American influence on the origins of neurosurgery in the Netherlands

Historical vignette

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Although the Netherlands played a major role in the revival of craniotomy in the late 19th century, modern neurosurgery made a late start there. 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.

During two lecture tours in the US in the 1920s and 1930s, the influential Dutch neurologist Bernard Brouwer also visited the leading neurosurgical centers. 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. Funds were raised to send the general surgeon Ignaz Oljenick for training to Harvey Cushing, and close ties between Amsterdam and neuroscientists in the US remained. Several American neurosurgeons received part of their basic training in Amsterdam. A second Dutch surgeon, Ferdinand Verbeek, honed his neurosurgical skills under Dr. Walter Dandy. The strong American influence on the philosophy and everyday actions of Dutch neurosurgeons continues until this day. (DOI: 10.3171/JNS/2008/109/8/0348)

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The first 3 decades of the 20th century saw a rapid development of neurosurgery as a separate surgical specialty, mainly as a result of Harvey Cushing’s pioneering work. In the Netherlands, however, craniotomies were generally the domain of general surgeons. Although the first craniotomy in the Netherlands was performed only 5 years after the first reported case by Rickman Godlee (1849–1925),⁴ and ~ 10% of craniotomies reported worldwide by the end of the 19th century had been performed in the Netherlands,⁵ craniotomy as a subspecialty did not develop further.

When craniotomies became less popular at the end of the 19th century due to disappointing results, European countries like England with Victor Horsley (1857–1916), France with Anthony Chipault (1866–1920), and Germany with Fedor Krause (1857–1937) had their own proponents. Unfortunately, the Netherlands lacked a protagonist in this evolving field of surgery. It was the stimulating personality of Bernard Brouwer (1881–1949), who was the first professor of neurology separate from psychiatry in the Netherlands (1923), which provided the necessary impetus for general surgeons such as Ignaz Oljenick (1888–1981) and Ferdinand Verbeek (1902–1958) to pursue a neurosurgical career.

In the following account, we will give some insights into these early influences and collaborations, with a special focus on these two pioneers of Dutch neurosurgery, both of whom were trained in the US.

**Dutch Pioneers in Neurosurgery**

Accounts of trepanation date back to the 17th century, the Golden Age of Dutch culture. In 1641 Nicolaes Tulp (1593–1674), who was immortalized in Rembrandt’s painting *The Anatomical Lesson*, provided a vivid description of a trepanation for an epidural hematoma.⁴⁴ Jakob van Meekeren (1611–1666) observed that some patients could survive the loss of brain substance rather well.⁵⁸ He implanted a portion of a dog’s skull into a patient who had a big skull defect. The patient survived but the skull graft had to be removed because of the threat of excommunication: the unification of a Christian with the skull of a dog was unacceptable! Another Dutchman, Stalpart van der Wiel (1620–1668), who was from The Hague, placed 22 bur holes in the skull of a patient who had symptoms of progressive obtundation and hemiparesis. He removed a subdural hematoma, and the patient survived.⁶² However, the iatrogenic origin of this hematoma cannot be excluded.
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It was only after the introduction and improvement of anesthetic and antiseptic techniques in the second half of the 19th century that neurosurgical procedures moved from these “superficial” interventions into the deeper structures of the brain. No less important was the application of localization theories by neurologists in the late 19th century. In the Netherlands, early studies on localization of pathological processes in the cerebral hemispheres were published by Aletta Jacobs (1854–1929), who was the first woman to graduate from a Dutch university as a physician.22,23 Her pioneering spirit, however, also led her to be the first Dutch suffragette, and she was lost to the field of medicine.

Cornelis Winkler (1855–1941), who had been appointed as lector in psychiatry at the University of Utrecht (a major city in the center of the Netherlands) in 1885, had been very impressed with the report of the first brain tumor surgery by Rickman Godlee in 1884 (which had been reported only 1 month later in the Dutch medical journal Nederlandsch Tydschrift voor Geneeskunde; this journal has been published uninterruptedly since 1857 [Nederlandsch and Tydschrift is the old spelling]).1,2,4,8

In 1882, Winkler constructed a geometrical system to transfer localization of gyri and sulci in relation to anatomical landmarks of the skull,7,1 1 year before another neurologist, Moses Allen Starr (1854–1932), published his method in his book on brain surgery.5 Winkler’s method of “triangulation” was mentioned in Dutch textbooks until the 1970s.

