A129 Reexamining Differences in the Rate of Decomposition Between Previously Frozen and Never Frozen Human Remains Using the Accumulated Decomposition Score (ADS)

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After attending this presentation, attendees will have a greater understanding of how freezing affects the rate of decomposition in human remains in an outdoor setting.

This presentation will impact the forensic science community by adding to the ongoing research being conducted involving the post-thaw effect on human decomposition.

Understanding how the freezing of human remains prior to decomposition affects the rate of decay is important in a forensic setting. Bodies can be frozen due to low outside ambient temperatures or intentionally frozen before being relocated in homicide cases. There are also instances in which taphonomic research facilities need to freeze remains prior to decomposition.

There have been mixed results in studies that examine the differences in decomposition between remains that were previously frozen, then thawed, and remains that had never been frozen. A previous study by Roberts and Dabbs using the Total Body Score (TBS) method found significant differences in the rate of decomposition between previously frozen and never frozen pigs (*Sus scrofa*), with previously frozen subjects decomposing at a slower rate.[1,2] A study recently conducted using human remains and TBS found no significant difference in the rate of decomposition between previously frozen and never frozen subjects.[3] The purpose of this study is to reexamine the difference in decomposition between human remains that had been frozen, then thawed, and human remains that had never been frozen using a newly developed gross morphological method known as the ADS.[4]

For this study, a total of 20 human remains that had been left to decompose in an outdoor setting at the Forensic Anthropology Center at Texas State were used. Ten of the donations had previously been frozen and were pair-matched to remains that had never been frozen using Body Mass Index (BMI) and season of placement. All remains were placed unclothed and on the ground surface under a wire cage to prevent scavenging. An ADS was calculated for each subject at approximately 100, 300, and 500 Accumulated Degree Days (ADD).

An *F*-Test was conducted to explore the homogeneity of variance between groups. Results for both 100 and 300 ADD indicated no statistical difference in variance of ADS between groups ($F(1, 18)$=0.354, p=0.069; $F(1, 18)$=0.567, p=0.205); however, results for 500 ADD indicate there is a statistical difference in variance between groups ($F(1, 18)$=0.295, p=0.042). A two-tailed *t*-test of equal variance was run to test for significance in 100 and 300 ADD, while a two-tailed *t*-test of unequal variance was run for 500 ADD. The P value states that there is no significant difference between groups at 100, 300, and 500 ADD.

This research validates the previously documented results that there is no significant difference in the rate of decomposition between human remains that had previously been frozen, then thawed, and human remains that had never been frozen.

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Reference(s):

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3. Garza S., Wescott D.J. Differences in Rate of Decomposition Between Frozen and Non-Frozen Human Remains. *Proceedings of the American Academy of Forensic Sciences*, 69th Annual Scientific Meeting, New Orleans, LA. 2017. 23:214.
4. Gleiber D.S., Meckel L.A., Siegert C.C., McDaneld C.P., Pyle J.A., Wescott D.J. Accumulated Decomposition Score (ADS): An Alternative Method to TBS for Quantifying Gross Morphological Changes Associated With Decomposition. *Proceedings of the American Academy of Forensic Sciences*, 69th Annual Scientific Meeting, New Orleans, LA. 2017. 23:206.

Decomposition, Frozen, ADS

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