

CONCLUSIONS

This study has attempted to present an overview of the physical anthropology of the skeletal remains from seven sites in the North-East of England. In every section recent work on aspects of osteological study have been considered, both in their own right and in relation to the study groups.

As has been discussed in Section 3.1, the techniques of ageing an adult human skeleton are currently undergoing major revision because of their inadequacy. It seems unlikely at present, however, that methods based on any part of the skeleton other than the teeth are likely to give a reasonable estimate of age. Tooth attrition, although it should be used with care on different populations, seems to produce the best picture of advancing age, although it is by no means a constant and steady process. Although it is of little use for more recent populations, it seems likely that with some revision it could be of use for groups of medieval or earlier date.

In the case of children, the assessment of age is less troublesome and more accurate. The results from the seven groups considered here suggest that the largest proportion of child deaths occurred in the 0-2 year age group, and it seems likely that this represents a real trend. The proportions of children present were broadly similar at the three main sites under consideration (Jarrow, Monkwearmouth and The Hirsell), although the Monkwearmouth figure was slightly lower than the others, possibly due to the nature of the site (i.e. poor preservation and disturbed burials).

The other four sites had proportionally fewer juveniles, possibly due to poor preservation at Blackgate and Norton, but most likely due to differential burial practices in the high status medieval monastic groups of Guisborough Priory and Blackfriars.

The age group with the greatest proportion of adult burials varied at each site. At Jarrow and Monkwearmouth the greatest numbers of adult deaths occurred in the oldest age group ("45+"), at Blackgate in the second oldest ("35-45"), at The Hirsell, Blackfriars and Guisborough in the 25-35 year group, and at Norton in the youngest group ("17-25"). It is likely that the teeth of the Norton group would have had a reasonable amount of wear for their age, since it would be expected that the earlier the population the less refined the food, and attrition would thus occur at a faster rate. Individuals from Norton are therefore perhaps less likely to be underaged from dental wear, which suggests that the group recovered from the site were actually dying at a fairly young age. Whether this is a result of differential preservation discriminating against older osteoporotic individuals (and juveniles), or whether it is a social or environmental phenomenon is unknown. Blackfriars and Guisborough, being medieval groups, are perhaps most likely to have been underaged by dental attrition, and the large proportion of young to middle-aged individuals probably reflects this rather than a true mortality pattern. The great majority of Hirsell adults died in middle-age ("25-45"), and this may be an accurate reflection of their mortality rates due to the rural nature of the site. Jarrow and Monkwearmouth, although partially aged by the present writer, were analysed in the greater part by Calvin Wells, and it is likely that his methods of ageing were different. The largest proportion of adults at both sites were in the "Old" age group, suggesting that his techniques may have been more accurate, since this is what we might expect to find. One other alternative is that the people of Jarrow and Monkwearmouth benefitted from the presence of a monastic order and survived to a greater age because of it.

An attempt was made to test the effects of inaccurate ageing on palaeodemographic life tables by using weighted figures. This seemed to suggest that similar patterns would be seen, although actual life expectancy and survivorship figures would change slightly.

The Hirsell showed the lowest life expectancy of the three main sites, perhaps because it was a rural population with little wealth. The survivorship curves show broadly similar patterns at all three sites, although 50% of the deaths at Monkwearmouth had occurred by the age of 10, at Jarrow by 14, and at The Hirsell by 17 years. This is probably a reflection of the difficulties of ageing some of the poorly preserved skeletons at the first two sites. The probability of death curves show the greatest probability of death in infancy and old age, as expected. The least chance of dying occurred between 14-17 years at all three sites, so although there are some differences in the shapes of the curves, the basic trends are actually the same.

Although individuals may have been older than suggested by tooth wear, it does seem that a smaller proportion of adults were reaching old age at The Hirsell than at Jarrow and Monkwearmouth. Tooth wear is probably unlikely to produce a bias in this direction because it seems reasonable to assume that a rural population would be more likely to have worn teeth than an urban group.

It has already been noted that analysis of Jarrow and Monkwearmouth by Wells could have introduced a biasing factor when the two sites are compared with those analysed by the present author. However, the two sites are spatially, temporally and culturally the closest, so there is no real reason why they should not be similar to one

another. It is possible that the large proportions of individuals who could not be aged at the two sites have introduced another biasing factor.

