

## A STUDY ON THE OCCURRENCE OF WORMIAN BONES IN ADULT DRY SKULLS

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### ABSTRACT

**Background:** Sutural or wormian bones are islands of bone that are commonly found in the sutures of the skull mainly along the lambdoid suture. These sutural bones which are irregular in size, shape and number may arise from separate centres of ossification. The prior knowledge about the Wormian bones is important because they are present in normal individuals as well as in various disorders such as osteogenesis imperfect, rickets, etc.

**Aim:** To study the occurrence of wormian bones in adult dry skulls

**Materials and Methods:** The present study was carried out on 95 adult dry human skulls in the department of Anatomy, Adichunchanagiri Institute of Medical Sciences, B G Nagara. Skulls with fractures and deformities were excluded from the study. Intact skulls were cleaned thoroughly and observed for the presence of wormian bones along the sutures of skull.

**Results:** Out of 95 skull bones studied, 24 (25.26%) skulls showed the presence of wormian bones. We also observed that maximum number of such bones (single or multiple) were present along the lambdoid suture followed by lambda, asterion, sagittal suture & coronal suture. A very small wormian bone was also found near the bregma of the skull.

**Conclusion:** The awareness about the occurrence of wormian bones and their topographical distribution will guide the clinicians mainly neurosurgeons in their practice. These bones mimic fracture lines in radiograph; therefore radiologists must also be aware of this normal variation.

**KEY WORDS:** Wormian bone, Lambdoid suture, skull.

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### INTRODUCTION

Sutural or wormian bones are islands of bone that are commonly found in the sutures of the skull mainly within the lambdoid suture. These sutural bones which are irregular in size, shape and number may arise from separate centres of ossification but they appear to have no clinical significance, being of genetic rather than pathological aetiology. They are single

or multiple wormian bones present along the sutures but among them a large interparietal bone is common and is sometimes referred to as an Inca bone [1].

Many studies have showed the presence of single or multiple small such bones along the sagittal suture [2]. When the wormian bones occur as a normal variant, they tend to be smaller and lesser in number than when they

are associated with other disorders [3]. The prior knowledge about the Wormian bones are important because they are present in normal individuals as well as in various disorders such as osteogenesis imperfecta, rickets, etc [4].

Genetic and metabolic factors are the major causes for the formation of the wormian bones within the sutures of the skull [5]. These bones mimic fracture lines in radiograph, therefore radiologists must be aware of this normal variation. Neurosurgeons must be careful with sutural bones during burhole surgeries [6].

## MATERIALS AND METHODS

The present study was carried out on 95 adult dry human skulls in the department of Anatomy, Adichunchanagiri Institute of Medical Sciences, B G Nagara. Skulls with fractures and deformities were excluded from the study. Intact skulls were cleaned thoroughly and observed for the presence of wormian bones along the sutures of skull. The data thus obtained was tabulated, analysed and also compared with other studies.

**Fig. 1:** Picture showing the Wormian bones with respect to different sutures of the skull



## RESULTS

**Table 1:** Presence of wormian bones.

Wormian bones	Number	Percentage
Present	24	25.26
Absent	71	74.7

**Table 2:** Number & Percentage of wormian bones with respect to different sutures of the skull.

Sutures	Number	Percentage
Lambdoid suture	13	13.68
Lambda	5	5.26
Sagittal suture	2	2.1
Asterion	2	2.1
Coronal suture	1	1.05
Bregma	1	1.05

Out of 95 skull bones studied, 24 (25.26%) skulls showed the presence of wormian bones. It was observed that maximum number of wormian bones (single or multiple) were present along the lambdoid suture followed by lambda, asterion, sagittal suture & coronal suture. A very small wormian bone was also found near the bregma of the skull.

## DISCUSSION

Wormian bones which were firstly described by Danish anatomist Olaus Wormius are accessory, small, different-shaped bones

located on the cranial sutures which are appeared from additional centres of ossification [7]. The presence of wormian bones more along the lambdoid suture is the common finding in most of the previous studies [8-13]. Three different shapes of wormian bones, quadrangular (4%), irregular (36%) and triangular (8%) were also identified in a study [10]. Another research shows the existence of sexual dimorphism of wormian bones with respect to its location. According to that, Wormian bones are observed along the coronal suture, Bregma and Asterion in male skulls and in females they are present in intra- orbital region [11].

The overall incidence of wormian bones was seen in 52 skulls (35.3%) with males having 23.8% and females having 11.5% in north india region [4]. Wormian bones are mostly seen along the lambdoid suture in 115 (52.99%) skull of western uttar pradesh region. In those skulls, multiple wormian bones were seen only in 2 skulls [5].

In the study done by Vijay LVG, the incidence of wormian bones was seen in 123 (61.5%), with a maximum incidence at the lambdoid

suture (112 skulls, 91.05%), followed by the asterion and coronal suture. They also found that 70 (14.17%) wormian bones were present along the midline sutures of the skull [3].

One hundred and twenty-four (74.7%) skulls had wormian bones out of 166 skulls examined by an author. There was no difference was detected between the incidence of wormian bones with respect to gender and age. Wormian bones were most commonly located in the lambdoid suture (44.6%), followed by the coronal suture (39.8%), asterion (21% on -the left and 15.3% on the right side) and parietomastoid suture (15.1% on the left and 13.9% on the right side). They were also present with respect to other sutures of the skull such as occipitomastoid, sagittal, squamosal, zygomaticosphenoid, metopic, frontonasal and frontozygomatic [14]. In an another study overall incidence of wormian bone was 44.4% and occurred more frequently at lambdoid suture (48.14%). Wormian bones were also present at asterion (18.5%), along the coronal suture (0.03%), along the parieto-temporal suture (0.07%), along the occipito-mastoid suture (0.03%) and at pterion (0.03 %). Adding to the finding, wormian bones were found 48.1% on left half of skull and 37.03% on right half of skull [15].

## CONCLUSION

In the present study wormian bones were more numerous along the lambdoid suture which correlates with many existing literature. The awareness about the occurrence of wormian bones and their topographical distribution will guide the clinicians mainly neurosurgeons in their practice. As these bones mimic fracture lines in radiograph; radiologists must also be aware of this normal variation.

**Conflicts of Interests: None**

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