

Supplementary Materials 1

S1 List of measurements used for the analysis.

The measurements used for this analysis are mentioned in the following list. Abbreviations according to:

Albarella, U., & Davis S.J.M. (1994) *The Saxon and Medieval bones excavated 1985-1989 from West Cotton, Northamptonshire*. London: English Heritage, AML Report 17/94.

Davis, S.J.M. (1992) *A rapid method for recording information about mammal bones from archaeological sites*. AML Report 19/92.

Von den Driesch, A. (1976) *A guide to the measurement of animal bones from archaeological sites*. Harvard: Peabody Museum, Bulletin 1.

In order to avoid the issue of the interdependence of the variables, we only used one measurement per element and axis.

Cattle:

- Postcranial widths: astragalus Bd, humerus BT, metacarpus Bd (and when not available, BatF preferred over SD), metatarsus Bd (and when not available, BatF), and tibia Bd.
- Postcranial lengths: astragalus GLl, calcaneum GL, humerus HTC (and when not available, GL), and metacarpus GL.
- Postcranial depths: astragalus Dl, metacarpus 3, metatarsus 3, and tibia Dd.
- Teeth: insufficient measurements available.

Sheep:

- Postcranial widths: astragalus Bd, humerus BT, metacarpus Bd (and when not available, BatF preferred over SD), metatarsus Bd (and when not available, BatF), and tibia Bd.
- Postcranial lengths: astragalus GLl, calcaneum GL, humerus HTC, and metacarpus GL.
- Postcranial depths: astragalus Dl, metacarpus 3, metatarsus 3, and tibia Dd.
- Teeth: insufficient measurements available.

Pig:

- Postcranial widths: humerus BT, and tibia Bd.
- Postcranial lengths: astragalus GLl, calcaneum GL, and humerus HTC.
- Postcranial depths: none, as standards are not available.
- Tooth lengths: Upper and lower teeth considered together. Only one measurement per mandible is considered, prioritising M1L when present. If not available, another measurement from the same mandible was used (prioritising: M1L>M2L>M3L>dP4L).
- Tooth widths: Upper and lower teeth considered together. Only one measurement per mandible is considered, prioritising M1WP when present. If not available, another measurement from the same mandible was used (prioritising: M1WP>M2WP>M2WA>M3WA>dP4W>P4W).

Chicken:

- Widths: femur Bd, humerus Bd, tarsometatarsus Bd, and tibiotarsus Bd.
- Lengths: femur GL, humerus GL, tarsometatarsus GL, and tibiotarsus GL.
- Depths: femur Dd, and tibiotarsus Dd.

For the log-ratio analysis, the standards used for cattle, sheep and chicken have been calculated from our own data from The Shires. These standards have been calculated from the combination of the contexts dated between the 15th and mid-16th centuries (both Little Lane and St. Peter's Lane). These standards calculated for The Shires are provided in Tables S2 to S4. These tables show all standard measurements calculated from this data set, not only those used in our analysis. EL: anatomical element; Min: minimum value (mm); Max: maximum value (mm); n: number of measurements; SD: standard deviation; CV: coefficient of variation.

S2 Table. Cattle standard measurements. The Shires 15th-mid 16th c.

	EL	measurement	Min	Max	n	Average	SD	CV
teeth	dP ₄	W	10.7	12.7	11	11.7	0.7	6.2
teeth	M ₃	W	14.6	16.2	7	15.2	0.6	4.3
length	AS	GLI	54.7	64.5	19	59.7	2.9	4.9
length	CA	GL	114.6	149.8	11	129.9	9.8	7.5
length	HU	HTC	25.4	34.8	21	29.9	2.6	8.8
length	MC	GL	178.9	193	4	183	6.8	3.7
depth	AS	DI	29.7	36.5	18	32.6	1.8	5.4
depth	MC	1	20.5	25.5	16	22.5	1.4	6.1
depth	MC	3	25.1	30.2	16	27.2	1.8	6.5
depth	MC	4	19.4	24.6	16	21.9	1.6	7.3
depth	MT	1	18.9	23.1	15	20.8	1.3	6.1
depth	MT	3	22.7	27.4	15	25.1	1.7	6.7
depth	MT	4	17.2	23.1	15	20.2	1.9	9.2
depth	TI	Dd	37.4	47.8	13	41.9	3.3	8
width	AS	Bd	33.2	43.7	24	38.1	2.5	6.5
width	HU	BT	57	77.8	15	65.1	5	7.7
width	MC	BatF	43.1	56.4	18	50.5	3.6	7.2
width	MC	Bd	48.6	62.1	19	55.9	3.9	7
width	MC	SD	28.3	30.7	4	29.5	1.3	4.4
width	MT	BatF	40.8	51.8	17	46.5	3.6	7.7
width	MT	Bd	43.1	55.2	20	49.6	3.4	6.8
width	TI	Bd	51	64.8	15	55.5	4.6	8.3

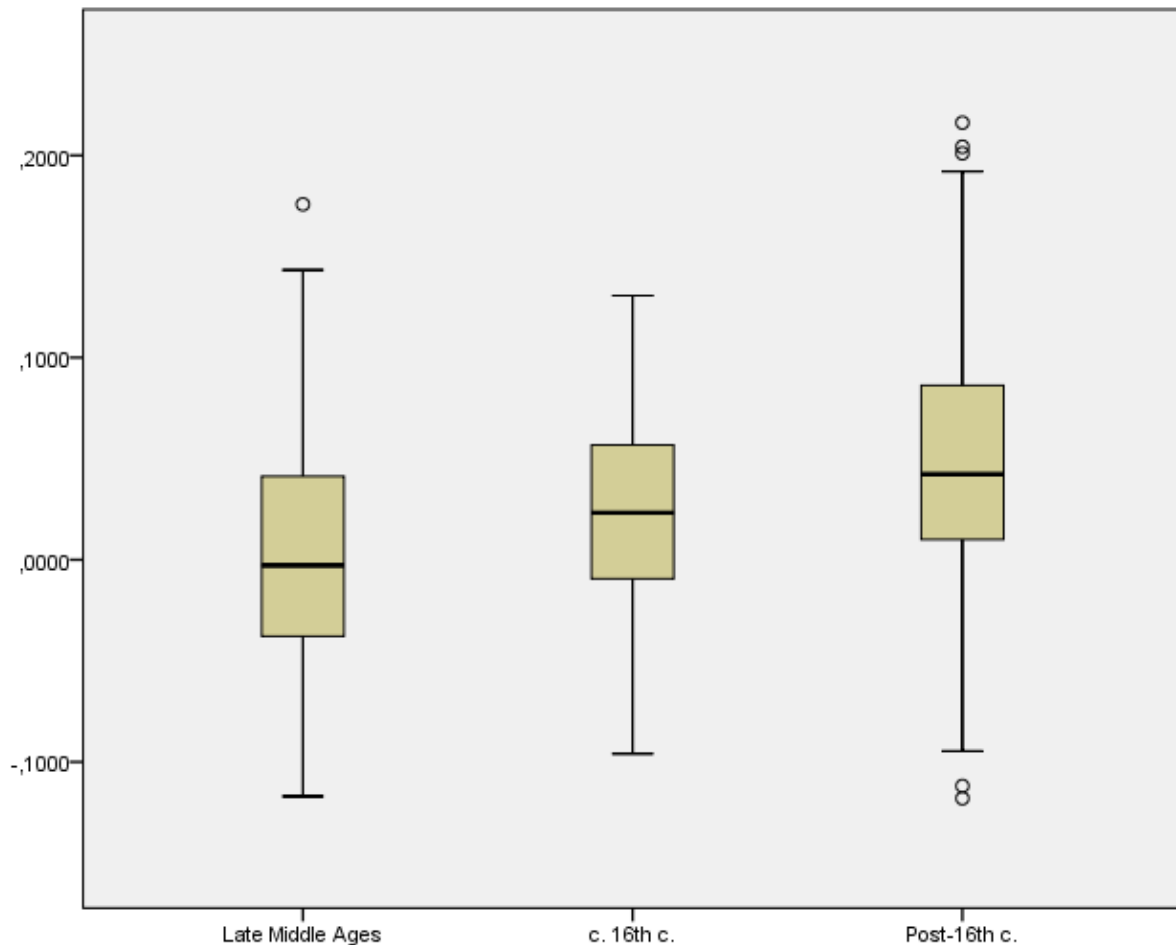
S3 Table. Sheep standard measurements. The Shires 15th-mid 16th c.

	EL	measurement	Min	Max	n	Average	SD	CV
teeth	dP ₄	W			insufficient measurements			
teeth	M ₃	W	7,1	8,5	21	7,9	0,5	5,9
length	AS	GLI	24,6	29,9	15	27,8	1,4	5,1
length	CA	GL	47,4	61,4	23	54,6	3,1	5,8
length	HU	HTC	12,2	16,3	69	14,4	0,9	6,6
length	MC	GL	105,6	136,1	53	118	6,7	5,7
depth	AS	DI	13,4	16,9	17	15,5	1	6,6
depth	MC	3	11	15,3	76	13,2	0,7	5,4
depth	MT	3	11,3	14,4	95	12,9	0,6	4,9
depth	TI	Dd	13	22	76	19,5	1,4	7,1
width	AS	Bd	16	20,1	17	18,4	1,2	6,5
width	HU	BT	23,4	32,4	67	27,8	1,9	6,8
width	MC	BatF	21,8	28,1	79	24,4	1,5	6,3
width	MC	Bd	22,2	27,4	77	24,6	1,2	5
width	MC	SD	12	16,8	52	14,1	1,2	8,3
width	MT	BatF	19,5	26,2	92	22,6	1,3	5,9
width	MT	Bd	19,3	26,2	91	23,2	1,3	5,6
width	TI	Bd	17	29,7	78	25,4	1,9	7,6

S4 Table. Chicken standard measurements. The Shires 15th-mid 16th c.

	EL	measurement	Min	Max	n	Average	SD	CV
length	FE	GL	71	84.6	8	78.8	5.8	7.3
width	FE	Bd	12.7	17.6	20	15.5	1.8	11.8
depth	FE	Dd	11.7	15	9	13.3	1.4	10.5
length	HU	GL	62.4	74	6	70.2	4.5	6.3
width	HU	Bd	13.2	15.7	10	14.8	0.9	6.2
length	TMT	GL	68.1	80.2	6	72.7	5.2	7.2
width	TMT	Bd	12	15.4	10	13	1.3	10.2
length	TIT	GL	99.4	138.6	6	111.6	14.8	13.3
width	TIT	Bd	8.8	15	20	11.5	1.7	14.5
depth	TIT	Dd	9.7	14.6	10	12.3	1.6	12.8

S5. Statistical analysis of cattle postcranial widths. Measurements of all sites combined. Standard: The Shires (15th-m.16th c.). N= Late Middle Ages: 1124, c. 16th c.: 901, post-16th c.: 821.

