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SEXING THE MAORI SKULL - A REVIEW

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Abstract

Methods of sexing crania are briefly reviewed and some practical suggestions are offered to archaeologists who wish to sex Maori crania.

A necessary consideration in the excavation of a burial is the sexing of the skeletal remains. With enough evidence from burials, it may be possible, for example, to infer palaeodemographic patterns of past populations.

A complete, or nearly complete, skeleton can be sexed in over 90% of the cases. The femur, the bones of the pelvis and the skull provide ample evidence for sexing. In some instances, the sexual identification of a burial may have to be made on the basis of non-metrical cranial evidence alone. In dealing with the Maori, this problem is not resolved as easily as one might think. Little has been published on the sex differences of the Maori skull. Earlier writers, such as Scott (1893) gave no clear indication how crania were sexed. Scott was a trained anatomist and in his study he worked with post-cranial as well as cranial material. It seems he took sexing as a matter of course. In a more recent paper, Schofield (1959), studying the Maori femur, had the benefit of 39 complete or partially complete skeletons associated with the femora and probably had little cause to examine or describe skulls.

To date, the only major comparative series of sexually identified Maori crania is found in the skeletal collection of the Otago Medical School. These skulls were sexed by the late Dr Monheimer, but the criteria which he used have not - to the present writer's knowledge - been stated.

One obvious solution, when investigating sex differences in Maori skulls, is to draw on overseas research carried out on other populations. However, it should be remembered that the value of certain cranial features varies with the population being studied (Brothwell, 1972).

Thus the problem of sexing crania entails the study of an adequate sample in order to distinguish diagnostic criteria and to establish the likely range of morphological variation.

The purpose of this review, then, is two-fold: firstly, to examine briefly overseas research concerned with the non-metrical features of the skull which may be applicable to Maori crania; and, secondly, to offer archaeologists some practical suggestions which they may find useful for sexing skulls.

Keen (1950) used a combination of metrical and non-metrical evidence to sex crania of the Cape Coloured population of South Africa. Fifty individuals were known to be females and fifty to be males. From this sample Keen obtained measurements which showed diagnostic differences between the sexes, which were easily observed and which were taken from different anatomical regions of the skull. Subsequently, he arrived at four diagnostic measurements: length of the cranial vault, bizygomatic diameter, depth of the infra-temporal fossa and length of the mastoid process. However, Keen pointed out that metrical data for his sample did not necessarily apply to other populations; further, he noted that within his sample his metrical analysis showed an "intermediate neutral zone" where the data from males and females overlapped and, thus, crania were more difficult to identify. Used in conjunction with the measurements just described were three commonly used non-metrical features which were recorded according to their degree of development, i.e. slight, medium or marked development. The traits Keen used were the supra-orbital brow ridges, each external auditory meatus and muscle markings on the nuchal area of the occipital (see Figure 2).

Although he found the four measurements useful, Keen emphasised the value of non-metrical traits, stating "...the anatomical criteria will always be valuable and, presumably, this applies to the skulls of all racial groups" (Keen, 1950: 77). Keen claimed an accuracy of 85% for sexing skulls using his method but warned that in any cranial series there will always be some degree of uncertainty.

Keen disagreed with Hrdlička (1920) that the gonial angle of the mandible is a significant marker of sex, but agreed with Martin (1928) on the importance of: size of the foramen magnum, the total facial index, and the "frontal type" of the female as opposed to the "parietal type" of the male.

Genovés (1963) described the male face as bigger and longer, while the mandible and malars are stronger and more solid. Brothwell (1972) listed 11 features which he considered important and some of these included: the male skull is generally larger and heavier, the

palate and teeth are larger, the ramus of the mandible is broader with a more developed coronoid process, and there is greater flaring at the gonion. Krogman (1962) mentioned that, in the male, the temporal line is usually more pronounced, the mastoids are more developed and the skull is less rounded. The vault of the female skull, on the other hand, is usually more rounded and presents the appearance of an adolescent.

In a recent study examining the methods of sexing crania, Weiss (1972) was critical of the non-metrical method of sexual diagnosis because of the degree of subjectivity involved when a morphological trait is assessed in what could be called a "larger-smaller" type of decision. "The larger, or more marked the trait, is called the male.... when a specimen is found, in which the traits are of intermediate size, rugosity, or development, there seems to be a tendency to call it male" (Weiss, 1972: 240). Weiss suggests that there could be an average bias of up to 12% in favour of males in a cranial series. The conclusion to be drawn here is perhaps already apparent: in sexing Maori crania, without reference to any positive comparative series, a similar bias, perhaps of the same magnitude suggested by Weiss, may result.

It has not been possible to review, here, all the literature relating to non-metrical sexing of crania, but those authors mentioned cover the major features on which it is based. From these sources alone, 17 cranial traits have been noted here and it is appropriate at this point to review their application in sexing Maori skulls.

