



Physical Anthropology Section – 2005

H85 Differential Human Decomposition in the Early Stages: An Experimental Study Comparing Sun and Shade

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The goal of this presentation is to provide information to help further the accuracy of the estimate of time since death (or postmortem interval, PMI) in cases that involve decomposition in very sunny locations such as a field, or those in very shady locations such as a dense forest.

This presentation will impact the forensic community and/or humanity by presenting research which examines the affects of sun and shade on the early stages of human decomposition. The results of this study should further the base knowledge on PMI estimation for the forensic anthropology community.

The analysis and estimation of time since death has long been a significant contribution of the forensic anthropologist to the death investigation. It is also, perhaps, the most difficult portion of data that the forensic anthropologist must analyze. It is widely known that many factors directly affect the rate of decomposition and therefore blur the actual PMI. Throughout the years many experimental studies have been conducted, attempting to generate information about decomposition. The purpose of this study was to analyze two possible extremes that arise in most casework: the affects of positioning a body in the direct sunlight or in complete shade.

To examine differences in decomposition in the early stages, a study using five human bodies that were un-autopsied, unembalmed, and had no soft tissue trauma was conducted. The study took place in 2002 at the Anthropology Research Facility in Knoxville, TN. The remains were placed out at the facility as soon as they became available during the summer months. All remains were placed in a supine position, with no clothing. During the study, data was observed, and collected daily including information on the weather, the remains and the amount of insect activity. Weather data that was collected independently at the two sites included current temperature, high and low temperature for the 24-hour period, humidity, rainfall, and sky conditions. Decomposition data that was observed included marbling, skin slippage, bloat, discoloration, desiccation, and skeletonization. In order to have data that would be relevant to actual casework, all other environmental factors were not eliminated from the study (except animals access, as scatter would have greatly detracted from the observations).

Results from the study were quite confounding but will be examined more thoroughly. The decomposition patterns of remains left in direct sunlight differed slightly from those of remains placed in complete shade. The remains in the sun progressed evenly through early decomposition but then hit a plateau during which time there were minimal changes in coloration, marbling, bloating, skeletonization, and insect activity. On the other hand, the remains in the shade maintained a constant rate of decomposition and did not run into the same type of stall in progress. Therefore, the remains in complete shade actually decomposed faster, some reaching skeletonization earlier. The weather data was more informative in terms of fieldwork. The temperature readings indicated that the sun bodies experienced highs that averaged about 10 degrees Celsius above those in the shade, where lows were very similar. In addition, the rain gauge readings indicated that remains in open, sunny locations are exposed to much higher rainfall levels. The forest canopy actually worked to block and redistribute rain limiting the amounts that reach the remains in heavily shaded areas. The data recorded daily and the photographs can serve as a great comparative sample when analyzing actual casework, weather comparisons, and fluctuation analysis.

The study was very informative, but the evaluation of the data maintains that analyzing PMI is truly an estimate. The more studies such as this, combined with actual known PMI casework can only help to increase the accuracy of the estimation that the forensic anthropologist is asked to make in death investigations.

Decomposition, Postmortem Interval (PMI), Forensic Anthropology