

August von Froriep and his Ganglion

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ABSTRACT

Although the German anatomist, August von Froriep, made substantial contributions to our understanding of the craniovertebral junction, little is known of his life and work. Herein, the life and career of this forgotten anatomist are reviewed. Von Froriep will be most remembered eponymously for elucidating the dorsal root ganglia cells of the hypoglossal nerve. The Spine Scholar 1:13-14, 2018

Background

August von Froriep was born on September 10, 1849 in the town of Weimar. He was a Lecturer of Anatomy at the University of Tübingen in Germany and a renowned researcher of the skull. Hailing from a well-established medical family, von Froriep's grandfather Ludwig von Froriep was a professor of surgery, gynecology, and anatomy at the University of Tübingen as well as the private doctor to King Frederick I of Württemberg. Ludwig von Froriep strived to modernize medical education in Germany and was also a well-known publisher. Ludwig's son, August von Froriep's father, Robert von Froriep, was a professor of anatomy at the Charité – Universitätsmedizin, Berlin. The family gained a reputation as the "family of academics" for their extensive involvement in the medical field. The family often traveled to Paris, the research metropolis at the time, to further develop their professional and cultural skills and knowledge. August von Froriep was lauded for maintaining the family legacy of high academic achievements and research of medical curiosities.

The Froriep family was also known to share their wealth of medical knowledge with not only medical professionals, but also artists and painters, teaching them how to draw anatomically correct figures. August, for example, published *Anatomie für Künstler. Kurzgefasstes Lehrbuch der Anatomie, Mechanik, Mimik und Proportionslehre des menschlichen Körpers* (Anatomy for artists. A short textbook of anatomy, mechanics, mimicry and the theory of proportion of the human body) in 1890.

Academic Career

Von Froriep studied medicine in Göttingen, Tübingen and Leipzig and began practicing as a physician in 1874. Soon after, he assisted Christian Wilhelm Braune, a well known anatomist at the time. Von Froriep's most remarkable finding was that of dorsal ganglionated rootlets (Froriep's ganglion) of the hypoglossal nerve in embryonic calves and lambs. His findings were published in 1882 as *Ueber ein Ganglion des Hypoglossus und Wirbelanlagen in der Occipitalregion* (On a ganglion of the hypoglossus and vertebral systems in the occipital region). These transient ganglia were thought to show the true spinal (somatic) relationship of the hypoglossal nerve to the skull base. Fifteen years after his first mention of a ganglion of the hypoglossal nerve, von Froriep published *Zur Kenntniss der Lagebeziehungen zwischen Grosshirn und Schädeldach bei Menschen verschiedener Kopfform: zugleich ein Beitrag zur Vergleichung des Schädels mit der Todtenmaske* (To the knowledge of the positional relations between the cerebrum and the skull in humans with different head shape: at the same time a contribution for comparison of the skull with the death mask). Here he discussed the relationship between the skull and the brain. Von Froriep noted

that the specimens studied could be categorized into two groups. The first group being termed frontopetal were characterized by having the central sulcus lying farther forward in relation to the external acoustic meatus and having a more vertical orientation. The second group was termed occipitopetal, which was characterized by the central sulcus that was positioned more posteriorly. Brains with such configurations tended to have a greater distance between the occipital protuberance and the internal acoustic meatus. From these findings, von Froriep concluded that there was a relationship between the length of the skull and the size of the brain. The sylvian point was also first illustrated by von Froriep as mentioned by Krause in 1912. Lastly, von Froriep made significant observations regarding the cranial end of the notochord at the craniovertebral junction in human embryos.

von Froriep and Friedrich Schiller

Von Froriep's discoveries in medicine tend to be overshadowed by his involvement in the search for the discovery of German poet, Friedrich Schiller's skull. Von Froriep believed that the previously-claimed skull of the poet was not his and reexamined the mass grave to correctly identify Schiller's skull. Using his experience in skull research, von Froriep also worked closely with a sculptor to recreate facial figures for the presumed skull of Schiller. In 1911, von Froriep published *Die Schädel Friedrich von Schillers und des Dichters Begräbnisstätte* (The skull of Friedrich von Schiller and the poet's burial place), detailing his findings and his conclusions.

Later Life

August von Froriep died on October 12, 1917 in Tübingen, Germany. His obituary was featured in the *Frankfurter Handelsblatte* and described his family as one of medical professionals and doctors. The obituary revered him as the only son to pursue medicine and maintain the family legacy. His older brother, Otto, pursued engineering, a career not nearly as highly regarded as that of a doctor or a professor of medicine. Today, von Froriep should be most remembered for elucidating the dorsal root ganglia cells of the hypoglossal nerve.

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