

Case report**A CASE REPORT OF QUADRANGULAR INCA BONE****Poonam Verma, Anterpreet K Arora***Department of Anatomy, Sri Guru Ram Das Institute of Medical Sciences and Research, Amritsar, Punjab, India.***RESUMEN**

Los huesos wormianos son estructuras osificadas que se encuentran dentro de las suturas. En frecuencia que varían extensamente entre grupos étnicos diferentes hay más predominio entre mujeres. En el presente estudio reportamos el caso de un verdadero hueso cuadrangular interparietal o hueso inca en el cráneo humano adulto. Los huesos de wormian interparietal o los huesos epactal se diferencian de los huesos suturales sobre la base de su posición. Los huesos wormianos interparietales están localizados dentro de la región interparietal, mientras los huesos suturales son formados a partir de centros de osificación adicionales que pueden ocurrir en o cerca de las suturas. La osificación inadecuada de la región interparietal lleva a la formación de los huesos wormianos. Ellos también pueden estar relacionados con factores genéticos. El hueso interparietal es formado por la separación del segmento intermedio del plato lateral por la sutura occipital transversa, por lo tanto este hueso es formado por las placas intermedias y laterales que pueden ser únicas o múltiples. La localización de tales huesos está, sobre todo, en la parte central superior de la región interparietal. La ocurrencia de la variable del inca es rara es seres humanos. El conocimiento del hueso del inca puede ser útil a las clínicas, disciplinas de la neurocirugía, ortopedia, antropología, radiología y para los expertos forenses.

Palabras Claves: *Cráneo humano, hueso interparietal, huesos wormianos, hueso sutural.*

ABSTRACT

Wormian bones are ossified structures that are found within the sutures. Incidence of which varies widely among different ethnic groups with more prevalence among females. In the present study we hereby report a case of single true quadrangular interparietal or inca bone in adult human skull. Wormian interparietal bones or epactal bones differ from the sutural bones on the

basis of their location. The wormian interparietal bones are located within the interparietal region, while the sutural bones are formed from additional ossification centers that can occur in or near the sutures. Inadequate ossification of the interparietal region leads to the formation of interparietal or wormian bones. They may also be linked with genetic factors. The interparietal bone is formed by the separation of the intermediate segment from the lateral plate by the transverse occipital suture, hence this bone is formed by the medial and lateral plates which may be either single or multiple. The location of such bones is mostly in the upper central part of the interparietal region. The occurrence of inca bone variation is rare in humans. Knowledge of inca bone in human skulls may be useful to clinicians, disciplines of neurosurgery, orthopaedics, anthropology, radiology and for forensic experts.

Key words: *Human skull, interparietal bone, wormian bone, sutural bone.*

INTRODUCTION

The skull is most studied and documented part of the vertebrate skeleton. The squamous part of occipital bone consists of two parts, supra-occipital and interparietal (Srivastava, 1992). Sometimes the interparietal part remains separated from the supraoccipital part by a suture which is then named as interparietal or Inca bone (Saxena et al, 1986). They were previously nomenclatured as os Incae, os interparietale, goethe's ossicle(Williams et al, 1995).

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Received: 22 July, 2012. **Revised:** 15 August, 2012. **Accepted:** 30 September, 2012.

Inca bone resembles triangular architectural monument design of inca tribe (Gordon, 1963). The non-wormian epactal or interparietal bone was firstly described by Hilaire (1823) and called the Inca bone (Tschudi, 1844; Mata et al, 2010). The sutural bones if present are usually

associated with cranial and central nervous system anomalies (Das et al, 2005). Due to clinical implication information of presence of Inca bones, their incidence, sexual dimorphism and number of fragments is essential to clinicians (Marathe et al, 2010).

