

A short history of British and Irish Neurosurgery

The history of Neurosurgery in the UK and Ireland reaches a major milestone in 2026 when the Society of British Neurological Surgeons celebrates its Centenary. This organisation, modelled on its American counterpart, was established at a meeting in London in December 1926. Its origins lay in the era when Neurosurgery, as we now recognise it emerged, as a craft practiced by dedicated specialists.

Prior to this time, Neurosurgery had its roots in a collaboration between progressive Nineteenth Century neurologists and a small group of highly innovative Victorian surgeons. The acceptance of the concept of cerebral localisation, the notion that distinct areas of the brain surface subserve specific functions, was the catalyst for the beginning of planned brain surgery. A Scotsman, the neurologist David Ferrier, proved this concept after conducting detailed animal experiments from 1873. The discovery coincided with a general improvement in the safety of surgery with antisepsis, the use of antiseptics to prevent infection at operation, introduced by Joseph Lister.

William Macewen in Glasgow began operations on the brain in 1879, guided by Ferrier's map of the motor area. Following Macewen, in London in 1884, a single brain tumour operation took place in a small Regent's Park Hospital. On this occasion Rickman Godlee, aided by Ferrier, located and removed a tumour from within the brain but his patient met with a fatal outcome. At the National Hospital in Queen Square, founded as a specialized hospital for the treatment of disorders of the nervous system, a surgeon named Victor Horsley then secured the first appointment in the world as a neurological surgeon in 1886, at 29 years of age. He reported promising outcomes, concentrating his work on patients with epilepsy and brain tumours, and achieved several global firsts including the successful removal of a spinal tumour in 1887 and the removal of a pituitary tumour in 1904.