Winkler was also a stimulating force in the early attempts to get general surgeons interested in the emerging field of neurosurgery. In Utrecht he collaborated closely with Jan-Anton Guldenarm (1852–1905), who was a good friend, a fellow student, and most importantly, a skilled general surgeon at a community hospital. Guldenarm designed and manufactured his own instruments for neurosurgical procedures in his basement. After some disappointing procedures for brain abscesses these physicians eventually, in November 1889, were successful in the debulking of an “angiosarcoma in the left gyrus frontalis superior, lobulus paracentralis, and the top of the gyrus centralis anterior” in a 54-year-old former infantry captain.5,56,59,66,68 The patient survived for 3 weeks after the operation.

Several years later, Winkler also initiated a close collaboration with the newly appointed Professor of Surgery Anton Freiherr von Eielsberg (1860–1939), an Austrian surgeon at the Utrecht University Hospital. Professor von Eielsberg had received his training under Theodor Billroth (1829–1894) in Vienna and, after attending lectures by Jean Martin Charcot (1825–1893) in Paris, had developed an interest in neurosurgical procedures.62 Winkler, appointed Professor of Psychiatry and Neurology at the University of Utrecht in 1893, collaborated with him on several patients with brain tumors. Unfortunately, their teamwork ended when both men were frustrated in their efforts to expand their departments in the University Hospital and left the University of Utrecht. Von Eielsberg accepted a chair in the Department of Surgery in Königsberg, Germany, and later at the University of Vienna, where he continued to perform surgery for brain tumors, including the first operation on a patient with adiposogenital syndrome.49,63 In December 1896, Winkler went to the Municipal University of Amsterdam as Professor of Neurology and Psychiatry. At the turn of the last century, nearly all brain operations performed in the Netherlands until that moment had been described and documented in 3 dissertations and 5 voluminous articles in the Nederlandsch Tydschrift voor Geneeskunde, thus representing the complete state of the art of neurosurgery in the Netherlands.8,12,18,21,55,57,60,65

The first 25 years of the 20th century are somehow characterized by a lull in the development of Dutch neurosurgery. Explanations may be found in the lack of leaders in the young field of neurosurgery: no general surgeons were inspired by neurosurgical challenges and they seemed rather turned off by its dismal clinical results. Winkler, as neurosurgery’s foremost advocate, focused his attention mostly on experimental neuroanatomical studies and on organizing a more coherent infrastructure for the field of neurology in the Netherlands: he became the cofounder of the Central Institute for Brain Research, cofounder of the Society of Amsterdam Neurologists, and cofounder and coeditor of a short-lived Dutch journal for anatomy, Petrus Camper.15 He did, however, encourage another neurologist, Louis Jacob Joseph Muskens (1872–1937), to become familiar with neurosurgical procedures.34 In 1899, Muskens visited Victor Horsley (1857–1916) in London. After 20 months, he returned to Amsterdam and started to operate on his own patients. His results were rather disappointing, however, and he gained more recognition for his scientific publications on ocular movement disorders and epilepsy.31,32 He remained in close contact with Horsley, and together they made plans to start a journal completely devoted to neurosurgery, which was to be published by Elsevier.33 Horsley’s untimely death in World War I put a stop to this plan.

As in the 1920s, Harvey Cushing was a major, if not the only, force to push the development of neurosurgery in the US. It should therefore come as no surprise that it took the inspiration of a visit to Cushing’s clinic by the newly appointed Professor of Neurology at the University of Amsterdam, Bernard Brouwer, to pull the fledgling field of Dutch neurosurgery out of its slump.77

Origin of Modern Neurosurgery in the Netherlands

Bernard Brouwer completed medical school in Amsterdam and then worked at Constantin von Monakow’s laboratory in Zürich, Switzerland, for ~4 months. (This visit probably was mediated by Winkler, who was a lifelong friend of von Monakow’s.) Brouwer wrote his M.D. thesis (“Deaf Mutism and Acoustic Tracts”) under the guidance of Winkler (1909), but his studies of the visual system (especially the retinal topography in the lateral geniculate body, which he conducted with the ophthalmologist Zeeman) gained him a worldwide reputation as a neuroscientist. In 1923, he was appointed chairman of the Department of Neurology at the University of Amsterdam, and was the first ordinary Professor of Neurology in the Netherlands.

