

# **Comparative analysis of methodologies employed by Leonardo da Vinci and Andreas Vesalius in their studies of craniospinal anatomy**

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## **Abstract**

This study seeks to compare the methods used by Leonardo da Vinci and Andreas Vesalius in their investigations of craniospinal anatomy, and determine to what extent they employed the scientific method that is the foundation of rigorous scientific inquiry today. A review of the literature on their lives and anatomical works was undertaken, with examination of primary sources and discussion with art historians. Three aspects were considered: the aims of their anatomical studies; their investigative techniques and evaluation of evidence; and the effectiveness of the methods used to communicate their anatomical findings. Key strengths shared by both men include a strong emphasis on autopsy, use of experimental evidence, and clarity in presentation, showing structures from different angles. In addition, Vesalius's refutation of the existence of the rete mirabile in humans represented a radical break from Galenic dogma. They had the same goal: to produce a definitive treatise on anatomy, but Leonardo's absence of didactic emphasis led to drawings which lacked systematic organisation. In contrast, Vesalius's great work *De humani corporis fabrica* (On the fabric of the human body), was an exhaustive atlas of human anatomy, including detailed instructions on brain dissection. Nevertheless, their investigative methods reveal serious flaws: an over-reliance on comparative anatomy as in Leonardo's use of an ox brain; an excessive use of imagination in areas of uncertainty as in Leonardo's illustration of the brachial plexus and Vesalius's depiction of the path of the azygos vein; and blind leaps of logic in their attempts to understand function, as in Leonardo's reasoning that the sense of touch passes into the fourth ventricle. However, the use of evidence from dissection and other experiments, such as Leonardo's injections of wax into the cerebral ventricles, to support their descriptions of human anatomy was innovative and ahead of their times. In conclusion, this study shows that both Leonardo and Vesalius did develop a scientific method that was based on observation and deduction. This finding has clear implications for the credit that should be given to both men for the development of modern methods of anatomical study.

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