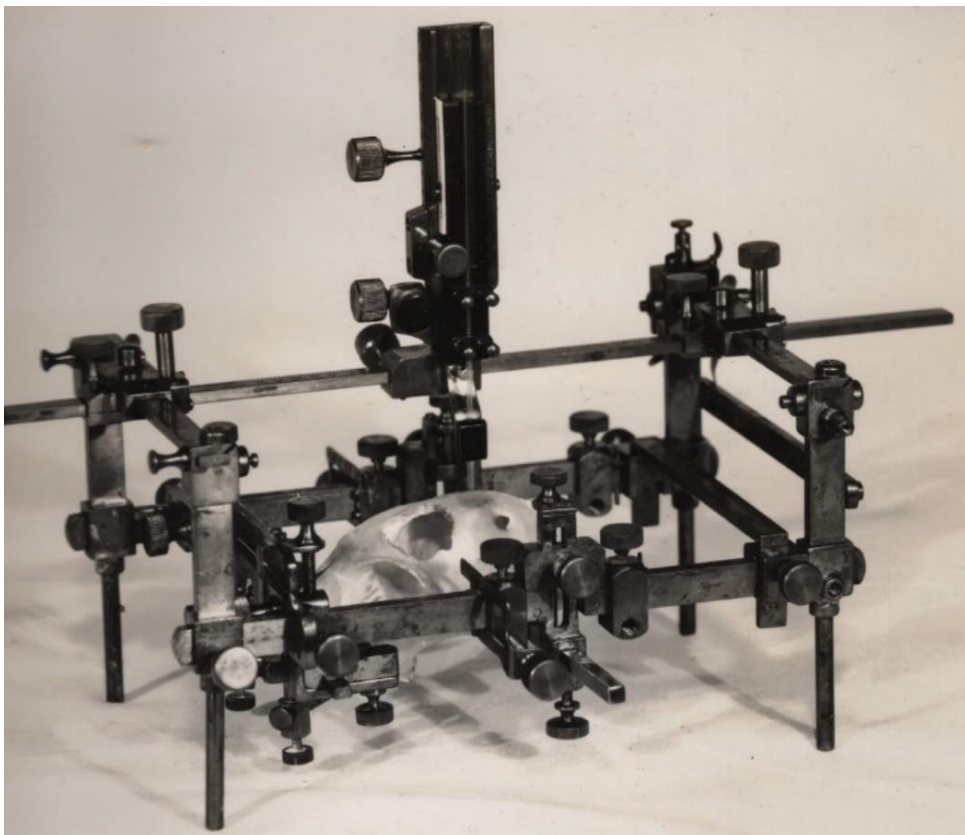


Figure 1. Horsley-Clarke Stereotactic Frame 1906

Horsley's achievements were paralleled by European surgeons including Von Bergmann and Krause in Germany and he was also emulated by those who came to be taught by him, including de Martel of Paris and Sachs of New York. It was in the USA, at Baltimore and later at the new Peter Bent Brigham Hospital in Boston from 1913, that Harvey Cushing then initiated a global revolution in brain surgery. Cushing was dedicated solely to neurological surgery and greatly enhanced operative technique by applying the surgical principles of his mentor, William Halsted. He also studied the pathology of brain disease and provided rich research and training opportunities for a new generation of British visitors to his clinic and to those of his followers. American sponsorship via the Rockefeller Foundation paid for the training of many overseas surgeons in the USA. In Canada, Wilder Penfield subsequently founded an influential unit at the Montreal Neurological Institute to which many British surgeons also travelled.



Figure 2. The plough craniotome Henry Souttar, 1928

UK development, paused at the time of the First World War which also saw the death of Horsley, became resurgent between the wars as many young British surgeons went to the North American units and imported what they had learned. Four of these men in particular drove forward the specialty. Adams McConnell (1884-1972) in Dublin, Norman Dott (1897-1973) in Edinburgh, Hugh Cairns (1896-1952) at the London Hospital in Whitechapel and Geoffrey Jefferson (1886-1961) in Manchester each overcame strong resistance to specialisation amongst the general surgeons of the day in order to promote Neurosurgery. They secured funding for new services and gathered teams of young surgeons and allied specialists around them including in neuroanaesthesia and neuroradiology.

By the outbreak of the Second World War there were further appointments of neurological surgeons including William Henderson (1904-1975) in Leeds, Wilfred Willway (1907-1944) in Bristol and Alfred Pattison (1906-1940) in Newcastle. Wylie McKissock (1906-1994), at Maida Vale Hospital and Great Ormond Street Hospital for Children in London, imported the best of contemporary neuroradiology to the UK from Stockholm with his neuroradiology colleague James Bull. Increasing use of the techniques of ventriculography and angiography, to visualise the ventricles of the brain and its vessels, meant that locating brain lesions at operation could be done with better accuracy.

