

Chapter 5 Case Study (5.5.1): Evidence of Archery among Early European Farmers

Tracy K. Betsinger

Studies of nonpathological and pathological changes to human skeletal remains can provide insight into past activity patterns. Entheseal changes have often been used to reflect activity, just as changes to joint surfaces and their margins (i.e., degenerative joint disease, osteoarthritis) may reflect particular use of that appendage. Use of such data is most reliable when the individuals under study have been exposed to comparable environmental influences, as a number of other factors can impact the development of enthesal changes and osteoarthritis. Additionally, having reliable indicators of age and sex is also necessary as some of these changes may be influenced by these factors. Aline Thomas (2014) investigated archery in Neolithic Europeans by examining enthesal changes as well as external geometric properties of long bones. Thomas sought to assess whether individuals buried with projectile points practiced archery while those without such burial goods did not engage in such activity.

The Neolithic (5000 BC) Cerny culture from the Paris Basin in France is considered one of the first in Western Europe to have monumental cemeteries. The Cerny culture was an agricultural economy, although hunting may have continued to play a role. Approximately half of those buried in Cerny cemeteries have burial goods in association, including projectile points or arrowheads, which are most commonly found. These arrowheads are not linked to the cause of death and were clearly placed in the grave, next to the deceased, probably originally hafted to arrows. Currently, there is no skeletal or archaeological evidence that suggests the Cerny culture was involved in regular warfare. Rather, the projectile points are likely associated with hunting. Although the role of hunting may have reduced over time, as evidenced by reduced faunal assemblages from settlements, it may have continued to play an important part in this culture. Moreover, the 'hunting equipment' in some graves may be foremost a matter of display.

Thomas tested the hypothesis that burial with arrowheads reflects engagement in archery during life by examining the remains of 36 adult males from seven Cerny cemeteries in the Paris Basin. Sex determination was primarily based on the morphology and morphometry of the pelvis. Age-at-death estimates were based on changes to the auricular surface of the pelvis, and tooth wear for those without observable pelvic bones. Of the 36 adult males, 13 were found with an arrowhead in association. Thomas collected more than 40 postcranial measurements from the scapula, clavicle, humerus, radius, ulna, femur, tibia, patella, talus, and calcaneus, reflecting the overall shape of the long bones and degree of diaphyseal robusticity. Changes to the fibrocartilaginous and fibrous entheses were evaluated, including origins and insertions on the humerus, radius, os coxa, and femur. The evaluation utilized a three-grade scale: absent, minor enthesopathy, and major enthesopathy. Only individuals less than 50 years of age were included in the assessment of enthesal changes, as age-related degenerative changes can alter entheses. Additionally, individuals with specific skeletal conditions, such as diffuse idiopathic skeletal hyperostosis (DISH), were excluded from this portion of the study. Statistical

analyses of bone shape and robusticity included nonparametric Mann–Whitney testing for an overall evaluation of between-group differences. Multivariate analysis of the variance (MANOVA) was used to compare the two groups for multiple variables. Lastly, Fisher's exact test was used to compare the presence or absence of enthesopathies.

Results of this study revealed that the overall shape of the left radius was significantly different between those buried with arrowheads and those buried without them. The mid-shaft circumference of the clavicle was significantly larger in the males with arrowheads, and their ulnas were significantly more robust than the ulnas of males without arrowheads. The bones of the lower limb show no such differences between the two groups. The MANOVA analysis of the entire appendicular skeleton revealed significant differences between the two groups for the upper limbs (radius, ulna, clavicle), but no differences for the lower limbs. The analysis of entheses resulted in the presence of minor enthesopathies, but no major ones. Significantly more males with arrowheads have enthesopathies than males without arrowheads, with the most important differences noted for the upper limbs, especially the left upper limb. Of the 11 entheses that have at least one lesion, males with arrowheads have higher frequencies, accounting for seven of them.

These results indicate that there are indeed differences between the two groups of males for both morphological and pathological analyses. Those males buried with arrowheads have a significantly different shape to some upper elements and significantly greater robusticity for some upper limb bones than males buried without arrowheads. Additionally, males with arrowheads have significantly more enthesopathies than males without arrowheads. Collectively, these results support the hypothesis that males buried with arrowheads were more frequently involved in more forceful use of upper limb muscles, consistent with archery. Based on these results, Thomas suggests that there is a strict correlation between grave goods and the socioeconomic status of an individual, reflecting a strict structuring of Cerny society. Archery, for example, may have been delegated to a particular subgroup of the population. Furthermore, the lack of arrowheads in any of the adult female graves suggests that archery may have been restricted to men, and then only a particular group of them.

This study demonstrates the utility of using pathological and nonpathological changes to the skeleton to gain insight into past activity patterns. By contextualizing both the study and the results with archaeological and historical data, Thomas was able to make a strong argument for a particular burial pattern indicating a specific activity in life. By controlling the sample so as to eliminate age- and sex-biases and environmental impacts, Thomas was able to argue for a link between the patterns of pathological and morphological changes observed on the skeletons and the likely activity that caused these changes.

Reference

Thomas A. 2014. Bioarchaeology of the middle Neolithic: Evidence of archery among early European farmers. *American Journal of Physical Anthropology* 154: 279-290.