

Saw Toolmarks on Bone: Kerf Mark Analysis Using Microscopic Measurements¹

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Saw marks on bone have been routinely reported in dismemberment cases. The purpose of this study is to evaluate 100 saw kerf mark widths in bone produced by ten saw types to determine variability of saw blade thicknesses. Five measurements were taken from each of the 100 saw kerf mark widths to establish a range for excluding saw blades when compared to the kerf marks. A total of 500 kerf widths were examined to determine the kerf mark ranges. As class characteristics, kerf mark widths can be examined and evaluated to eliminate possible saw blades. When teeth on a saw blade contact bone and the bone is not completely sawed into two parts, bone fragments are removed forming a channel or kerf. Kerf width approximates the thickness of the saw blade.

Ten sections of bovine bone were cut into ~9.0 in by x ~2.0 in size and used as a substrate to collect kerf marks from five mechanical and five electric saws. Ten cuts were made with each saw on a section of bone. A boom microscope equipped with a digital camera and measuring software was used to record the kerf mark measurements. These measurements were taken from each cut mark at 20X. The kerf width range was determined for each blade based on these measurements. Dial calipers were used to measure the thickness of each saw blade.

Comparisons were made between the saw blade thicknesses and the saw kerf widths to determine which saw blades could be eliminated from those tested. The saw kerf width range for each of the saws was determined using thousandths of an inch. The hand saw was (.055 -.072), hack saw (.028 - .040), meat saw (.042 - .049), bow saw (.036 - .041), moulding cut-off saw (.035-.045), reciprocating saw (.055 - .062), skill saw (.087 - .124), cut-off saw (.105 - 113), portable band saw (.026 - .034) and jig saw (.50 - .058).

In Conclusion, analyzing kerf mark measurements can be an effective procedure for eliminating some saw blades. In this study 80% of the blades from kerf mark widths of (.055 -.072) could be eliminated, 70% from (.028 - .040), 90% from (.042 - .049), 90% from (.036 - .041), 70% from (.035-.045), 80% from (.055 - .062), 90% from (.087 - .124), 90% from (.105 - 113), 90% from (.026 - .034) and 50% from (.50 - .058).

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