

Neurosurgery in the Netherlands

André Grotenhuis^{1,*}

¹Department of Neurosurgery, Radboud University Nijmegen Medical Centre, Nijmegen, The Netherlands

*Corresponding author: André Grotenhuis, Department of Neurosurgery, Radboud University Nijmegen Medical Centre, Nijmegen, The Netherlands. Tel/Fax: +31-243611111, E-mail: andre.grotenhuis@radboudumc.nl

Received: February 25, 2015; **Accepted:** March 13, 2015

Keywords: Neurosurgery in Netherlands; History of Neurosurgery

As in most areas around the world, modern neurosurgery in The Netherlands had to struggle to be recognized as a medical specialty in its own right. Although the Netherlands played a major role in the revival of craniotomy in the late 19th century, modern neurosurgery made a late start here. Neurosurgery was mostly submitted to the hegemony of neurologists and sometimes also of general surgeons in that period, who considered brain and spine surgery to be a (not highly regarded) part of general surgery.

Unlike the situation in other European countries, Dutch neurosurgery lacked a protagonist when, at the turn of the last century, craniotomy became less popular due to discouraging results, until the influential Dutch neurologist Bernard Brouwer visited the leading neurosurgical centers in the USA during two lecture tours in the US in the 1920s and 1930s. He was deeply impressed by the high standards and results in the New World, and upon his return to Amsterdam, he decided to try to change the dismal state of Dutch neurosurgery.

The development of modern neurosurgery in The Netherlands after that was highly influenced by the personal involvement of both Harvey Cushing and Walter Dandy, each in their own way. After Brouwer had paved the way by raising funds for sending the Dutch general surgeon Ignaz Oljenick overseas, Cushing personally took the responsibility to train him from 1927-1929. On his return to Amsterdam, Oljenick and Brouwer established the first neurosurgical department in the country. Encouraged by Oljenick's favorable results, a number of Dutch general surgeons started asking Cushing for support but Cushing strategically managed and deflected these requests, probably aiming to increase the advantage of Oljenick and Brouwer.

However, the University Hospital in Groningen persisted in the plans to establish its own neurosurgical unit and sent Ferdinand Verbeek to the US in 1932. Although staying at Cushing's department initially, Verbeek ultimately

applied to Walter Dandy for a position of visiting voluntary assistant, staying until the end of 1934. In the 1930s, most European neurosurgeons were influenced by the Cushing school, and it appeared that Dandy hoped Verbeek would serve as ambassador of the Dandy school.

Verbeek and Dandy became lifelong friends. On his return to Groningen, Verbeek started practicing neurosurgery, isolated in the northern part of the country. He relied on the support of Dandy, with whom he kept up a regular correspondence, discussing cases and seeking advice. Dandy, on his part, used Verbeek as the ambassador in Europe for his operative innovations. Indeed, Verbeek performed his type of surgeries and promoted these techniques to his colleagues in the Netherlands and the rest of Europe. Dandy wrote to Verbeek, "you are way ahead of the times in Holland" and "you have been well trained and do the best type of work."

In line with his strategy, Dandy encouraged Verbeek to contact renowned European neurosurgeons, writing to Verbeek in 1937, "Have you ever met Wilhelm Tönnis in Berlin? I get the impression that he is doing very good work in Germany." That summer, Verbeek attended the British-German joint meeting in Berlin, as he had already become friends with Tönnis. At that time Verbeek became the Dutch representative on the editorial board of the *Zentralblatt*, until the final edition in 1943.

Due to the political situation in the Second World War, the German neurosurgeons became isolated. The personal contacts between them and the foreign coeditors of the *Zentralblatt* stopped. Verbeek was one of the first Dutch colleagues who reestablished communication with German neurosurgeons after the war, especially Tönnis.

At the beginning of World War II, Oljenick had to flee the country, which terminated the direct line with the Cushing school in the Netherlands. After Dandy's death in 1946, Verbeek continued practicing neurosurgery following his style and philosophy. By the time Verbeek died in 1958, the strong American influence on everyday prac-

tice of Dutch neurosurgeons had been established.

But another line developed: a connection to the French school of neurosurgery. In 1936 Henk Verbiest was a resident in neurology and psychiatry in Leiden. In 1938 he started his training in neurosurgery in Paris, under the supervision of Professor Clovis Vincent, and from 1940 he was a resident of Cornelis Lenshoek in Utrecht and Amsterdam. In 1942 Verbiest was registered as a certified neurosurgeon in the Netherlands and started his neurosurgical practice in Utrecht. Today he is probably the most renowned Dutch neurosurgeon, due to his description of the concept of neural intermittent claudication and the stenosis of the spinal canal (also known as Verbiest syndrome).

