TECHNICAL ARTICLE:

CREATING A BLOODSTAIN PATTERN GENERATOR

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Introduction —

Numerous methods and materials have been used to reproduce impact bloodstain spatter consistent with gunshot. In schools I have attended, students would saturate sponges with blood and fire a .22 cal. rifle through the sponge. Targets would collect the resulting spatter at both front and rear of the impacted sponge. This method was adequate for showing students what impact bloodstain patterns consistent with gunshot looked like, but not practical for recreating crime scenes.

I am a police officer and during a training session for our S.W.A.T. team, I noticed that the paintball guns that we used to train with did not always function properly. When the paintball would break on the way through the barrel of the gun, the resulting effect of the ruptured paint would resemble impact spatter consistent with gunshot. Noting this, I wondered how I might utilize my paintball gun to generate blood spatter. Using a number of different designs, I was finally able to create a system that accurately reflects blood spatter patterns found at crime scenes.

Materials

1. ¼" brass wire
2. 50 ml beaker
3. 10 ml graduated cylinder
4. 5 ml pipette
5. Brass Eagle Paintball marker (Stingray model)
6. ¾" x 5 ½" PVC tubing
7. ¾" PVC elbow with ¾" O-ring
8. Wadding Material
9. Blood
10. Jig to hold Paintball Gun

The paintball gun was one that could be purchased at any K-mart or Wal-Mart store and was inexpensive compared to other models. The gun is powered by compressed air and fires a blast of air capable of sending a 68-cal. paintball down range at over 300 fps. When the gun ran out of paintballs, the weapon would still fire the compressed air. With this in mind, I needed a way to position the blood so that it would be impacted by the blast of air coming from the barrel of the gun. This was accomplished by using inexpensive tubing, an elbow, and some o-rings.
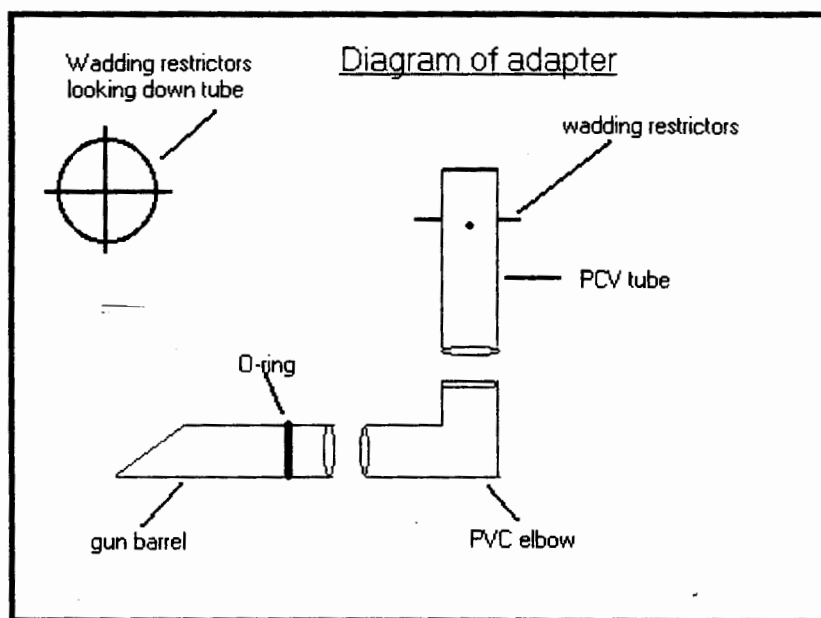
Figure #1

Methods & Procedure

Drill four holes in the ¾"X 5 ½" PVC tube 2 ½" from the muzzle end of the tube. so when wires are passed through the holes, an X is formed (See Figure #1). The holes should be offset. so that the wires fit close to each other. This allows the wadding that will hold the blood to only go down the tube to that point.

Place the O-ring over the end of the paintball gun barrel. Then place the ¾" PVC elbow is then placed over the gun barrel and the O-ring making a tight seal (See Figure #1).

The 5 ½" PVC tube is then fitted into the elbow with the wadding restrictors at the opposite end.

On this particular paintball gun, the barrel can move freely and rotate both clockwise and counter clockwise. To limit this rotation, I placed a wooden shim in-between the barrel and the gun frame. This allowed the barrel of the adapter to stay in place once being rotated to the desired angle.

