

Incidence of interparietal bones in the adult human skulls of south India

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Abstract:

The occurrence of sutural bone in human skulls is quite common. The squamous occipital bone consists of two parts supraoccipital and interparietal. Usually interparietal bone fuses with supraoccipital but sometimes remains as separate bone. In this study total 125 adult skulls were examined to determine the incidence of the interparietal bone. The interparietal bone was observed in 6(4.8%) skulls.

Key words: Wormian bones, Sutural bones, Interparietal bones, Lambda

Introduction:

The squamous portion of the occipital bone consists of two different parts: the upper, interparietal part, which is a membrane bone, and the lower, supraoccipital part, which is a cartilage bone. According to some researchers, the boundary between these parts is the highest nuchal line [1, 2]. Others, however, have identified the boundary to be the superior nuchal line [3]. In a recent experimental study on human fetuses, Srivastava[4] concluded that the boundary is the highest nuchal line, but in contrast to previous studies, states that the supraoccipital part, which lies below this line, is partly membrane bone and partly cartilage bone. The area between the highest and superior nuchal lines, called the intermediate segment, is composed of membrane bone. The membranous part of occipital bone develops above the superior nuchal lines by three pairs of centres. The first pair, in which each centre consists of one nucleus, lies between the superior and highest nuchal lines and is known as the torus occipitalis transversus or lamella triangularis. These two ossification centres form the intermediate segment. Above the intermediate segment, there is a second pair of centres, one on each side of the midline, each of which has two nuclei, lateral and medial. These four nuclei form the lateral plate of the interparietal. The lateral portion of the lateral plate is separated from the intermediate segment by the lateral fissure. The third pair of centres consists of two nuclei on each side, upper and lower, forming the medial plate of the interparietal. Between the two medial plates there is a deep median

fissure. Thus, formation of the interparietal bone depends on the separation of the intermediate segment and the lateral plate by the sutura occipitalis transversa. This means that the interparietal bone is formed by the lateral and medial plates together. Failure of fusion of these centres or their nuclei with each other or intermediate segment gives rise to various anomalies of the interparietal bone. In this study the incidence of interparietal bone in the Karnataka region has been estimated and compared with other relevant literature.

Material and methods:

The material used in this study consisted of 125 adult skulls in the Department of anatomy, JJM Medical College, Davangere, Karnataka, India. These were examined to determine the incidence of interparietal bone.

Results:

A total of 6 skulls of interparietal bones were determined out of 125 skulls examined. The incidence of interparietal bones was 4.8%. In all cases were showing large number of sutural bones in between the parietal bones and occipital bone. Two skull (Figure 1, 2) were showing large number of sutural bones. The largest among them was at the lambda and rest of the bones reduced progressively in size from lambda to asterion and were irregular in shape. In the other skull (Figure 3) the sutural bones were present between the parietal bones and occipital bone on either side there was no sutural bone at lambda. The bones reduced progressively in size from lambda to asterion.

Discussion:

All anomalies of the interparietal bone in our studies of skulls could be interpreted



Figure 1: The posterior view of the skull showing multiple sutural bones.

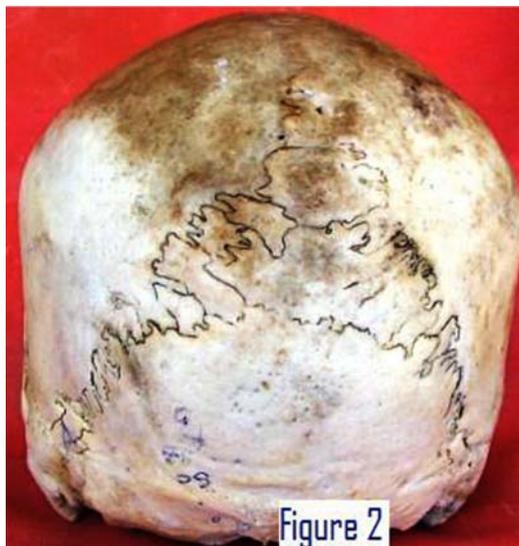


Figure 2: The posterior view of the skull showing multiple sutural bones

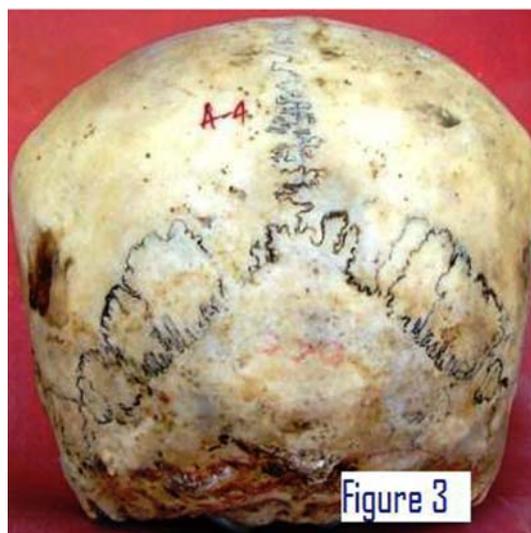


Figure 3: The posterior view of the skull showing multiple sutural bones.

easily in the light of the ossification centres observed by Srivastava. Previous studies describe pairs of centres in the interparietal part of the squamous portion of the occipital bone. The first pair is above the supraoccipital cartilage and is formed of two lateral plates of bone. A second pair of centres lies between these two lateral plates on either side of the midline. According to Pal, the lower boundary of these centres is very close to the external occipital protuberance. He mentions a third pair of centres seen occasionally near the upper angle of the bone. When this third pair remains unfused with the rest of the second pair of centres it is called the preinterparietal bone. When we compare these centres with Srivastava's ossification centres, the lateral centres in Pal's study lack the medial nuclei determined by Srivastava. This is possibly due to non-fusion of the medial nuclei of the lateral plates to the any separate bone in this region other than the complete interparietal bone. Furthermore, in Pal's study there is no mention of the intermediate segment. This segment is a piece of the supraoccipital part of the occipital bone which never separates from the lower piece of the supraoccipital part of the occipital bone, which is a cartilage bone. According to Srivastava, all the bones seen in the region of the lambda and lambdoid suture outside the interparietal area are sutural bones and are, in man, clearly the result of fragmentation of an originally single centre. Sometimes, sutural bones are confused with pre-interparietal bones. To prevent this confusion, the ossification centres and nuclei determined by Srivastava should be known. Furthermore, by knowing these ossification centres and their nuclei, we can differentiate the interparietal bone and its variations from fractures of the occipital bone. The incidence of the interparietal

bone varies among different groups of man. The incidence of interparietal bone was reported as 0.8% by Shrivastava (1977) 1.6% by Singh et al (1979) [5], 2.6% by Pal et al (1984), 4.0% by Cireli et al (1985) [6], 2.5% by Saxena et al (1986), 1.6% by Maden Muftuoglu (1990) [7] and 6.6% by Aycaan (1993) [8]. In our study the incidence of 4.8% was found.

Conclusion:

The incidence was 4.8% in south Indian skulls. These results showing nearly with results of Cireli et al, Saxena et al and Pal et al. In conclusion the interparietal bone can be appearing in various forms depending on the ossification centres and their nuclei in this region. Therefore, all bones that are not sutural bones in the interparietal part of the occipital bone when it occurs in man are part of the interparietal bone.

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