



B43 Visualization of Bloody Fingerprints at Violent Crime Scenes

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After attending this presentation, attendees will have a better understanding of the causes of bloody fingerprints that are frequently observed at violent crime scenes and the significance of the visualized bloody fingerprint.

This presentation will provide the analyst with a better understanding of how bloody fingerprints may be visualized at violent crime scenes. It will assist in the interpretation and presentation of bloody fingerprints when doing bloodstain pattern analysis evaluations and expert witness testimony.

Fingerprints were deposited on a variety of substrates that may be encountered in the home or workplace. The substrates that were used for the research were pieces of glazed ceramic tile, glass, melamine bookshelf, wood (pine and poplar), acrylic plastic, residential vinyl floor tile, commercial vinyl floor tile, and galvanized sheet metal. The substrates were cleaned prior to use and several of the pieces of wood and galvanized sheet metal were painted using either oil-based glossy, oil-based matte, latex glossy, or latex matte paint. Each of the painted substrates was also tested in an unpainted condition. After preparation of the substrates, fingerprints were deposited on them using either light or heavy pressure. The fingerprints were made by coating a finger with motor oil, WD-40® spray lubricant, floor wax, skin oils, hair oils, or silicone lubricant. Fresh human blood mixed with citrate phosphate dextrose anticoagulant obtained from the South Florida Blood Bank was then dripped, spattered, or flowed over the fingerprints. The interaction of the blood with the fingerprint was recorded; fingerprints that became visible upon interaction with the blood were photographically documented. The photographs of the bloody fingerprints were examined by a Latent Print Examiner to determine if the fingerprint was a positive or negative image and if it was of comparison value.

A second study examined the visualization of bloody fingerprints as the result of touching a blood drip. Blood was deposited on the substrates in volumes of 50µl. A finger was then pressed into a pool of blood at 0, 15, 30, 45, and 60 minutes. The results were photographed and examined by a Latent Print Examiner.

The third study examined bloody fingerprints that resulted when the substrate was touched by a finger that had been coated with blood. The results of the experiment were photographed and examined by a Latent Print Examiner.

The substrate characteristics, as well as the method used to deposit the blood on the substrate, affected the formation of visible bloody fingerprints. The less porous, smooth, polished, and/or glossy substrates resulted in the visualization of a higher number of bloody fingerprints. Flowing or dripping the blood onto the substrates resulted in bloody fingerprint images more often than the test substrates that were spattered with blood. The fingerprints made from oils interacted more often with the blood to leave a visible fingerprint than the fingerprints made from silicone lubricant or wax. These visible bloody fingerprints were negative or reversed images. The fingerprints became visible because the blood flowed into the areas that were not oily. These non-oily areas correspond to the furrows of the fingerprint and the oily areas represent the ridge pattern of the fingerprint. All of the bloody fingerprints that were visualized by interaction with the human blood during the first and second studies were negative images and none were of comparative value. The bloody fingerprints from the third study were all positive images and were of comparative value.

Bloody fingerprints are frequently identified at violent crime scenes. It is frequently argued that the fingerprint was there prior to the bloodshed event and that the blood interacted with the fingerprint to make it visible. Another argument is that the defendant entered the crime scene after the bloodshed event and accidentally touched a pool of semi-dried blood, leaving a bloody fingerprint in its place. This research demonstrates that it is difficult to obtain bloody fingerprints as a result of a pre-existing fingerprint interacting with blood being deposited on it or because a finger was pressed into a pool of semi-dry blood. When bloody fingerprints are visualized due to these interactions, the resulting fingerprint is a negative image of no comparative value. The only mechanism that will consistently produce a positive image of comparative value is when a finger coated with blood contacts a clean substrate and transfers the blood onto that substrate.

The research provides the analyst with a better understanding of how bloody fingerprints may be visualized at violent crime scenes. It will assist in the interpretation and presentation of bloody fingerprints when doing bloodstain pattern analysis evaluations and expert witness testimony.

Bloodstain Pattern Analysis, Bloody Fingerprints, Latent Print Examination