

False Sutural Bones should have its Own Anatomical Denomination in International Anatomical Terminology?

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Abstract

False sutural bones share an unknown origin with true sutural bones. Both are found in healthy individuals; however a higher incidence has been recorded in a variety of congenital disorders. Equally have been reports of very high frequencies in Chinese and Indian's cranium. Due to false sutural bones anatomical location inside a cranial bone not related to cranial's sutures. Author proposes false sutural bones should have denominated as intercranial bones (Ossa Intercranial) in International Anatomical Terminology. The debate is opened about its anatomical denomination.

Keywords

Sutural bones • False sutural bones • True sutural bones • Wormian bones

Introduction

The sutural bones are supernumerary bones in cranium's sutures and fontanelle. The knowledge of the presence of sutural bones is very important to human anatomists and other medical specialties. Sutural bones were named Wormian bones after the Danish anatomist, Olaus Wormius. He made a detailed description of them in 1643. But their first description was attributed to Hippocrates. Sutural bones were also mentioned but with other names by Paracelsus and D'Andemach Gonthier but Vesalius was one of the first to associate sutural bones with cerebral disorders [1,2]. The international anatomical nomenclature named Sutural bones as Ossa Suturae and identified them [3]. Sutural bones appear to be as old as man himself, they have even been observed in Australopithecine cranial fragments from Makapansgat [4]. The aim of this paper is to do a brief review about sutural bones mainly to false sutural bones which due its anatomical location author proposes denominated as intercranial bones (Ossa Intercranial) in International Anatomical Terminology.

Methodology

Human Cranium is the most complex bony structure in the Human body. While the young adults' cranium and face consist of 28 separate bones, many of which are paired, the older adults' craniums are composed of 22 bones. The cranium is essentially made up of 8 bones: 2 (paired) parietal bones, 2 (paired) temporal bones, frontal bone, occipital bone, sphenoid bone, ethmoid bone. Most of these bones are held together by sutures. Sutures and the junctions of sutures undergo a series of morphological changes from birth to adulthood [5,6]. During all this process, additional ossification centers appear in or near the sutures, which are the potential sites of sutural bones. Although the intramembranous ossification process of

cranial bones has been embryologically well studied, the growth of the vault bones encompasses a more complex process that is not fully understood, and several important aspects, including bone tissues organization in cranial bones, remain unknown [7-9].

These are supernumerary bones in the cranium. They have been documented on most mammals and in hominids, so they are not exclusive to modern human skulls [4]. Sutural bones are found in both sexes in similar percentages as well as in both sides of the cranium, being predominantly symmetrical [10]. They can have different irregular shapes (round, oval, oblong, triangular, quadrilateral and polygonal have all been reported) and can vary from under 1 mm in diameter to 1 inches-2 inches or 5 cms × 9 cms in diameter. Sutural bones articulate with the surrounding bones by sutures with indentations more complex on the outer surface of the skull than on the inner aspect. Although they are most commonly found in the posterior sutures (lamboidal and occipito-mastoid sutures), they can occur in any cranial suture and fontanel and these are denominated as True sutural bones.

Sutural bones can develop either from independent ossification centers or by their separation from primary centers [11,12]. According to the site where sutural bones are formed they receive a different name that is, in most cases, derivative from the suture or sutures they are in contact with or with the centre of ossification or fontanel where they originate. The isolated sutural bone in lambda is named as 'Os Incae' [13]. The morphological significance of sutural bones is unknown. They have been reports of very high frequencies of sutural bones in some population and their absence in others which are geographically close or are subject to the same environmental stresses suggesting a genetic mechanism of formation [13-15]. Their incidence is variable, ranging from around 10% in Caucasian's cranium, 40% in Indians' cranium, to 80% in Chinese's cranium [16-18]. Sutural bones are also found in healthy individuals, however a higher incidence of multiple wormian bones have been recorded in a variety of congenital disorders like osteogenesis imperfecta, cretinism (hypothyroidism), cleidocranial dysostosis, progeria, hypophosphatasia, rickets etc. The morphological knowledge of sutural bones is very vital in the diagnosis of these disorders [19,20].

Sutural bones are classified into true sutural bones and false sutural. True sutural bones derived from one or many points of ossification in or near cranial are sutures. False sutural bones are ossification centers not welded to independent bones. These are not related to sutures [21-25].

Discussion

False sutural bones share an unknown origin with true sutural bones. It is uncertain but perhaps false sutural bones could have a different origin as well as a different clinical meaning than true suture bones. However, because "false" term means something that is not true or mentioned,

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these bones should be cited by their own anatomical attribute: Its location inside a cranial bone not related to cranial's sutures. Due to its anatomical location, Author proposes false sutural bones should have denominated as intercranial bones (Ossa Intercranial) in International Anatomical Terminology.

In order to differentiate these from the true sutural bones, which lie between the cranial's sutures. As far as our literature searches showed us this matter about its denomination is rare debated. The discussion is opened about its anatomical denomination.

Conclusion

The knowledge of the presence of true and false bones are of interest and useful to Human Anatomy, Neurosurgery, Physical Anthropology, Forensic Medicine, Imaging Medicine, Craniofacial Surgery and Legal Medicine among others.

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Conflict of Interest

Author declares that there is no conflict of interest.

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