During that time, neurosurgeons met only as a small part of international neurology meetings. The continuous dominating attitude of the neurologists towards the growing self-respect of the neurosurgeons led irrevocably to a growing need for emancipation of neurosurgery as a separate specialty. At the first post-war International Congress of Neurology in Paris, 1949, Alfonso Asenjo, from Chile, arranged for a meeting with a group of neurosurgeons in order to discuss how neurosurgery might present itself at international congresses in the future. In the end of a deliberate discussion it was decided to participate as a separate group.

Some years later, at the preparatory meeting prior to the Neurological Congress in Lisbon, it was proposed that one of the official scientific topics should regard neurosurgery. This proposal met only very limited acceptance by the neurologists. Although the Lisbon Congress became successful, a growing discontent developed among the neurosurgical and other "splintergroups" as they were called by Sir Francis Walshe, one of the leading neurologists.

It was still felt that neurosurgery did not receive a sufficient opportunity to present its full potentialities. In order to meet these objections to a certain degree the next convention to be held in Brussels broadened its name to: International Congress of Neurological Sciences. This reconciling move did not fully satisfy the feelings of equivalence of the neurosurgeons. Sir Geoffrey Jefferson, supported by a group of neurosurgeons, brought strongly to the fore that an independent organization was required "which would meet with and cooperate with International Neurological Congresses whenever and where ever possible".

This rebellious meeting implicated the beginning of the divorce of neurosurgery from the neurological international organization. Although ambivalent feelings and hesitations still lingered among Europeans, the Americans unanimously considered the time to be ripe for autonomy of neurosurgery. William B. Scoville was given the task to give it shape. He wrote an extensive letter to the officers of the neurosurgical societies in Europe and America and to outstanding leaders in neurosurgery, explaining the actual situation. As a great majority of the answers to his letter were positive, William Scoville arranged for a meeting of senior European neurosur-

geons and representatives of 17 national neurosurgical societies, which was held in Brussels on September 4 and 5, 1955. After ample discussions and deliberations it was decided to institute "an international organization composed of and controlled by the component neurosurgical societies", which can be considered the birth of the World Federation of Neurosurgical Societies.

The First International Congress of Neurological Surgery was held in 1957 and there were 382 neurosurgeons participating in the Congress. The topics were: extrapyramidal pathology, states of consciousness in neurology, therapeutic applications of hypothermia, stereotactic methods and supratentorial angiomas. The interim meeting two years later was held in Copenhagen with following topics: radioactivity and heavy radiation particles in neurosurgery, re-evaluation of surgery in the treatment of pain, space occupying lesions of the central nervous system, management of hydrocephalus and biology and chemistry of the nervous system.

The topics already clearly showed that neurosurgeons were involved also in basic neuroscience, but the other specialties within neuroscience still had difficulties recognizing that fact. Neurosurgery in The Netherlands was and still is not considered to be part of neuroscience. Neurosurgeons are craftsmen, while others in the field, neurologist, neuropathologists, neuroanatomists, neurobiologists, etc. are scientists. This is still a struggle today. Only 12 years ago, when my own university decided to concentrate scientific work in a new Institute of Neuroscience involving all specialties in this field, the appointed head of the institute was strictly against any involvement of neurosurgery in that endeavor, stating that surgeons are no scientists, "the only useful thing they do is providing us real scientist with brain tissue". When we insisted on being part of it, he threatened with his resignation and so the board decided against participation of neurosurgery in the neuroscience institute.

But what they do not realize is the unique possibilities that we have as neurosurgeons, we are the only neuroscientists that can see and touch and study the living human brain! And most progress in neuroscience has come through the study of the diseased central nervous system. Early studies of the human brain used a simple method: wait for misfortune to strike strokes, seizures, infectious diseases, accidents and see how victims coped. In many cases their survival was miraculous, if puzzling. Observers were amazed by the transformations that took place when different parts of the brain were destroyed, altering victims' personalities. Parents suddenly couldn't recognize their own children. Pillars of the community became pathological liars. Some people couldn't speak but could still sing.

This is beautifully described in *The Tale of the Dueling Neurosurgeons*, by Sam Kean. It refers to the case of French king Henri II, who in 1559 was lanced through the skull during a joust, resulting in one of the most significant cases in neuroscience history. For hundreds of years scientists have gained important lessons from traumatic accidents and illnesses, and such misfortunes still repre-

sent their greatest resource for discovery.

In 1559, the two surgeons Ambroise Paré and Andreas Vesalius discussed trephining the skull of King Henri II of France to remove any excess fluids and “corrupted” blood inside, but the risks outweighed the benefits and they gave up the idea. In the meantime, they examined the heads of the decapitated criminals. It was a macabre mix of medieval brutality and modern experimental savvy, and Paré and Vesalius eagerly examined them for clues. Alas, they offered little inspiration for treatment.