The paintball gun was now ready for loading. I experimented with different material, finally using strips that I cut from plastic grocery sacks. This material was very light, yet made an adequate seal for the blood prior to firing the gun It was also important that the wadding not travel very far down range. I found that the plastic grocery sacks provided all of these attributes. The bloodstain pattern can sometimes be ruined if your target is struck by the wadding, so perfect results are not always attained.

When the wadding was pushed into the tube with my little finger, I was able to form a thimble shape receptacle where blood could be placed. I then placed 2 ml of blood into the formed wadding and fired the gun immediately. Failure to fire the gun in a timely fashion after loading it with blood will cause the blood to seep down past the wadding, causing a poor pattern.

The gun would then be fired, causing the compressed burst of air to impact the wadding. The blood would then separate into small droplets and produce the desired spatter pattern. As with other methods, varying sizes of spatter occur. Discounting the larger spatter, you can utilize the physical attributes of the smaller droplets and use them to reconstruct scenes.

When working with the generator. I used both horizontal and vertical targets. The best effect came from using the vertical target. The more blood that I used the heavier the pattern would become.
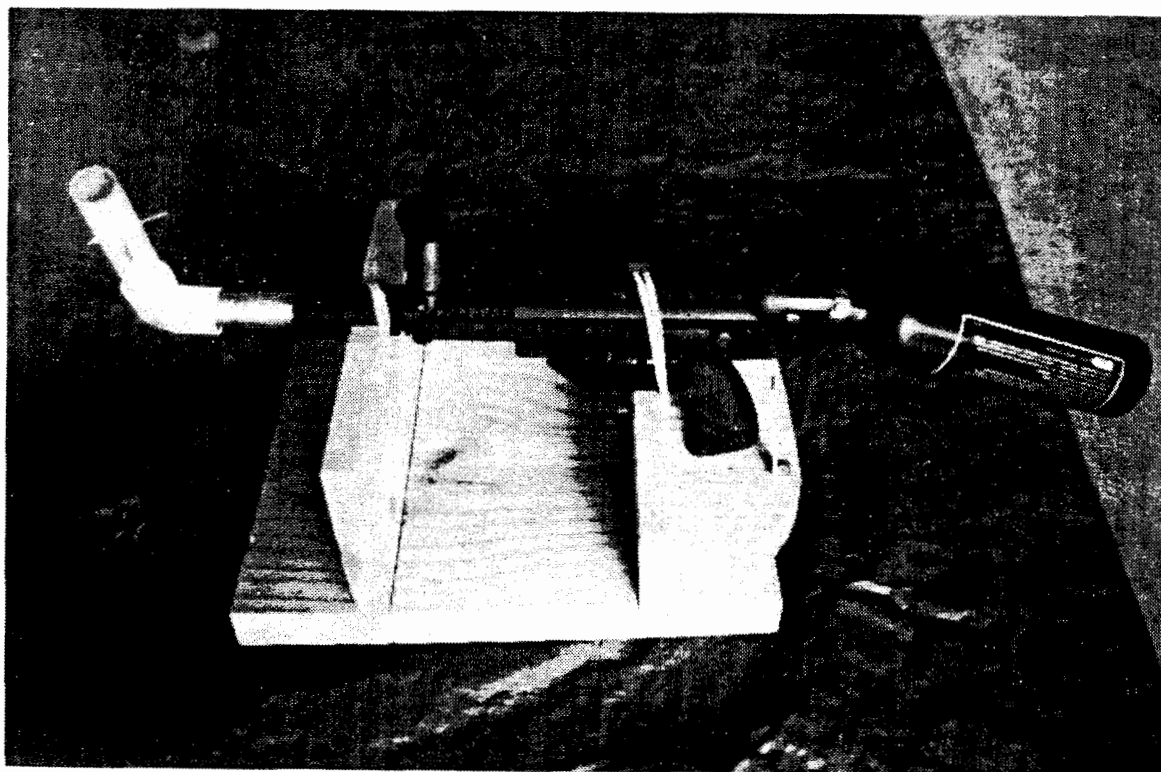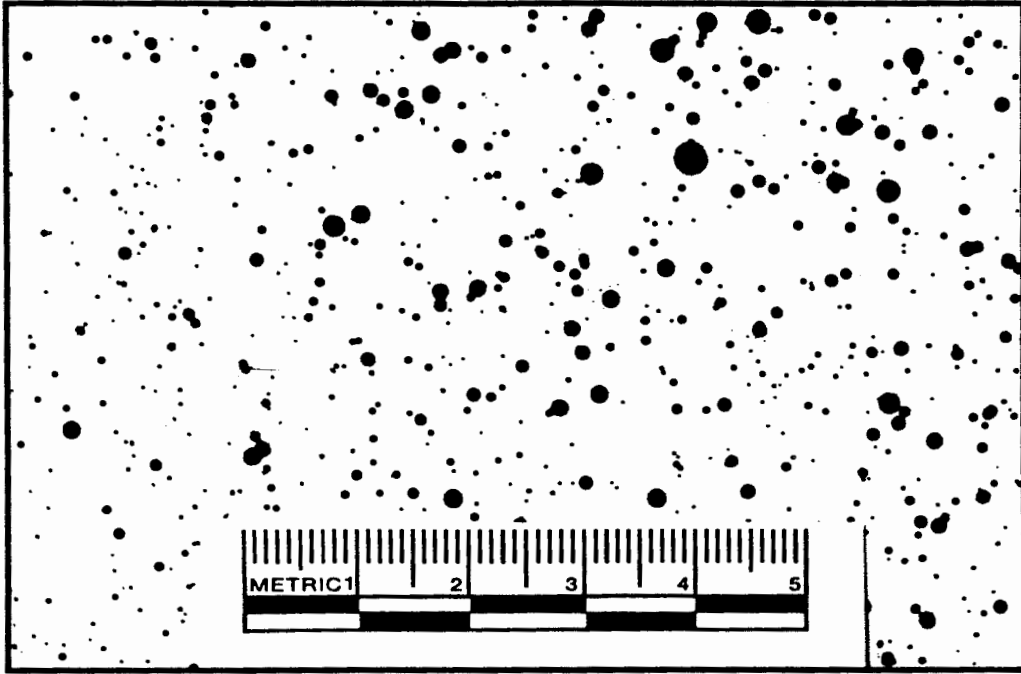