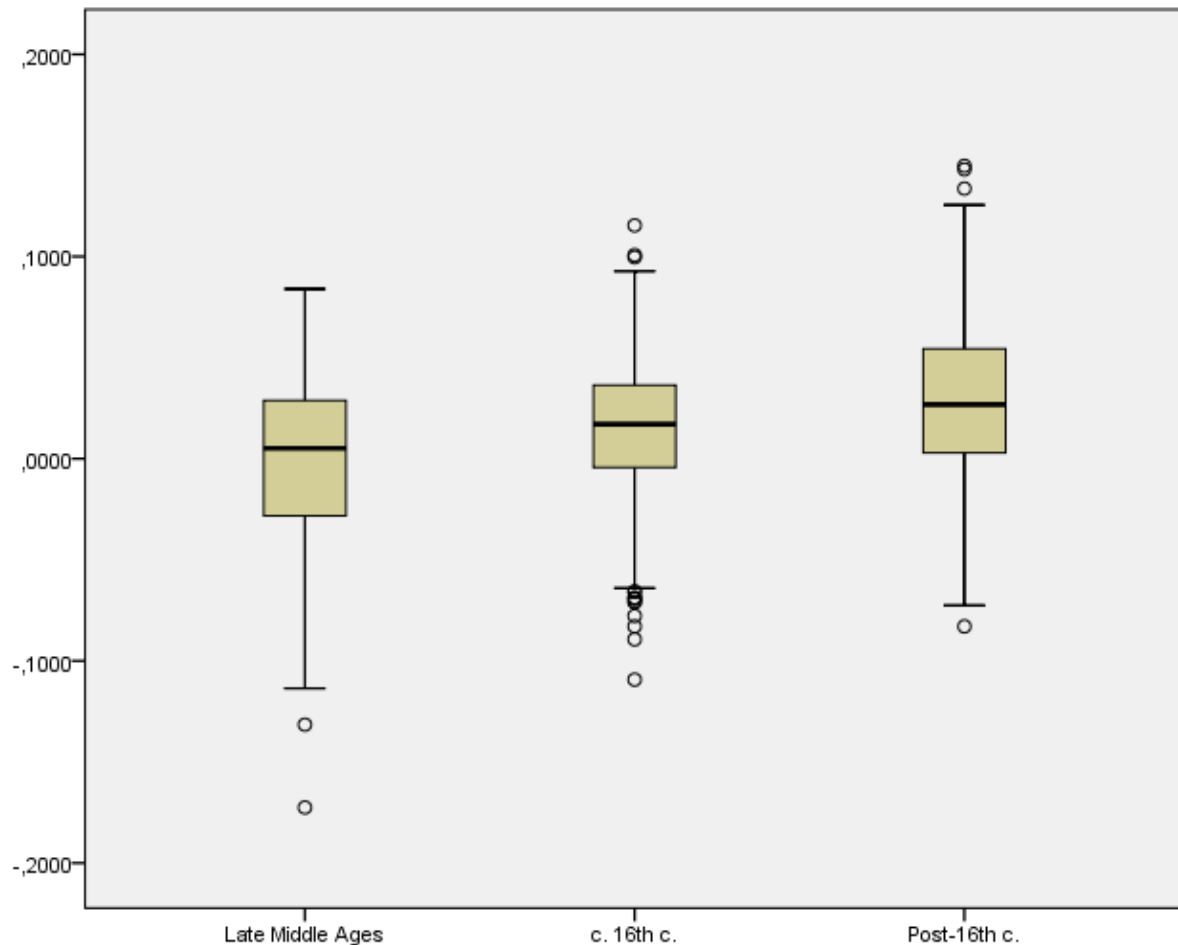


The tests of normality (Kolmogorov-Smirnov and Shapiro-Wilk) showed, for the three chronological periods, p-values ≤ 0.05 , suggesting that data are not-normally distributed and, therefore, non-parametric tests were carried out.

A Kruskal-Wallis H test showed that there was a highly statistically significant difference in the log-ratios of cattle postcranial widths, $\chi^2 (2) = 317.777$, $p = 0.000$, with a mean rank score of 1122.52 for Late Middle Ages, 1463.46 for 16th c., and 1791.71 for Post-16th c.

Testing post hoc all possible pairs makes the use of multiple test procedures mandatory. We adjust the results of the Mann-Whitney U test using the Bonferroni correction. We observe highly statistically significant differences between the pairs Late Middle Ages-16th c. and 16th c.-Post-16th c., with p-values of 0.000 in both cases.

S6. Statistical analysis of cattle postcranial lengths. Measurements of all sites combined. Standard: The Shires (15th-m.16th c.). N= Late Middle Ages: 520, c. 16th c.: 515, post-16th c.: 253.

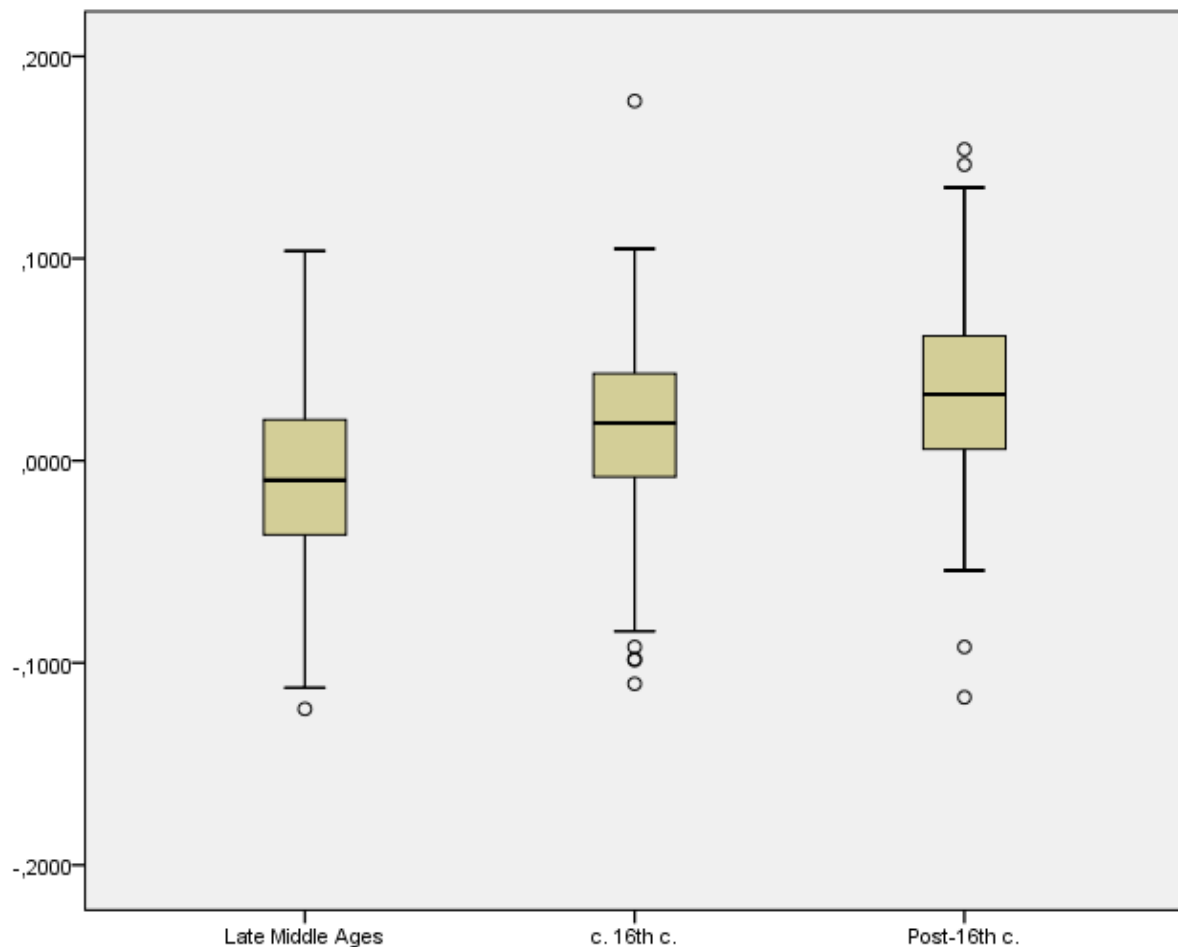


The tests of normality (Kolmogorov-Smirnov and Shapiro-Wilk) showed, for two of the three chronological periods, p -values ≤ 0.05 , suggesting that data are not-normally distributed and, therefore, non-parametric tests were carried out.

A Kruskal-Wallis H test showed that there was a highly statistically significant difference in the log ratios of cattle postcranial lengths, $\chi^2(2) = 83.189$, $p = 0.000$, with a mean rank score of 540.22 for Late Middle Ages, 679.10 for 16th c., and 788.39 for Post-16th c.

Testing post hoc all possible pairs makes the use of multiple test procedures mandatory. We adjust the results of the Mann-Whitney U test using the Bonferroni correction. We observe highly statistically significant differences between the pairs Late Middle Ages-16th c. and 16th c.-Post-16th c., with p -values of 0.000 in both cases.

S7. Statistical analysis of cattle postcranial depths. Measurements of all sites combined. Standard: The Shires (15th-m.16th c.). N= Late Middle Ages: 389, c. 16th c.: 497, post-16th c.: 156.

