

# EXTREME TYPES OF VARIABILITY OF THE VERTEBRAL ARTERY (V3) SUBJECT TO SHAPE OF SKULL

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## ABSTRACT

The problem of cerebral circulation is one of the topical problems of modern medicine, because cerebral blood supply disturbance occupies a leading place in the structure of morbidity and mortality of population ([Ingall](#), 2004).

Under normal conditions, cerebral blood flow is independent from systemic blood pressure in a wide range. The adequacy of cerebral blood circulation is maintained due to special arrangement of vascular system of the brain that is an anatomical foundation of its self-regulation (Musienko, 2001). In the cranial cavity, the internal carotid artery by means of the anterior and middle cerebral arteries, and the vertebral artery through the posterior cerebral arteries are merged by connecting arteries into a vascular circle (Circle of Willis) that actively participates in restoring of cerebral blood flow in case of any violation ([Hillen](#) et al., 1991). Plasticity of the arterial bed of brain is a unique compensatory ability of human's circulatory system; however, capacity of this complex depends to a large extent on anatomical variability of its constituents (Bekov et al., 2003). Study of variability of the cerebral vessels is of great practical importance, since it allows us to predict the course of pathological processes and to avoid serious iatrogenic injury during diagnostic and therapeutic procedures (Inamasu et al., 2005). At present, there are a lot of studies describing of shapes, sizes, abnormal origins of the main resources of brain's blood supply ([Gluncic](#) et al., 1999; [Hong](#) et al., 2008; [Shoja](#) et al., 2006; [Bruneau](#), 2006). However, most authors report the individual cases or analyze the variations of the vessels without taking into account the main parameter of human variability – individual type of constitution. We correlate our findings with structural features of the body to collate wide range of individual anatomical variability and make these data practically useful.

The posterior circulation of brain is of particular interest due to complex course and relations of the vertebral artery and frequent development of the chronic and acute disorders in it. Especial accumulation of bends, loops and angles is typical for the third segment (V3) of VA that runs over atypical C1-C2 vertebrae. Certain anatomical variations of the V3 can serve as prerequisites for development of stenosis, obstructions, as well as VA dissections and must be taking into account by specialists.

The objective of this study is to determine and characterize the range of anatomical variability of the V3 of vertebral artery and identify the correlation with individual shape of skull, by analysis of MRI and MRA. The anatomical grounds predisposed to development of V3 pathology are planned to be figured out.

**KEY WORDS:** Vertebral artery - V3 segment – Variability - Cranial index - Shape of skull