Experiment 23

Bloodstain Pattern Geometry (Part B)

Purpose

Acquire familiarity with the basic geometric shapes and patterns formed by droplets of blood when they impact different target surfaces at 45, 60, and 70° angles. Experiment with smears and contact pattern transfers. Learn the effects of various impact angles on the geometry of blood droplets and the concepts and rationales that are used in the study, and to interpret complex bloodstain patterns.

Equipment and Supplies

1. Artificial blood prepared in accordance with instructions in Experiment 22
2. 30- to 60-mL dropper bottle or 50-mL beaker
3. Disposable pipettes
4. Plain white typing paper
5. 12-in. square pieces of cardboard
6. 12-in. square pieces of 1/8-in.-thick, smooth, clear or white sheets of acrylic
7. 12-in. square pieces of plywood
8. Paper towels
9. Tape measure
10. Ruler
11. Meter stick
12. Protractor

Procedure

1. Draw artificial blood into the pipette or dropper and wipe off any excess from the outside of the tip with a paper towel. Be careful not to include any air bubbles with the blood drops.
2. The test surfaces should be placed at various angles to the floor. Hold the loaded pipette or dropper perpendicular to the floor and release the blood. Figure 23.1 shows the technique.
3. Release a single drop of artificial blood straight downward onto each surface texture to be tested from a height of 12 in. at impact angles of 45, 60, and 70° (Figure 23.2 shows appearances of droplets after impact). Prepare one test surface for a drop of artificial blood impacting a surface at 60° from a height of 24 in. (see Figure 23.3).
4. Make your observations while the stains are wet and after the stains are thoroughly dried.
5. Repeat the experiment on several different surfaces.
6. Prepare one smear and one contact pattern on separate pieces of plain white paper (see Figure 23.4).

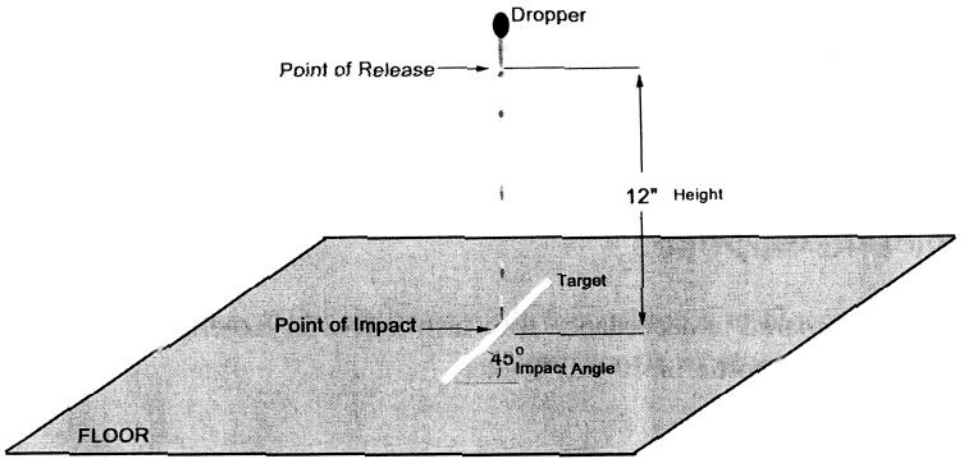


FIGURE 23.1
The application of the test droplets of artificial blood.