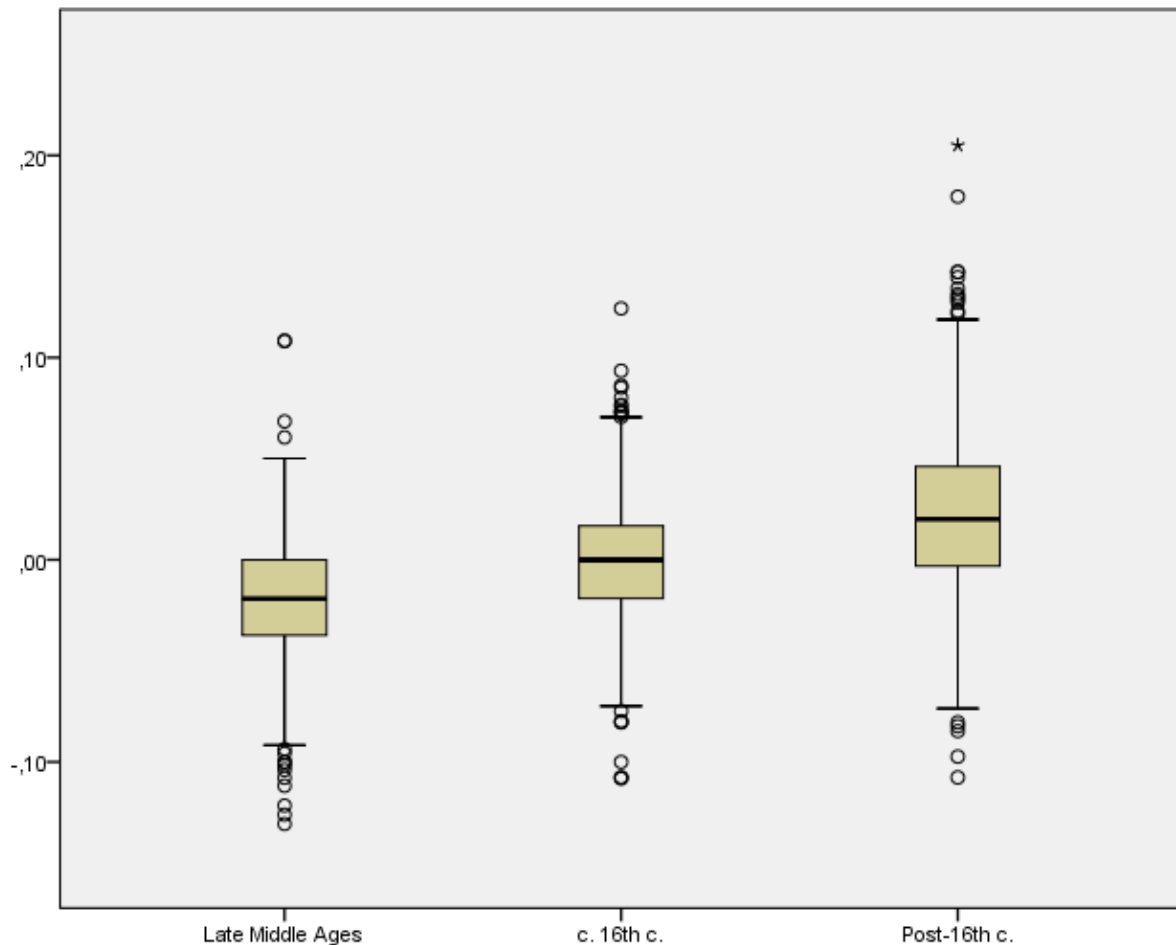


The tests of normality (Kolmogorov-Smirnov and Shapiro-Wilk) showed, for one of the three chronological periods, p-values ≤ 0.05 , suggesting that data are not-normally distributed and, therefore, non-parametric tests were carried out.

A Kruskal-Wallis H test showed that there was a highly statistically significant difference in the log-ratios of cattle postcranial depths, $\chi^2(2) = 125.999$, $p = 0.000$, with a mean rank score of 393.56 for Late Middle Ages, 573.19 for 16th c., and 675.84 for Post-16th c.

Testing post hoc all possible pairs makes the use of multiple test procedures mandatory. We adjust the results of the Mann-Whitney U test using the Bonferroni correction. We observe highly statistically significant differences between the pairs Late Middle Ages-16th c. and 16th c.-Post-16th c., with p-values of 0.000 in both cases.

S8. Statistical analysis of sheep postcranial widths. Measurements of all sites combined. Standard: The Shires (15th-m.16th c.). N= Late Middle Ages: 1219, c. 16th c.: 2246, post-16th c.: 1263.

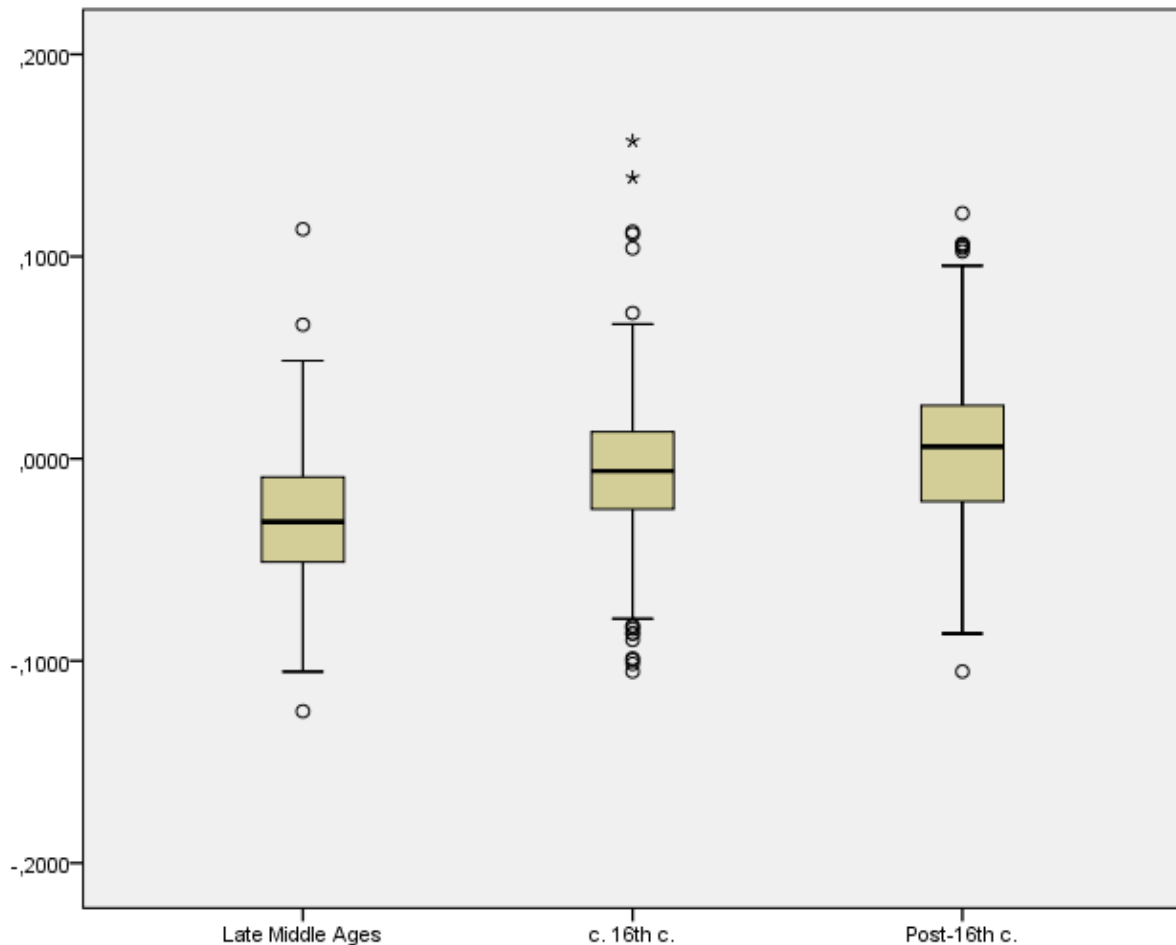


The test of normality (Shapiro-Wilk) showed, for the three chronological periods, p-values ≤ 0.05 , suggesting that data are not-normally distributed. Another test of normality (Kolmogorov-Smirnov) showed p-values ≤ 0.05 for two of the three chronological periods. In any case, non-parametric tests were carried out, as data are not-normally distributed.

A Kruskal-Wallis H test showed that there was a statistically significant difference in the log-ratios of sheep post-cranial widths, $\chi^2 (2) = 861,938$, $p = 0.000$, with a mean rank score of 1553.09 for Late Middle Ages, 2356.44 for c. 16th c., and 3161.97 for Post-16th c.

Testing post-hoc all possible pairs makes the use of multiple test procedures mandatory. We adjust the results of the Mann-Whitney U test using the Bonferroni correction. We observe very highly statistically significant differences between the pairs Late Middle Ages-c. 16th c. and c. 16th c.-Post-16th c., with p-values of 0.000 in both cases.

S9. Statistical analysis of sheep postcranial lengths. Measurements of all sites combined. Standard: The Shires (15th-m.16th c.). N= Late Middle Ages: 441, c. 16th c.: 817, post-16th c.: 396.

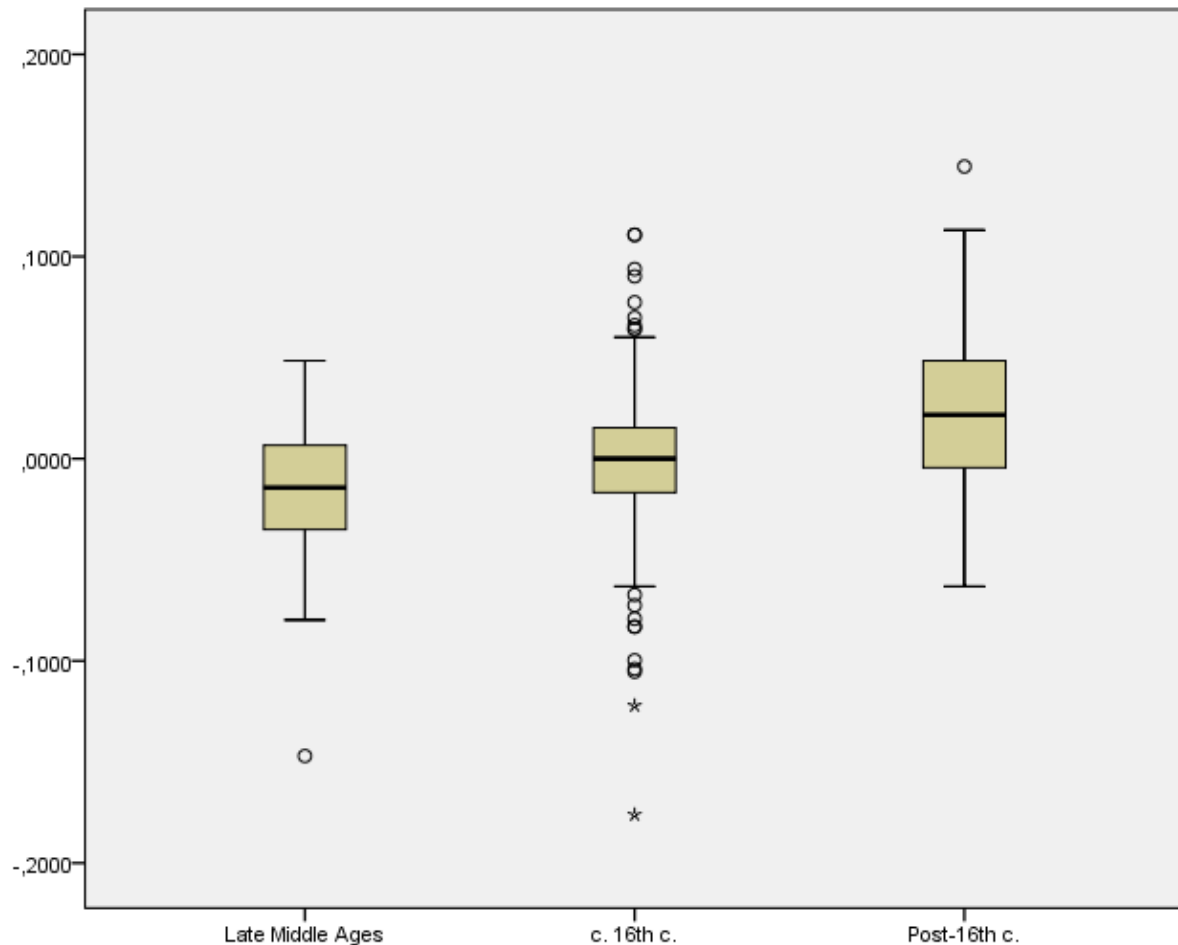


The test of normality (Shapiro-Wilk) showed p-values ≤ 0.05 for the three chronological periods, suggesting that data are not-normally distributed. Another test of normality (Kolmogorov-Smirnov) showed p-values ≤ 0.05 for just one of the three chronological periods. In any case, non-parametric tests were carried out, as data are not-normally distributed.

