A95 The Use of a Gelatin-Based Consolidant to Preserve Thermally Altered Remains

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Learning Overview: After attending this presentation, attendees will be familiar with a novel method of using a gelatin-based consolidant for preserving and recovering thermally altered remains.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by offering a possible new method to protect and preserve the relative anatomical positioning of thermally altered remains during recovery and transport.

Human remains from fire scenes can be severely altered, including being highly fragmented and extremely fragile. Recovery, preservation, and transport can therefore be very challenging in these cases due to the potential for the remains to become further fragmented during the recovery process. Few methods of preserving burned skeletal remains have been scientifically tested or generally accepted by crime scene investigators and forensic analysts. This study tests whether the application of commercially available food-grade gelatin as a consolidant may be an effective method for preserving thermally altered skeletal remains. Food-grade gelatin was selected due to being easily available and non-reactive (i.e., will not chemically or physically alter bone).

Twelve domestic pig (*Sus scrofa)* mandibles were each placed into aluminum trays filled with sand. The specimens were thermally altered using a hand-held propane torch (temperatures >1,100°F), which was applied to each bone for ten minutes. Distance and position of the heat source were kept constant to ensure similar thermal exposure to all specimens. The mandibles were allowed to cool *in situ*. Six of the mandibles were then treated with a 1:10 mixture of Knox® brand food-grade gelatin and warm water using a hand-held spray bottle; the other six mandibles remained untreated. The gelatin was then allowed to cure for 60 minutes.

Specimens were each removed/recovered from the sand substrate manually and transported approximately 14.5' where they were then assessed and photographed. Preservation was assessed as a function of the total number of fragments following transport, with better preservation being represented as fewer fragments.

Results demonstrate that treated samples were significantly better preserved (i.e., were represented by fewer fragments following transport) compared to untreated controls. Most of the treated specimens, in fact, remained as one intact piece, along with part of the sand substrate, during the recovery and transport process. In contrast, untreated controls became separated into multiple bone fragments during recovery and transport. Because they remained intact and in anatomical position, the treated specimens could also be visually and radiologically assessed while still held together by the gelatin.

Additional testing of Knox® gelatin (or chemically similar products) for skeletal preservation would be beneficial, including testing the approach in different environments (e.g., varying temperature, humidity) as well as varying degrees of thermal alteration. However, preliminary tests suggest that the application of a gelatin-based consolidant appears to have significant potential as a method for preserving thermally altered remains for recovery and transport. This approach is also easy to use, affordable, non-destructive, and reversible (the gelatin can be removed using warm water if needed). It may also have utility in non-forensic anthropological contexts, including the preservation of archaeological or non-skeletal material and artifacts.

Forensic Anthropology, Skeletal Preservation, Gelatin