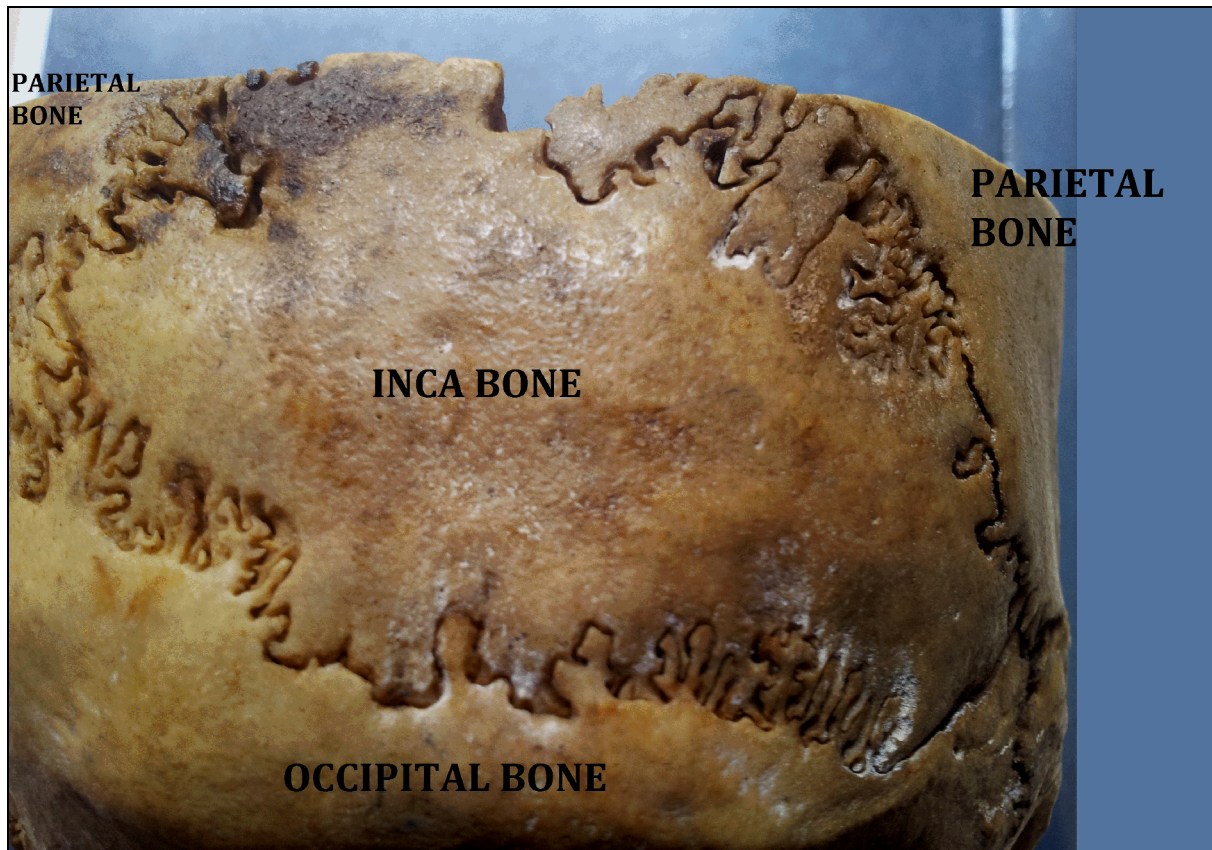


Figure 1. Posterior view of skull showing inca Bone

CASE REPORT

During the routine osteology demonstration classes for undergraduate medical students in Government Medical College Amritsar, incidentally, a single large quadrangular interparietal or Inca bone was found in a skull of unknown sex behind the lambda in between the two lambdoid sutures (Figure 1), lateral angles of which are at variable distances from parieto-occipito-mastoid suture (asterion). The left lateral angle (60°) of Inca was at a distance of 5.5 cm from left asterion. (Figure 2) Right lateral angle (55°) was at a distance of 1.5 cm from right asterion (Figure 3). The suture separating the interparietal bone from the rest of the occipital bone was at the level

of the highest nuchal line at a distance of 1.5 cm from the external occipital protuberance and 0.8 cm above the superior nuchal line near the lamboid suture. The length of interparietal bone was 10 cm. and width was 4.8 cm.

DISCUSSION

According to Keith's study, (1948) a separate single interparietal bone in man is an extremely a rare anomaly. He reported that phylogenetically, the interparietals fuse with the parietals in marsupials, ruminants and ungulates, while in rodents, they fuse both with occipital and parietal

bone. In primates and carnivora as in man, they fuse with occipital bone. But sometimes as a variant in man, the interparietal is seen as a separate bone (Keith, 1948). The authors here report a case of single true quadrangular interparietal or inca bone behind the posterior fontanelle in adult human skull. Wormian bones (sutural bones) are very commonly found in the skull. According to Bergman et al (1988) nearly 40% of skulls have sutural bones in the vicinity of

the lambdoid suture. However, there are reports of the appearance of sutural bones in diseases with bone involvement (Duque et al, 1998; Das et al, 2005). Saxena et al (1986) in his study found the presence of interparietal bone in 2.5% of the cases. Marathe et al (2010) found the presence of Inca bone in 1.31% of the cases. They also found sexual dimorphism for the presence Inca bones, the incidence being higher (1.42%) in males compared to females (1.17%).