A Kruskal-Wallis H test showed that there was a statistical significant difference in the log-ratios of sheep post-cranial lengths, $\chi^2 (2) = 246,442$, $p = 0.000$, with a mean rank score of 541.12 for Late Middle Ages, 879.13 for c. 16th c., and 1039.90 for Post-16th c.

Testing post-hoc all possible pairs makes the use of multiple procedures mandatory. We adjust the result of the Mann-Whitney U test using the Bonferroni correction. We observe very highly statistically significant differences between the pairs Late Middle Ages-c. 16th c. and c. 16th c.-Post-16th c., with p-values of 0.000 in both cases.

S10. Statistical analysis of sheep postcranial depths. Measurements of all sites combined. Standard: The Shires (15th-m.16th c.). N= Late Middle Ages: 222, c. 16th c.: 634, post-16th c.: 133.

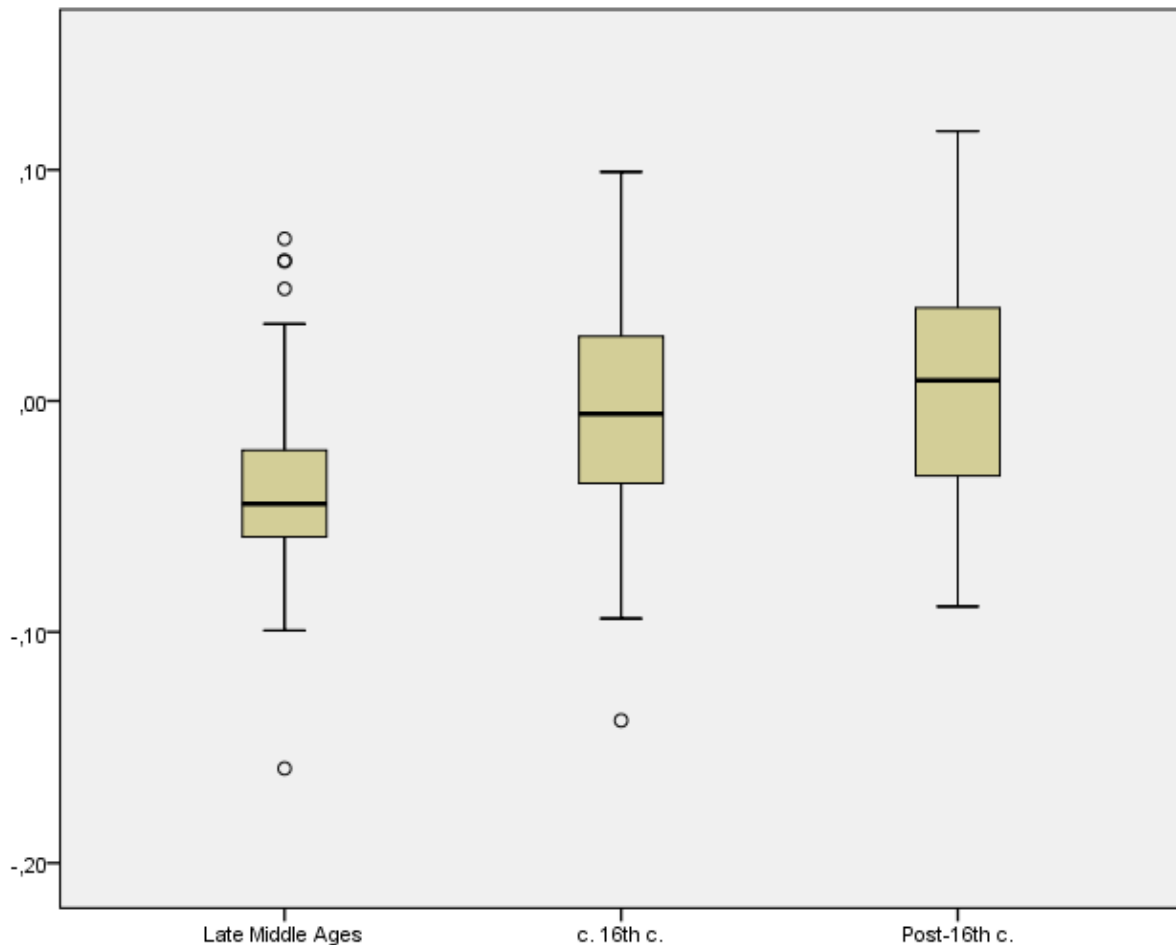


The test of normality (Shapiro-Wilk) showed p-values ≤ 0.05 for two of the three chronological periods, suggesting that data are not-normally distributed. Another test of normality (Kolmogorov-Smirnov) showed p-values ≤ 0.05 for just one of the three chronological periods. In any case, non-parametric tests were carried out, as data are not-normally distributed.

A Kruskal-Wallis H test showed that there was a statistical significant difference in the log-ratios of sheep post-cranial lengths, $\chi^2 (2) = 94,402$, $p = 0.000$, with a mean rank score of 368,25 for Late Middle Ages, 502,55 for 16th c., and 670,55 for Post-16th c.

Testing post hoc pairs makes the use of multiple procedures mandatory. We adjust the result of the Mann-Whitney U test using the Bonferroni correction. We observe very highly statistically significant differences between the pairs Late Middle Ages-16th c. and 16th c.-Post 16th c., with p-values of 0.000 in both cases.

S11. Statistical analysis of pig postcranial widths. Measurements of all sites combined. Standard: Late Neolithic from Durrington Walls (Albarella & Payne 2005). N= Late Middle Ages: 71, c. 16th c.: 71, post-16th c.: 36.



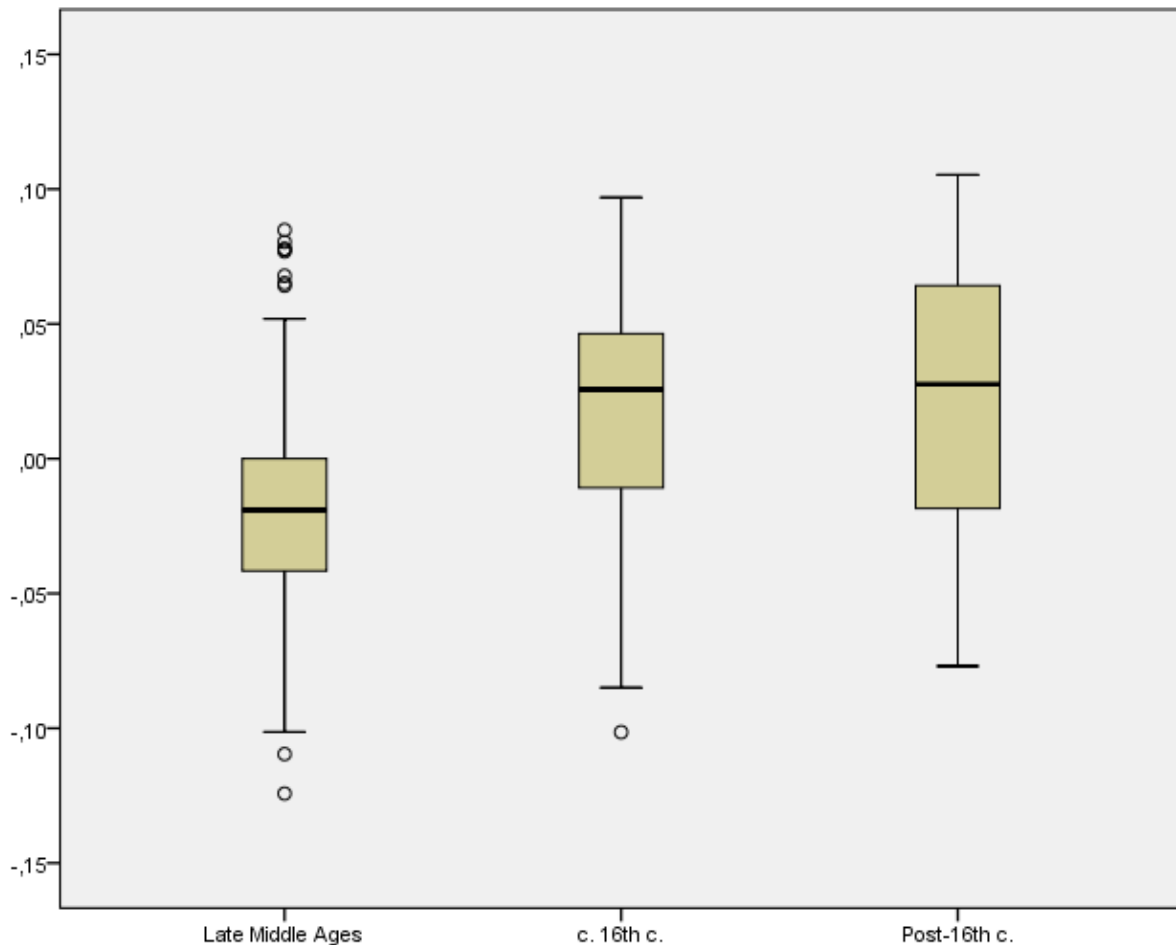
The tests of normality (Kolmogorov-Smirnov and Shapiro-Wilk) showed p-values ≤ 0.05 for just one of the three chronological periods, suggesting that data are not-normally distributed, so non-parametric tests were carried out.

A Kruskal-Wallis H test showed that there was a statistically significant difference in the log-ratios of pig postcranial widths, $\chi^2(2) = 25.361$, $p = 0.000$, with a mean rank score of 67.10 for Late Middle Ages, 100.75 for c. 16th c., and 111.49 for Post-16th c.

Testing post hoc all possible pairs makes the use of multiples test procedures mandatory. We adjust the results of the Mann-Whitney U test using the Bonferroni correction. We observe very highly statistically significant differences between the pair Late Middle Ages-c. 16th c., with a p-value of 0.000. However, with the Mann-Whitney U test, we observe no statistically significant difference between 16th c. and Post-16th c., with a p-value of 0.260.

