H67 An Atypical Burn Pattern Associated With Forensically Significant Human Remains

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The goal of this presentation is to demonstrate patterns of heat alterations on fresh bone, and more specifically the identification of atypical characteristics of heat alteration to human remains that decomposed for approximately two weeks before being burned. In addition, this presentation present a more typical burn pattern and color to fresh bone while in a pugilistic pose to decomposed remains configured in a tightly flexed position.

After attending this presentation, attendees will understand typical burn patterns on fresh bone including the initial, secondary, and final areas to burn on bone, the color range on burned bone, and how to identify possible trauma caused to an individual prior to heat alteration.

This study will impact the forensic science community by serving as an example of an atypical burn pattern seen in a homicide case and demonstrate the effects that heat has on bones.

Forensic anthropologists analyze burned remains to aid medical examiners in determining the manner in which an individual died. Burning human remains can destroy or alter evidence and is used to attempt to obscure the identity of an individual. Proper recovery of burned skeletal remains is important for identification of the individual and possible trauma sustained antemortem. Heat can cause bone fractures making it difficult to distinguish trauma from heat altered fractures. Recovery and thorough reconstruction of the skeleton is helpful in determining if there was any trauma to the bones prior to the body being burned (Herrmann and Bennett).[1] Heat altered bones also exhibit a range of colors indicative of the amount of time the bone was exposed to heat in a sequence (from the highest exposure to heat to the lowest) of calcined, charred, border and heat-lined (Ubelaker).[2] Teeth exhibit a similar range of colors which are categorized (from highest heat to lowest heat exposure) as incinerated, charred, scorched and intact. Some teeth may burst apart from high amounts of heat as well (Delattre).[3]

This presentation is based on an analysis of a decedent that was decomposing in a large garbage can for two weeks and then set on fire in an attempt to cover up a homicide. The remains were analyzed at the Southeast Texas Applied Forensic Science (STAFS) Facility in Huntsville, Texas. During the recovery process some skeletal elements were recovered approximately fifteen feet from the concentration of remains. In the laboratory, the skeletal remains were reconstructed, placed in anatomical position, and inventoried. In the anatomical position the burn pattern of the skeletal and dental remains was evaluated. The burned bone ranged from no burn to calcination. The burn pattern of "initial, secondary and final areas to burn on bone" was not consistent with that typically seen on fresh bone in the pugilistic pose. In addition to the atypical burn pattern, a triangular-shaped unburned bone fragment, from the left parietal bone, measuring approximately 23mm on each side, was recovered. With the exception of the posteroinferior tip of the bone no surfaces, including edges, were burned. When reconstructed the edges of this bone were part of radiating fractures that extended from a tool mark located approximately 15mm anterior to the unburned bone fragment. The tool mark, radiating fractures, and the unburned parietal bone are consistent with blunt force trauma prior to thermal alteration.

In fresh bone burn patterns of the skull, the squamous portion of the frontal bone is typically one of the first areas to burn while the occipital is one of the last areas to burn. In the present case, the occipital was calcined while the frontal bone was charred with small areas of unburned diplöe. Other atypical burn patterns of the bone and dentition will be compared to the more typical heat-altered pattern. The results of this presentation will give insight into the importance of proper recovery and reconstruction and the recognition of an atypical burn pattern as a result of unusual body positioning during burning. The information provided in this study will be helpful to forensic anthropologists and medical examiners presented with burned human remains.

References:

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2. Ubelaker D.H. The forensic evaluation of burned skeletal remains: a synthesis. Forensic Sci Int 2009;183(1-3):1-5.
3. Delattre VF. Burned beyond recognition: systematic approach to the dental identification of charred human remains. J Forensic Sci 2000;45:589–96.

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