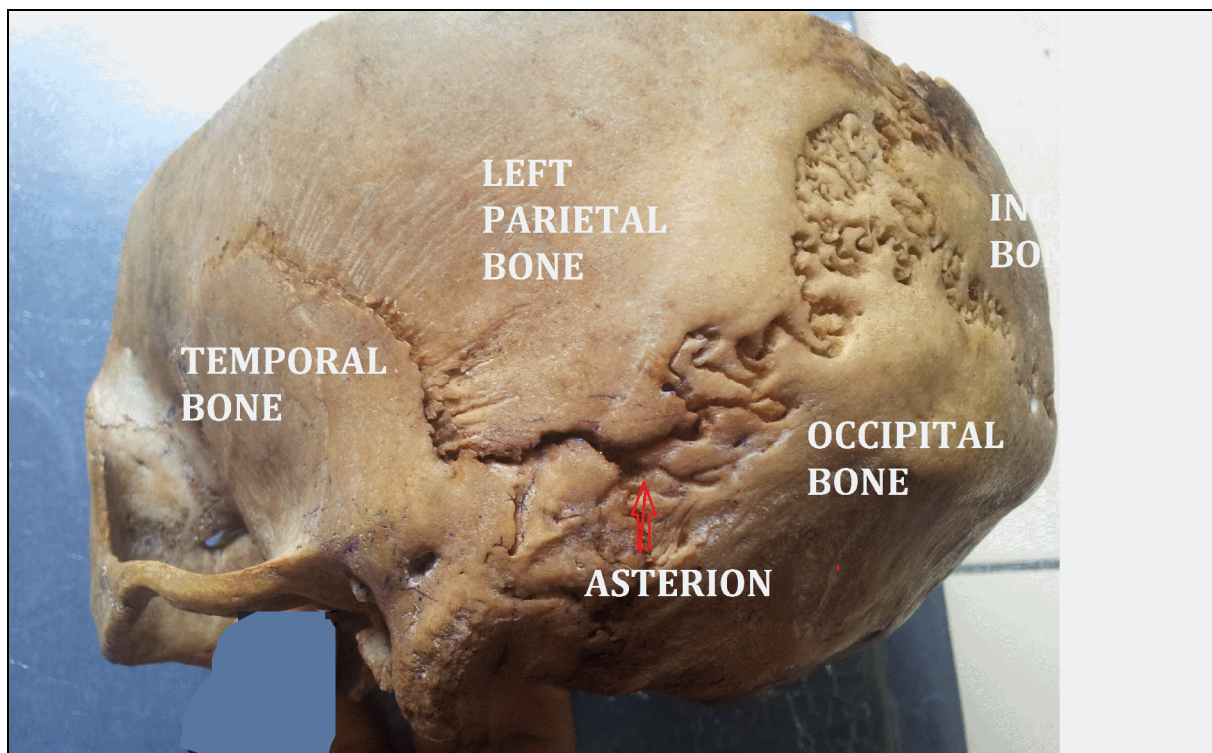


Figure 2. Left lateral view of skull showing distance of left lateral angle of inca bone from left asterion.

Geographical and ethnographical patterns of the frequency variation of the Inca bone found in this study indicate that the possible genetic background for the occurrence of this bone cannot be completely excluded. Relatively high frequencies of the Inca bone in Africans indicate that this trait is not a uniquely East Asian regional character (Hanihara and Ishida, 2001). The inca bones may give a false appearance of fracture on roentgenographs. Such bones may continue with the fracture lines. Due to clinical implication information of presence of inca bones, their incidence, sexual dimorphism and number of fragments is essential to clinicians (Marathe et al, 2010). The clinical importance of wormian bones

are markers for various diseases and important in primary diagnosis of brittle bone disease for example in osteogenesis imperfecta. Wormian bones may also be seen in pyknodysostosis, rickets, cleidocranial dysostosis, hypoparathyroidism, hypophosphatasia and Down syndrome (Glorieux, 2008). Wormian bones are ossified structures that are found within the sutures. Meticulous knowledge of sexual dimorphism, incidence and number of Inca bones in human skull may be useful to clinicians, disciplines of neurosurgery, orthopaedics, anthropology, radiology and medicolegaly for forensic experts.

