



A44 Visualizing Fingerprints From Fired Casings for DNA Extraction

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After attending this presentation, attendees will learn if the visualization of fingerprints by a non-destructive means, such as with a hyperspectral imaging system, increases the DNA yield of “touch DNA,” over the conventional double swabbing method of the entire evidence surface.

This presentation will impact the forensic science community by providing information about the effectiveness of target swabbing over the traditional double swabbing of a larger area of crime scene evidence.

Previously, it has been shown that touch DNA can be retrieved from fired bullet casings. In this study, fingerprint visualization will be attempted on fired casings using hyperspectral imaging, and a targeted swabbing will be performed to determine the effect on ability to retrieve DNA. It is believed that a target swab will concentrate the DNA retrieved due to decreased, but more directed sampling. Casings from a 9 mm handgun, 40 mm handgun, and 12-gauge shotgun were examined. A

blind study was conducted using ten shooters, five from each sex. Each shooter fired five rounds from the 9 mm and the 40 mm handgun, as well as two cartridges from the shotgun. For a negative control, two unfired and untouched cartridges from each type of ammunition were set aside for later analysis. For the positive control, two unfired cartridges from each type of ammunition were handled and bagged like the samples. Each shooter also provided an archival FTA card reference sample for comparison and identification after genotyping. These reference samples will be processed after the experimental samples.

Prior to shooting, all cartridges were placed under UV light so any archival DNA present was destroyed. The spent casings were collected using wooden stirrers that were similarly decontaminated under UV light and placed into individually labeled bags. The casings will be examined using hyperspectral imaging and swabbed only where fingerprints are visualized by the imaging software. DNA will be extracted from the swabs using a modified organic extraction protocol and quantified on a UV/VIS spectrophotometer. The extracted DNA will be genotyped using an in-house multiplex, containing four common STRs and the sex marker, Amelogenin.

The use of hyperspectral imaging allows for the visualization of fingerprints on various surfaces, including complex and interfering backgrounds. Forensic scientists are limited in their ability to obtain a complete DNA profile after many fingerprint processing techniques are carried out, and latent prints are often destroyed during swabbing. With the use of a hyperspectral imaging instrument, this study aims to establish the ability to visualize fingerprints and swab for DNA on the same sample.

Hyperspectral Imaging, Fingerprints, Touch DNA