H38 Saw Cut Marks in Bone Created by Atypical Saws

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After viewing this poster attendees will have an understanding of the properties of saw cuts in bone created by saws without traditional blades.

This presentation will impact the forensic community by adding addi- tional means of documenting dismemberment in homicide and other inves- tigations.

The documentation of saw cuts in bone is well established. Each class of saw blade is characterized by class features: the number of teeth per inch (TPI), push versus pull stroke cutting, tooth offset, and tooth width (blade thickness).

Today there are saws commercially available which do not use teeth as the cutting medium. In having no teeth these saws lack most of the class defining traits used in saw identification including the lack of directional cutting (push versus pull stroke). For this study two saws were chosen.

The "MXZ" brand carbide saw has been advertised on television and the internet. This saw has a short blade (13 cm in length) encrusted with carbide chips. This saw is advertised to be able to cut through various materials including steel, concrete, and tile.

The zip saw is common to hunting outlets and is used in field dressing deer to cut through the pelvis at the pubic symphysis. The saw consists of a fine braded chain of three stainless steel wires 48 cm in length. Smaller irregular segments of wire have been welded to the main wires creating a cutting edge. The cutting wire is attached to two short handles.

In the absence of saw teeth one of the few practical properties of both saws is the cutting width or diameter. For the MXZ saw 10 measurements were made perpendicular to the blade recording the maximum width across the carbide chips. This width ranged from 1.85 to 2.23 mm with an average width of 1.99 mm. For the zip saw 10 measurements were made perpendi- cular to the long axis of the saw in the center segment of the saw recording the maximum width across the cutting wires. This ranged from 1.40 to 1.59 mm with an average width of 1.51 mm.

Experimental saw cuts were made using long bones of the white tailed deer (*Odocoileus virginianus*). Partial (false starts) and complete cuts were made. Kerf widths were measured for the partial cuts, and both partial and fully cut surfaces were examined for class-specific characteristics.

The MXZ saw does not cut so much as gouge bone like sandpaper. The kerf width at mid cut ranged from 2.02 to 2.50 mm. This is greater than the measured width of the blade and is attributable to the lack of teeth to maintain blade control through the cut. Despite this the superior margins of the partial cuts were parallel throughout their range. Chipping was evident along the superior margins of both sides of the cut. The kerf floor was marked by parallel striations running the length of the floor. The kerf profile can be characterized as U-shaped with roughly parallel walls. The fully cut surfaces display fine striations similar to those of toothed saws. The striations were less sharp than in toothed blade cuts, however.

The zip saw chisels bone more like a toothed saw but like the MXZ saw lacks the regularity provided by saw teeth. The zip saw also cuts in a curved axis with the cutting force varying in application with how the saw is applied to the bone. The kerf width at mid cut ranged from 1.50 to 1.60 mm. This is nearly the same as the measured width of the blade. The superior margins of the partial cut surface were parallel throughout their range. Chipping was evident along only one side of the superior margin of the cut surface. Given the flexible blade this reflects the direction of pressure applied to the bone. The kerf floor was marked by parallel striations running the length of the floor. The kerf profile can be characterized as semi-circular with well rounded walls at the base. The fully cut surfaces are marked by fine curved striations similar to those created by circular and gigli saws. The curved striations were most obvious at the beginning and end of the cut. This corresponds to the most curved pressure being applied to the bone surface.

In conclusion the absence of teeth, while removing a substantial amount of saw information, does not negate the possibility of identifying saw class.

Bone, Cut Marks, Saws

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