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Johns Hopkins University invited him to read the Herter Foundation Lectures in 1926. Brouwer wrote to Walter Dandy (1886–1946) in advance (February 1926) expressing his hopes to witness him performing surgery on “some fine cases of brain tumors.” Besides other major neurologists and neurosurgeons of that time, he did indeed meet Dandy and Cushing. Being of the opinion that neurosurgery represented “a new therapeutically promising domain” and especially impressed with Cushing’s work, he returned to the Netherlands determined to promote the development of neurosurgery as a separate specialty in his home country. In doing so, he turned down an offer to assume a new chair of Experimental Neurology at Johns Hopkins University; he did not want to leave the Netherlands. He was able to secure funding to send a general surgeon over to Harvey Cushing in Boston to be formally trained as a neurosurgeon. He chose Ignaz Oljenick, who at that time was working with him, seeing patients in the Neurological Outpatient Clinic.

Ignaz Oljenick (1888–1981)

Ignaz Oljenick (Fig. 1) was born in Amsterdam, the son of northern-German Jewish immigrants (the name is from Slovakian–Polish origins). He studied medicine in his hometown and, following graduation in 1911, was trained as a general surgeon by Lanz and Noordenbos (Willem Noordenbos [1875–1954], the father of the future neurosurgeon William [1910–1990]; the son authored the classic work Pain, Problems Pertaining to the Transmission of Nerve Impulses Which Give Rise to Pain). As a resident, he traveled with a Dutch ambulance team to the Balkan War in Montenegro in 1913 and worked for the Red Cross in Czechia and later in Vienna. While in Austria, he wrote an article about the neurological sequelae and treatment of traumatic cerebral artery lesions, thus demonstrating his interest in neurological disorders.

This interest certainly played a role in his decision to enter a residency in neurology, after his surgical training, in the Hospital for Epilepsy and Organic Nervous Diseases in Amsterdam, under the leadership of J. K. A. Wertheim Salomonson (1864–1922). From 1918 until 1927 he worked as a close associate in the neurological patient clinic with Bernard Brouwer. After his visit to the US, Brouwer made strong efforts to create a separate neurosurgical ward in the newly formed neurological institute in Amsterdam. Oljenick was the most suitable man to be trained in neurosurgery. They found grants to support him, and in 1927 Oljenick went to Boston to become a resident under Cushing for a 2-year period.

Oljenick, however, was not the first Dutch surgeon to visit and operate with Cushing. Adrianus Beukers (1885–1969) had visited Boston and Cushing in 1920. Forewarned about the long and monotonous operations on neurosurgical patients, he nevertheless became very impressed with Dr. Cushing’s work and results as well as with his rigorous scholarship. Cushing offered him a residency slot in neurosurgery, but Beukers declined because he had decided to become a gynecologist.

Oljenick was appointed “voluntary graduate assistant” and worked with Cushing for longer than most other residents at that time (2 years). Unfortunately, little is known about this time. Fulton, in his famous biography of Cushing, and also Bliss, in his recent biography, mention Oljenick only in passing. Although staying with Cushing at later dates, two other assistants, Bronson S. Ray and Richard U. Light, do not make any mention of him at all in their autobiographies, which were privately published (although later on, Light visited Oljenick in Amsterdam during his seaplane trips around the world).

Oljenick remained in contact mostly with Hugh Cairns (1896–1952), the founder of modern neurosurgery in England (at London and Oxford), with whom he overlapped during his time with Cushing, when Cairns was senior resident. Oljenick consulted the sympathetic Englishman on difficult patients during his time in Amsterdam, and Cairns crossed the Channel by boat at least once to assist Oljenick with a particularly difficult procedure.

During his stay with Cushing, Oljenick obtained experience with trichloroethylene treatment for trigeminal neuralgia, which resulted in a publication in the Journal of the American Medical Association. In cooperation with Cairns, he participated in the research on one of the cases (Case XII, Angioma Arteriole) for Cushing’s book Tumors Arising from the Blood-Vessels of the Brain. Angiomatos Malformations and Hemangioblastomas. He also reported on 100 cases of posterior fossa surgery from Cushing’s clinic (in French) and wrote a contribution on bilateral cervical ribs for Harvey Cushing’s Festschrift on the occasion of his 60th birthday. His description of the occipitalization of C-1, which was presented at the Third International Congress for Neurology in Copenhagen in 1939, is still known as “Oljenick’s syndrome” in the pres-
ent Russian medical literature (although its existence is doubtful).

