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Incidence of Wormian Bones in the North Coastal Andhra Pradesh
Original Research Article

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Abstract:
Objective: *The Wormian bones are small accessory bones found in the cranial sutures. The present study examines the incidence of these Wormian bones in dry skulls in the North costal Andhra Pradesh. Materials and* ***Methods and Results:*** *In a sample study of 58 skulls, we have found in 14 of them (24.13%), the Wormian bones confined to the lambdoid suture only and their number ranging from 1 to 4. When in multiples they showed a tendency to be more on the right side. We have not found any of them in the coronal suture or sagittal suture or at the pterion. One skull showed quite a large Wormian bone extending into the occipital bone. (Figures)*
Key words: *Wormian bones (WBs) sutures, ossification centers*

I. Introduction

Wormian bones are the small chips of bone found most often in the lambdoid suture separated from it and well circumscribed by a suture which makes them stand out. First described by Paracelsus (1460 to 1541 CE (Common Era); generally known to be named after a Danish Anatomist; Olaus Worm who reportedly described them in a letter to Thomas Bartholin in 1643.1-3.

The mechanisms responsible for the formation of these Wormian bones are unknown though some studies have shown that their presence may mark some congenital anomalies of central nervous system. They occur in large numbers associated with skeletal dysplasias[4].

II. Materials and methods and results:

48 skulls have been obtained for the study from the Anatomy museum of Maharajah Institute of Medical Sciences, Vizianagaram and we found the WBs confined to the lambdoid suture in 14 of them. The orbits, sagittal and coronal sutures and the Pterion did not show any. The incidence is 24.13%.

III. Discussion:

Wormian bones can be found as normal variants and seem to be determined genetically in certain populations[4]. Wormian bones have been recognized in an Australopithecine skull[5]. In his monograph, Parker [2] mentioned several synonyms that were used, as follows:

1. According to the discoverer: ossiculaAndernaci, ossaGoethiano
2. According to shape: ossatriquetra, ossatriangularis,ossaquadratum
3. According to localization: suturaux, fontanellaires, insules, intercalaria, raphogeminantia, apicis
4. According to function: complementaria, ossaaccessorii Wormian bones are also called ossawormiana, intersutural bones, and Inca bones. Najjar and Dawson suggested that the prevalence is lower in fetuses (11.3%) than in adults (62.1% to 76.2%)[6]. About half of the wormian bones are located in the lambdoid suture and fontanelle (and the mastooccipital suture).

The second most common site of occurrence (about 25%) is in coronal suture. The rest occur in any remaining sutures and fontanelles[7]. In the present study we have observed the WBs in the lambdoid suture only and not in fontanelles. In 1979, Pryles and Khan, studying groups of children in hospitals and schools, showed that the prevalence of wormian bones in humans varies[7] from 8% to 15% in a random population and reaches 54% in a mentally impaired population[3]. Since Wormian bones belong to the neurocranium, they share its embryology. They appear as isolated ectopic islands of intramembraneous ossifications. In the fetus, the diploë is not formed yet, and thus wormian bones are composed of a single layer of compact bone on the dural side[4].

Parker suggested that "the number of wormian bones increases with the capacity of the skull, regardless

of the cause of enlargement." His data was based on various skulls from normal populations and from abnormal skulls (microcephalic having fewer, and hydrocephalic [at a time when shunting did not exist] having more[2]. A similar relationship exists with the total length of sutures: "The greater the sutural length of a skull the greater the number of
wormian bones." He suggests that sutural diastasis induces the formation of ectopic ossification centers. In 1946, Hess proposed that the formation of wormian bones could result from metabolic disorders of the mesoderm, and he noted that they also correlated with asymmetry of the skull, bone malformations(occiput, sphenoid), metopism, and congenital anomalies of the central nervous System [8]. The WBs are hypothesized to be inherited as a dominant trait[9].

IV. Conclusion:

The wormian bones, in themselves, do not carry a pejorative prognosis, and thus the prognosis will depend on the type and severity of the associated diseases.

About half of the wormian bones are located in the lambdoid suture and fontanelle (and the mastooccipital suture). The second most common site of occurrence (about 25%) is in the coronal suture. The rest occur in any remaining sutures and fontanelles[7]. WBs located posteriorly are influenced by environmental factors more than the anteriorly located ones[10].

Apart from a rare misdiagnosis of a cranial fracture, the authors wonder whether these chips of sutural bones are given too much of an importance. In our study we are describing a very large unique WB 3cm X 3cm presenting all most independently not described earlier by any worker.

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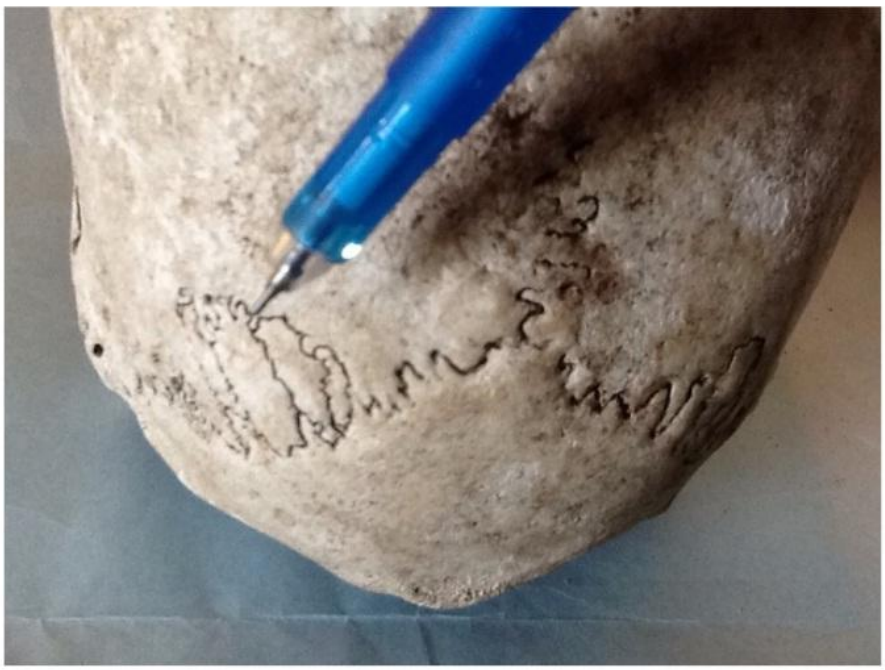
Figures:

1. Showing 3 WBs
2. Showing multiple WBs in the Lambda and Lambdoid suture
3. Showing multiple WBs at Lambda and adjoining Lambdoid suture
4. Showing a large unique WB in our study
5. THE LARGEST WB FOUND IN OUR STUDY

Figures

1. Showing 3 WBs



2 Showing multiple WBs in the lambda and lambdoid suture

3. Showing multiple WBs at lambda and adjoining lambdoid suture

4. Showing A Very Large Unique Wb In Our Study

5. THE LARGEST WB FOUND IN OUR STUDY