



B136 A Case Study: Rubber Buckshot Tissue Penetration Capability

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After attending this presentation, attendees will better understand the penetration capabilities of rubber buckshot pellets fired at various distances and at different media.

This presentation will impact the forensic science community by demonstrating the inability of rubber buckshot to penetrate ballistic gelatin, a tissue simulant, from approximately eight yards. The experiments in this presentation were conducted due to a question posed in a case by the submitting agency; therefore, the methodology and results/conclusions can impact the forensic science community by exposing fellow colleagues to an unusual case and the approach that was taken to answer the posed question.

A determination was requested as to whether 12-gauge RIO™ brand rubber buckshot was able to penetrate ballistic gelatin, a tissue simulant, at a muzzle-to-target distance of approximately 40 yards (the approximate distance between the suspect and victim at the time of the shooting). According to the detective and multiple police statements, on November 14, 2015, the suspect indicated that the victim and his friends were trespassing on his property on their All-Terrain Vehicles (ATVs). The suspect proceeded to retrieve his 12-gauge Mossberg® model 500A shotgun and fired two warning shots using RIO™ brand rubber buckshot (marketed as less lethal ammunition). One pellet penetrated the victim's thigh; however, the pellet could not be removed for medical reasons. The victim was wearing four layers of clothing — none of the clothing was collected. The fired shotgun shells could not be located at the crime scene to verify what type of ammunition was fired. The detective had reason to presume that the suspect was not firing less lethal ammunition (i.e., rubber buck shot) but was instead firing lethal ammunition, such as lead buckshot.

Testing was conducted at the Seattle Police Department shooting range and high-speed videos were taken. The Mossberg® 500A shotgun was used to fire 12-gauge RIO™ brand rubber buckshot at cardboard and denim-covered ballistic gelatin at various distances to determine the penetration/perforation ability of the rubber buckshot. The 10% ballistic ordinance gelatin was mixed using standard practices and calibrated using a BB. During testing, the gelatin was not temperature controlled. Ballistic gelatin is intended to simulate soft tissue and does not account for skin, bone, additional layers of clothing, or other intervening materials. At approximately eight yards, all 15 rubber pellets perforated cardboard with an approximate pattern diameter of 24 inches. At approximately 40 yards, four rubber pellets impacted the cardboard, none of the four perforated the cardboard (only 4 of the 30 rubber pellets impacted the cardboard target). At approximately eight yards, two rubber pellets perforated the layer of denim, but there was no penetration of the gelatin (only 6 of the 15 rubber pellets impacted the denim-covered gelatin). Obtaining data for rubber buckshot into gelatin from 40 yards away was not feasible due to the wider pattern distribution of the rubber pellets. That being said, as a projectile travels downrange, it will gradually decelerate; therefore, if the rubber pellets could not penetrate the gelatin at approximately eight yards, it was concluded that they would not penetrate gelatin at approximately 40 yards. In conclusion, the 12-gauge RIO™ brand rubber buckshot pellets did not penetrate/perforate the cardboard at approximately 40 yards or the denim-covered ballistic gelatin at approximately eight yards.

Rubber Buckshot, Ballistic Gelatin, Case Study