

Documentation of Bloodstain Pattern Evidence

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Abstract: Bloodstain pattern evidence is a valuable investigative tool for determining the events which occurred during a violent crime where blood was shed. The best method for evaluating bloodstain pattern evidence is to visit the crime scene and view the patterns. Frequently this does not happen and the analyst must work from photographs, notes, and sketches. Proper documentation is important to assist in the reconstruction of events and to preserve the work product of the analyst for presentation in court. The documentation process can be divided into six areas of importance: notes, team work, photographic records, sketches, serological analysis, and court presentation.

Introduction

Bloodstain pattern evidence produced in violent crimes in which blood is shed provides valuable investigative information for determining certain events that occurred. For the bloodstain pattern analyst, the best means of evaluating this evidence is actual attendance at the crime scene; however, this frequently is not possible, and the analyst must depend upon proper photographs, sketches, and notes that describe the scene and the evidence. Good scene documentation enables the analyst to examine the evidence properly, and is useful for court presentations of what the analyst observed, how the patterns were interpreted, and why certain conclusions were reached.

The complete documentation of bloodstain pattern scenes can be divided into six components: 1) notes; 2) team work; 3) photographic

ence. When a team is employed, there should be a recognized team leader who is in charge of the scene processing.

Photographic record

Prior to photographing the bloodstain pattern evidence, the analyst must position measurement scales around the areas of interest to provide reference points in the resulting photograph. The scales must originate from a minimum of two fixed points, and must be used to define the outer margins of the area being documented (Figure 1). Although either metric or English scales can be used, metric is preferred. Perimeter scales should be of sufficient size to be legible in any photograph, even those taken from longer distances.

After the perimeter scales have been placed, smaller metric scales are positioned by the particular bloodstains in the patterns being documented so that they will appear in the close-up photographs of the bloodstain patterns. Placement of these smaller scales must be selected with care to avoid covering any bloodstains. Although this is not always possible, the analyst should choose locations for minimal interference. After all the scales are in place, photographs can be taken.

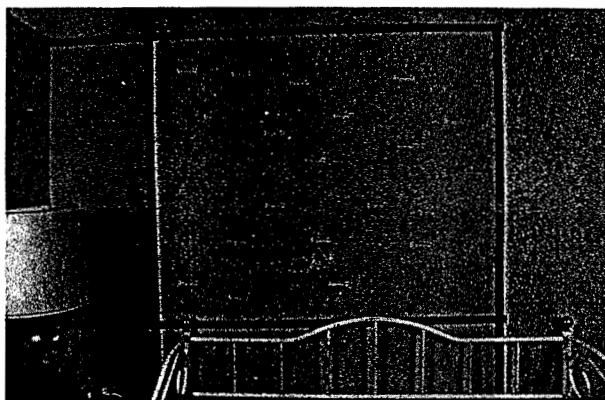


Figure 1

Bloodstain patterns after placement of the measurement scales

To obtain high quality photographs, proper lighting of the scene is necessary. Photographs of bloodstain patterns taken under poor lighting conditions fail to display detail, especially of smaller bloodstains, due to insufficient contrast and depth of field. Improved contrast and depth of field will exhibit crisp details and a more accurate color rendition.

Good quality photographs may be obtained using equipment, such as that displayed in Figures 3 and 4, consisting of the following items:

1. 35 mm camera;
2. tripod;
3. shutter cable;
4. lights, including a) two flash units, one with a slave attachment, or b) two studio umbrellas on tripod stands; *
5. a hand-held light meter.

The camera should be placed on a tripod and adjusted so that it is positioned at a right angle to the surface being photographed, thus making the film plane parallel with the surface. This will keep spatial distortion of the bloodstain patterns to a minimum. The use of a tripod with a shutter release cable will prevent movement of the camera that

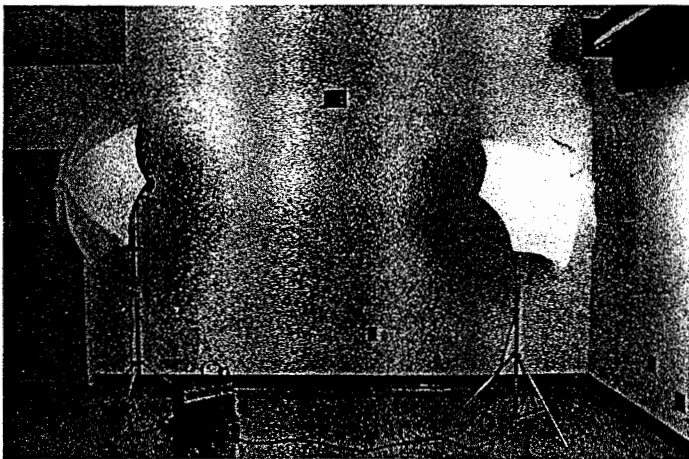


Figure 3

Equipment set-up for the photography of bloodstain patterns

After photographing the particular areas to depict the present bloodstain patterns, the location of the point of convergence for each bloodstain pattern that will be reconstructed is determined. The point of convergence is two dimensional, and is defined as the position to which a bloodstain pattern can be projected. This point is ascertained by tracing back the long axis of well-defined bloodstains within a pattern to a common point [1].

