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TECHNICAL NOTE

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Blood and Tissue Spatter Associated with Chainsaw Dismemberment

ABSTRACT: In response to the unexpected paucity of blood/tissue spatter at the site where a body of an adult woman was dismembered by an electric chainsaw, we dismembered two large pig carcasses with a small electric chainsaw in a controlled environment. These experiments demonstrated first that a large carcass could be easily dismembered by a small electric chainsaw. When the chainsaw bar is held parallel to the ground the majority of the blood and tissue is deposited directly beneath the saw and bar and very little elsewhere. If the discharge chute of the saw however is not oriented directly at the ground, larger amounts of blood and tissue may be sprayed on lateral surfaces or deposited some distance from the chainsaw. The characteristic striations created on the surface of wood as it is cut by a chainsaw can also be found on bony surfaces cut by a chainsaw.

KEYWORDS: forensic science, chainsaw, blood spatter, tissue spatter, dismemberment, tool marks

The interpretation of blood spatter evidence has a long-standing record of being useful in determining the mechanism of inflicted trauma, and to a limited degree, the type of weapon used in an injury (1). Blood spatter evidence can often suggest the velocity component of a weapon, e.g., the spatter pattern associated with gunshot wounds. However, the spatter patterns associated with some other inherently "energetic" weapons have not been rigorously studied. We report herein the blood and tissue spatter pattern along with tool marks on bone and skin associated with dismembering a large swine carcass with a chainsaw.

Materials and Methods

In February of 2005, a 43-year-old, 108-kg, woman was reported missing. The ensuing police investigation and evidence found at the suspected scene suggested that the missing woman had been killed and subsequently dismembered in the basement of the residence. A part of the incriminating evidence was the recovery of a purchase receipt for an electric chainsaw, which was never recovered. The location of the suspected dismemberment was in the basement of the home in a small confined space once used as a coal room (approximately $2 \times 3 \times 3$ m) with a concrete floor.

When the house was entered as part of the investigation, the coal room was found to have been recently, and partially, repainted with blue paint consisting of a few dabs of paint in a patchwork fashion on the walls and completely covering the floor. Although no blood was discovered in the room, a few small pieces of bone and soft tissue were recovered and were subsequently shown by DNA evidence to have belonged to the victim. The scant fragments of recovered bone and soft tissue were found on the lateral walls no more than 1 m above the floor. Several small, superficial, fresh divots were noted on the concrete floor of the room (Fig. 1).

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Twenty-one and 23 days, respectively, after the suspected time of death, the victim's lower legs (amputated below the knees) and the victim's pelvis and thighs were recovered from a local landfill. The bony surfaces of the recovered body parts showed striations felt to be consistent with dismemberment by a chainsaw. Fifty-four days after the suspected day of death the remainder of the victim's body (intact from the pelvic brim upward) was recovered wrapped in blankets in a ditch. This larger body segment matched the previously recovered segments and also showed bony striations felt to be consistent with a chainsaw dismemberment. Neither large portion of the body, or the legs, showed any evidence of hesitation marks or "false starts" on either skin or bone surfaces. DNA markers confirmed that the recovered body segments were those of the missing victim.

Those investigating the crime however were uncertain that an electric chainsaw could have been used to dismember a large human body in such a small, enclosed, space with such little evidence of blood or tissue spatter. There also was skepticism that the small electric chainsaw apparently purchased by the assailant could be powerful enough to dismember a large body without becoming fouled in soft tissue and bone.

To address the above questions an experimental reenactment of the dismemberment was conducted. Although the suspect electric chainsaw was never found, the same make and model of electric chainsaw, as noted on the recovered receipt at the scene, was used in the experiment: a Remington 1.5 HP (M15014US; DESA LLC, Bowling Green, KY) (Fig. 2). The chainsaw was unused prior to the experiment. White cotton sheeting was used to recreate the dimensions of the small basement coal room. A humanely euthanized 90-kg female pulock pig was used as the test carcass. The decedent had sustained severe blunt head trauma with associated hemorrhage suggesting that the trauma, which represented a potential cause of death, was sustained during life. None of the dismemberment surfaces however showed any evidence of hemorrhage to suggest any portion of the dismemberment had been attempted while the decedent was alive. Since the decedent had been reported missing for 2 days before the purchase date of the electric chainsaw, a 2-day postmortem interval prior to the dismemberment was

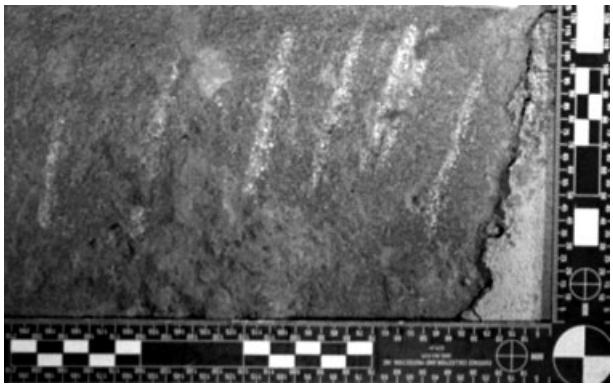

FIG. 1—*Divots in the concrete floor of the victim's suspected dismemberment site.*