After his return to Amsterdam in March 1929, Oljenick was the first formally trained neurosurgeon in the Netherlands. Under Brouwer’s guidance, he worked in the newly established Neurological Institute at the “Wilhelmina Gasthuis” of the University of Amsterdam. Of the 120 beds that made up this Institute, he had as many as needed at his disposal, usually around 30. Because of his excellent diagnostic skills (like Cushing, Oljenick examined all his patients himself prior to surgery) and meticulous operating techniques (including effective antisepsis and hemostasis), he rapidly changed the existing concept of a neurosurgical procedure as a prelude to death into a potentially life-saving intervention, thus promoting neurosurgery’s maturation as a separate discipline. As a consequence, patients from all over the country were soon referred to him.

Oljenick also practiced radiology himself, preferring information provided by stereoscopic images. He reviewed microscopic specimens from his surgically treated patients together with members of the Neurology Department. In spite of his busy clinical practice, he was able to publish a considerable number of articles (although never a thesis) on a wide range of neurosurgical topics.

Obviously, Oljenick was also the first neurosurgeon to train the next generation of Dutch neurosurgeons. Arnold de Vet (1904–2001) was his first resident, starting in September 1929, and Paul Hoeberechts (1911–1967) was his second, starting in 1938. De Vet was appointed to the newly founded Ursula Clinic in Wassenaar (near The Hague), which was a specialized clinic for neurology, neurosurgery, and psychiatry. He was also one of the few people to have put some personal memories of Oljenick on paper. He remarked that Oljenick could be quite harsh and unreasonable to his coworkers during stressful surgical procedures. His meticulous operating techniques were sometimes perceived (and criticized) as too slow, reflecting indecisiveness rather than caution. Apparently, the burden of making difficult decisions weighed heavily on Oljenick, the more so because he had essentially no colleagues of equal capability around him with whom to consult.

The Amsterdam Neurological Institute developed into a renowned clinic during the 1930s and was visited by many foreign clinicians, including some American physicians who later would become neurosurgeons themselves, such as Earl Walker and Jost Michelson.

At the national stage, Oljenick, along with Brouwer and Verbeek (see below), was instrumental in founding the Nederlandse Studieclub voor Neurochirurgie (Dutch Study Club for Neurosurgery), a unique get-together of leaders in the fields of Dutch neurology and neurosurgery, conceived by Verbeek after a German model.

The productive and mutually stimulating collaboration between the neurologist Brouwer and the neurosurgeon Oljenick came to an abrupt end when the Germans invaded the Netherlands in May 1940 and Oljenick, because he was a Jew, had to flee his country. With very little luggage, he took one of the last boats to England before the Dutch army surrendered following the bomb-
Catholic Hospital in Groningen. There he also performed general surgery, because neurosurgery was not a formally recognized specialty yet and insurance companies (including the “Ziekenfonds,” the Dutch National Health Service) did not reimburse these procedures. In spite of these adversarial circumstances, Verbeek performed an impressive number of operations between 1935 and the end of World War II. He operated on 130 patients with trigeminal neuralgia, mostly using the Frazier procedure (but preferring the Dandy method, although this is technically more demanding). He also performed surgery in 332 patients with cerebral gliomas, with a 26.5% mortality rate, and 28 patients with cerebellopontine angle tumors, of whom only 1 patient died. Verbeek, together with Bernard Brouwer, played a crucial role in the organization of neurosurgery in the Netherlands and was the co-founder with Brouwer of the Nederlandse Studieclub voor Neurochirurgie in 1936. He also was a coeditor of the Zentralblatt für Neurochirurgie, the first journal devoted entirely to neurosurgery, which was founded by Wilhelm Tönnis (1898–1978) in Germany in 1936.

After World War II, Verbeek’s influence within the Dutch neurosurgical world gradually declined. This may be attributed at least partially to the unpopularity of his ablative surgery for the treatment of epilepsy, and partially to his complex (meaning impulsive and short-tempered) personality. He committed suicide in a psychiatric hospital in 1958.

