

Skull Development from Observations of Historical Fetal Specimens

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Skull development occurs in two parts: the neurocranium forms the vault, and the viscerocranium forms the facial skeleton. The neurocranium has both membranous and cartilaginous parts. The membranous part comprises flat bones forming via intramembranous ossification, with bone spicules arising from primary ossification centres that spread peripherally. These bones thicken into neonatal life as new layers of bone are laid down on the outer surface while the inner layers are resorbed by osteoclastic activity. The cartilaginous part becomes the skull base. The viscerocranium is initially small compared to the neurocranium due to the small size of facial bones, as well as the absence of paranasal air sinuses and teeth. In a previously uncatalogued historical collection in the Human Dissection Room at the University of Cambridge, there are 5 spirit-preserved potted specimens and 46 dry specimens of developing skulls ranging from 14 weeks gestation to the newborn. The collection also includes a number of disarticulated fetal skull bones. All these were photographed and examined to provide a sequential presentation of skull development. In the potted specimens and disarticulated bones, individual bone spicules can be observed to form within the membranous neurocranium from ossification centres. In the earliest specimens, the skull vault is clearly chiefly membranous then thickens towards term. Closing of the sutures and proportional increase of the size of the viscerocranium compared to the neurocranium can also be demonstrated. It is hoped that these specimens will facilitate understanding and visualisation of skull development for students on the anatomy course.

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