In this case, because the normal distribution of these two groups (c. 16th c. and Post-16th c.) holds, we decided to do a parametric test (a student's independent-samples t-test), in order to gain some test power. This test showed that there was no significant difference in the scores for c. 16th c. ($M = -0.0007$, $SD = 0.04609$) and Post-16th c. ($M = 0.0062$, $SD = 0.05169$); $t(105) = -1.989$, $p = 0.179$.

S12. Statistical analysis of pig postcranial lengths. Measurements of all sites combined. Standard: Late Neolithic from Durrington Walls (Albarella & Payne 2005). N= Late Middle Ages: 114, c. 16th c.: 78, post-16th c.: 42.



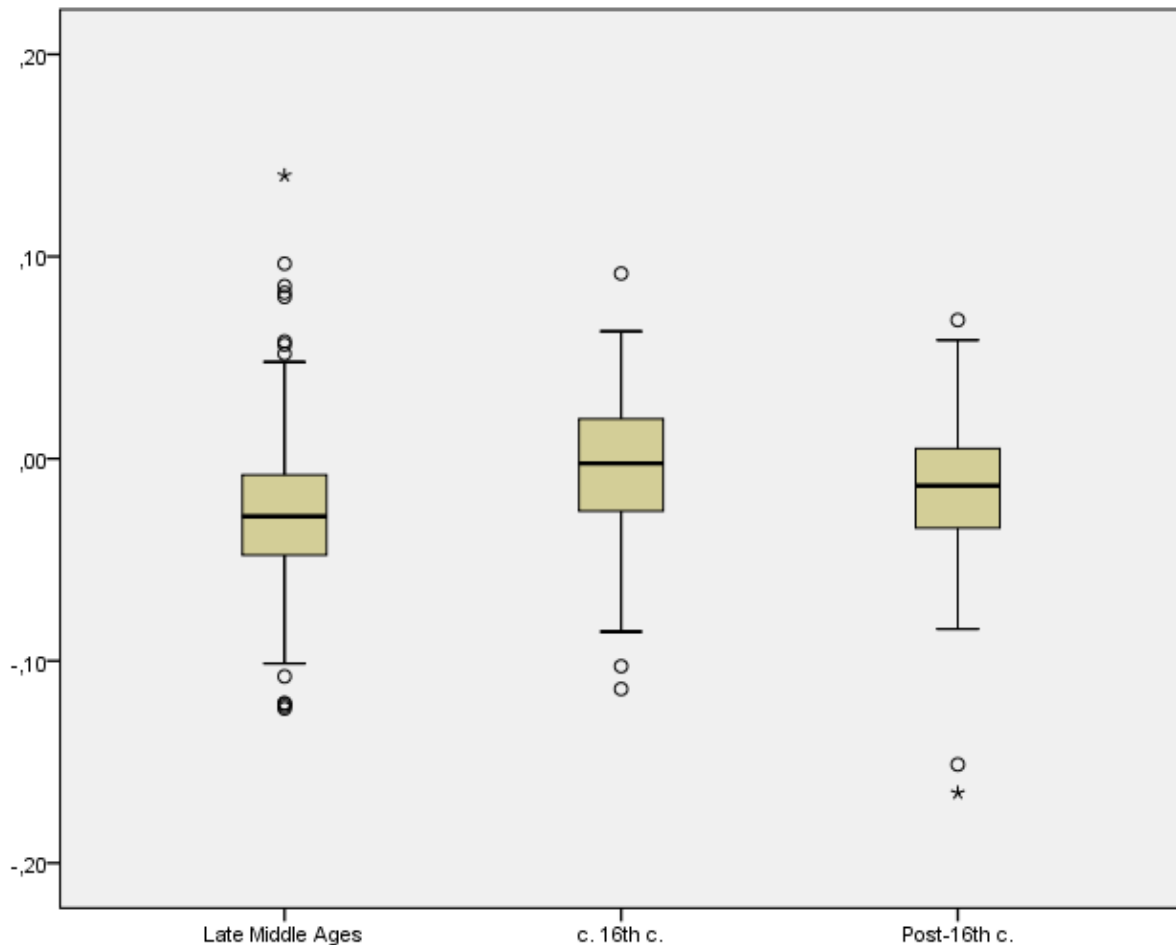
The tests of normality (Kolmogorov-Smirnov and Shapiro-Wilk) showed p-values ≤ 0.05 for just one of the three chronological periods, suggesting that data are not-normally distributed, so non-parametric tests were carried out.

A Kruskal-Wallis H test showed that there was a statistically significant difference in the log-ratios of pig postcranial lengths, $\chi^2(2) = 39.792$, $p = 0.000$, with a mean rank score of 88.93 for Late Middle Ages, 142.72 for c. 16th c. and 148.21 for Post-16th c.

Testing post hoc all possible pairs makes the use of multiple tests procedure mandatory. We adjust the results of the Mann-Whitney U test using the Bonferroni correction. We observe very highly statistically significant differences between the pair Late Middle Ages and c. 16th c., with a p-value of 0.000. However, with the Mann-Whitney U-test, we observe no statistically significant differences between the pair c. 16th c. and Post-16th c., with a p-value of 0.351.

In this case, because the normal distribution of these two groups (c. 16th c. and Post-16th c.) holds, we decide to do a parametric test (a student's independent-samples t-test), in order to gain some test power. This test showed that there was no statistically significant difference in the scores for c. 16th c. ($M=0.0171$, $SD=0.04062$) and Post-16th c. ($M=0.0236$, $SD=0.4976$); $t(118)=-0.768$, $p=0.444$.

S13. Statistical analysis of pig teeth (upper+lower) lengths. Measurements of all sites combined. Standard: Late Neolithic Durrington Walls (Albarella & Payne 2005). N= Late Middle Ages: 348, c. 16th c.: 212, post-16th c.: 57.

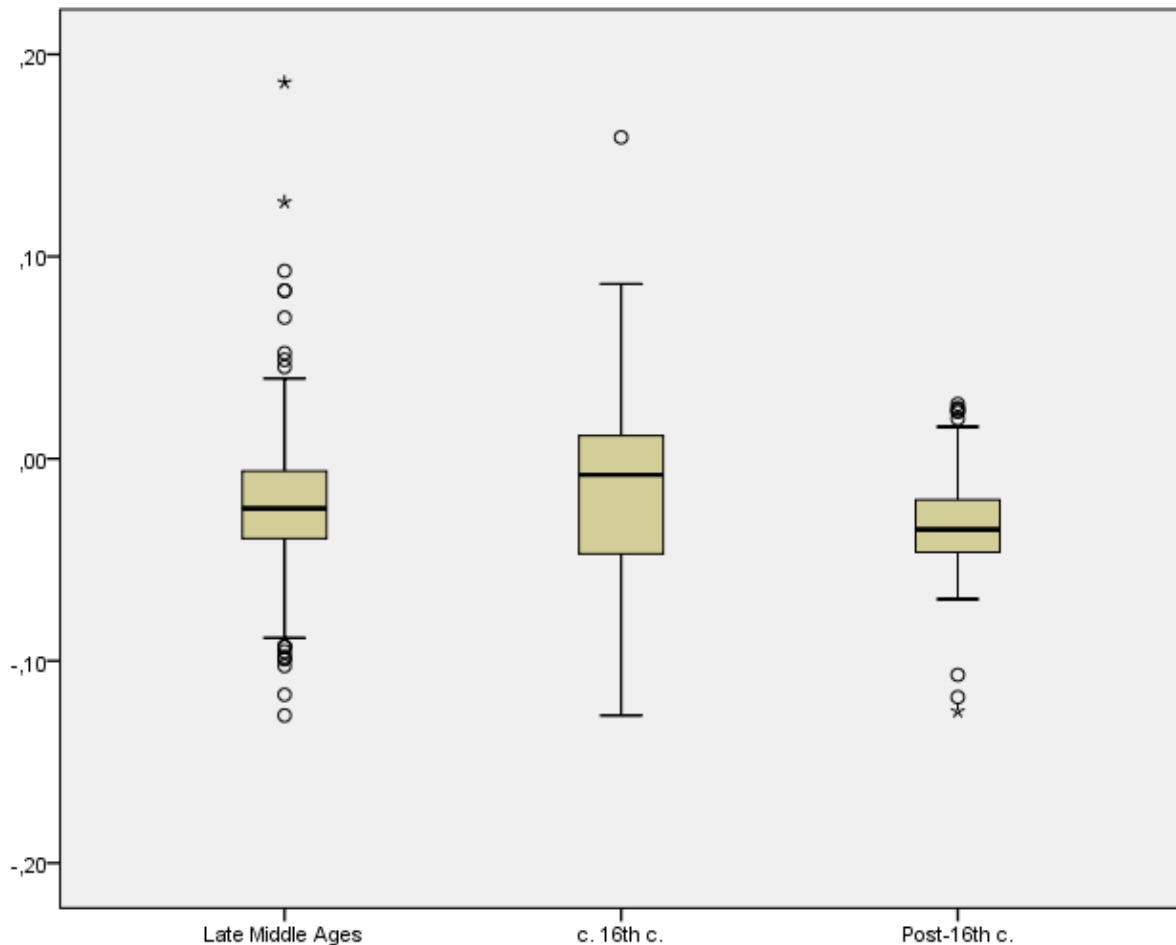


The tests of normality (Kolmogorov-Smirnov and Shapiro-Wilk) showed p-values ≤ 0.05 for two of the three chronological periods, suggesting that data are not-normally distributed, so non-parametric tests were carried out.

A Kruskal-Wallis H test showed that there was a statistically significant difference in the log-ratios of pig teeth lengths, $\chi^2(2) = 62.590$, $p = 0.000$, with a mean rank score of 260.95 for Late Middle Ages, 383.23 for c. 16th c. and 326.25 for Post-16th c.

Testing post hoc all possible pairs makes the use of multiple pairs mandatory. We adjust the results of the Mann-Whitney U test using the Bonferroni correction. We observe very highly statistically significant differences between the pair Late Middle Ages-c. 16th c., with a p-value of 0.000. We observe a statistically significant difference between the pair c. 16th c. and Post-16th c., with a p-value of 0.03.

S14. Statistical analysis of pig teeth (upper+lower) widths. Measurements of all sites combined. Standard: Late Neolithic Durrington Walls (Albarella & Payne 2005). N= Late Middle Ages: 368, c. 16th c.: 232, post-16th c.: 87.

