THE VALUE OF BLOODSTAIN PATTERN RECOGNITION AT CRIME SCENES FOR PROBATIVE SAMPLE SELECTION FOR DNA ANALYSIS

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Bloodstain pattern recognition can be an important tool to aid in an investigation. The examination of bloodstain patterns is based on principles studied in fluid mechanics; biology and trigonometry. Some patterns show characteristics that are attributable to a particular mechanism based on principles studied in bloodstain pattern analysis (BSPA). Even though it takes years of experience, training and practice to develop the level of confidence it takes to be able to adequately write a bloodstain pattern analysis report, every crime scene analyst, serologist and DNA analyst can benefit from a short course in pattern recognition to aid them in their selection of stains from a crime scene or from garments.

The following photographs demonstrate a pair of soiled tan cargo shorts collected from the suspect in a homicide case. A close look at the shorts reveals bloodstains that are characteristic of back spatter from a gunshot wound. It was known that a male victim was shot twice through the head in such a way that the bullet traveled through his head then through the floor into the apartment below. Another shooting victim in the apartment was a female. The suspect (who was a roommate to the two victims) claimed self-defense stating that he retrieved his gun after seeing his male roommate shoot the female roommate. He stated that he was not near the female when she was shot. The suspect admits to shooting the male victim in self-defense. Although the shorts may seem like a simple item of evidence to examine, if the stains had not been documented and recognized as gunshot back spatter then the analyst may have selected one larger stain on the shorts for DNA and documented in their notes only that there were bloodstains on the front of the shorts. DNA analysis of the gunshot spatters on the interior right hem of the shorts identified them as belonging to the male victim. DNA from the gunshot spatters on the right front exterior were identified as belonging to the female victim. The detection of the female profile in gunshot spatter vs. a statement that a bloodstain on the shorts was identified as coming from the female shows that the suspect had to have been near the female victim when she was shot, which was contrary to his interview statements. This case demonstrates the necessity for individuals examining garments to describe and document the size, shape and distribution of the bloodstains.

Scientists have demonstrated that there is an overlap in some pattern descriptions in regard to the size, shape and distribution created by different mechanisms such as gunshot, expiration of blood and blunt trauma in a beating. Since not all of the facts of a case are available when the first crime scene analysts arrive at the scene it is extremely important to document the scene in such a way that when questions come up later (and the scene has been released) that investigators and bloodstain pattern experts can view the notes and photographs and obtain the information they need in order to accurately assess the patterns that are present. The importance of taking overall, intermediate range and close up photographs with alpha-numeric stickers and other measuring devices to aid in visualization of the stain location cannot be stressed enough. The close up photographs should be taken perpendicular to the stain of interest.

Other important areas to consider when examining a scene for bloodstain patterns include the ceiling, the deceased individual's skin and the decedent's clothing. Patterns on the ceiling may reveal the location of cast-off spatters that occurred when blood was hurled from a moving, blood stained object at a scene where the walls and floors have been cleaned up. The ceiling may also reveal needle cleaning in areas used by heroin addicts, as small droplets of blood are

ejected from the needle when the plunger is depressed. Bloodstains on the body and clothing will need to be documented before the body is placed into a body bag since they can be destroyed when the body is placed into the bag. Depending upon the case, it may be necessary to swab spatters on the body or remove the outer layer of clothing to preserve evidence that would otherwise be lost when the body bleeds out in the body bag. Fingerprints in blood can also be developed and photographed on bare skin using diaminobenzidine (DAB).

When examining suspect's clothing it is important to think outside the box. Dark fabrics can pose problems by making it difficult if not impossible to see bloodstains. Using an infrared (IR) light source will cause black fabric to appear light grey and the bloodstains to appear black. Night vision goggles can be used to screen dark garments while the bloodstains are circled with a silver marker. Other hand-held small IR light sources with attached cameras or computers (such as the unit made by Foster and Freeman) are also coming out on the market to aid in blood detection on dark fabrics. When examining a suspect's clothing it is also important to consider cessation cast-off patterns that may exist on the back side. In cases where the injuries are consistent with blunt trauma for instance, blood may be abruptly thrown off the object in motion that comes to a sudden stop on the back swing causing blood to be deposited on the back of a shirt or pants.

Careful documentation of bloodstain patterns, whether at the scene, on the victim's body (skin or clothing), or on the suspect (skin and clothing) provides an investigative tool that may otherwise be lost. An introductory class in BSPA will improve the efficiency with which an investigator documents patterns at a crime scene and selects stains for DNA analysis. An analyst who has had the opportunity to take a class in BSPA will find it easier to select probative stains for DNA analysis. The Scientific Working Group on Bloodstain Pattern Analysis (SWGSTAIN.org) is an important resource that can connect investigators and laboratory scientists to the reference materials or individuals that can answer their questions regarding bloodstain analysis.