Instead, the two men could have learned a lot more by simply observing the king, whose suffering foreshadowed many great discoveries over the next four centuries of neuroscience. Henri continued to drift in and out of coherence, limning the borders of the unconscious. He suffered from seizures and temporary paralysis, two then-mysterious afflictions. Strangely, the paralysis or seizures would derange only half of his body at any one time, a clear hint (in retrospect) that the brain controls the body’s halves independently.

Henri’s vision also went in and out, a clue that the back of the brain (where Paré expected to find the contrecoup damage) controls our sense of sight. Worst of all, Henri’s headache kept widening, which told Paré that his brain was swelling and that blood vessels had ruptured inside the skull. As we know today, inflammation and fluid pressure can crush brain cells, destroying the switches and circuits that run the body and mind. This explains why brain injuries can be lethal even if the skull suffers no fracture.

The history of neuroscience has proved the brain amazingly resilient, but one thing it cannot stand is pressure, and the secondary effects of trauma, like swelling, often prove more deadly than the initial blow. King Henri II of France finally succumbed to an intracranial hemorrhage at 1 p.m. on July 10. Queen Catherine ordered every church to say six requiem masses daily, and ordered all church bells which had been bleating for the king silenced.

Amidst this sudden, sinister quiet, Vesalius and Paré began their famous autopsy. To cut open a king to even suggest such a thing was bold. In that era, anatomists might open someone up for one of two reasons, a public lecture or an autopsy. Both activities had a stink of the disreputable about them. By the mid-1500s, a few cities, especially in Italy, had relaxed the old prohibition on dissections for teaching purposes, but only barely: authorities might allow one per year (usually in winter, to prevent spoilage), and only then of criminals, since an official sentence of “death and dissection” would wring a little more posthumous punishment out of the rogue. Most kingdoms limited autopsies to suspected cases of poisoning, infanticide, or other heinous acts. Why Catherine gave in to Paré and Vesalius and permitted a full, invasive autopsy of Henri isn’t clear, since everyone knew who had killed him and how, but history remains grateful she did.

Vesalius had laid out the proper steps for opening the skull in *Fabrica*. After he removed the skull vault, he encountered the meninges. In *Fabrica* Vesalius suggested that students nick the meninges with their thumbnails

and unwrap them. He then encouraged students to plunge their fingers in and squeeze and fondle every fold: dissection was as much a tactile as a visual pleasure for him. The front and sides looked normal, but in the rear antipodal to the blow Vesalius and Paré found pools of blackened fluids bulging beneath the meninges, like blisters about to burst. The brain itself had also yellowed and putrefied back there, a mass that measured one thumb’s-width across by two thumb’s-widths tall. Equally important, they found that the wooden shards from Montgomery’s lance had never penetrated the brain.

It is not always clear what Vesalius and Paré understood, in modern terms, of how brain damage kills. In their reports they often lapsed into talk of imbalanced humours and “animal spirits” escaping Henri’s body. They knew nothing of neurons or localization. And the shards from Montgomery’s lance probably led to an infection that weakened Henri and hastened his death—a complication they couldn’t have grasped. But the duo understood well enough that the “commotion” and “corruption” in the back of Henri’s brain, along with the resultant pooling of blood, had ultimately killed him. Trauma to the brain alone, they determined, could be deadly, even without a skull fracture. And in proving this, they vastly outdid the mutterings of that old phony, Nostradamus. He had equivocated about lions and cages of gold. Vesalius and Paré had predicted what sort of damage they’d find inside Henri’s brain and exactly where they’d find it—and find it they did. They proved science the superior clairvoyant.

Neurosurgeons should be able to cope with this basic ambivalence in medicine, already described by Galenus, the patient as the human being that first of all needs our full attention and care but at the same time will be the subject of our studies, to learn more about the (patho) physiology of the nervous system. Modern imaging technology allow a much more precise image of what is going on inside the brain or spinal cord, but still a lot remains unknown. Neurosurgical techniques have developed steadily throughout the decades to be as less invasive as possible.

Intra-operative monitoring and awake craniotomy not only allow real-time update of functional integrity, it also allows to study how the brain reacts to the surgical procedure and it has given new insights into the brain’s plasticity.

With growing numbers of neurosurgeons and with ongoing subspecialization, the number of operative procedures per neurosurgeon will decrease. The “general” neurosurgeon doing all kind of procedures, from carpal tunnel release to brainstem cavernoma, will no longer exist. But this also gives the opportunity for the upcoming generation of neurosurgeons to be more intensively involved in basic research in their specific field of interest.

It is a great idea to establish an international journal devoted to neuroscience, in the broadest sense, and more so that it has been an initiative from neurosurgery, a specialty that has matured from a pure surgical craft into a highly specialized, full member of the neuroscience community.