



A97 Accumulated Decomposition Score (ADS): An Alternative Method to Total Body Score (TBS) for Quantifying Gross Morphological Changes Associated With Decomposition

Devora S. Gleiber, BA, Texas State University, 601 University Drive, San Marcos, TX 78666; Lauren A. Meckel, MA*, 1509 Marlton Street, San Marcos, TX 78666; Courtney C. Siegert, BA*, Texas State University, 7501 Whispering Winds Drive, Austin, TX 78745; Chloe P. McDanel, MA*, Texas State University, 601 University Drive, San Marcos, TX 78666; Justin Alexander Pyle, BS, Texas State University - Anthropology, 601 University Drive, San Marcos, TX 78666; 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 be aware of the foundation of a novel standardized method for quantifying human decomposition for the purpose of estimating the Postmortem Interval (PMI) based on gross morphological changes. Attendees will also have a better understanding of the pattern of decomposition in Central Texas as it relates to Accumulated Degree Days (ADD).

This presentation will impact the forensic science community by resolving issues anthropologists face when using the current TBS method to estimate PMI.¹

Megyesi and colleagues presented a method for quantifying gross morphological changes during decomposition known as the TBS, as well as a regression equation for calculating the ADD since death based on the TBS; however, subsequent research has shown that the progression of descriptive traits used to calculate the TBS may not be universal.^{1,2} Therefore, a new method of quantifying gross morphological changes associated with decomposition is needed.

In this presentation, the preliminary results of a new method of quantifying gross changes in the body during decomposition that resolves many of the issues associated with the progressive stages of the TBS are introduced. The proposed method, ADS, utilizes component scoring of traits, which allows for quantification of variability within and between regions. The ADS is calculated based on the appearance and progression of traits, including discoloration, skin slippage, marbling, bloat, purge, liquefaction, desiccation, mummification, and skeletonization. Although a sequence of decomposition is implied in this method, the ADS includes flexibility for adding the traits as they appear. For example, Megyesi and colleagues describes marbling and skin slippage in the trunk as occurring simultaneously; however, this is often not the case.¹ Additionally, because discoloration can be variable during decomposition, the ADS is designed not to emphasize coloration details, but to simply observe the initial appearance of this trait. Like the TBS, the ADS segments the body into regions for scoring; however, unlike the TBS, the ADS requires scoring the upper and lower limbs separately since they differentially decompose. Thus, the ADS observes the head and neck, torso, upper limbs, and lower limbs as four separate regions.

Four individuals from the Texas State University Willed Body Donation Program were scored throughout active decomposition using the ADS method. Observations were made both in the field and based on photographs taken throughout the decomposition process. ADD for each observation ($n=138$) was calculated using the average of the minimum and maximum temperature for the entire day. The ADS was then regressed against ADD, and the regression formula was tested using ten additional static observations at different stages of decomposition. Preliminary results indicate that the ADS correlates exponentially with ADD ($y= 25.574e^{0.0926x}$, $R^2=0.84689$), explaining a significant



Anthropology - 2017

proportion of the variation observed in the rate of decomposition in Central Texas. This pilot study suggests the ADS method is a good predictor of PMI based on ADD.

This research introduces a new standardized method of collecting decomposition data that can be used to develop regionally specific regression formulas in order to more accurately estimate PMI. This will lead to a greater understanding of the PMI and the process of decomposition in forensic anthropology, may assist in condensing missing persons reports, and aid in generating a timeline for law enforcement investigation.

Reference(s):

1. Megyesi M.S., Nawrocki S.P., Haskell H. 2005. Using accumulated degree-days to estimate the postmortem interval from decomposed human remains. *J Forensic Sci.* 50(3):1-9.
2. Suckling J.K., Spradley M.K., Godde K. 2016. A longitudinal study on human outdoor decomposition in Central Texas. *J Forensic Sci.* 61(1):19-25.

Decomposition, Postmortem Interval, Taphonomy