Section 3.2 considered the problems of sex determination of skeletal remains. Although easier than ageing, it is still more difficult than might be expected, especially since different dividing lines between the sexes are found in different populations. No reliable objective method is available for use with all groups at present, and it seems unlikely that one which is applicable to every group will be found. Only the pelvis shows primary sexual characteristics due to one of its major functions in life, the bearing of a foetus. Almost every other sexing trait is a function of size and robusticity. This is obviously relative and continuously variable. There have been problems in the sexing of individuals from The Hirsfel, where a small set of "females" with masculine skulls were found. Whenever possible the pelvis was used when discrepancies between skull and pelvis were seen.

There were more males than females at every site except The Hirsfel, which was actually the closest to the norm (p. 88). It is possible that monastic cemeteries are biased towards male burials, but Norton and Blackgate were not monastic sites, so another explanation for their greater percentages of males must be sought. It is possible that older females with osteoporotic bones would be lost or rendered unsexable, especially on a site with such poor preservation as Norton, or it may be that some "cultural" factor such as warfare or religion caused an increase in the number of men buried in one or both of these cemeteries. The large proportions of unsexed individuals at Saxon Jarrow or Monkwearmouth suggests the possibility of a bias against females. Expectation of life was greater for men than for women at all sites. If more females were dying as children (i.e. before their skeletons are sexable) it is possible that the ratios would be evened out, but this does not seem to be the case at the poorer rural site of The Hirsfel, so there is no real reason why it should be true of any other site.

One other factor which concerns palaeodemographers is fertility rates. Unfortunately recent work (see Section 3.3) has shown that the so-called "scars of parturition" seen on the pelvis are not correlated with numbers of pregnancies, or even pregnancy itself. The numbers of children carried to full term by women in the past can therefore only be judged from the study of written records.

Stature was considered in Section 4.1. It proved to be remarkably similar at all the sites in this study, especially if taken to the nearest centimetre. Male means were all within 6cm of each other, and females within 5cm. No particular trend was noted through time, and modes of the sites were all very similar. The Hirsfel seems to have had the shortest people, but whether this was due to genetic or environmental factors is uncertain, since the site is likely to be different in both respects from other groups.

Mean height was estimated from all complete long bones at The Hirsfel to test differences between means derived using the various formulae. Male heights varied from 167 to 172cm, and females from 158 to 162. The lower arm bones showed the greatest divergence, but all the measurements were within Trotter and Gleser's standard errors, suggesting that it is reasonable to use whichever bones are available when estimating stature for a whole group.

A study of body proportions suggested that all the groups were close enough to the American white population (which was after all derived from earlier European stock) for use of the Trotter and Gleser formulae to be reasonable. There was possibly a slight decrease in arm length relative to leg length from Saxon to Medieval times, but not really enough to affect standard errors in stature estimation.

The slight differences in stature between the groups could be due to a variety of factors, including body proportions, nutrition, and inherited characteristics, but whether it was a combination of these or some other element is impossible to decide with current evidence.

Section 4.2. dealt with the indices which can be taken from long bones. Very few are used, and those which are have unknown aetiologies. For the meric index an increase of the mean was seen through time, with broader femora in later groups. Females were generally found to have relatively thinner femora than men. Similar trends have been noted before (Brothwell 1981). The mean cnemic index also increased through time, although actual distribution patterns of index categories do not seem to be related to time periods. The actual meaning of this is unclear due to uncertainty about the nature of the conditions of platymeria and platycnemia.

Cranial indices were studied in Section 4.3. No complicated statistical analysis was carried out due to lack of time and the small numbers of crania involved. The cephalic index showed an increase towards "round-headedness" (brachycephaly) from Saxon to Medieval times (Fig. 4.17), a phenomenon which has been noted throughout Europe. An index used for European populations showed a similarity between Guisborough, Burgh Castle, and Germanic and Scandinavian groups, and a difference between these and The Hirsfel. Some unexpected differences were probably due to small sample size, especially at Monkwearmouth and Jarrow. Plotting of cephalic indices against vault height showed quite a good separation of Saxon and Medieval sites, and produced groupings of populations

most likely to be close to Germanic and Scandinavian groups. This seems to suggest that cephalic and other simple indices are quite useful in distinguishing population groupings, since they seem to produce patterns which might be expected given a fairly large sample, but do not require the large numbers of skulls and measurements necessary for multivariate analysis.

Section 5 involved the study of non-metric traits. Various problems were considered, including the fact that the genetic/environmental components of most traits are not fully understood at present, scoring is subjective, there may be relationships between some traits, and sex, age, side, size and shape may all have some influence over their appearance. Raw data from the assessment of scored traits is difficult to use and assimilate, so the Mean Measure of Divergence was used to attempt to show inter-population groupings. Calculated distances were different to those suggested by metrical analysis, and on the whole seemed to be less feasible. Guisborough and Blackgate for example were shown to be the closest groups, which seems unlikely given their geographical and temporal separation.