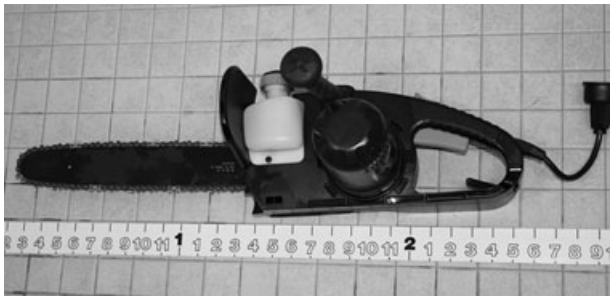

FIG. 2—*The Remington 1.5 HP chainsaw corresponding to the model found on the receipt in the decedent's home and the chainsaw used in the first pig dismemberment.*

presumed. The pig carcass therefore was allowed to lie on a concrete floor at room temperature for 2 days after death before the experiment commenced. At the time of the first experimental dismemberment, the pig was placed on a large piece of plywood painted white.

Later the experiment was repeated using a McCulloch 1.5 HP (MS1415; Husqvarna Group. Stockholm, Sweden) electric chainsaw with the same-sized motor to dismember a freshly killed pig of similar size and weight.

Results

The experiments showed that the electric chainsaws easily cut through the pig carcasses with little resistance beyond some mild to moderate pressure needed for the initial skin penetration. There was no hint of the saw fouling or even laboring during the dismemberments.

In the first experiment, with the saw held largely parallel to the floor, there was a trail of tissue deposited largely directly beneath the chainsaw bar and a somewhat larger puddle of tissue on the floor directly under the discharge chute of the chainsaw (Fig. 3). Very little spatter, consisting primarily of small, fine, high velocity droplets, was found on the sheet "walls" of the test chamber after the first cutting (Fig. 4). A few larger pieces of bone and soft tissue, similar to those found on the walls at the dismemberment scene, were also present on the sheet "walls." Similar to the dismemberment scene, no evidence of spatter was seen on the walls more than 1 m above the floor. When the chainsaw was used in a more vertical position, however, larger amounts of blood and tissue spatter were seen on the lateral walls (Fig. 5).

FIG. 3—*The first experimental cutting on an adult pig after a 2-day postmortem interval with the chainsaw held parallel to the ground.*

FIG. 4—*Spatter on the floor and rear wall after the chainsaw cut shown in Fig. 3.*

In the second experiment, using a freshly killed pig, the pattern of spatter was similar; however, an increased volume of blood spatter was seen on the lateral walls (Fig. 6). When the chainsaw was brought into a more vertical position during the second experimental cutting, the discharge chute discharged a much larger volume of tissue onto the lateral wall behind the operator (Fig. 7). The freshly killed pig left a large pool of blood on the floor after the dismemberment (Figs. 6 and 7), whereas very little blood was seen on the floor after dismemberment of the pig that was dead for 2 days (Figs. 3–5).

As seen in both experimental dismemberments, Fig. 8 demonstrates the downward discharge of sawdust from a horizontally held chainsaw cutting a log. When a log is cut with a more vertically oriented chainsaw, the sawdust is discharged more laterally

FIG. 5—*More extensive spatter on the adjacent back wall in the first experiment when the chainsaw was held more vertically.*

FIG. 6—*Spatter and tissue on the floor when a freshly killed adult pig was dismembered with a horizontally oriented chainsaw, compare with Fig. 3.*

FIG. 7—*More extensive spatter on the back adjacent wall when a freshly killed pig was dismembered with a more vertically oriented chainsaw, compare with Fig. 5.*

FIG. 8—*A horizontally oriented electric chainsaw cutting a log illustrating the downward discharge of sawdust. The discharge chute and chain direction are noted.*

(Fig. 9), comparable to the patterns seen with a more vertically oriented chainsaw in both experiments.

Both of the dismembered pig carcasses and the victim showed characteristic striations across bony surfaces consistent with those seen on hard objects cut with a chainsaw (Figs. 10 and 11). In both experiments, some of the skin surfaces adjacent to the dismemberment sites were relatively smooth while other areas showed somewhat regular skin tags (Fig. 12).

The plywood sheeting that supported the pig in the first dismemberment showed superficial divots, where the chainsaw bar came in contact with the floor, similar to those seen at the scene (Figs. 1 and 13).