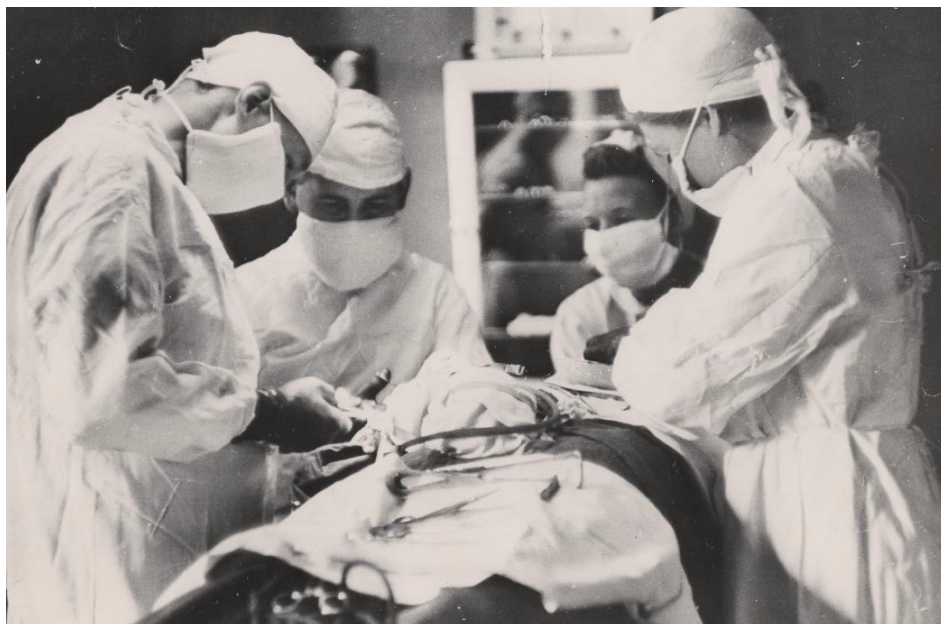


*Figure 3. Cecil Calvert and Walpole Lewin operating at St Hughes College Oxford 1941
By kind permission of the Principal and Fellows of St Hugh's College, Oxford*

The outbreak of War in 1939 brought wholesale expansion in the number of Neurosurgeons and in neurosurgical beds in anticipation of an air war. These were concentrated in a small number of Special Head Units of the Emergency Medical Service and were co-ordinated by Geoffrey Jefferson. For the army, a cohort of young surgeons were trained at St Hughes College in Oxford by Hugh Cairns to accompany British troops around the globe, developing their neurosurgical skills as they did so. Some of these men had their careers interrupted by being made prisoners of war. Antimicrobial Penicillin was developed in Oxford by a team lead by Howard Florey and was successfully deployed in battle, dramatically cutting the infection rate following brain surgery. Experience treating penetrating brain injury formed the basis of British prominence in neurotrauma that would endure long after the war. At

home, developments during wartime included surgery for psychiatric conditions, especially the widespread use of frontal leucotomy, and surgery for sciatica caused by a prolapsed lumbar disc. A new understanding arose of the value of rehabilitation in returning the injured of the conflict to useful lives. Rehabilitation facilities were provided, most notably at Stoke Mandeville Hospital by Sir Ludwig Guttmann.

Postwar, the National Health Service was founded in July 1948 and provided a salary for each consultant with state funding for every hospital which greatly assisted the opening of a national network of Neurosurgical units. There were at least 41 of these at the peak, 33 of which exist at the present day. Diana Beck (1900-1956), who trained with Cairns, was appointed as the first female consultant Neurosurgeon at the Middlesex Hospital London in 1947. A military head injury hospital at Wheatley, Oxfordshire, became a training base for the early postwar generation of neurosurgeons who were required to take part in National Service.

Influential surgeons of the postwar period included Joseph Pennybacker (1907-1983), an American who accompanied Cairns to Oxford and Walpole Lewin (1915-1980), another assistant of Cairns, who assumed leadership in Cambridge from 1955. Bryan Jennett (1926-2008) became a Professor in Glasgow, establishing a highly influential centre of research, especially in brain injury. The most prominent of the young wartime military men, John Gillingham (1916-2010), completed his training at St Bartholomew's Hospital and was then appointed to a fruitful research career as Professor in Edinburgh.

In London, Wylie McKissock built an influential unit at Atkinson Morley's Hospital in Wimbledon. Beginning as an emergency hospital in 1942, the unit acquired all the elements of a complete neurosciences centre and rose to global prominence. He also joined the staff of the National Hospital, Queen Square, placing its service on a more secure footing after the war, and promoted a succession of highly able assistants including Kenneth Till (1920-2008), the first purely paediatric Neurosurgeon, and Valentine Logue (1913-2000), the first professor of neurosurgery at the National. McKissock conducted the first controlled trial of a Neurosurgical procedure comparing surgical versus non-surgical treatment of the ruptured aneurysm in subarachnoid haemorrhage. Postwar London leaders also included Douglas Northfield (1902-1976) at the London Hospital, John O'Connell (1906-2001) at Barts and Leslie Oliver (1909-1990) who began neurosurgery at Romford in Essex and at Charing Cross Hospital. In South London, Geoffrey Knight (1906-1994) at the Brook Hospital and Murray Falconer (1910-1977) at the Maudsley Hospital developed the surgery of movement disorders and psychiatric conditions.