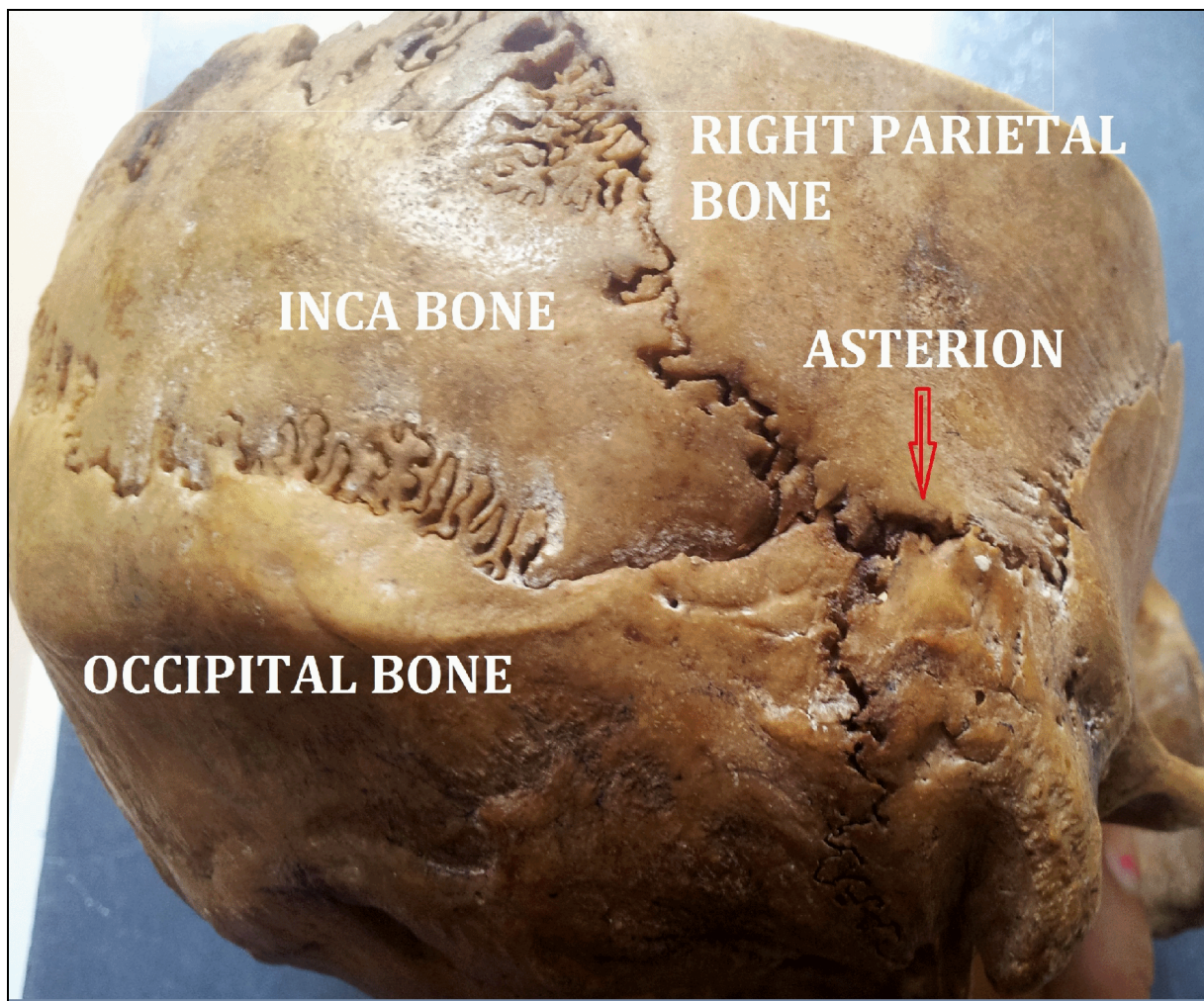


Figure 3. Right postero-lateral view of skull showing distance of right lateral angle of inca bone from right asterion.

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