



H111 Identity Crisis: The Case of a Wormian Bone Interpreted as a Traumatic Skull Fracture

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After attending this presentation, attendees will: (1) be aware of the importance of correct identification of a wormian bone; (2) understand differentiating features of wormian bones and skull fractures; and, (3) be able to recognize wormian bones.

This presentation will impact the forensic science community by: (1) emphasizing the importance of wormian bone recognition, especially in alleged child abuse situations; and, (2) preventing the misdiagnoses of a wormian bone as a cranial fracture as well as the cranial fracture as a wormian bone.

Wormian bones, also known as intra-sutural bones, are developmental abnormalities of the cranium. They are classified as normal anatomical variants and differ in size, shape, and location. On occasion, they can be mistaken for traumatic fracture in the pediatric population. This distinction has strong consequences for allegations of child abuse, and this case represents an interesting intersection between forensic pathology, hospital imaging, incidental findings, and claims of child abuse.

A 4-month-old Black female was reportedly found unresponsive and subsequently experienced 45 minutes of successful cardiopulmonary resuscitation. Hospital Computed Tomography (CT) revealed a left tibial fracture and an accessory cranial suture; the interpretation of the head CT was then amended to a suspected occipital skull fracture due to its “angularity, location, and presence of tibial fracture.” Various consulting physicians labeled the suspected fracture as “non-depressed skull fracture,” an accessory suture, and “linear lucency vertically and distally from the middle region of the right lambdoidal suture, possibly reflecting subtle fracture.” More detailed radiography of the tibia did not confirm a tibial fracture. The patient was taken off assisted ventilation five weeks after admittance. There were suspicious circumstances concerning the infant’s care, including differing histories that she was found between the mattress and wall and found on the ground next to the bed. A preliminary investigation by local police listed the death as a suspected homicide. Criminal charges were made; these charges were dismissed following the conclusions of an autopsy examination.

Wormian bones are commonly located in parietal and occipital bones, mimic linear fracture patterns, lack soft tissue swelling, demonstrate a pattern of sclerotic borders, have no associated diastasis, and merge with adjacent sutures. Meanwhile, fractures are characterized by sharp lucency with non-sclerotic edges on radiography, usually have associated tissue swelling, can cross suture lines, widen when approaching sutures, and can be separated into non-accidental and accidental categories.¹ Lastly, lack of fracture callus cannot be readily relied on to define wormian bones, as fracture callus is not always seen in intramembranous flat bones of the calvaria.²

This case, while unusual, is not unique. In fact, at least five case reports have been published in the last ten years of various accessory sutures misinterpreted as abusive fractures.³ The ability of pathologists and radiologists to differentiate between skull fractures and wormian bones is of critical importance, particularly with allegations of abuse. Wrongful accusations can be devastating for families already experiencing difficult times. This case illustrates a need for further clarification surrounding the pathologic picture of abusive fractures, consistent documentation of wormian bones, and greater emphasis on the absence of soft tissue swelling. Lastly, it encourages caution and thorough consideration of the differential diagnoses of suspected abusive fractures.



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Reference(s):

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 3. Wiedijk J.E.F., Soerdjbalie-Maikoe V., Maat G.J.R., Maes A., van Rijn R.R., de Boer H.H. Article in Press: "An accessory suture mimicking a skull fracture." *Forensic Sci Int* 2016:e1-3.
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