Immediately prior to a recent cranial survey, Watt (1973) examined many of the cranial traits in a series of over 100 Maori skulls in the Auckland Museum. He had two aims: firstly, to isolate appropriate morphological features for sexing and, secondly, to apply those features to Maori crania which had been sexed by Dr Monheimer in Otago.

As an independent member of the survey, it became obvious to me that many of the morphological traits which could be used for other populations were not suitable when applied to Maori crania. For example, it was unreliable to distinguish between the sexes on the basis of cranial weight, facial index or facial height, size of the foramen magnum and the development of the coronoid process. There was considerable sexual overlap in the size of the palate and the size of teeth. While it has been stated that the mandible is a guide for sexing (Giles and Elliot, cited by Genovés, 1963), in the Maori this

was difficult to establish since a considerable degree of sexual overlap was again apparent, especially in terms of robustness. The gonial angle, which has also been used as a sexual marker (Morant, 1936) has so far been of little value, especially when dealing with the so-called Polynesian "rocker jaw" (Marshall and Snow, 1956). (It should be noted that of 695 crania used in the survey only 30% had mandibles.)

It was found that only seven features seemed appropriate to sex Maori skulls. When these traits were applied to the Monheimer series of well over 200 Maori crania, both assessments agreed more than favourably with each other. There was a small area of disparity. In only 2% could no sexual identity be given.

An important point which must be stressed is that sexing should be attempted only for adult skulls since it is not until about 17 to 20 years of age that the cranium has assumed a form which will remain relatively unchanged throughout a normal lifespan. Two markers which are often used to establish whether a skull is adult are: (a) full adult dentition and (b) ossification of the junction between the basal portion of the occipital bone and the sphenoid bone (see Figure 1).

(a) Adult dentition

Adult dentition is taken as fully erupted when the third molars, or "wisdom teeth", are present in the tooth row. In some cases an adult skull may not present third molars either because of a late eruption or because they are congenitally absent. When this problem occurs, one must rely on assessing the closure of the basi-sphenoid.

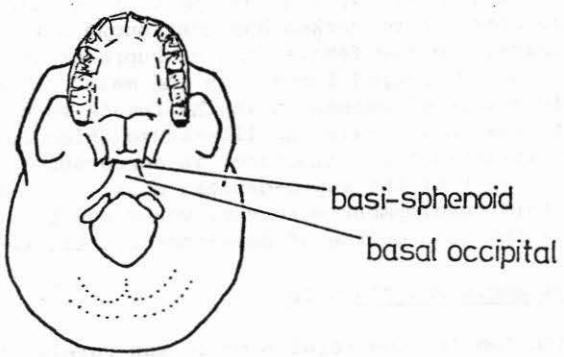
(b) Basi-sphenoid closure

As shown in Figure 1, the junction at the basi-sphenoid is completely ossified during adult life. "Ossification commences soon after puberty and by 21 years is complete." (Wood-Jones, 1946: 156).

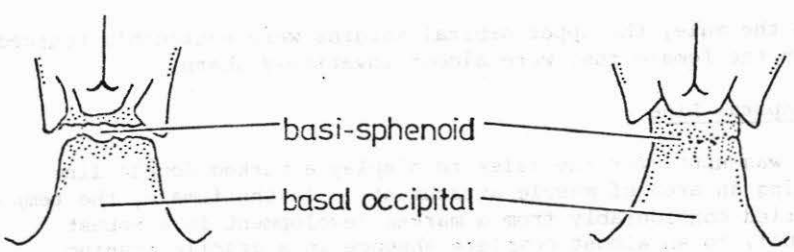
Of the numerous features which have been used to sex skulls, the following traits may be of use to archaeologists who find themselves handling cranial material. It must be appreciated that all features should be considered in combination as no one characteristic has been found to be sexually diagnostic. Further, just as an archaeologist becomes familiar with the different types of adzes, it is well worth his while to view a selection of Maori crania.

figure 1

LOCATION OF THE BASI-SPHENOID



CLOSURE



PRE-ADULT

closure begins soon after puberty

ADULT

usually fully closed by about 21 years

MW

The seven suggested traits are (see Figure 2):

(1) Supra-orbital ridges

In the male these were always present to some degree and in a few cases were noted to be marked and continuous across the upper margins of the orbits. A few females had no supra-orbital ridges but most presented less developed forms than the male. The presence of moderately developed eminences in the female seems contrary to some points of view in the existing literature which describes the female skull as "infantile" or "immature" in appearance, implying little, if any, development of the supra-orbital area. The few females which did lack this development were very young adults. This might imply that there may be a degree of development still to take place.

(2) Nasal angle and glabella

In the female, the nasal profile was rarely straight and usually softly rounded, with a little development of the glabella. In male skulls it was not uncommon for the nasal profile to be rounded as in the female, but usually the glabella was more prominent. Males often presented a marked development of the glabella which contributed to making the nasal angle noticeably acute. Together with the supra-orbital ridges, the nasal angle and the glabella appeared closely related in their development and consequently proved a useful unit of markers for sexual identity.

(3) Orbital margins

In the male, the upper orbital margins were noticeably rounded, while in the female they were almost invariably sharp.

