

Bone weathering helps determine time of death

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Researchers have made great strides in determining how long a human body has been dead by looking at characteristics of bones subjected to the elements. In one of the first studies looking at freezing and thawing specifically, researchers have concluded that freeze-thaw cycles are an important component of bone weathering (the chemical and physical breakdown that bones undergo when exposed).

These findings, published in the *Journal of Archaeological Science: Reports*, may one day assist in [crime scene investigations](#).

According to the researchers, ages of older skeletons (such as mummies) are routinely determined with carbon dating, and ages of more recent skeletons lying on the ground surface at outdoor crime scenes often rely on the state of decomposition, including the species of insects found at the scene. Determining the age of skeletons in-between proves more of a challenge, relying on techniques such as bone weathering.

In this study Boston University School of Medicine (BUSM) researcher James Pokines, PhD, repeatedly subjected a large sample of bones to freezing and thawing cycles over the course of three months. At intervals, the bones were examined under microscopes for evidence of cracking.

"Imagine what happens to the paint on your house," explains Pokines, who is the corresponding author and assistant professor of anatomy and neurobiology at BUSM. "When exposed to the elements, it bleaches,

cracks, dries-out and flakes away, exposing what is underneath. A similar process occurs in bones that have been left outdoors." By mapping out the process of how bones decay, Pokines hopes to help law enforcement answer the question, "How long has this skeleton been lying outside?"

Researchers found that repeatedly freezing and thawing the bones caused some definite progression of cracking, but, the progression was not extreme. Pokines suspects that repeated wetting-drying of bones may play a larger role in [bone](#) weathering than freezing-thawing alone. "We hope that other scientists will perform similar research into what makes bones weather; including the freeze-thaw process, but also wetting-drying, warming-cooling, degreasing, mineral crystallization from ground water, and solar radiation."

Provided by Boston University Medical Center

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