INTRODUCTION & SIGNIFICANCE

Key information about an individual’s cause and manner of death can be discovered through the examination of injuries to bone. To improve the ability of forensic anthropologists to distinguish between a variety of different implements, it is important to study each distinct class of injury produced by sharp force, as it is highly associated with forensically relevant cases. This study focused on conducting a comparison of the four classes of sharp force trauma. This was done using four household items (a chef’s knife, a Phillips head screwdriver, a hatchet, and a hand powered saw) on cow and pig bones, then comparing them to the pre-existing literature. Our results exhibited the documented characteristics associated with the acts of incising, puncturing, chopping, and sawing. Overall, the descriptions of the individual characteristics of each of the four classes represented in existing sharp force traumatic research were consistent with our findings. This demonstrates the significance of sharp force traumatic injury patterns in assisting forensic anthropologists in identifying and individualizing causative implements in cases of forensic significance.

MATERIALS & METHODS

Our specimens were a domestic cow femur (Bos taurus) and a rack of back ribs from a domestic pig (Sus scrofa domesticus). Our weapons of choice were a large kitchen knife, a Phillips head screwdriver, a hatchet, and a large pull-saw. All trauma was inflicted by Hannah, using her dominant hand, in an effort to limit variables. The femur was used for the chopping (hatchet) trauma and the sawing trauma because of its robusticity. The ribs were used for the puncture (screwdriver) and incision (knife) trauma. Ribs were selected for this because of how often sharp force trauma is found in the human thorax in the forensic context. The specimens were then boiled in individual pots in water to remove the soft tissue. Once they were defleshed, each bone was analyzed to document macroscopically visible instances of trauma. Photographs were taken of the bones at this stage. The wounds were numbered on the bone and two types of datasheets were completed for each of the four wound classes, looking at 6 characteristics helpful in identifying causative instruments.

RESULTS

The four implements used yielded four very different injury patterns. The puncture wounds on specimen 1A (screwdriver) were identifiable by their bevelled, circular, cone-shaped indents. There was no visible fracturing, warpage, or striations. The incisions on specimen 1B (knife) were characteristic long, thin, linear marks in the bone. Several of the incisions exhibited small hinge fractures. The chopping trauma on specimen 2A (hatchet) left 8 large clefs in the bone, as well as a complete oblique fracture through the femur. This was in addition to hinge fracturing and radiating fracture lines present. There was very significant warpage with this injury pattern. Specimen 2B was the sawing trauma on the opposite surface of the femur from the hatchet trauma. There were 3 original false-starts in the bone, each with a rectangular kerf 6 mm. The third was sawed completely through later in the project to make visible the significant striations. The wounds were much wider than the saw used, and are the result of significant warpage in the form of bone dust from the sawing process.

INFLICTION

The specimens, safety equipment, and implements used

TRAUMA

The specimens, safety equipment, and implements used

DATASHEETS

Example of one of our trauma analysis datasheets (specimen 1A)

REFERENCES