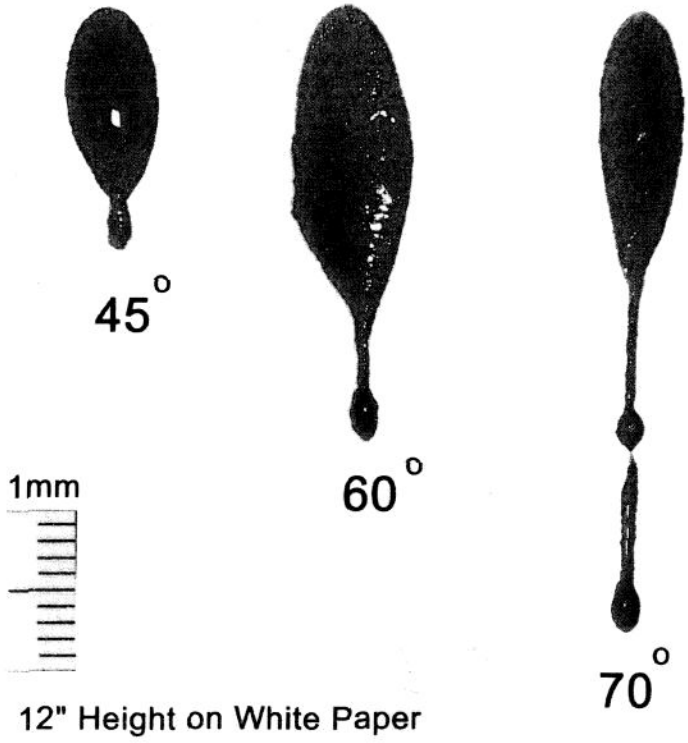


FIGURE 23.2
Appearance of blood droplets after impacting a plain white paper surface at various angles from a height of 12 in.

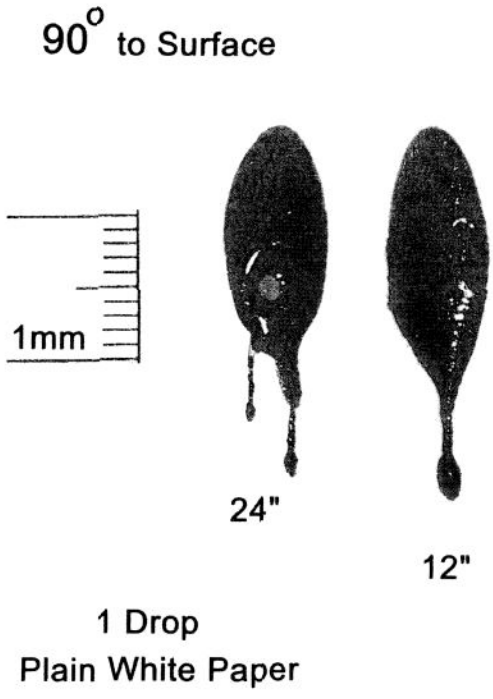
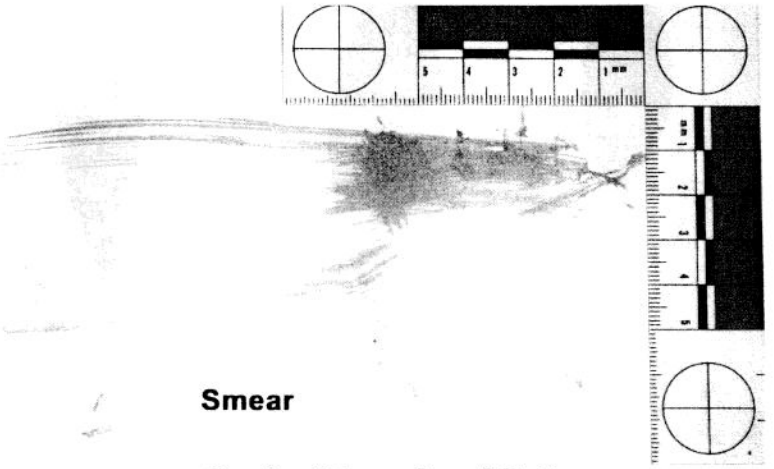


FIGURE 23.3
The appearance of two blood droplets after impacting a piece of plain white paper 60° from a height of 24 in. and 12 in.



Smear

Contact Transfer of Pattern

FIGURE 23.4

Report

1. Report your observations.

2. Sketch or photograph each specimen. (See Figures 23.2 and 23.3.)

3. For each surface texture examined, make the following observations:
   A. Describe the texture of the surface: hard of soft; smooth or rough; porous or nonporous; absorbent or nonabsorbent.

   B. Describe the edge characteristics of the resulting stains.

   C. Measure the diameter and length (in mm) of each pattern.

D. Describe the extent of peripheral satellite spattering.

E. Discuss what effect the changing drop heights had on the resulting stains.

F. Experiment with other surface textures such as floor tiles, carpets, textiles.

G. How do the 12-in. and 24-in. 60° impact angle test patterns differ on plain white paper?

H. How do the smear and contact transfer patterns differ?