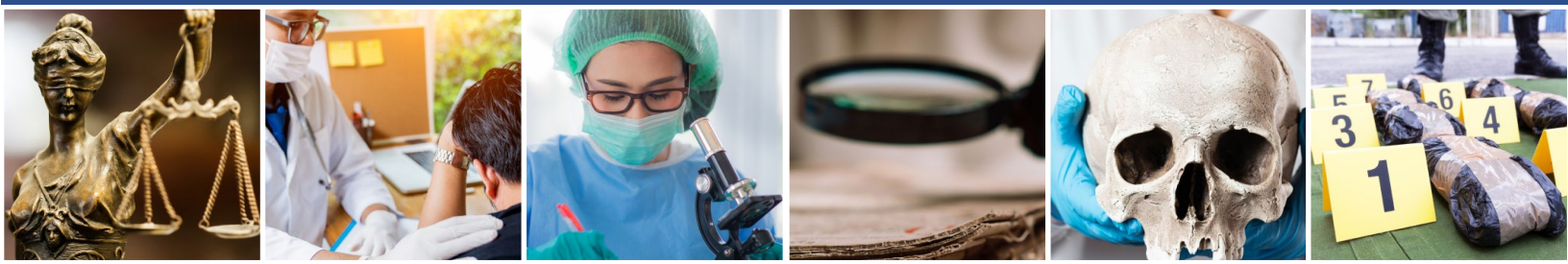

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H12 A Colorimetric Study of Burnt Teeth as a Diagnostic Tool to Aid in Forensic Dental Identification

Emilio Nuzzolese, University of Turin, Piemonte, Italy; Matteo Aliberti, University of Turin, Piemonte, Italy; Giancarlo Di Vella, University of Turin, Piemonte, Italy; Lucia Tattoli, University of Turin, Piemonte, Italy*

Learning Overview: After attending this presentation, attendees will have acquired foundational knowledge regarding the color modifications of teeth exposed to various temperatures and their relevance in forensic dental identification.

Impact Statement: This presentation will impact the forensic science community by informing attendees about the standard colors of burnt human teeth and how this data can be used in postmortem procedures and the collection of autoptic parameters.

Teeth are composed of the most resilient tissues in the human body, making them a valuable resource for forensic odontologists in the analysis of human remains for the identification of burnt, decomposed, and skeletonized human remains.[1-3]

The aim of this research is to analyze the colorimetric changes of the dental coronal portions subjected to high temperatures and to develop a reproducible forensic cataloging method. Sixty-three human teeth were extracted from private dental clinics and university dental schools for therapeutic reasons, following the approval of the Ethics Committee of the University, and divided into three groups. The teeth were subjected to three temperature ranges—400°C/752°F, 700°C/1,292°F, and 1,000°C/1,832°F—in a laboratory furnace for double time periods of 20 minutes and 60 minutes. Each group of teeth was analyzed with a spectrophotometer designed for dental use to extract the colorimetric data of the enamel of each burnt tooth. The coordinates found were subsequently converted into RGB values. The two predominant colors were then selected to create colorimetric averages, which show the change in color tone depending on the temperature.

The groups of teeth subjected to 20 minutes at 400°C (752°F) showed a dark gray coloration; the teeth subjected to 700°C (1,292°F) for 20 minutes showed a general increase in color brightness with beige-blue tones; the teeth subjected to 1,000°C (1,832°F) for 20 minutes showed increasingly lighter tones with pink reflections. Teeth subjected to the same temperatures for 60 minutes showed a general increase in brightness, making differentiation more complex, except for the group of teeth burned at 400°C, which displayed light blue-gray tones.

The study confirms the literature data on the possibility of linking colorimetric shifts of carbonized teeth to the maximum temperature peaks reached, providing valuable assistance to the work of forensic pathology and forensic dental identification of burnt human remains.[4,5] A further step of this research will be the development of a standardized colorimetric scale of burnt human teeth.

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Burnt Teeth; Color; Spectrophotometry