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The osteological use of diagnostic radiographs: Further material for osteoarchaeologists

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Although more recently devised imaging techniques now get much of the limelight, the clinical value of "standard" radiography remains undiminished. Within a year of the announcement of the discovery of X-rays by Roentgen on 28th December 1895, one thousand papers concerning the production and use of X-rays had appeared. Although primarily of clinical concern, those interested in archaeology were not slow to recognise the potential uses for the non-destructive investigation of material. Stewart Culin at the University of Pennsylvania seems to have been the first to use X-rays to study ancient human remains - that of a Peruvian mummy in 1897 (Brothwell, Molleson & Metreweli, 1968) although Charles Thurstan Holland had produced a radiograph of a mummified bird from an Egyptian tomb on 22nd October 1896 (Holland, in Bruwer, 1964).

Yet, despite the obvious osteological uses of radiography (Brothwell, 1965), its full scope is often overlooked. At the 1967 symposium of the Society for the Study of Human Biology (SSHB) on "The Skeletal Biology of Earlier Human Populations", Brothwell, Molleson and Metreweli (1968) pointed out that the radiographic study of skeletal variability had been a rather neglected subject. This remains largely the case.

At the inaugural SSHB symposium in 1957 on "The Scope of Physical Anthropology and its Place in Academic Studies", Kenneth Oakley of the British Museum (Natural History) described a lack of osteological material available for teaching and research. This too is a state of affairs which persists to this day. So much so that there is now a trend towards the use of plastic skeletons in undergraduate and pre-clinical education. While these are often of excellent quality, they are certainly not "the real thing". More importantly, while suppliers offer both male and female skeletons, all skeletons of a given sex are identical. Little sense of individuality in the shapes and sizes of bone can be gained.

Radiology remains in use for a variety of non-clinical purposes and those relating to osteoarchaeology have been of interest to the radiographic press (for example: Lorimer, 1989; Jones & Howell, 1992; Capel, 1994). However, the ties between the clinical and osteological research communities are not as close as they might be. Vast amounts of osteological information about current populations, in the form of radiographic images, are produced in hospitals every day. There can be little doubt that the greatest repositories of

osteological information are the filing rooms of X-ray departments nor that the number of bone images obtained per annum in this country exceeds its "dry bones" collection many times over. However, when the clinical use of a radiograph is complete and the patient's file has remained inactive for about three years, the radiograph is discarded - with no regard for its osteological information.

Precedence for the osteological use of clinical radiographs, if it were needed, was set when the National Hospital for Nervous Diseases donated 10,000 documented radiographs of the skulls of patients of all ages to the British Museum (Natural History). As Oakley (1958) described it, "If we had not been willing to receive these documents of human variation, they would have had to be destroyed". To obtain such material, it is often simply a matter of asking. With the recent move of radiographic education and training to degree programmes, there is now a greater research ethos within the profession and an increased receptiveness to research proposals and collaborations.

One should not be put off by matters of patient confidentiality, ethical approval etc. These need pose no significant problem when a genuine study is proposed and can be addressed in consultation with an X-ray department superintendent or the radiologist in charge. Of more practical importance for the researcher is the need to understand how the bones in which they are interested were imaged. Should a researcher be concerned to make measurements, there are various considerations regarding positioning, distortion, enlargement etc. to be borne in mind but these are all matters about which radiographers can fully advise.

Although radiographs do not have the three-dimensional quality that even plastic skeletons possess, it must be remembered that for purposes of metrical and morphological analysis, dry bones are frequently X-rayed and reduced to the two-dimensional type of image which X-ray departments can readily provide.

Using radiographs affords a researcher the scope to test ideas about the behaviour of metrical and non-metrical characteristics within and between populations where there may otherwise be insufficient numbers and subject details. Using this approach, it has been possible to build up a database of osteological measurements made from a series of hand radiographs from Ynys Mon (Anglesey) and the (pre-1996) county of Gwynedd. For this study, sex, town of residence and "Welshness" of surname (Ashley & Davies, 1966) were all known. Given such a database, it is now possible to compare with other populations past and present and is available for collaborative work with colleagues in the Osteoarchaeological Research Group.

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