This common point can be demonstrated with the use of Letraline, a graphics art tape. Letraline has adhesive on one side and comes in many different widths and colors. A strip of Letraline is attached to the edge of a bloodstain in line with its long axis, then attached to the surface in a straight line which follows the reverse direction of travel determined for that bloodstain [2]. This process is repeated for several bloodstains in the pattern, and the position where the Letraline tapes intersect is the point of convergence. When the point of convergence has been located, overall photographs of the taped pattern should be taken as previously described (Figure 5).



Figure 5

Bloodstain patterns after the convergence points have been determined

This procedure is repeated for each bloodstain in the pattern until the origin is defined. Photographs which display the scales, Letraline, strings, and ruler should be taken from several different angles to show the reconstructed bloodstain pattern (Figure 6).

After the reconstruction of the bloodstain pattern has been completed, the analyst must record the specific measurements of the bloodstain that were used, the location of the point of convergence, and its possible origin. The entire procedure is repeated for each pattern that is to be reconstructed.

Sketches

Crime scene sketches depict the appearance of the entire crime scene as a single picture rather than a series of photographs. They help illustrate the location of the evidence and its relationship to the bloodstain patterns. Good crime scene sketches should be drawn to scale using accepted sketching procedures. The crime scene sketch, when combined with the photographic record, clarifies the results of the bloodstain pattern analysis.

Additional sketches can be drawn to help illustrate the conclusions that were reached in the interpretation of the reconstructed bloodstain patterns and the analysis of the evidence. The conclusions of bloodstain pattern analysis can be very confusing to a jury. Sketches help clarify by making the process less abstract.

Serological analysis

Serological analysis of the stains is often necessary to complete the bloodstain pattern interpretation. If the bloodstain pattern analyst is not a forensic serologist, then this portion of the procedure must be completed by others. In such cases, the bloodstain pattern analyst must discuss the evidence with the serologist. The analyses required should be determined by the serologist and should be based upon the circumstances surrounding the case.

In most bloodstain pattern analysis cases in which only one person was injured, presumptive testing for the presence of blood and species determination is sufficient, and it is not necessary to test the samples for serological or DNA markers. When more than one person is injured, a more complete analysis of the samples is required, and should be in-

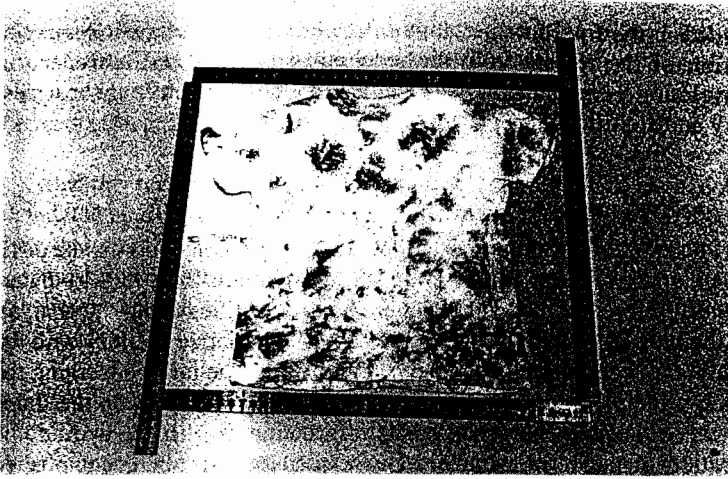


Figure 7

Bloodstained shirt prior to analysis

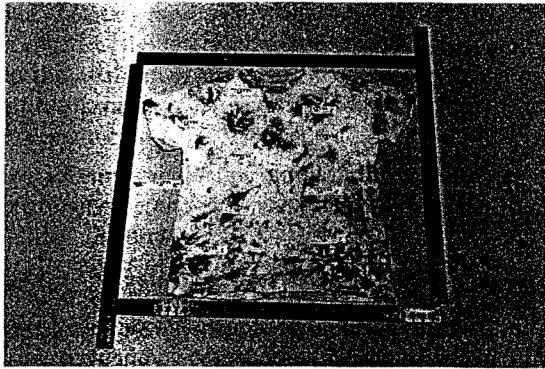


Figure 8

Bloodstained shirt after placement of the measurement scales

2. Bunker, J. L., "Advanced Techniques in Bloodstain Pattern Analysis" (workshop), Valencia Community College, Orlando, FL, 1988.
3. MacDonell, H. L., *Bloodstain Patterns*, Laboratory of Forensic Science, Corning, NY, 1993.