Twisted Handaxes in Middle Pleistocene Britain and their Implications for Regional-scale Cultural Variation and the Deep History of Acheulean Hominin Groups

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APPENDIX S1: HANDAXE MORPHOMETRICS & TECHNOLOGY

White (1998a) considered whether twisted ovates and cordates represented resharpened expressions of non-twisted ovates, a possibility suggested by the work of Shannon McPherron (eg, 1994). Two factors were explored: the need for economy in raw material use and handaxe morphometrics. Careful selection and edge maintenance of flat flint blanks has been used to explain the unique series of plano-convex ‘slipper-shaped’ handaxes from Wolvercote, in the flint-poor Upper Thames Valley (Ashton 2001). Similarly, the reformatting of ovates with tranchet removals was used to account for the higher frequency of cleavers in assemblages belonging to Roe’s Group I, most coming from sites where river cobbles formed the principle source of raw materials (White 2006). Most twisted ovate sites, however, are situated in flint-rich areas such as the Lower Thames and East Anglia where, even if a source of flint was not immediately available, transport distances would have been negligible. No common geographical or environmental factor can be identified that might have encouraged hominins to extend the life of their tools in this way at these sites.

To demonstrate unequivocally whether twisted handaxes were or were not resharpened would require the refitting of sequences not yet recovered from the record. In their absence, handaxe morphometrics and technology provide the only viable proxies. If twisted ovates and twisted cordates were resharpened variants of non-twisted ovates and cordates, then we might reasonably expect them to show evidence of greater reduction intensity, in the form of more flake scars and less cortex. We might also expect morpho-metrical differences. For example, as the imposition of twisted edges demonstrably involved removing flakes from the margins of the handaxe, rather than the tip or the butt, any resharpening should cause the width to decrease faster than length, leading to an increase in elongation (width/length) and relatively narrower handaxes. Refinement (thickness/width) would be similarly affected by the reduction in width, probably decreasing as width was reduced faster than thickness, although the reverse may also apply. All of this assumes, of course, that hominins did not consciously maintain the shape of a handaxe as they resharpened it.

Table S1 shows data for length, width, thickness, scar count, elongation, and refinement for twisted and non-twisted ovates from five key assemblages from East Anglia and the Thames Valley. At face value, some would seem to conform to a reduction trajectory similar to that outlined above, twisted ovates generally being smaller and more heavily worked, although the East Anglian sites show that handaxes with twists are less elongated than those without, contrary to the type of predictions outlined above. However, pairwise students t-tests produced few significant differences, providing little reason to conclude that twisted ovates were the result of resharpening (Table S1) rather than just part of the normal variation in size and working intensity at each site. No significant differences were found at Elveden or Wansunt, while the single significant result from Bowman’s Lodge (a continuation of the same Dartford Heath deposits as Wansunt and only metres away on the other side of the Penton Road) is probably just the result of a sampling issue. While all sites do show higher scar counts on twisted ovates, this is statistically significant only at Foxhall Road and at Hitchin, where the twisted ovates are actually longer and wider than non-twisted ones, contrary to the expectations of a resharpening model. The increased scar counts probably reflect the simple fact that producing twisted edges required more removals. The assemblage from the Foxhall Road Grey Clay is the smallest (n=18) but also the most coherent and informative, having been carefully excavated and recorded by Nina Layard in 1903–4 (White and Plunkett 2004). Seven handaxes (39% of the assemblage) have twisted edges and are significantly different to the non-twisted ovates (n=11) in length, width, scar count, elongation, and refinement. The pattern is inverse to that expected, however, with twisted ovates being much longer, wider, thicker and more elongated than non-twisted ones.