**European Influences on Dutch Neurosurgery Before World War II**

Whereas Oljenick and Verbeek are the Dutch representatives of the American school of neurosurgery, the third pioneer of modern neurosurgery in the Netherlands represented the French school. Cornelis Hendrikus Lenshoek (1902–1969) received his medical and subsequent general surgical training at the State University of Utrecht. By the time he completed his surgical residency, the leaders at Utrecht had started to feel uncomfortable with the University of Amsterdam’s superior position in the fields of neurology and neurosurgery. In 1933, Lenshoek was therefore sent to Paris to receive training as a neurosurgeon under Professor Clovis Vincent (1879–1947) at the Pitié Hospital. Vincent had been trained initially as a neurologist by Joseph Babinski (1857–1932), later becoming a neurosurgeon considerably influenced by Harvey Cushing, whom he visited for only 1 month. Lenshoek’s presumed communist sympathies might have played a role in his not choosing to stay in the US. Following a short visit to Herbert Olivecrona (1891–1980), another pupil of Cushing’s, in Stockholm, Lenshoek returned to Utrecht in 1936 and established neurosurgery at that city’s university. He kept in contact with French neurosurgeons and neurosurgery for the rest of his professional life, and his style of practice and neurosurgical techniques reflected that approach of original ideas and many innovations. He published a significant number of mostly clinically oriented papers, especially in the Dutch and French neurosurgical literature. His first resident was Henk Verbiest (1909–1997), who also started his neurosurgical training under Vincent in 1938 and, after a temporary interruption during World War II, completing it under Lenshoek. Verbiest later became a well-known neurosurgeon in his own right as the author of a series of articles on the symptomatology and treatment of lumbar spinal canal stenosis. In 1955, Lenshoek was appointed Professor of Neurosurgery at the University of Groningen, the first neurosurgical chair in the Netherlands.

Arnold de Vet, Oljenick’s first resident, enhanced his skills by visiting Olivecrona in Stockholm after completion of his training. He also visited a number of other neurosurgical clinics in Europe that were less influenced by the American school, such as Otfrid Foerster (1878–1941) in Breslau, Germany (the present Wrocław in Poland), and Thierry de Martel (1876–1940) and Clovis Vincent in Paris. De Vet acknowledged Foerster’s scholarship but was less impressed by his surgical skills, describing him as “a neurologist taking up the knife.” De Vet mirrored Brouwer’s opinion that a neurologist should not also be a neurosurgeon.

In this way, all neurosurgical care in the Netherlands, which had a population of 8.8 million people at the beginning of World War II, was provided by only 4 neurosurgeons, 3 of whom were, if not fully trained by American neurosurgeons, at least strongly influenced by the American school of neurosurgery (Fig. 3).
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Dutch neurosurgery

Cushing

Oljenick

De Vet

Vincent & De Martel

Lenshoek

Dandy

Hoeberechts

Verbiest

Fig. 3. Chart showing influences in Dutch neurosurgery before World War II.

was well known in the US already in the 1920s. After his second lecture tour in that country in 1932–1933, he kept in contact with John Fulton (1899–1960), who was especially interested in his work in comparative neuroanatomy and sent several residents to the Amsterdam hospital and Brouwer’s research laboratory.25,27 Margaret Kennard (1899–1976), who would later become one of the pioneers in the experimental field of preservation and recovery of brain function, worked with Brouwer. She very much liked the amicable scientific atmosphere in the Central Institution for Brain Research, where one would grab every chance to organize social events outside of the lab.25

Future distinguished and internationally renowned neurosurgeons such as Earl Walker and Tracy Putnam (whom Brouwer considered his smartest resident ever) received part of their basic training in Amsterdam. Also, the names of neurosurgeons like Jost Michelson of New York and Clancy of St. Louis can be found in the Dutch medical literature as a result of their participation in meetings of the Amsterdamsche Neurologen Vereniging (Amsterdam Neurological Society).6

Harvey Cushing (who even could read Dutch!) visited the Netherlands only once. During his trip to Europe in September 1929, he flew to Amsterdam, where his friend Arnold Klebs (1870–1943), a bacteriologist, and his former pupil Oljenick met him at the airport.16 They made a trip through the Netherlands, visiting among other places Volendam, a quaint, folkloric fishing village on the shores of the Zuiderzee (since converted into land) near Amsterdam (Fig. 4).4,5

Cushing presented one of the keynote lectures at the 13th International Ophthalmologic Congress in Scheveningen (a sea resort near The Hague) about blindness caused by brain tumors compressing the optic nerve.16 In 1932, he received an honorary degree (“doctor honoris causa”) from the University of Amsterdam.4

Fig. 4. Photograph showing Harvey Cushing in Volendam (1929). (Reprinted from Brouwer B: In memoriam Harvey Cushing. Ned Tijdschr Geneeskd 83:4902–4903, 1939.)
Conclusions

Unlike in the US, where neurosurgery developed as a branch of general surgery, or in Germany, where neurologists picked up knife and scalpel themselves, in the Netherlands it was the strong influence of leading neurologists who, following his lectures in the US, created a strong bond between Dutch and American neuroscientists. This had a major impact on neurosurgery in the Netherlands, which Brouwer pushed from a fledgling and struggling upstart into a respected and modern clinical specialty. The strong American influence on the philosophy and everyday actions of Dutch neurosurgeons continues until this day.

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