

## Credentials And Different Positions Of Sutural Bones In South Indian Dry Cranium

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### **ABSTRACT:**

The incidences and prevalence of sutural bones are more common, the formation of sutural bones still unclear but sutural bones were associated with certain genetic syndromes including medical conditions such as osteogenesis imperfecta, cleidocranial dysplasia, craniosynostosis, increased intracranial pressure and hydrocephalus, their association with a number of clinical conditions highlights their importance in medical research. Wormian bones, are small bones found within the sutures or joints between the bones of the skull, the most common location being in lambdoid suture. In our study, we have used total number of 108, unknown sex of dry craniums. All the cranial bones were observed carefully for sutural bones, noted the presence of sutural bones shape, unilateral or bilateral and point of location, which were entered on Microsoft excel, 2010 version. From the results, sutural bones found within lambdoid sutures in highest number of 68 crania about 62.96%. Next to lambdoid, asterion is the site with high sutural bone of 47 crania among 43.51% These both sites are more frequent to presence of sutural bones. We observed 2-3 sutural bones at pterion and parietal notch in Figure-2,3. Also found that suture bones present at sagittal suture (3.70%) and coronal sutures (5.55%). In conclusion, sutural bones may be present in larger numbers or may be abnormally shaped and located. Overall, sutural bones are an interesting and sometimes clinically relevant aspect of Human Anatomy, Anthropologist and forensic science researcher can divert their ideas and their presence or absence can be an important consideration in medical diagnosis and treatment.

**Keywords:** sutural bones, lambdoid suture, pterion and parietal notch, associated clinical conditions

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### **I. INTRODUCTION:**

Sutural bones, also known as wormian bones, are small bones found within the sutures or joints between the bones of the skull. These bones can vary in size, shape, and number, and their function is not yet fully understood (1). Several research articles have explored the prevalence and characteristics of sutural bones. One study published in the Journal of Anatomy found that sutural bones were present in 31% of skulls examined, with the most common location being the lambdoid suture. The authors also noted a correlation between the presence of sutural bones and certain genetic syndromes (2). Another study published in the Journal of Craniofacial Surgery examined the relationship between sutural bones and craniosynostosis, a condition where the sutures in the skull fuse prematurely. The authors found that the presence of sutural bones was associated with a lower risk of craniosynostosis, suggesting a potential protective effect (3). A study published in the journal Clinical Anatomy investigated the morphology of sutural bones using computed tomography (CT) scans. The authors found that sutural bones were more common in females and tended to be larger in older individuals. They also noted a high degree of variability in the shape and location of sutural bones (4). In addition, sutural bones have been associated with other craniofacial abnormalities, such as facial asymmetry and dental anomalies, Duman et al found that the presence of sutural bones was significantly associated with dental anomalies in a sample of Turkish individuals (5). Sutural bones have also been implicated in some neurological conditions. For example, more common in individuals with Chiari malformation, a condition where brain tissue extends into the spinal canal (6). In addition, sutural bones have been associated with increased intracranial pressure and hydrocephalus (7). Overall, while the function and significance of sutural bones are still not fully understood, their association with a number of clinical conditions highlights their importance in medical research. In our studies provide the valuable insights into their prevalence, characteristics and further knowledge of research is needed to fully understand the role of sutural bones in these conditions.

## II. MATERIALS AND METHODS:

This retrospective and observational study was carried out in Department of Anatomy, Basic science block, JKKN Dental College and Hospital, Nammakal dist, Tamilnadu from December 2022 to April 2023. A total number of 108, unknown sex of dry craniums, were collected from our Institution. All the cranial bones were observed carefully for sutural bones, noted the presence of sutural bones shape, unilateral or bilateral and point of location, which were entered on Microsoft excel, 2010 version. Statistical significance was analysis were performed in IBM SPSS16.0 version.

## III. RESULTS:

**Table 1: SITES OF SUTURAL BONES**

S.No	Sites of sutural bones	Unilateral	Bilateral	Total no with (%)
1	Lambdoid suture	16	52	68 (62.96)
2	Asterion	12	35	47(43.51)
3	Pteron	4	17	21(19.44)
4	Parietal notch	5	15	20(18.51)
5	Sagittal suture	-	-	4(3.70)
6	Coronal suture	6	-	6 (5.55)

Among with 108 cranial bones, sutural bones occur at lambdoid sutures in highest number of 68 crania about 62.96%. Next to lambdoid, asterion is the site with high sutural bone of 47 crania among 43.51% These both sites are more frequent to presence of sutural bones (Figure-1,2). Figure-3 shown that 1-2 sutural bone at pterion. In the parietal notch we have observed 2-3 sutural bones, Figure-4, shown the small plate of squamous part of temporal bone. Sagittal suture present in midline of cranium, suture bones present at sagittal suture was 4 bones out of 108 cranium (3.70%) and (figure 5,6) coronal sutures were unilateral present in 6 bones out of 108 cranium ( 5.55%).