In sum, twisted handaxes are not resharpened versions of untwisted forms.

table s1: selected metrical and technological attributes for key twisted handaxe assemblage, showing means and (standard deviations)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | *Length (mm)* | *Width (mm)* | *Thickness (mm)* | *Scars >5 mm* | *Elongation (L/W)* | *Refinement (W/Th)* |
| Bowmans Lodge Twisted (n=10) | 82.4 (23.0) | 53.1 (10.3) | 21.9 (5.1) | 56.6 (10.0) | 0.66 (0.14) | 0.42 (0.07) |
| Bowmans Lodge Untwisted (n=14) | 90.5 (25.4) | 63.5 (16.2) | 28.3 (7.2) | 53.8 (15.8) | 0.72 (0.12) | 0.45 (0.06) |
| Wansunt Twisted (n=8) | 85.3 (19.2) | 59.1 (14.0) | 23.5 (4.5) | 59.6 (13.3) | 0.70 (0.10) | 0.40 (0.06) |
| Wansunt Untwisted (n=19) | 88.3 (17.5) | 64.8 (13.3) | 23.9 (4.5) | 54.9 (13.3) | 0.74 (0.08) | 0.37 (0.04) |
| Elveden Twisted (n=25) | 105.5 (25.1) | 66.0 (14.6) | 28.9 (6.8) | 63.1 (21.2) | 0.63 (0.09) | 0.44 (0.09) |
| Elveden Untwisted (n=29) | 110.0 (26.1) | 66.4 (17.1) | 30.3 (6.8) | 58.0 (18.0) | 0.61 (0.10) | 0.47 (0.09) |
| Hitchin Twisted (n=9) | 104.9 (25.3) | 65.7 (15.9) | 27.7 (7.3) | 59.8 (11.5) | 0.64 (0.06) | 0.43 (0.08) |
| Hitchin Untwisted (n=15) | 101.2 (25.5) | 60.1 (12.5) | 28.9 (8.2) | 48.3 (11.5) | 0.61 (0.14) | 0.48 (0.11) |
| Foxhall Road Grey Clay Twisted (n=7) | 96.0 (16.1) | 73.0 (13.8) | 26.7 (7.1) | 73.1 (13.2) | 0.76 (0.04) | 0.36 (0.04) |
| Foxhall Road Grey Clay Untwisted (n=11) | 76.0 (13.7) | 51.5 (6.4) | 24.0 (3.2) | 41.5 (14.0) | 0.68 (0.04) | 0.47 (0.02) |

Data are presented for twisted handaxes and for non-twisted handaxes falling into Roe’s metrically-defined ovate category. Pointed handaxes are excluded as their ‘starting’ shape renders it improbable that they could ever be re-sharpened into twisted ovates.

table s2: results of student’s t-test comparing twisted handaxes with non-twisted handaxes in roe’s metrically-defined ovate category

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | *df* |  | *Length* | *Width* | *Thickness* | *Scars* | *Elongation* | *Refinement* |
| Bowmans Lodge  | 22 | t= | 0.78 | 1.76 | 1.83 | 0.49 | 0.99 | 1.55 |
|  |  | p= | 0.22 | 0.05 | 0.04 | 0.31 | 0.17 | 0.07 |
|  |  |  |  |  |  |  |  |  |
| Wansunt | 27 | t= | 0.40 | 1.00 | 0.24 | 0.85 | 0.11 | 1.44 |
|  |  | p= | 0.34 | 0.16 | 0.41 | 0.20 | 0.46 | 0.08 |
|  |  |  |  |  |  |  |  |  |
| Elveden  | 45 | t= | 0.63 | 0.10 | 0.77 | 0.77 | 0.97 | –0.93 |
|  |  | p= | 0.27 | 0.46 | 0.22 | 0.22 | 0.17 | 0.18 |
|  |  |  |  |  |  |  |  |  |
| Hitchin  | 22 | t= | 0.29 | 0.88 | 0.34 | 1.93 | 0.52 | 1.28 |
|  |  | p= | 0.39 | 0.19 | 0.37 | 0.03 | 0.31 | 0.11 |
|  |  |  |  |  |  |  |  |  |
| Foxhall Road Grey Clays  | 16 | t= | –2.26 | –3.49 | 0.10 | –4.47 | –3.19 | 3.29 |
|  |  | p= | 0.02 | 0.00 | 0.46 | 0.00 | 0.00 | 0.00 |

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