



E12 Analysis of Blood Spatter Formation on Stain-Resistant Fabrics

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After attending this presentation, attendees will understand how stain repellent affects the formation and appearance of bloodstains on fabrics and household textiles.

This presentation will impact the forensic science community by providing information that can aid bloodstain pattern analysts in the examination and interpretation of bloodstains on porous surfaces. This knowledge will limit misinterpretations of the type and cause of bloodstain patterns.

Bloodstain patterns provide valuable information on the physical events that occur during a crime and assist investigators in the reconstruction of an incident. Bloodstain pattern analysts examine, categorize, and interpret bloodstains based on their shape, size, and patterns; however, the surface on which the bloodstains are present can affect the stain formation. Much of the research for understanding the formation of bloodstains on different surfaces was only conducted on non-porous surfaces. The forensic science community understands the formation of stains on these surfaces because only the roughness of non-porous surfaces has an impact on the stain; however, the majority of crime scenes involve bloodstains on porous surfaces such as apparel, household textiles, upholstery, and carpets. Unfortunately, the science of bloodstain pattern analysis is not able to provide the same level of confidence in the analysis of the bloodstains on these surfaces because of the complex structure of textiles. It is important for a bloodstain pattern analyst to consider both the type and texture of the fabric and understand how these two characteristics affect bloodstains.

The purpose of this research was to examine and compare the characteristics of impact bloodstain patterns on different fabrics, including those that were treated with stain repellent. Stain resistant fabrics are treated to repel and release stains. Ten common fabrics that may be encountered at a crime scene were chosen. Five of these fabrics are common clothing items: khaki pants, denim, a silk tie, a dress shirt, and a polo shirt. The other five are common household fabrics: carpet, upholstery, pillow cases, a tablecloth, and an outdoor furniture fabric. For each type of fabric, a section of the fabric was chemically treated with a stain-repellent spray. A rat trap was utilized to create medium- to high-velocity impact blood spatter stains. White butcher paper was used as a control. Comparisons were made between the fabric and control bloodstains, bloodstains on chemically treated fabrics and regular fabrics, and different textures of fabrics. Ten representative spatter stains were selected on each piece of fabric to analyze. The height and width of each individual stain was measured in millimeters and photographs were taken. The spatter size range and average was determined for each fabric. The comparison microscope was also used to compare individual stains present on the stain-resistant fabrics to those present on the regular fabric of the same composition and the different types of patterns were recorded. It was hypothesized that there would be a difference in the absorption of the blood spatter on the stain-resistant fabrics compared to non-stain-resistant fabrics of the same composition. This could affect the analysis of the pattern, causing the analyst to misinterpret the events of the crime scene. The documentation of the stain sizes, shapes, and characteristics on the different fabrics will aid bloodstain pattern analysts in understanding how stain-resistant fabrics affect bloodstains.

Bloodstain Pattern Analysis, Blood Spatter, Stain Resistant