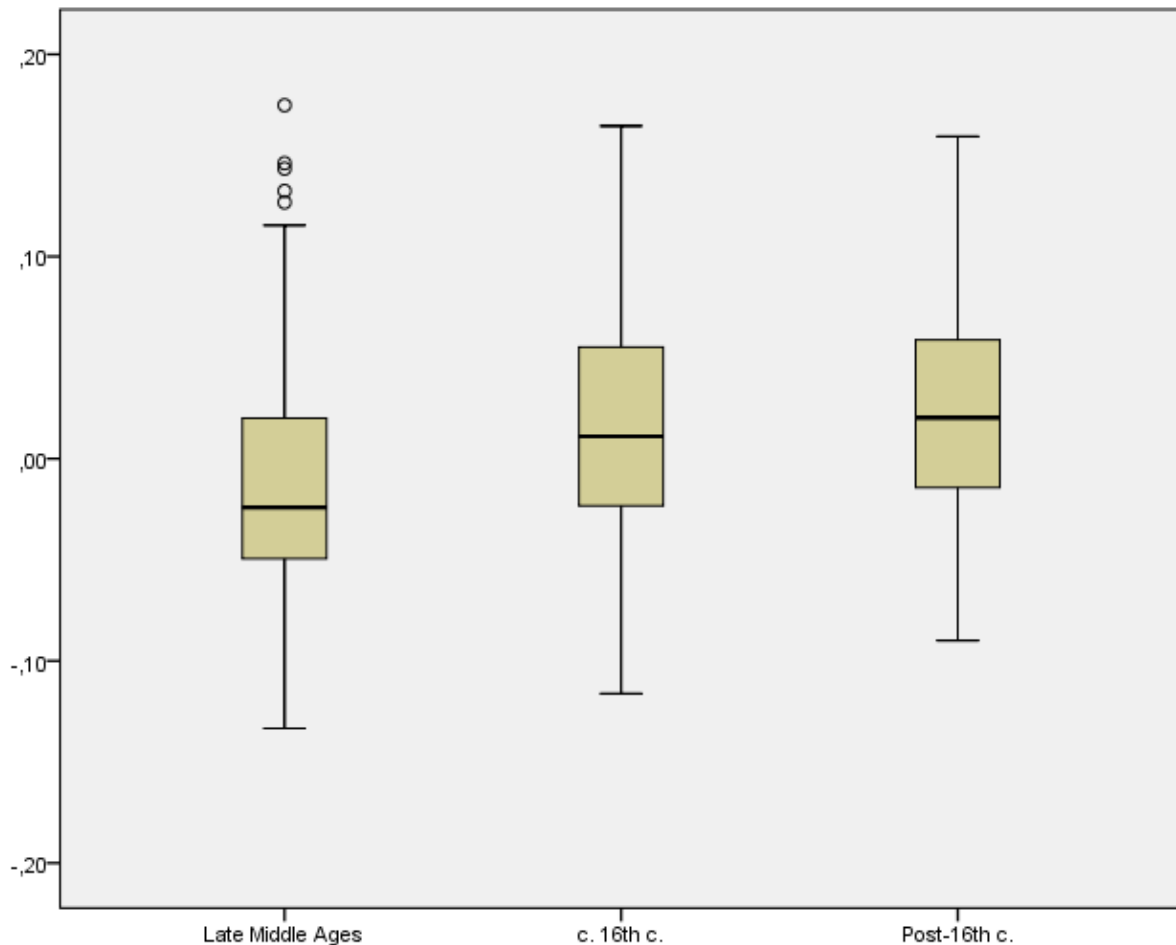


The tests of normality (Kolmogorov-Smirnov and Shapiro-Wilk) showed p-values ≤ 0.05 for all chronological periods, suggesting that data are not-normally distributed, so non-parametric tests were carried out.

A Kruskal-Wallis H test showed that there was a statistically significant difference in the log-ratios of pig postcranial widths, $\chi^2 = 22.306$, $p = 0.000$, with a mean rank score of 336.70 for Late Middle Ages, 383.77 for c. 16th c., and 268.82 for Post-16th c.

Testing post hoc all possible pairs makes the use of multiple test procedures mandatory. We adjust the results of the Mann-Whitney U test using the Bonferroni correction. We observe very highly statistically significant differences between both pairs Late Middle Ages-c. 16th c., with a p-value of 0.002, and c. 16th c.-Post-16th c., with a p-value of 0.000.

S15. Statistical analysis of chicken postcranial widths. Measurements of all sites combined. Standard: The Shires (15th-m.16th c.). N= Late Middle Ages: 806, c. 16th c.: 541, post-16th c.: 124.

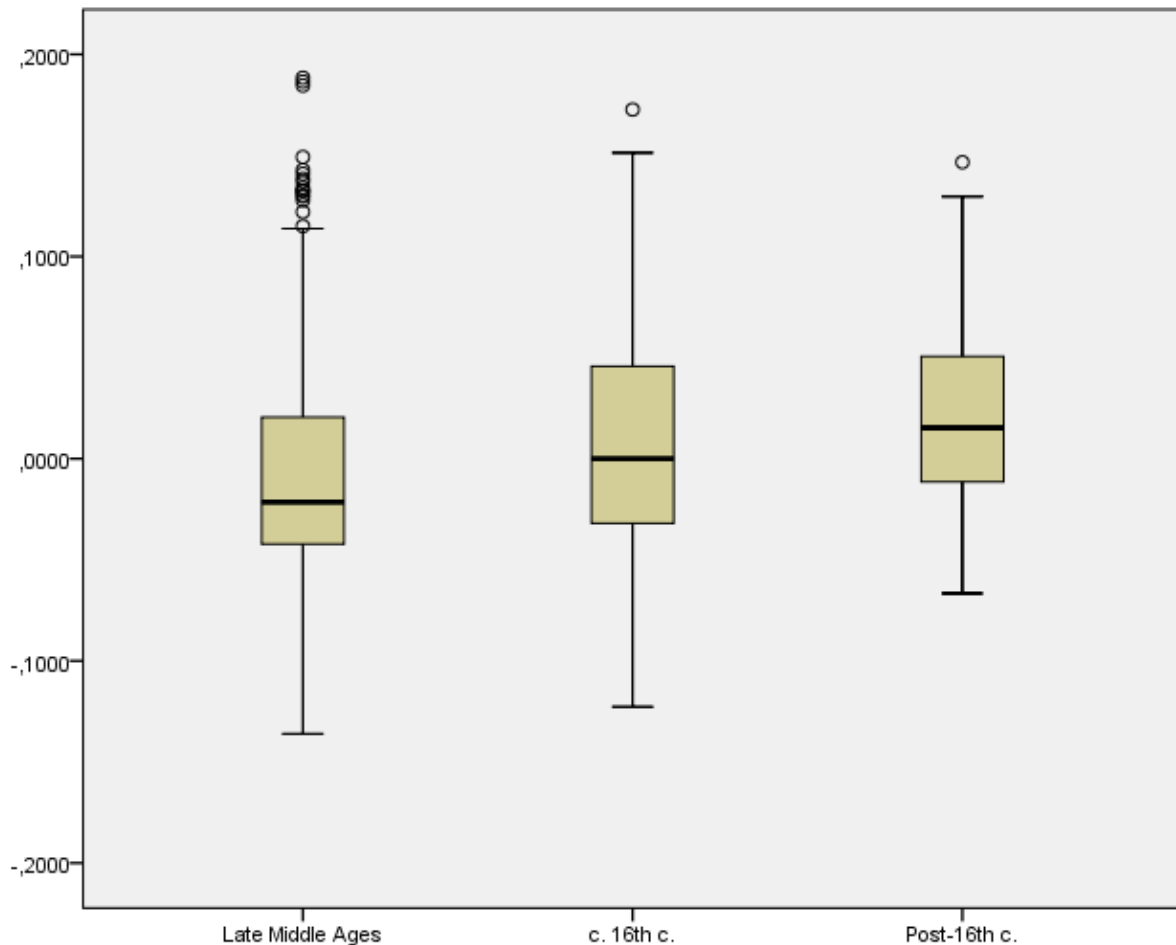


The tests of normality (Kolmogorov-Smirnov and Shapiro-Wilk) showed p-values ≤ 0.05 for two of the three chronological periods, suggesting that data are not-normally distributed, so non-parametric tests were carried out.

A Kruskal-Wallis H test showed that there was a statistically significant difference in the log-ratios of chicken post-cranial widths, $\chi^2(2) = 141.875$, $p = 0.000$, with a mean rank score of 617.15 for Late Middle Ages, 868.09 for c. 16th c. and 932.21 for Post-16th c.

Testing post hoc all possible pairs makes the use of multiple test procedures mandatory. We adjust the results of the Mann-Whitney U test using the Bonferroni correction. We observe very highly statistically significant differences between the pair Late Middle Ages-c. 16th c., with a p-value of 0.000. However, there is no statistically significant difference between the pair 16th c.-Post-16th c., with a p-value of 0.128.

S16. Statistical analysis of chicken postcranial lengths. Measurements of all sites combined. Standard: The Shires (15th-m.16th c.). N= Late Middle Ages: 530, c. 16th c.: 552, post-16th c.: 263.

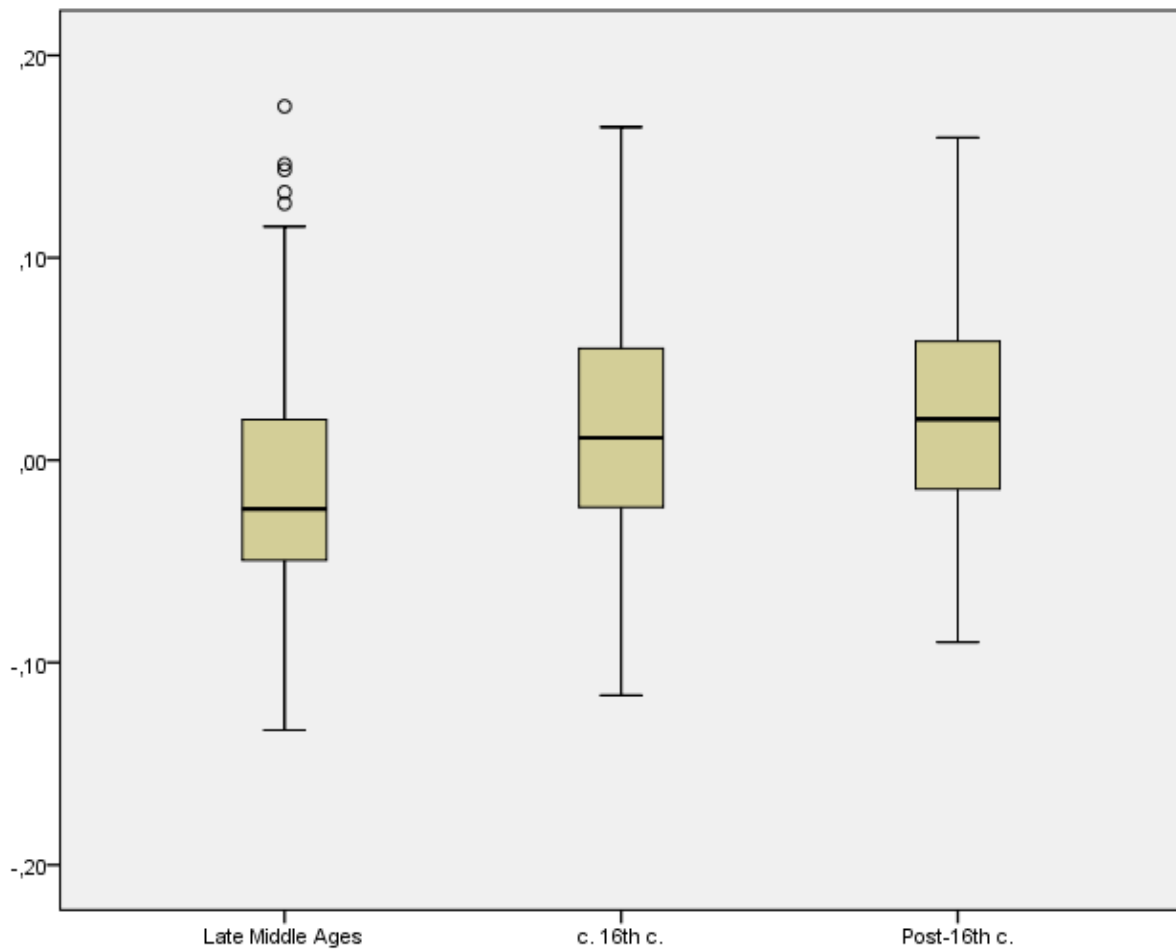


The tests of normality (Kolmogorov-Smirnov and Shapiro-Wilk) showed p-values ≤ 0.05 for the three chronological periods, suggesting that data are not-normally distributed, so non-parametric tests were carried out.

