H29 Analysis of Experimental Wood Chipper Trauma on Bone

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After attending this presentation, participants will understand the results of a study conducted to observe and analyze the skeletal trauma created by a home-model wood chipper.

This presentation will impact the forensic science community by providing information regarding trauma that may be suffered following dismemberment via wood chipper, thereby facilitating event reconstruction, victim identification, and conviction of perpetrators.

Since the highly publicized murder trial of Richard Crafts in 1989, there has been an explosion in pop culture media such as movies, television shows, and the internet postings involving body disposal using a wood chipper. It is repeatedly portrayed as a quick and effective method for disposing of a body and eliminating evidence while avoiding detection; however, in the scientific literature and research relating to human corpse dismemberment and mutilation, there are few studies focused on wood chipper trauma. This paper addresses these shortcomings through case reviews and a preliminary experimental study on wood chipper trauma to bone.

Five domestic pig (*Sus scrofa*) limbs were inserted into a light-capacity home model wood chipper, similar to models that are available for purchase at home improvement and hardware stores and most likely to be used in a criminal context. Following the insertion of each limb, the wood chipper receptacle was removed and the chipped materials were collected, weighed, photographed, and processed. After processing, chipped bone fragments of each limb were separated into five size categories using sieves with openings measuring 11.6mm, 5.85mm, 2.82mm, and 1.69mm respectively. Fragments from each category were weighed and examined for cut marks and other alterations.

Traumas observed had characteristics associated with sharp force trauma and blunt force trauma. Bone fragment sizes ranged from 45mm to less than 1mm. Only 13% of bone fragments by weight were collected in the largest sieve with 71% being collected in the second and third seized sieve. The chipping blade consistently cut the bone all the way through. A total of 239 bone fragments collected from the three larger sieves were observed to have at least one through-cut, and most had two such cuts, creating a roughly parallel-sided fragment. The average length between the two parallel cuts was 6.47mm. This characteristic is a product of the width and speed of the cutting blade as well as the speed and force with which the input chute or hopper brings the material in contact with the cutting blade. The consistent size and pattern of fragments produced are believed to be features that distinguish wood chipper trauma from other types of sharp force trauma.

The wood chipper used in this study produced square, V-shaped, and W-shaped alterations that were dissimilar to the cuts described above and most likely were not caused by the chipping blade. Possibly, these alterations were created when the bone came into contact with other metal components of the wood chipper, and may reflect components and defects specific to the wood chipper used. Other alterations observed included peeling, flaking, spurs, notches, and incomplete fractures. These and other non-cut alterations could potentially assist in associating fragments to a particular chipper model or perhaps to an individual chipper. Although not the primary focus of this study, several relevant soft tissue observations were also made. Of particular note was the fact that, while the bone material was consistently cut by the chipping blade, the skin remained largely intact.

This is a preliminary study, and additional tests such as using different models of chippers, different types of bones, different pre-chipping conditions (i.e., freezing or burning), and microscopic analysis of blade striations on the bone may be useful in further understanding wood chipper trauma patterns. Nonetheless, the study shows that wood chippers create a pattern of skeletal trauma that can be identified and associated to wood chippers in a forensic context. This pattern includes the production of bone fragments of a particular size, through-cuts resulting in roughly parallel-sided fragments, and other alterations that may be specific to the wood chipper used.

Skeletal Trauma, Sharp Force Trauma, Wood Chipper

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