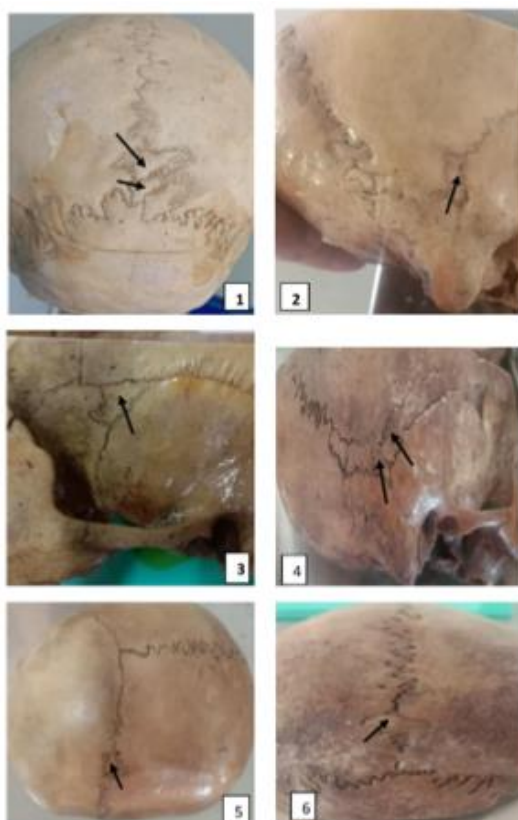


Figure1: shows 1. Suture bones at lambdoid 2. Asterion suture bones 3. Suture bones in pterion 4. Parietal notch suture bones 5. Sutural bones in coronal suture 6. Sutural bones at sagittal suture posterior to parietal foramen.

#### **IV. DISCUSSION:**

In 1643, the Danish Anatomist Olaus Wormius, reported a letter in Latin with his colleagues regarding Australopittherine cranial fragments from Makapansgat. Even before wormien's time cranial fragments had described, but Bartholin was named the wormian bones/ sutural bones. The incidences of sutural bones are more common, the formation of sutural bones still unclear but V.D.O'LOUGHLIN mentioned in their article regarding incidence of wormian bones, primary reason of this incidence is genetic influences and external factors, secondarily environmental stress, in third point was genetically determined. Many research reviews says that hydrocephalic cranium have great number of sutural bones which linked with cranial expansion (Standing S,2005), metabolic changes in embryonic mesoderm (Hess L,1946 ), abnormal number of sutural bones were indicative of osteogenesis imperfect (Govsa F, Ozer MA,2014). Sanchez-Lara et al noted that increased number and large wormian bones can see in craniostenosis cases and various disorders including deformational brachycephaly because of decreased mineralization or decreased movement. One more study, authors investigated 515 infants and children skull, out of 515/91 skull (17%) showed the presence of wormian bones, out of 91 CNS abnormalities demonstrated in 87(96%) and five (6%) were considered to have minimal brain dysfunction syndrome, the incidence of wormian bones decreased with age advances (Anderson et al., 2012). Even though normal people have the sutural bones, but its number and position may associate with lot of clinical condition as mentioned above. Salah Eldin M. Abdel-Ghani et al discussed prevalence and morphology of Wormian bones in two different human populations, they found that Wormian bones was higher in the Egyptian population than in the Icelandic population, and that the morphology of the bones varied between the two populations. The authors suggest that these differences may be due to genetic and environmental factors (GROZA VM, 2018).

Here, we have found the sutural bones frequently in lambdoid suture (numerous numbers), asterion and lambda with large suture bones. Coronal and sagittal sutures also have the 1-2 sutural bones, in this study we support that even at pterion and parietal notch also chance to have the sutural bones. We observed 108 cranial bones, and found sutural bones in 62.96%. The presence of sutural bones in patients with craniosynostosis was found to be associated with a higher risk of surgical complications. knowledge of sutural bones and its position will be useful for neurosurgeons to avoid misunderstood with cranial fractures, as well as for Anatomist, Anthropologist and forensic science researcher can divert their ideas. Further studies needed to discuss the factors of wormian bones and its associated clinical correlation.

#### **V. CONCLUSION:**

Sutural bones are formed when there is an incomplete fusion of the bones that make up the skull during fetal development. They are often small and vary in shape, and can be round, flat, triangular, or irregular in shape. While they are usually located in the lambdoid suture, they may also be found in other sutures, such as the coronal, sagittal, or squamous sutures. Although sutural bones are generally considered to be a normal variation, they may be associated with certain medical conditions such as osteogenesis imperfecta, cleidocranial dysplasia, and Down syndrome. In these conditions, sutural bones may be present in larger numbers or may be abnormally shaped or located. Overall, sutural bones are an interesting and sometimes clinically relevant aspect of human anatomy, and their presence or absence can be an important consideration in medical diagnosis and treatment.

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