H110 The Consistency of ADD, TBS, and Decomposition Rate: A Validation Study Spanning Five Years

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After attending this presentation, attendees will understand that experimental studies using Total Body Score (TBS) to predict Accumulated Degree Days (ADD) and decomposition rate have produced consistently accurate results over time.

This presentation will impact the forensic science community by presenting a validation of using the TBS methodology to provide an estimate of the Postmortem Interval (PMI). This method will be shown to produce consistent and accurate results over a lengthy period of time, using different carcasses and different observers; this validation study provides confirmation that this methodology produces robust and reliable results.

When Megyesi *et al*. introduced the TBS system as a means of quantifying the decomposition sequence, and derived an equation based on observed TBS to predict ADD, this provided forensic anthropology practitioners with a standardized method to estimate PMI.[1] Further research has since demonstrated the utility of TBS in predicting ADD and producing PMI estimates under a variety of scenarios relating to both intrinsic and extrinsic aspects of decomposition, including: the size of the body; the condition of the body; the deposition of the body (e.g., surface, water, buried); and what is often loosely termed the "environmental conditions."[2-6]

This study reports on the consistency of results from research performed at the Taphonomic Research in Anthropology: Centre for Experimental Studies (TRACES) facility in the northwest of England from May to August during the years 2007 to 2012. Data collection protocols at TRACES have remained consistent throughout this period of time; visual observation, body scoring, and photography were undertaken every 50 ADD (as recorded by both the on-site weather station and self-contained thermocouple/data loggers with each pig). Approximately 100 domestic pigs (*Sus scrofa*) were used as controls over five years of experiments, under variable climatic conditions, and using different observers. Decomposition rates were not significantly different and graphs of TBS against ADD produced slopes that were nearly identical. Not only TBS, but individual body region scores (e.g., head/neck, trunk, and limbs) were significantly consistent at comparable ADD intervals regardless of observer, body, or year and prevailing climatic conditions.

To cite just one example where decomposition rate was not significantly different ($t=0.50$, $df=372$, $p=0.616$), the scores for the head/neck region in 24 control pigs from 2009 were virtually identical to those of 10 control pigs from a 2011 study at comparable ADD intervals:

TBS (2009) = $-0.799 + 0.458 \times \sqrt{}$ (ADD)

TBS (2011) = $-0.759 + 0.452 \times \sqrt{}$ (ADD)

The results of this study provide strong evidence that using TBS to predict ADD is consistent with regard to observers, time, and both intrinsic and extrinsic factors affecting a body—and, hence, a relevant, reliable, and valid methodology in the estimation of the PMI.

References:

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Validation Study, TBS and ADD, Decomposition Rate

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