FIG. 9—*A vertically oriented electric chainsaw cutting a log illustrating the lateral discharge of sawdust.*

Discussion

These experiments have shown that a human body may be easily dismembered with a chainsaw, even a smaller electric-powered model. As a body or carcass is dismembered by a chainsaw, the

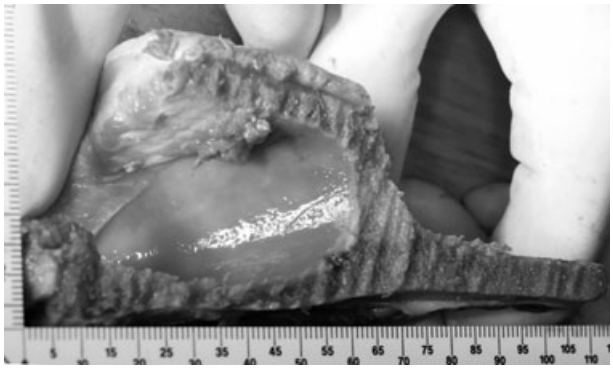

FIG. 10—*Striations noted on bone from the cut surface of one of the dismembered pigs, comparable to those seen in Fig. 2.*

FIG. 11—*Cut surface of a piece of wood cut with a chainsaw.*

chainsaw often leaves characteristic periodic striations on the cut bone surfaces (Fig. 10). These striations are similar to the familiar striations left on the surfaces of wooden logs (Fig. 11) that are cut with a chainsaw and can offer a valuable clue that a chainsaw was used in dismemberment. To preserve dismemberment bone cut surfaces for further examination, including possible tool-mark evaluation, we recommend that a length of bone to include the cut surface be removed from the dismembered body/carcass and preserved separately through formalin fixation or freezing.

Despite popular beliefs fueled by crime scene shows on television and recent *Chainsaw Massacre* movies, postmortem dismemberment does not necessarily produce a large amount of blood

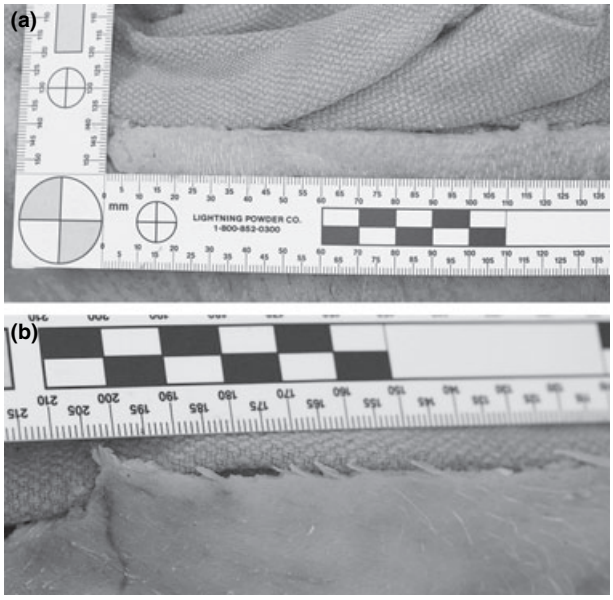

FIG. 12—*Skin edges from the cut surfaces of the dismembered pigs showing a smooth cut edge (a) and a ragged cut edge (b).*

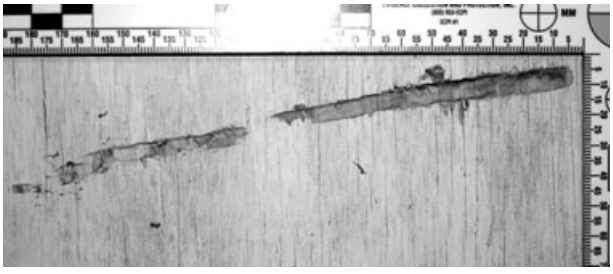

FIG. 13—*A divot in the plywood beneath one of the dismembered pigs (see Fig. 1).*

spatter at a dismemberment scene. In bodies with a longer postmortem interval, there may even be less blood left at a scene. In fact, it is possible that the only evidence that a chainsaw dismemberment has occurred may be superficial divots on the flooring produced by the chainsaw blade as it severs the last bit of tissue and contacts the floor.

Very little has been written about blood spatter and chainsaw injuries (2–5). Campman et al. (5) describe a 10-feet long "V-shaped blood spatter pattern on the floor" at a scene where an individual had committed suicide by placing their neck into an electric chainsaw mounted with the discharge chute pointed parallel to the ground. This article (5) and our experiment illustrate that the majority of blood and tissue discharged by the chainsaw exits the saw via the discharge chute at the bottom of the saw (Fig. 8). With a horizontally oriented chainsaw, therefore, the majority of the tissue and blood will be found on the ground beneath the saw. If the chainsaw discharge chute, however, is not directed towards the ground, then a large volume of blood and tissue, and subsequent spatter, could be expected some distance from the saw (5).

Acknowledgments

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