Naming the Cranial Nerves: a historical note

Abstract
This summary relates the history of the Galenic system of ordinal numbering and the later naming of the cranial nerves. It emphasises the original classification by Samuel Thomas Soemmerring’s naming of 12 pairs, now universally accepted.

Physicians recognise that the cranial nerves are an important part of anatomy whose precise identity is essential to the understanding of their clinical and pathological disorders and potential remedies. Cranial nerves are derived from embryonic neural crest cells and their anterior extension the cranial placodes. Their history1 reaches back to ancient Greek Medicine.

Herophilus of Chalcedon (325-255 BC) and his contemporary Erasistratus (325-250 BC),2 were leading Ptolemaic Alexandrian scholars. From cadaveric dissections and probably vivisection, Herophilus identified at least seven pairs of cranial nerves. He distinguished motor from sensory nerves, and importantly observed that the nerves of the spinal cord were directly linked to the brain.

Similarly, Galen of Pergamum (129-c. 216 AD) described seven pairs of cranial nerves, recorded in On Anatomical Procedures.3 He did not name them, relying on an ordinal numeric system of classification,4 Galen insisted that descriptions of anatomy were based only on actual observations made at dissection, an opinion strictly respected; this proved a crucial factor in the almost universal acceptance of his dictates over 1500 years. Galen thus dominated medical theory and practice in Europe until the mid-17th century. His authority embraced the Byzantine world and the Muslim Middle East.

However, his work was based not on humans but on dissection of mice, pigs, many domestic animals and the Barbary macaque. He identified the olfactory nerve but considered it an extension of the brain. His optic nerves were therefore the first pair of cranial nerves. He also showed the optic chiasm. Galen demonstrated the oculomotor nerve terminating in the “muscles which move the eye,” but he did not identify the trochlear or abducens nerves. The sensory root of the trigeminal was Galen’s third pair, and its motor root the fourth. The facial and vestibulocochlear nerves he unified as constituting the fifth pair, though he separated their functions: the vestibulocochlear served hearing, the facial nerve “arrives on the face.” He combined the glossopharyngeal, vagus, and spinal accessory nerve as the sixth pair. The vagus, “lying next to the artery of stupor (carotid artery) and the hypoglossal innervating the tongue was his seventh pair.5

When Galen’s writings in Greek were translated into Arabic, Avicenna (980-1037 AD), Rhazes (864-930 AD), and other celebrated Arabian physicians adhered to his ordinal system. Galen’s doctrines became available to other European physicians only in the 13th century when translated into Latin.

Medieval anatomists such as Achillini, Berengario da Carpi, and Massa investigated these nerves but like the ancestors of Graeco-Roman times were seriously restricted in dissection by the contemporary prohibitive laws until after the 15th-16th centuries.

Like Galen, Andreae Vesalius (1514-1564 AD)6 in his famous De humani corporis fabrica 1543,7 described seven pairs of cranial nerves (Figure 1), but he did identify the trochlear nerve. Vesalius was succeeded by several respected Italian anatomists who published conflicting accounts and variants of the Galenic system with little in the way of additional detail or clarification.

Thomas Willis (1621-1675) in 1664, in his Cerebri anatome identified nine cranial nerves but combined the facial and vestibulocochlear nerve into his seventh pair, and the glossopharyngeal-vagus-accessory nerves into his eighth pair although he recognised a separate accessory nerve (Figure 2).8 All these early anatomists had to rely on naked eye observations, assisted only by low magnification hand-held lenses. Not until the 18th century did our present classification of 12 cranial nerves arise. This would challenge and replace the stupefying status quo that had succeeded Galen.

It originated in the work of the German anatomist, inventor and polymath, Samuel Thomas Soemmerring (1755-1830), who in 1778 classified the twelve cranial nerves as we recognise them today (Figure 3).9 His work was part of his student’s doctoral thesis: Anatomica de basi encephali et originibus nervorum cranii erandum libro quinque10 (on the Base of the Brain and the Origin of the Nerves Exiting the Skull. Five Chapters). It is astonishing that such an important discovery was the work of a student, and it bears testimony to his precocious skills of dissection and observation, not least because it plainly contradicted a long established ‘fact’.

Heinrich August Wrisberg (1739-1808), who was Soemmerring’s teacher, first named two separate roots of the fifth nerve, naming them portio major and portio minor. Soemmerring was the first to use the term nervus abducens in 1778. Before Soemmerring, the facial and vestibulocochlear nerves were classed as a single nerve. Soemmerring named the facial nerve branch—the nervus intermedius of Wrisberg in deference to his teacher.4 Although Haller in 1762 had described the eighth cranial nerves as comprising: the glossopharyngeal, vagus, and the spinal accessory nerves, it was Soemmerring who separated the three components but retained Haller’s nomenclature.

His description brought him instant, widespread recognition. It remains valid today.11 However,
Soemmerring mistakenly thought that the cranial nerves emerged from the ventricles. In the medieval tradition, he further believed that the cerebrospinal fluid could be animated and was the immediate organ of the soul, the sensornium commune. The philosophers Goethe and Kant disputed his attempt to localise the soul. Like Descartes, Soemmerring believed the nerves ended in the walls of the ventricle and were stimulated by the flow of ventricular fluid.

Soemmerring’s system of cranial nerves was rapidly adopted across continental Europe, although it was only slowly accepted in Britain, not appearing until the 11th edition of Gray’s Anatomy in 1887.

Nomenclature was diverse and usually in Latin. The reasoning and basis for the naming appears to have been: localise nerves and their anatomy, and to imply their function, and appearance. While the ordinal numbering was unchanged after hundreds of years, Soemmerring’s naming of the 12 individual nerve pairs was finally established in the Basle Normina Anatomica in 1805 renamed Terminologia Anatomica in 1998.

Current anatomy mirrors the account of Henry Gray’s (1821–1865) Anatomy of the Human Body, 1918, that relates:

The fibres of the nerve can be traced into the substance of the brain to a special nucleus of gray substance. The motor or efferent cranial nerves arise within the brain from groups of nerve cells which constitute their nuclei of origin. The sensory or afferent cranial nerves arise from groups of nerve cells outside the brain; these nerve cells may be grouped to form ganglia on the trunks of the nerves or may be situated in peripheral sensory organs such as the nose and the eye.

REFERENCES

5. Cited by Riese. 14