A Kruskal-Wallis H test showed that there was a statistically significant difference in the log-ratios of chicken post-cranial lengths, $\chi^2 (2) = 74.191$, $p = 0.000$, with a mean rank score of 571.57 for Late Middle Ages, 703.16 for c. 16th c. and 814.12 for Post-16th c.

Testing post hoc all possible pairs makes the use of multiple test procedures mandatory. We adjust the results of the Mann-Whitney U test using the Bonferroni correction. We observe very highly statistically significant differences between the pair Late Middle Ages-c. 16th c., with a p-value of 0.000, and also for the pair c. 16th c.-Post-16th c., with a p-value of 0.000.

S17. Statistical analysis of chicken postcranial depths. Measurements of all sites combined. Standard: The Shires (15th-m.16th c.). N= Late Middle Ages: 309, c. 16th c.: 282, post-16th c.: 64.

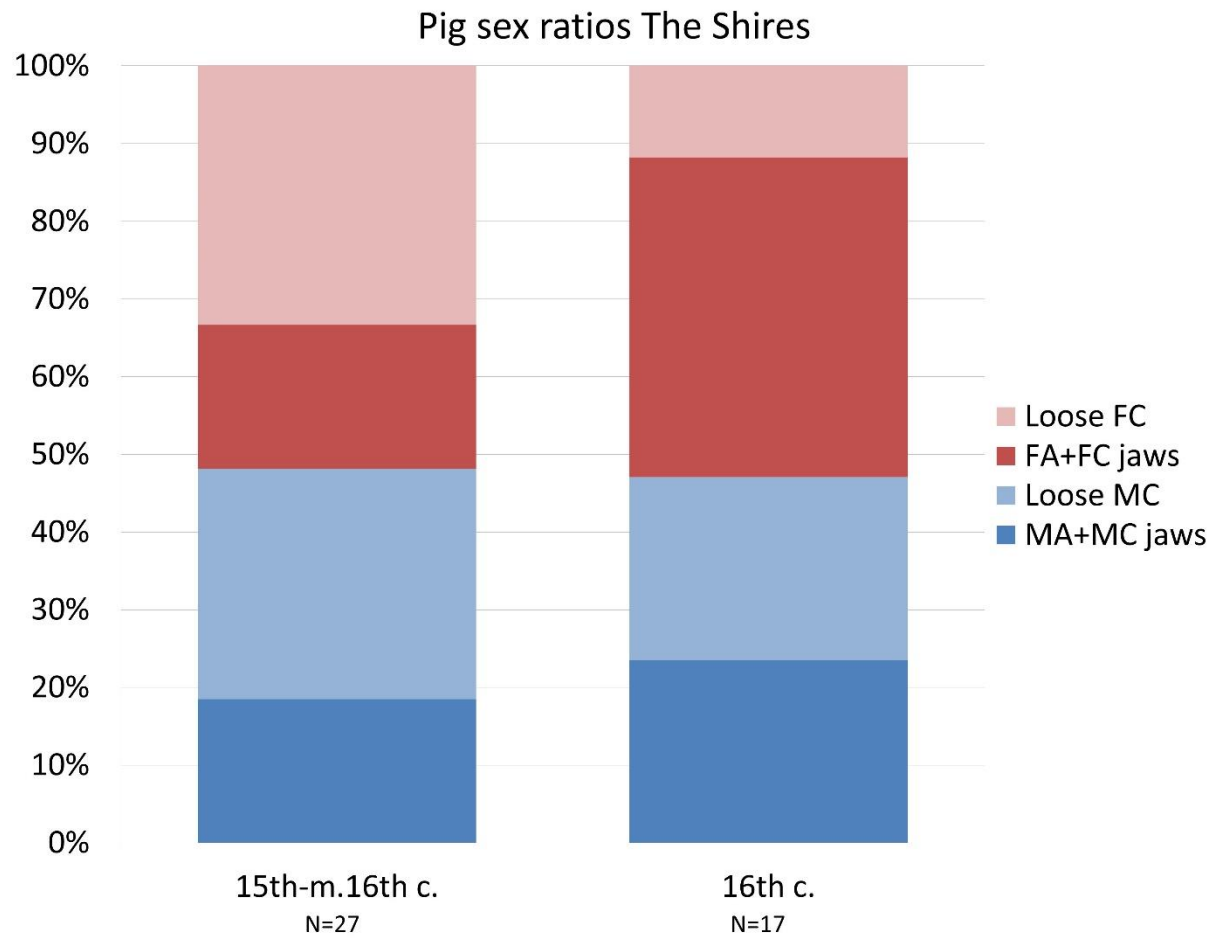


The test of normality (Shapiro-Wilk) showed p-values ≤ 0.05 for two of the three chronological periods. Another test of normality (Kolmogorov-Smirnov), showed p-values ≤ 0.05 for all periods. In any case, both tests suggested that data are not-normally distributed, so non-parametric tests were carried out.

A Kruskal-Wallis H test showed that there was a statistically significant difference in the log-ratios of chicken post-cranial depths, $\chi^2(2) = 73.042$, $p = 0.000$, with a mean rank score of 261.20 for Late Middle Ages, 385.98 for c. 16th c., and 395.07 for Post-16th c.

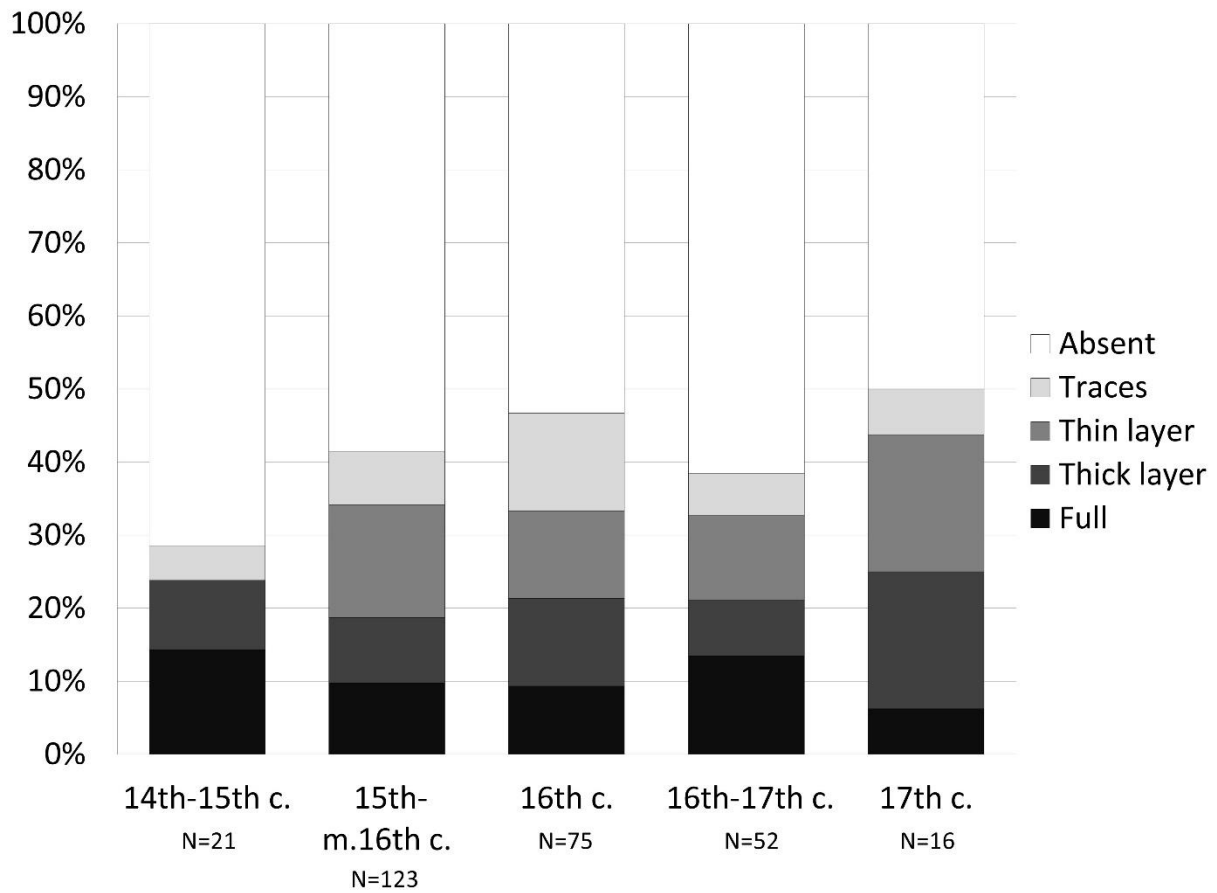
Testing post hoc all possible pairs makes the use of multiple test procedures mandatory. We adjust the results of the Mann-Whitney U test using the Bonferroni correction. We observe very highly statistically significant differences between the pair Late Middle Ages-c. 16th c., with a p value of 0.000. However, there is no statistically significant difference between the pair 16th c.-Post-16th c., with a p-value of 0.834.

S18. Pig sex ratios according to canine (upper and lower) morphology at The Shires. Only samples where N is larger than 10. FA: female alveoli, MA: male alveoli, FC: female canine, MC: male canine.

