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### A26 The Effect of Embalming on Discoloration of Burnt Bone

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After attending this presentation, attendees will understand how embalmed bone changes color during burning in comparison to fresh bone.

This presentation will impact the forensic science community by enhancing knowledge of how bone reacts to burning.

Although there has been previous research regarding burnt bone, it has focused on repeating and confirming color changes from previous studies, while the effect of embalming on bone is largely unknown. This study is the first to examine the interaction between embalming and exposure to heat.

This project observes the color changes associated with burned bone after embalming. It was hypothesized that embalmed bone will show no differences from fresh bone after burning as the embalming process focuses on soft tissue and only affects hard tissue after being embalmed for several months. It was also hypothesized that bones soaked individually in formalin react differently to heat exposure due to formalin solutions reportedly leaching out inorganic material from bone.

Forty femora from domestic pigs (*Sus scrofa domestica*) were obtained from a local butcher. Half were burned without alteration and half were immersed in a 10% formalin solution for a week prior to burning. Ten whole pigs were embalmed using the same process used to embalmed deceased humans in the United Kingdom, after which femora were removed for burning.

Four different temperatures were chosen based on their use as milestones in the color change of bone during heating: beginnings of color change at 200°C; carbonization at 350°C; beginnings of calcination at 500°C; and complete calcination at 700°C.

A Munsell soil color book was used to analyze the color of the bone after burning. Each code in the Munsell soil color book refers to the hue, value, and chroma of a particular color, and each code also has a visual description that goes along with it. After initial observation, although there are differences in the assigned color code, there are multiple codes that all refer to the same color; therefore, it appears that there is no significant difference between the visual descriptions of the final discolorations of the fresh, immersed, and embalmed bones. Bones heated to 200°C result in a yellow-brown or brown color, bones heated to 350°C result in black or very dark gray, bones heated to 500°C result in variations of gray or bluish gray, and bones heated to 700°C result in white coloration. Both bone from embalmed pigs and bone immersed individually in formalin exhibit post-burning coloration that is consistent with that of fresh bone. When looking at the Munsell color codes, it can be seen that both the initial color and the final discoloration of the immersed bones were more homogenized. While the multiplications of fresh and embalmed bones revealed several different color codes for a particular temperature, the immersed bones only displayed two at most.

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#### Embalming, Burnt Bone, Color Change