



Anthropology Section - 2016

A19 The Effect of Plastic Tarps on the Rate of Human Decomposition During the Spring/Summer in Central Texas

Chloe P. McDaneld*, 125 Amberwood Cove, Kyle, TX 78640; and Daniel J. Wescott, PhD, Texas State University, Dept of Anthropology, 601 University Drive, San Marcos, TX 78666-4684

After attending this presentation, attendees will gain a better understanding of decomposition rates of human remains wrapped in tarps and whether they are different than unwrapped human remains using Total Body Scores (TBS) and Accumulated Degree Days (ADD).

This presentation will impact the forensic science community by adding to the research on the effects of decomposition when the body is covered or wrapped in a tarp. It will also contribute to time-since-death estimation.

Forensic case reports cite that bodies are commonly covered or wrapped in man-made materials for disposal and concealment.¹⁻³ Therefore, knowing whether there are differences in the rate of decomposition between wrapped and unwrapped bodies is important for forensic scientists conducting estimations of time since death. While several studies have been conducted on the effects of decomposition when the body is covered or wrapped in materials such as clothing, blankets, and plastic tarps, most of these studies have examined a variety of coverings simultaneously with relatively small sample sizes.⁴⁻⁹ Therefore, the purpose of this study was to conduct a controlled investigation of the effect of plastic tarps on the rate and pattern of decomposition in Central Texas using a relatively large sample size. Unlike previous studies, this study utilized only one type of covering, the sample size was larger than previously examined, and environmental conditions and dates of death were known.

Human remains covered or wrapped in a tarp provide the perfect environment for decomposition since the tarp may maintain moisture and temperature while providing insects and bacteria protection from the sun and rain. Therefore, it was hypothesized that the plastic tarp would aid in decomposition in two ways: (1) by increasing the activity of necrophagous insects, which prefer a warm, shaded, and outdoor environment; and, (2) by increasing putrefaction caused by bacteria that require an aqueous medium.¹⁰⁻¹² The increased activity of insects and bacteria would therefore likely increase the rate of decomposition or, in other words, require fewer ADD to reach each stage of decomposition.

The study sample consisted of 20 bodies wrapped in plastic tarps and a matched control sample of unwrapped bodies, both placed on the ground surface in a tree-covered area of the Forensic Anthropology Research Facility at Texas State University. The TBS was compared between the wrapped and control bodies at 500 ADD and 1,000 ADD.¹³ *T*-tests were used to test for statistical significance.

Statistical analyses showed that tarps primarily have an effect on the rate of decomposition after 500 ADD. There were no significant differences in TBS between the human remains wrapped in plastic tarps and the unwrapped remains at 500 ADD (*p*-value=.118036). While the rate of decomposition was not significant, it was observed that for the bodies wrapped in tarps, the head and neck region decomposed faster (higher TBS) compared to the control group; however, at 1,000 ADD, there was a significant difference in TBS between human remains wrapped in plastic tarps and the unwrapped remains (*p*-value=.0456).

The results show that during the early decomposition period, plastic tarps do not have a significant effect on the rate of decomposition, but the tarp may affect the observed pattern of decomposition. As the decomposition process continues, insect activity associated with the unwrapped bodies decreased and the bodies began to desiccate; however, the consistent warm and shaded environment in the tarps allowed for continued insect activity and slowed desiccation. As a result, bodies wrapped in plastic tarps had a greater TBS after 500 ADD than unwrapped bodies. These results suggest that ADD calculations based on TBS may underestimate the time since death for a body wrapped in a tarp if the individual has been deceased for more than 500 ADD.



Anthropology Section - 2016

Reference(s):

1. Forbes S.L., Stuart B.H., Dent B.B. The effect of the method of burial on adipocere formation. *Forensic Sci Int* 2005;154:44-52.
2. Komar D.A. Twenty-seven years of forensic anthropology casework in New Mexico. *J Forensic Sci* 2003;48(3):1-4.
3. Manhein M.H. Decomposition rates of deliberate burials: a case study of preservation. In: Haglund W.D., Sorg M.H., editors. *Forensic taphonomy: the postmortem fate of human remains*. Boca Raton: CRC Press, 1997;469-481.
4. Bell S. *Effects of wrappings on the decomposition process* (thesis). Lubbock, TX: Texas Tech University, 2013.
5. Dautartas A.M. *The effect of various coverings on the rate of human decomposition* (thesis). Knoxville, TN: University of Tennessee, 2009.
6. Goff M.L. Problems in estimation of postmortem interval resulting from wrapping of the corpse: a case study from Hawaii. *J Agri Entomol* 1992;9:237-243.
7. Miller R.A. *The affects of clothing on human decomposition: implications for estimating time since death* (thesis). Knoxville, TN: University of Tennessee, 2002.
8. Phalen K.A. *Assessing the effects of clothing on human decomposition rates in central Texas* (thesis). San Marcos, TX: Texas State University, 2013.
9. Voss S.C., Cook D.F., Dadour I.R. Decomposition and insect succession of clothed and unclothed carcasses in Western Australia. *Forensic Sci Int* 2011;211:67-75.
10. Shirley N.R., Wilson R.J., Meadows Jantz L. Cadaver use at the University of Tennessee's Anthropological Research Facility. *Clin Anat* 2011;24:372-380.
11. Clark M.A., Worrell M.B., Pless J.E. Postmortem changes in soft tissues. In: Haglund W.D., Sorg M.H., editors. *Forensic taphonomy: the postmortem fate of human remains*. Boca Raton: CRC Press, 1997;151-164.
12. Gill-King H. Chemical and ultrastructural aspects of decomposition. In: Haglund W.D., Sorg M.H., editors. *Forensic taphonomy: the postmortem fate of human remains*. Boca Raton: CRC Press, 1997;93-108.
13. Megyesi M.S., Nawrocki S.P., Haskell N.H. Using accumulated degree-days to estimate the postmortem interval from decomposed human remains. *J Forensic Sci* 2005;50:618-626.

Human Decomposition, TBS, Tarps