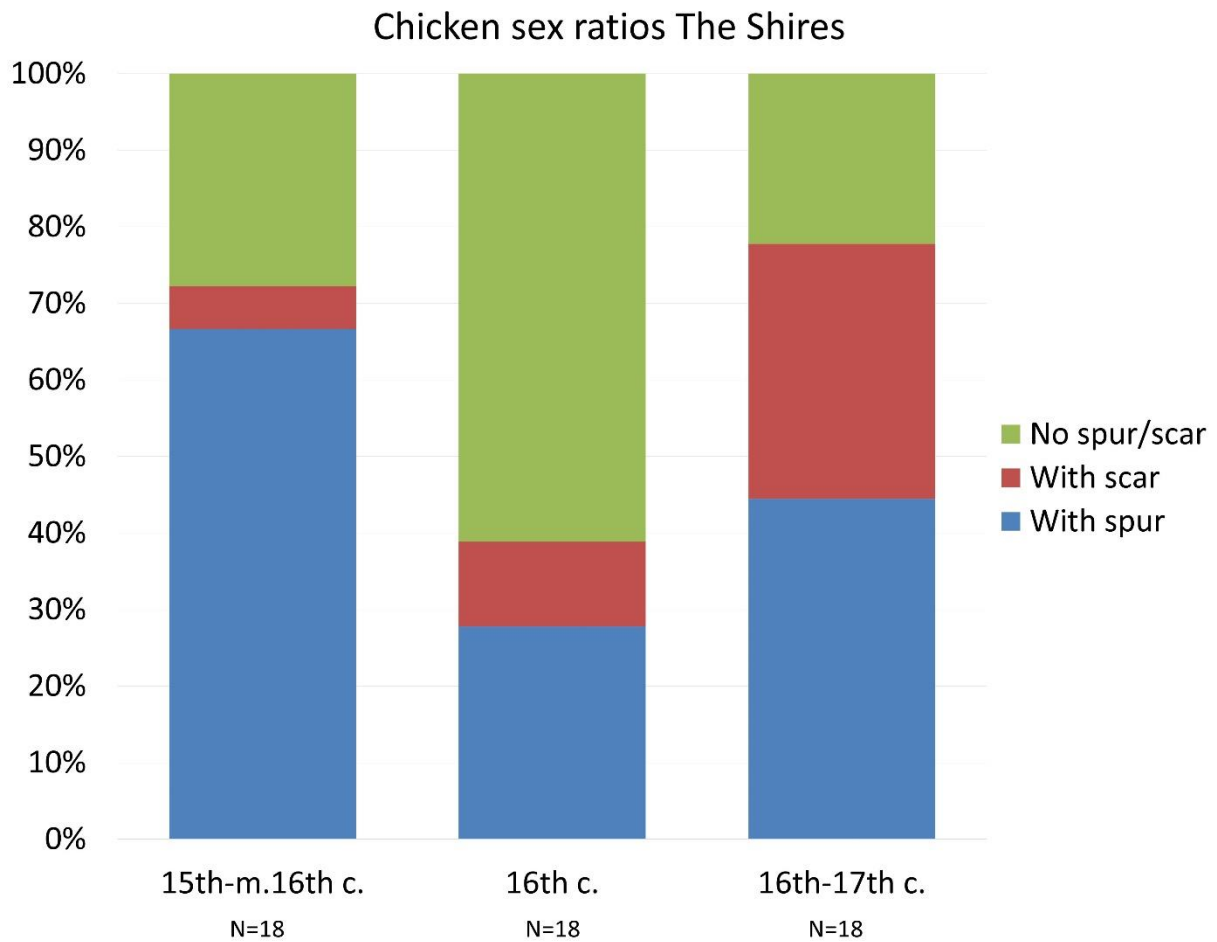


S19. Chicken sex ratios according to the presence/absence of medullary bone (in all femur, tibiotarsus and tarsometatarsus) at The Shires. Only samples where N is larger than 10.

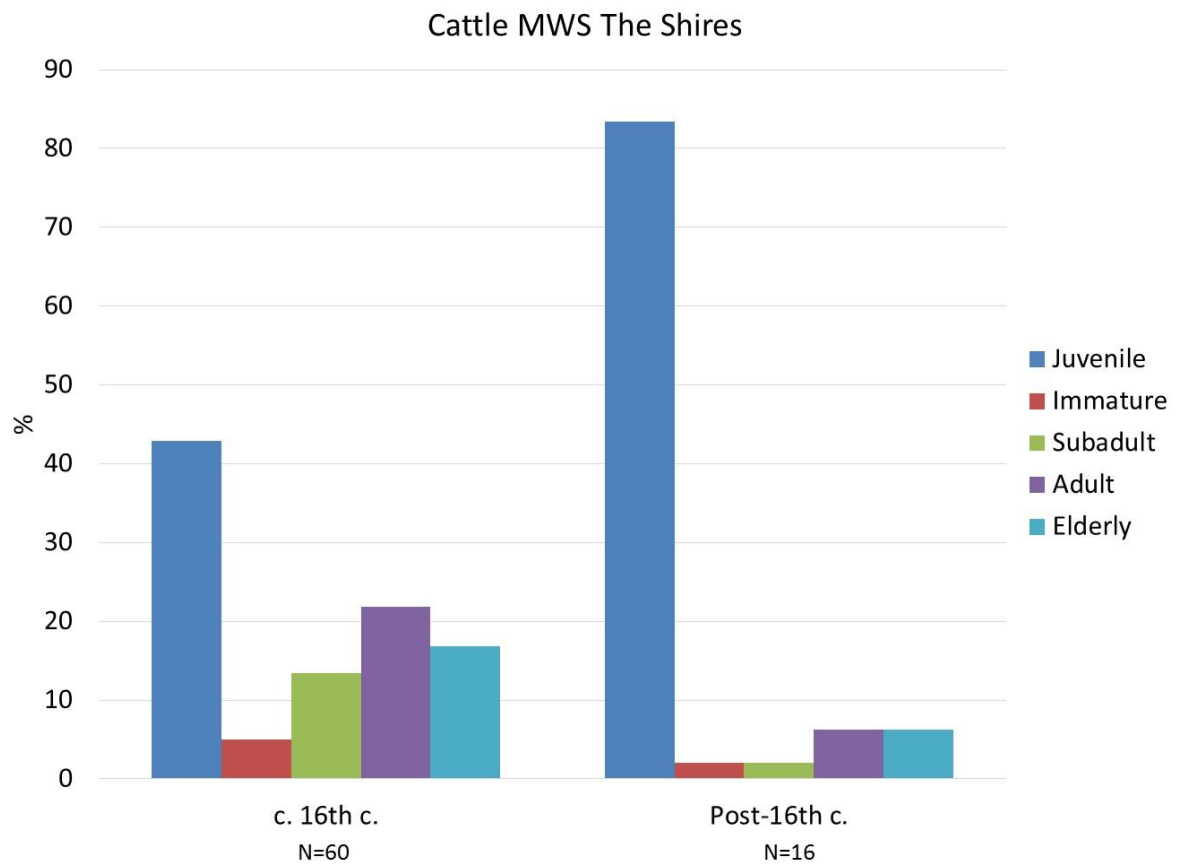
Chicken sex ratios The Shires



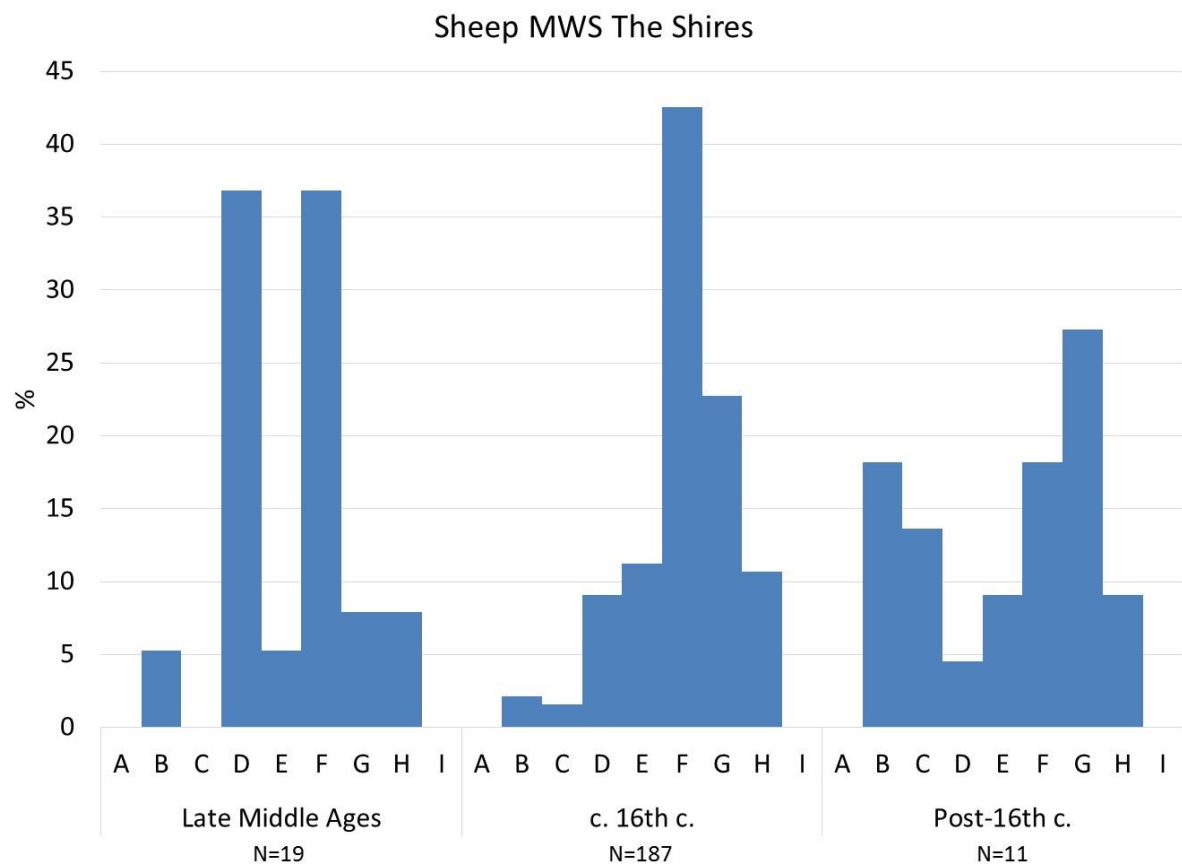
S20. Chicken sex ratios according to the presence/absence of spur/scar on tarsometatarsi at The Shires. Only samples where N is larger than 10.



S21. Mandibular wear stage of cattle at The Shires. Only samples where N is larger than 10.



S22. Mandibular wear stage of sheep at The Shires. Only samples where N is larger than 10.



S23. Mandibular wear stage of pig at The Shires. Only samples where N is larger than 10.