Intra-population study showed possible groupings when used at The Hirsal and Guisborough. The most likely familial relationship was seen at The Hirsal, where only two males in the whole (assessable) group were metopic, and they were buried next to each other. It seems unlikely that this would occur by chance. Based on trait evidence, Guisborough appeared to be a close inbreeding population, or to have a large extended family presence. Given the size and nature of the area from which the burials were excavated, it seems possible that family groups were present, but it should be remembered that there was a potential 340 year burial period at the site.

Dental research was carried out at all the sites, though more time was allowed for this at some than at others, and the results are collated in Section 6. Little could be said about metric and non-metric analysis. The former was simply not done due to the very small amount of useful information which can be derived from it, and because of the amount of time involved. Anomalies were noted when they occurred, but prevalence studies were only carried out on congenital absence (non-eruption) of third molars. The numbers of unerupted teeth varied considerably between populations. Females always had more unerupted teeth than males, except at Guisborough, probably due to their smaller jaw size. A possible increase through time was noted.

Dental pathology (Section 6.2) yielded more useful data, despite the fact that only a macroscopic analysis was possible. Percentages of caries, ante-mortem tooth loss and abscesses varied in the sites. Some increase through time was seen, particularly of caries and ante-mortem loss. Anomalies in the trend suggest that such a comparison should be based on age groups as well, but unfortunately this was only possible with The Hirsal, since it was the only group large enough to be divided up. As expected, an increase of dental disease with age was seen. Sex differences of caries were not significant, but some sites showed significant differences in ante-mortem loss and abscesses (particularly the former). Most lesions were found to affect the molar region at The Hirsal, and this picture was likely to be similar at the other sites. Very few children had caries, although the majority of those affected had lesions of the deciduous rather than the permanent dentition.

Alveolar resorption and calculus patterns at The Hirsal suggested a possible difference in eating patterns between males and females. Both occurred to a larger extent in females, but with a greater frequency in males, suggesting that females were eating softer food, but males were living to a greater age (perhaps due to a more nutritional diet of meat, etc.). Calculus frequencies showed great variation between the sites, being greatest at Blackfriars and least at Jarrow. The reasons for this are unknown.

Hypoplastic lesions of the enamel were greatest in males and grossest in children at The Hirsal. This may be because the grossest lesions are representative of the worst childhood diseases and therefore least chance of survival into adulthood. Blackgate showed the fewest hypoplastic lesions and Blackfriars the most, but Norton was also high. There does not appear to be any relationship with period or with wealth from this evidence, and similar findings have been made in modern groups.

The most important information which can be gained from human skeletal material, at least as far as the archaeologist is concerned, is probably that included under the heading of Palaeodemography in Section 3. Age and sex are fundamental pieces of information for the social reconstruction of a site history. Probably the next major source of data is that provided by studies of health and nutrition. Although palaeopathology of these sites could not be considered in this work (as explained in Section 7), some information about nutritional standards can be gleaned from the study of age at death (which involves an assumption of accuracy of age estimation), stature estimation and dental pathology. Information about head shapes and limb proportions is probably of less importance in this respect, although it is a valuable source of information about large population relationships. Non-metric traits appear to be of most use in the study of single groups, and relationships within a cemetery, than for large-scale population studies.

However, the overriding theme which runs through all this work is that none of this information should be presented as if it were factual, despite a tendency in the past for both archaeologists and anthropologists to do this. In the light of recent studies it now seems that many osteological techniques are even less accurate than has previously been assumed, and it is to be hoped that future research in the field of skeletal ageing in particular will do something to alleviate this problem.

In summary then, from this work it seems that slight differences can be seen in age and sex distributions at the sites, and some attempt has been made to explain these above. Stature at all the populations was within normal limits, although perhaps the people from The Hirsfel were rather smaller than their contemporaries. Average head shape may have changed through time, although whether this was due to a genetic or an environmental cause is, as usual, unknown. Non-metric traits have been most useful for showing relationships within groups, and it is after all reasonable to assume that family burial plots did exist in large churchyards and monastic churches (although it is as well to remember that *suggestions* of family relationships are just that). Analysis of the teeth from these groups has produced a picture of generally poor dental health, with increasing prevalences of many lesions through time, as would be expected. It seems that these seven population groups, although they cannot be taken as representative samples of the living populations from which they are derived, are broadly similar in patterns of health and demography, despite their temporal and spatial differences. However, it may be that slight variations could prove to be of significance if it is possible to study them in more detail in the future.