Examination and Identification of Hatchet Toolmarks on Bone[1]

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In limited dismemberment cases, cut marks on bone from edged weapons such as hatchets have been reported. The purpose of this paper is to present the principles of toolmark identification and the results of a study analyzing hatchet cut marks on bone. There are random microscopic imperfections on the cutting edge of a hatchet. These imperfections can be transferred to some substrates including bone. Imperfections on the hatchet blade, also known as individual characteristics, appear as a series of fine lines referred to as striations. A comparison of juxtaposed striations permits the examiner to determine if there is sufficient alignment for identification.

For this study, 50 hatchet cut marks on bovine bone were evaluated using a boom stereoscopic microscope at 15X, 20X and 25X to determine if the individual characteristics could be used to identify a specific edged weapon. Microscopic striations on the cutting edge of the hatchet blade were replicated by cutting a thin section from two paraffin blocks. The hatchet was used to make cuts into bone and the bone was compared to the paraffin blocks.

Of the 50 hatchet cut marks in bone, 4 (8%) cut marks had striations which could be matched to the hatchet, 11 (22%) cut marks had some striations but could not be matched to the hatchet, and 35 (70%) cut marks had no striations. Even though it is possible to match a cut mark from a hatchet to cut marks in bone, the number of matches in this study is limited.

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