

Blood Vessels that Groove the Skull

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Short Commentary

The cardiovascular system is the first system to form and function in an embryo, and the heart is the earliest differentiating and functioning organs.

The human heart develops on day 18 or 19 following fertilization [1]. On the day 22, the primitive heart tube develops into five distinct unpaired regions and begins to pump blood. Between days 23 and 28, the primitive heart tube elongates unevenly, twisting and folding to form a U-shape and then an S-shape. As a result, the atria and ventricles of the future [2].

In human embryos the heart begins to beat at about 22-23 days from conception, with blood flow beginning in the 4th week [3].

The Skull is a unique skeletal structure in several ways: embryonic cellular origin (neural crest), form of ossification (intramembranous and endochondrial) and flexibility (fibrous sutures). The cranial vault (which encloses the brain) bones are formed by intramembranous ossification. While the bones that form the base of the skull are formed by endochondrial ossification. The bones enclosing the brain have large flexible fibrous joints (sutures) which allow firstly the head to pass through the birth canal and secondly postnatal brain growth. In humans, ossification continues postnatally, through puberty until

mid-20's and in old age the sutures separating the vault plates are often completely ossified.

The continuous embryonic heart beating may lead to indentation in the soft skull bones early in life and as a result to this, grooves may develop in certain regions like occipital artery (medial to the mastoid process), deep temporal arteries (at the infratemporal crest), middle temporal artery (at the root of zygomatic arch), middle meningeal vessels (at greater wings of the sphenoid within the cranial cavity), and internal carotid artery (at the side of the body of the sphenoid within the cranial cavity). Regarding the venous sinuses, (like transverse sinus, sigmoid sinus, superior sagittal sinus), also grooved the skull bones early in life as a result of continuous heartbeat, because the blood in embryo is completely oxygenated.

References

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