Figure #2
Bloodstain Pattern Generator

Figure #3
Cross-section of vertical target positioned 32" away from
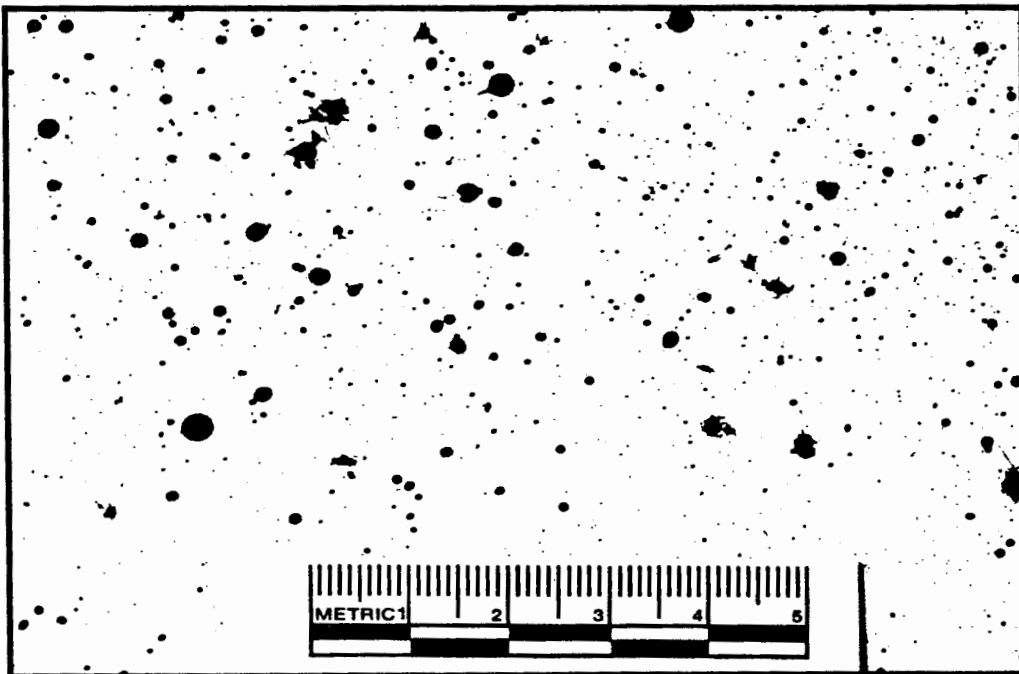Bloodstain Pattern Generator at a 30-Degree angle.

