# Middle Pleistocene 'hunting lesions': experimental approaches to an archaeological puzzle

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## Introduction

Hunting lesions provide indirect evidence of humans using weapons for subsistence. While evidence for hunting during the European Middle Pleistocene (MP) is supported at numerous sites, examples of potential hunting lesions from the period are currently limited to just two examples. The well-known horse scapula fragment bearing a semi-circular edge margin (Fig. 2) comes from the 'horse butchery site' GTP 17 at Boxgrove (MIS 13), and has been suggested to represent impact from a wooden spear (1). A cervid scapula (Fig. 3) from Swanscombe (MIS 11), has also been proposed to potentially signify a hunting lesion (2).


The damaged margins on these two scapulae have received little critical evaluation. There are few studies addressing identification of the use of plain wooden spears, which are known from the MP sites of Clacton-on-Sea (MIS 11) and Schöningen (MIS 9) (3, 4). Furthermore, signatures resulting from other anthropogenic and taphonomic actors remain poorly understood, leading to problems of equifinality. Many MP sites including Boxgrove and Schöningen demonstrate the reduction of bone for access to marrow and possibly grease, and yet the damage signatures of hammerstones or other percussors to flat bones such as scapula are poorly understood. The research presented here is part of an ongoing experimental program replicating hammerstone and wooden spear damage, and an assessment of the MP scapulae in comparison with experimental damage as well as proposed hunting lesions from later periods.

Fig. 1 Hominins butchering a rhino at Boxgrove. Copyright and courtesy of John Sibbick

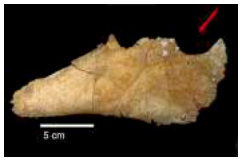


Fig. 2 Boxgrove horse scapula

Fig. 3 Swanscombe cervid scapula

## Materials and Methods

An ongoing program of actualistic studies is designed to establish damage signatures resulting from flint hammerstone impact, as well as from wooden spears on horses. Bones are examined using a hand-lens and DinoLite digital microscope to understand microscopic damage patterns. A descriptive analysis of damage follows criteria established for lesions resulting from impacts with composite weaponry (e.g. 5). Quantitative analysis includes the use of calipers, and the software SketchAndCalc™ for calculating area ($cm^2$) and perimeter (cm). This permits the comparison of results from the current program with published images of hunting lesions. Features such as bevelling, suggested to signify impact from a projectile (e.g. 6) are facilitated by calculating ratios of lateral and medial impact areas. In order to directly compare semi-circular lesions with circular and irregular lesions, perimeters were halved for perforations.

## Results 1. Impact Lesions for Hammerstone Experiments

In terms of primary damage, of the 6 scapulae impacted with hammerstones 1 bears a curvilinear fracture, and 3 have perforations. Secondary damage such as crushing, hinging, cracking and flaking occurred. Margins vary from sharp to terraced. All damage demonstrates internal bevelling. Impacts 1, 4 and 5 have associated percussion pits and microstriations characteristic of hammerstone impact (e.g. 7). Future work includes SEM imaging of microscopic damage and 3D analysis of macroscopic damage.

## Results 2: Impact Lesions from Experimental Wooden Spears (Thrusted)

Experiments using wooden spears on horse carcasses are ongoing. Preliminary analysis of marks resulting from use as thrusting spears (Figure 5) suggests that while effective weapons, they may not leave a signature that would be easily detected archaeologically. Future work involves use at hand-delivered velocities and microscopic imaging.

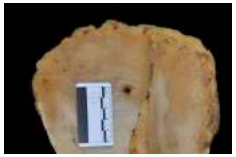

Fig. 4 illustrates an unpublished experiment by Bernard Knight impacting de-fleshed scapulae with wooden points at unknown velocities and forces.

Fig. 5 illustrates a hunting lesion in cartilage from a wooden spear used as a thrusting weapon on a horse carcass. This was the only macroscopically visible mark on either scapula from the thrusting experiment

## Results 3: Morphometric Comparison of Impact Lesion Shape

The horse scapula fragment from Boxgrove bears a curvilinear fracture, with a sharp margin and a very small amount of external bevelling, indicating that any impact would have likely entered from the medial (inside) of the scapula. The Swanscombe scapula has internal bevelling. Comparing areas of damaged scapulae (Fig. 6) shows that experimental hammerstone damage is larger than experimental wooden spear use, though there is an overlap in dimensions when including potential hunting lesions from later archaeological contexts. The Boxgrove damage appears to match best with hammerstone damage but larger samples are required.

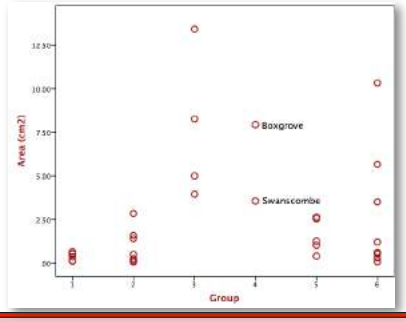


Fig. 6 Comparative areas of damage from experimentally generated hammerstone and weaponry damage with potential Pleistocene and Holocene hunting lesions. **Group 1** wooden spear experiments. **Group 2** Composite spear experiments **Group 3** Hammerstone experiments **Group 4** Middle Pleistocene 'hunting lesions' **Group 5** Late Pleistocene 'hunting lesions' **Group 6** Holocene 'hunting lesions'. Data from primary experimental research and published images of lesions. Data includes that extracted from photographs in references 8-14.

## Implications

Experimental work demonstrates overlaps in primary and secondary characteristics, as well as morphometrics, from hammerstone and weapon impacts. The evaluation of potential MP hunting lesions requires a holistic approach. This includes a better understanding of damage caused by hand-delivered wooden spears, marrow and grease access, and taphonimic processes, particularly in complex fluvial depositional environments such as that of Swanscombe. The MP sites of Boxgrove, Swanscombe, Clacton-on-Sea and Schöningen provide us with unique insights into hominin behaviours, providing the basis for future identification of both hunting lesions and bone modification signatures in the archaeological record.

## References & Acknowledgments

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