



B168 Determination of Entry and Exit Bullet Holes in Garments Using Light Microscopy

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The goal of this presentation is to highlight the different morphology between an entry and an exit bullet hole in a garment.

The presentation will impact the forensic community by providing information to microscopically distinguish between entry and exit bullet holes, allowing more accurate conclusions for shooting scene reconstructions.

The direction from which a bullet originates is often an important factor in crime scene reconstruction. When the muzzle-to-target distance exceeds two to three feet, the deposition of gunshot residue may be difficult to detect. For distances beyond a few feet, lead wipe is often tested for by the use of sodium rhodizonate. Unjacketed lead bullets commonly deposit lead wipe. For jacketed bullets, lead wipe, if present, may only result from primer residues acquired by the bullet's passage down the barrel. Occasional mishandling of the garment, lubricants in the barrel or the use of lead-free ammunition can result in lead wipe not being found.

A careful examination of the garment using light microscopy can reveal differences in the morphology of entry vs. exit bullet holes. This information may assist in the reconstruction of the shooting incident, and lead to a more timely and accurate resolution of the incident.

The experiments were conducted on garments made from synthetic fibers. The polyester garment was cut to fit both sides of the tissue simulation medium, which was approximately six to eight inches thick. This is designed to simulate a human clothed in the garment, and subsequently sustaining a perforating bullet wound through fleshy tissue. The bullet's velocity was determined on both sides of the tissue simulation medium using two identical chronographs, documenting both the initial velocity near the muzzle of the firearm and the velocity loss after traveling through the medium draped with the test garment. A "witness panel", consisting of a taught sheet of brown bench paper supported by a frame, was placed between the test garment and the chronograph on the exit side to determine whether the bullet was in a condition of stabilized or destabilized flight.

After shooting, the garments were examined with a stereomicroscope to determine the different morphologies of the bullet holes. Photomicrographs were taken for comparison purposes.

Entry Bullet Holes, Exit Bullet Holes, Light Microscopy