively poorly informed of the process in which juvenile bones degrade. Furthermore, the variation across different skeletal elements of a single individual has not been sufficiently explored. Experimentation with porcine bone as a proxy for humans provides one of the few opportunities to examine these issues.

This study uses a juvenile porcine model to examine the relationship between the length of the postmortem interval in buried environments and the changes in water, collagen, and mineral content of two distinct skeletal elements: ribs and ulnae.

Fifty-four suckling piglets (*Sus scrofa*) aged approximately between two and eight weeks were purchased from a local supplier. Ribcages and ulnae were disarticulated and manually defleshed, then left to decay in a controlled buried environment for 12 months. Each month, nine ribs and four ulnae were excavated, for a total of 108 ribs and 48 ulnae over the duration of the experiment. Each bone was sectioned to obtain a portion that was used for the quantification of water, collagen, and mineral content. This analysis was accomplished through a process of sequential controlled heating, designed specifically for this project. Each sample was weighed four times throughout the process, and the water, collagen, and mineral contents were expressed as a percentage of total weight.

Results indicate that the water, collagen, and mineral contents were approximately the same in both the ribs and ulnae at the beginning of the experiment. Water content diverged between the ribs and ulnae after the second month, with the values for ribs remaining relatively constant and ulnae increasing through time. Collagen appears to remain constant between the two skeletal elements throughout the experimental interval. An overlap in mineral content was observed between ribs and ulnae until month six, when a noticeable decrease in the ulnae values occurred.

These results suggest that the changes in the chemical composition of different skeletal elements may occur at different rates within the early postmortem interval. These varying rates can potentially impact the physical degradation of skeletal elements to differing degrees, thus influencing the reliability of time-since-death estimations from juvenile bone.

Decomposition, Collagen, Mineral