A171 Evaluating the Deposition Sequence of Overlapping Bloodstains Caused by Transfer and Airborne Droplets

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Attendees of this presentation will learn if it is possible to sequence overlapping stains produced by airborne droplets and contact transfers.

This presentation will impact the forensic community, and those being served by it, by evaluating the validity and boundaries of a technique used to reconstruct the sequence of bloodstains deposited during violent crime.

The order of deposition of bloodstains found at crime scenes can be useful when reconstructing the events of violent crime. This information can reveal the movements and actions of those involved (victim, perpetrator, and witness) and can be useful in corroborating or refuting statements made by the victim, suspect, or witnesses.

While there are many different mechanisms that can cause blood to interact with a target surface, they can all be grouped into two broad categories. Blood can appear from contact with the target surface or it can appear from the deposition of airborne droplets. It is possible, and even common, for airborne droplets to overlap with other airborne droplets. The same holds true for multiple bloodstain patterns produced by contact with a surface. For this preliminary study, only patterns produced by the combination of airborne droplets and contact transfers were evaluated.

Stains were produced on two commonly encountered surfaces; painted sheetrock and linoleum floor tile. The stains were made with recently acquired defibrinogenated ovine blood brought to body temperature in a water bath. Initial experiments illustrated no demonstrable difference in the patterns produced between fresh drawn human blood and the defibrinogenated ovine blood at body temperature.

Patterns were produced by creating contact stains on the two substrates and then overlapping airborne droplet stains at different stages of the initial contact stains' dryness. Each pattern was then photographed and evaluated. This same process was repeated with airborne droplet stains first and then overlapped with stains from contact at different stages of the initial airborne droplets' dryness. Temperature, humidity, and air circulation were monitored for all of the experiments.

Evaluation of the stains was first performed visually with the unaided eye and then with low power (5X and 10X) overall magnification. When possible, stains were also excised and evaluated under higher magnifications with epi-illumination. Since it is not uncommon for bloodstains to be dry before they can be adequately documented, additional work was conducted with traditional digital photography as well as infrared and ultraviolet imaging. Various adjustments were also attempted in image processing software to aid in the determination.

The interpretation of overlapping bloodstains has limitations, yet also significant information potential. Specific information is often required to make the analysis of such stains possible. This preliminary study has identified these boundaries and will outline future studies necessary to evaluate the same phenomena with two overlapping contact transfers or two overlapping airborne droplet stain patterns. **Bloodstains, Interpretation, Overlapping**

 ** Presenting Author*