(4) Temporal Line

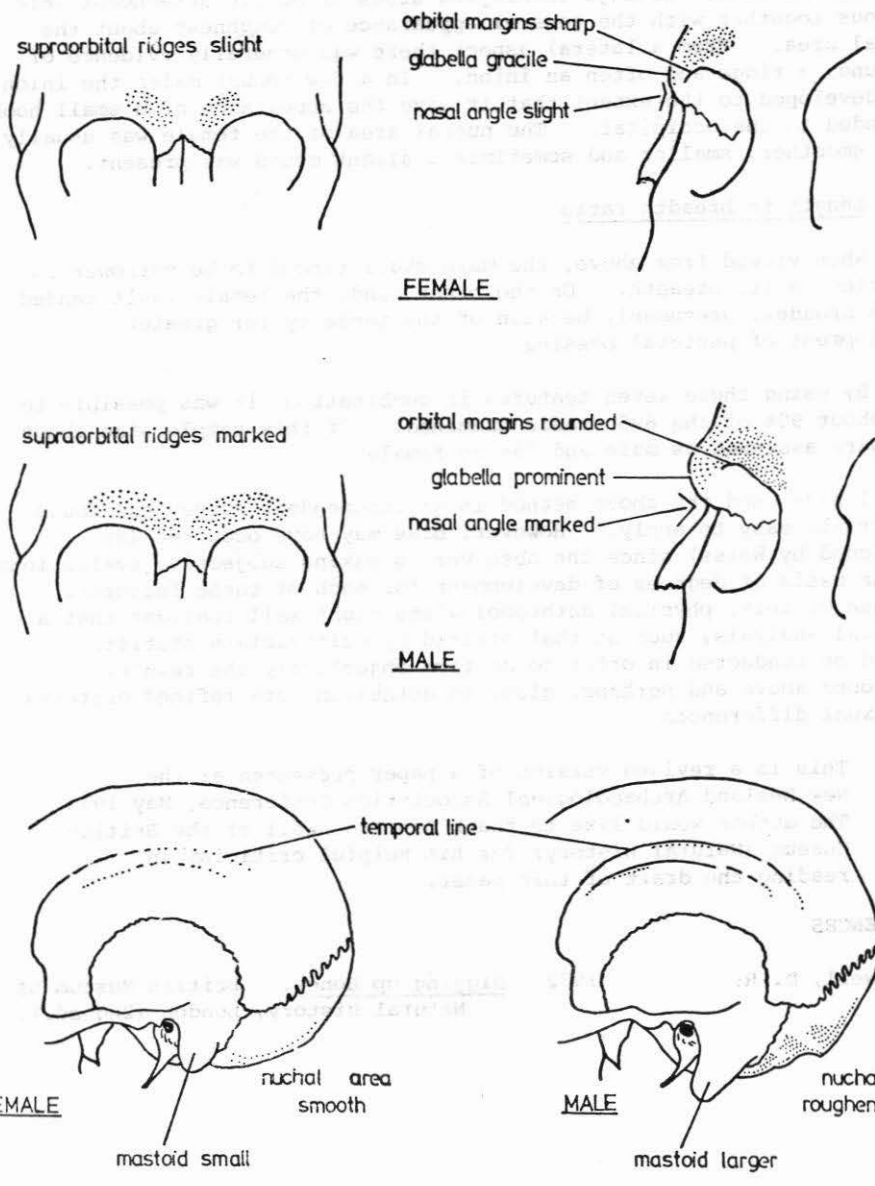
It was usual for the males to display a marked double line signifying an area of muscle attachment. In the female, the temporal line varied considerably from a marked development in a robust individual, to an almost complete absence in a gracile cranium.

(5) Mastoid process

The mastoid process of the female was usually less developed than the male, but in robust crania not invariably so.

Figure 2

SEXUAL TRAITS ON MAORI CRANIA



(6) Nuchal area

In the male, markings signifying areas of muscle attachment were obvious together with the general appearance of roughness about the nuchal area. From a lateral aspect there was generally evidence of a mound, a ridge and often an inion. In a few robust males the inion was developed to the extent that it gave the appearance of a small hook appended to the occipital. The nuchal area of the female was usually much smoother, smaller and sometimes a slight mound was present.

(7) Length to breadth ratio

When viewed from above, the male skull tended to be narrower in relation to its breadth. On the other hand, the female vault tended to be broader, presumably because of the tendency for greater development of parietal bossing.

By using these seven features in combination, it was possible to sex about 90% of the 695 crania examined. Of this sample size about 55% were assessed as male and 35% as female.

I have used the above method in an independent survey and found the traits easy to apply. However, bias may have occurred (as mentioned by Weiss) since the observer is making subjective evaluations on the basis of degrees of development for each of these features. Because of this, physical anthropologists might well consider that a metrical analysis, such as that offered by multivariate statistics, should be conducted in order to confirm objectively the results mentioned above and perhaps, also, to establish more refined criteria of sexual differences.

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