H5 The Effects of Coverings on the Rate of Human Decomposition

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After attending this presentation, attendees will understand some of the principles of human decomposition; specifically how decomposition can be affected by the presence of different materials surrounding a body.

This presentation will impact the forensic community by helping to expand the knowledge base of factors that influence the rate of human decomposition. This additional information will in turn aid investigators in more accurately predicting time since death in forensic settings.

A multitude of factors can affect each stage of the decomposition process, either accelerating the process or slowing it down, depending on the specific agent at work. Some of the most frequently observed variables are temperature, moisture, insect activity, and sun or shade exposure.

Coverings can impact several of these factors in the decomposition process, and are found frequently in forensic cases. In a survey of New Mexico cases, Komar[2] reported that sixteen individuals were found wrapped in plastic; and twenty were noted as wrapped in a cloth or blanket.

Variation in body coverings spans a wide spectrum. A case from Singapore involved the remains of a child found wrapped in nine layers of plastic and then placed in a plastic bag.[1] In this instance, the body was reportedly in a state of much higher preservation than expected for the climate;[1] illustrating how coverings can affect estimation of postmortem interval. In another survey conducted of eighty-seven cases, fifty-four of the bodies were wrapped in some covering prior to burial. Plastic was the most common, but a variety was noted, including rugs, sleeping bags, blankets, and clothing.[3]

In order to document how coverings could affect the decomposition process throughout the sequence, an experiment was designed to mimic a covered body in a forensic setting. Three human cadavers were used in each repetition of this experiment. Two of the cadavers were covered, one in a plastic tarp, the other in a cotton blanket, while the third was left uncovered as a control. The selection of materials was based on case reports of cadavers wrapped in plastic and blankets (Komar, 2003, Derrick, 2007 personal communication). The cadavers were placed at the same time and in close proximity to ensure that all were exposed to similar environmental conditions. The cadavers used were also of the same sex and ancestry, and the age range and body weight variation was kept to a minimum to avoid extraneous influences on the decomposition process. All demographic information was recorded.

Data collected included daily minimum and maximum temperatures and two daily temperature point comparisons. The maximum and minimum temperatures allowed for calculation of accumulated degree days. The bodies remained covered and undisturbed for thirty days. At the end of that period, the bodies were uncovered, the amount of decomposition was recorded and the presence or absence of insect activity was noted.

Using the recorded temperature data, the accumulated degree days (ADD) was calculated and compared to the actual number of days postmortem. This technique provided a standard basis of comparison between the temperature data recorded from each individual and how temperature differences affected decomposition, particularly in the earliest stages.

Significant differences in temperature were found between the covered bodies and the uncovered cadavers through the use of paired t- test analyses. This indicates that the presence of a covering on a body will have a noticeable effect on the rate of decomposition. Differences were also identified in moisture content between the various shroud and surface environments. Variation between the calculated accumulated degree days and the actual number of days postmortem was less significant, but still showed marked differences. This again suggests that special consideration should be taken when estimating time since death in cases involving covered bodies.

References:

1. Chui PPS. 2006. An unusual postmortem change in a child homicide-leaching. Proc. American Association of Forensic Sciences. *12:*247 (Abstract).
2. Komar DA. 2003. Twenty-seven years of forensic anthropology casework in New Mexico. J Forensic Sci 48: 1-3.
3. Manhein MH. 1997. Decomposition rates of deliberate burials: a case study of preservation. In Haglund WD, Sorg, M. (eds). Forensic Taphonomy: The Postmortem Fate of Human Remains. New York: CRC Press, 469-482.

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