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### E36 The Enhancement of Tattoos Using Alternative Light Sources vs. Photo Editing Software

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**Learning Overview:** After attending this presentation, attendees will have a better idea of how alternative light sources and digital photo editing software are used to enhance tattoos that were not clearly visible with the naked eye.

**Impact on the Forensic Science Community:** This presentation will impact the forensic science community by demonstrating enhancement techniques in photography that can help visualize tattoos that are obscured due to postmortem changes.

In addition to using conventional photography equipment and techniques, modified cameras and specialized filters can be used to capture obscured identifying features such as tattoos for unidentified decedents. Tattoos are especially helpful when fingerprints or other identifying features are not able to be captured. Even if tattoos are obscured to the naked eye due to postmortem changes, they can often be photographically documented with the use of enhancement methods such as alternative light sources or digital imaging software. Alternative light source photography is a technique that uses infrared and ultraviolet wavelengths from just outside the visible light spectrum to capture what our eyes are unable to see. Additionally, digital imaging software such as Adobe® Photoshop® offers tools that can bring out details that are otherwise difficult to see. Throughout this presentation, these methods will be explored to demonstrate the utility of each in bringing out tattoos on charred and decomposed decedents.

In 2018, it was reported that nearly 46% of the United States population has at least one tattoo.<sup>1</sup> Tattoos are typically highly personalized and even similar tattoos can be distinguished by ink color, size, and body location. When common identification methods like facial ID or fingerprints become a challenge due to trauma or postmortem changes, tattoos can remain a viable option with the help of alternative light sources and/or photo editing software. The most useful wavelengths for uncovering tattoos are near-infrared, which is between 700 to 900 nanometers in the electromagnetic spectrum. These wavelengths help visualize details beneath the epidermis. When a tattoo is created, the needle carrying the ink goes through the epidermis and into the dermis layer of the skin. As the ink stabilizes in the dermis and the epidermis heals, the tattoo becomes a permanent mark in the body. Digital photo editing software may also be utilized to bring out these obscured features. By using a conventional image of the tattoo and modifying the color channels, details that were not clearly visible can be enhanced. By utilizing these techniques, these identifying marks can become a useful tool in forensic identification and photographic documentation.

**Reference(s):**

1. Holmes, Anisa. Who Has the Most Tattoos? It's Not Who You'd Expect. *Medium* (2018). <https://medium.com/daliaresearch/who-has-the-most-tattoos-its-not-who-you-d-expect-1d5ffff660f8>.

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#### Forensic Photography, Alternative Light Source, Tattoo