Figure #4
Cross-section of vertical target created by firing through a blood soaked
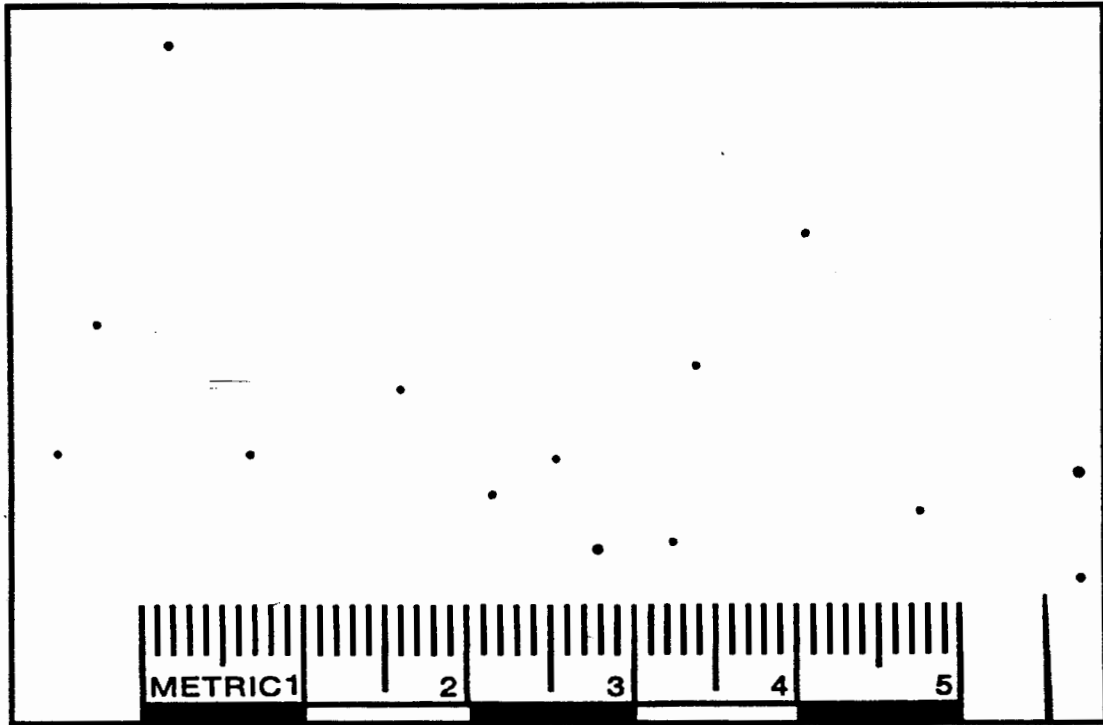sponge with a .357 magnum. Target was 30" from the blood source.

Figure #5
Cross-section of horizontal target positioned 32" away from the
Bloodstain Pattern Generator at a 30-degree angle.

Practical Uses For The Bloodstain Pattern Generator

One of the most recognized features of this design is being able to create void areas. By placing an object between the generator and the target, you can see the effect after firing the blood. Using the information and data that you obtained from the scene of the incident, you can place the generator in the concluded distance and angle from the target surface. The analyst can then prove his interpretation by making the voids as depicted at the actual scene.

I have also used the generator to produce blood spatter consistent with gunshot on different types of clothing. I was asked by Sgt. Dean Marks of the Indiana State Police to collect different clothing fabric and subject them to the generator. The results were a variation of different colored clothes and fabric types that could be used to instruct his serology personnel in the state police lab on what to look for when examining clothing. This resulted in numerous referrals for blood spatter interpretation, which previously may have been overlooked.

I urge everyone serious about reconstructing blood spatter events caused by an impact to blood to use the blood spatter generator. I believe you will find that there are many applications for the generator in both casework and research.