



### H6 Frangible Ammunition in Gunshot Wound Suicides in the Hampton Roads Region of Virginia: An Upward Trend?

Catherine G. Wilson, BS, Eastern Virginia Medical School, Norfolk, VA 23510; Gary M. Zientek, MD\*, Office of the Chief Medical Examiner, Virginia, Norfolk, VA 23510; Wendy M. Gunther, MD, Office of the Chief Medical Examiner, Tidewater District, Norfolk, VA 23510-1046

**Learning Overview:** After attending this presentation, attendees will be familiar with frangible ammunition effects on imaging and at autopsy of gunshot wound suicides and will elevate their index of clinical suspicion for an upward trend in its use.

**Impact on the Forensic Science Community:** This presentation will impact the forensic science community by increasing awareness of a possible trend in the use of frangible ammunition in gunshot wound suicides and by recognizing that frangible ammunition, although intended to cause less bystander damage, inflicts devastating injuries at contact range and may produce exit wounds.

Frangible ammunition has historically been used by law enforcement for training and for domestic and Special Weapons And Tactics (SWAT) team interventions, as it is more likely than conventional ammunition to wound only the intended target. This report reviews three recent gunshot wound suicides with frangible ammunition in the Hampton Roads area of Virginia (a catchment area covering a population approaching one million).

Within a span of three days, three unrelated persons committed suicide by gunshot wound to the head with frangible ammunition. A 25-year-old man with a family-reported history of psychiatric problems shot himself in the side of the head with a .40 caliber pistol, after first shooting and killing another victim with conventional ammunition in a homicide-suicide event. A 70-year-old male hunter, with a history of traumatic brain injury and anger management issues, shot himself in the side of the head with a .38 caliber revolver. In the third case, a 38-year-old woman with a significant psychiatric history shot herself in the forehead using a 9mm handgun loaded with 50-grain lightweight bullets carrying an increased gunpowder load. The first two decedents were proficient in knowledge of guns and ammunition (i.e., the younger man from military service and the older man from hunting experience). The third decedent used ammunition found at the scene.

On radiographic imaging of each decedent, there were radiating fractures from the entrance wound and frangible fragments scattered throughout the cranial cavity; the intact base of the frangible bullet was always identified. Autopsy of the first two cases demonstrated characteristic pulpified gunshot wound tracks through the brain, accompanied by multiple smaller tracks from ammunition and disrupted bone fragments. Fragments were also found in the scalp and dura. The first case had no exit wound. The second case had a partial exit wound from escaping fragments. The third case, with a central forehead entrance, had a continuous entrance-exit wound of the entire frontal skull and scalp, with radiating fractures throughout the calvarium and base of the skull; this case had some characteristics of a high-velocity gunshot wound, due to the ammunition type.

**Discussion:** Gunshot wounds comprise the most common method of suicide in the United States for both men and women. Standard ammunition is generally used (fully or partially jacketed lead-core bullets). Such bullets may be stripped into fragments during passage through bone from shearing forces, or they may remain intact. In contrast, frangible ammunition is manufactured to break apart into smaller pieces upon impact with hard surfaces. This enables law enforcement to reduce the risk of any ricochet damage.<sup>1</sup> Frangible ammunition can be differentiated from sheared standard ammunition on X-ray films by the granular-appearing borders of the fragments, the intact base, and the absence of standard core and jacket fragments.<sup>2</sup>

Studies have found that the damage caused by frangible ammunition is similarly severe to the damage caused by standard ammunition; these three cases illustrate the extent of damage caused by frangible ammunition in hard-contact gunshot wound suicides, and demonstrate that fragments may exit.<sup>3</sup> These cases also illustrate that frangible ammunition can be recognized by its characteristic appearance on radiographs and at autopsy, and that there may be increasing use of frangible ammunition in gunshot wound suicides.

#### Reference(s):

1. Komenda, J. et al. (2013). Forensic and clinical issues in the use of frangible projectile. *Journal of Forensic and Legal Medicine*, 20, 697-702.
2. Di Maio, V.J. (1999). *Gunshot wounds: Practical Aspects of Firearms, Ballistics, and Forensic Techniques*. Boca Raton: CRC Press LLC.
3. Kaplan, J. et al. (1998). Centerfire frangible ammunition: Wounding potential and other forensic concerns. *American Journal of Forensic Medicine and Pathology*, 19(4), 299-302.

#### Frangible Ammunition, Gunshot Wound Suicide, Forensic Autopsy