A66 The Extraction of Handedness and Amount of Experience From Sawing Imprints in Bone

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After attending this presentation, attendees will be informed about the possibility of determining handedness and experience from sawing imprints. Attendees will learn the markers that need to be taken into account explained in a visual manner.

This presentation will impact the forensic science community by explaining how the usual tool mark examination is directed toward classifying the tool that was used. This research shows that characteristics of the perpetrator may also be extracted from the same trace. This will have an impact on the tool mark analysis in bone as it will add an extra dimension to this type of examination.

The research material for this examination was obtained with the help of volunteers. Each of the 38 volunteers provided three different sawing cuts in a sheep bone. All volunteers inflicted one shallow cut, one cut halfway through the bone, and one cut completely severing the bone. Thirty-one of the bones were examined for characteristics described in earlier research pertaining to sawing imprints. For handedness, extra care was given to the side on which these characteristics were more prominent. To determine experience, the general prominence, roughness, or smoothness of these same characteristics were examined. Additionally, anything that stood out or seemed to be a pattern was noted. The remaining seven bones were saved for a blind test.

In determining handedness, the downward direction of the sawing imprint was shown to be most related to handedness. The side of the cut on which flaring was most prominent, as well as the horizontal direction and the harmonics of the cut, were also related to handedness. Less important (but still somewhat indicative for handedness) were the roughness of the imprint walls, the striations in these walls, and the placements of false starts surrounding a main cut.

In order to analyze the bones in the case of experience, the amount of experience was quantified. This was done by asking the volunteers to rank themselves on a scale of one through ten, one being very inexperienced and ten being very experienced. In the case of experience, the roughness (or smoothness) of the floor and walls of the cut as well as their striations were indicative. The straightness of the walls and the vertical direction of the cut were also shown to be of value.

The reason for the changes in the sawing imprints was investigated. For handedness, it is argued that the most comfortable way of holding a saw is by tilting the blade. For left-handed people, this tilt will be the opposite of right-handed people, causing a difference in the placement or prominence of markers described in earlier research. For experience, it is argued that more experienced sawyers will start sawing more easily and will proceed evenly, causing smoother, straighter cuts.

The blind test was performed by examining the seven saved bones and using the stated markers to judge handedness and to estimate the amount of experience of the sawyer in question. In performing the blind test, handedness was correctly classified in five out of seven bones, one was inconclusive, and one was wrongly classified. For experience, the examination resulted in defining a range of experience (mostly of three digits). This range included the self-given score five out of seven times.

This research provides an indication that it is possible to extract information related to handedness and experience from a sawing imprint; however, this is research in a new area and is simply an indication. More research is needed, with larger sample sizes and more variables to justify and verify the conclusions drawn in this research.

Tool Marks, Handedness, Experience