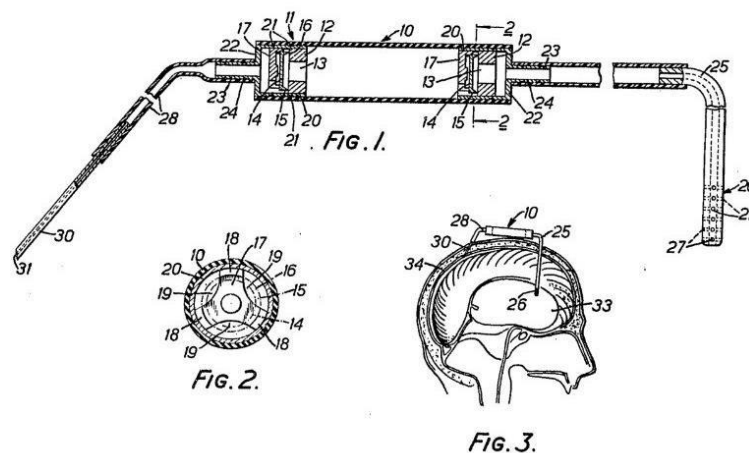


Figure 4. Patient application for the Wade-Dahl-Till shunt valve 1963

The subspecialties of Neurosurgery developed over the postwar decades. Vascular surgery permitted the treatment of ruptured cerebral aneurysms, initially by ligating the carotid artery and then by directly clipping a ruptured aneurysm. This accompanied the introduction of the operating microscope which transformed the safety and precision of neurosurgery. Functional surgery for movement disorders was improved with the use of stereotaxy, utilising a technique previously pioneered in animal studies. Joint operating with ear, nose and throat surgeons began, gaining access via the temporal bone to vestibular schwannomas and other base of skull tumours. Hydrocephalus became treatable with the introduction of valved shunts, notably at Great Ormond Street Hospital where the Wade-Dahl-Till shunt valve was invented. Norman Dott promoted the transnasal route to pituitary tumours, universally adopted.



Figure 5. The first clinical CT scanner. Atkinson Morley's Hospital, Wimbledon, 1971

New technology and new concepts defined the later 20th Century. Godfrey Hounsfield (1919-2004), a brilliant electrical engineer, worked with the radiologist James Ambrose (1923-2006) to invent Computed Axial Tomography, later known as CT. This transformed the surgeon's ability to identify surgical targets and lead to a radical shift in clinical diagnostics. Magnetic Resonance Imaging (MRI) was then pioneered at three UK centres in Aberdeen, Nottingham and the Royal Postgraduate Medical School, London. Peter Mansfield (1933-2017) of Nottingham shared the Nobel prize for MRI, whilst CT has remained the outstanding test for visualising bone and haemorrhage.

The assessment of the severity of coma was much improved by Graham Teasdale (b.1940) in Glasgow working with Jennett in 1974. They classified coma using the 15-point Glasgow Coma Scale (GCS). This scale found global acceptance as means of accurately describing a patient's condition, for detecting change, and as a valuable research tool.



Figure 6. Mr Bernard Harries operating at UCH London 1975

The value of therapy for acute brain injury in the intensive care setting became better defined in the 1970s and 1980s. The scientific justification for this was the demonstration of the 'ischaemic

penumbra' and 'thresholds of ischaemia' by the research group working under Lindsay Symon (1929-2019), Professor of Neurosurgery at Queen Square. The benefits of ventilation for the brain-injured patient were established and intensive care became the norm in severe injury.

The later Twentieth century saw a move towards less invasive surgery in various forms. The rigid endoscope, invented by the British physicist Harold Hopkins (1944-1994), became adapted for neurosurgery and has been particularly applied to ventricular, pituitary, skullbase and spinal surgery. Image-guidance technology removed the doubt of former years regarding the location of a surgical target within the brain. Transoral access to the cervical spine and improved implants for stabilisation of the diseased spine were developed in British hands.

Formal recognition of the training of a Neurosurgeon in the UK and Ireland, once an apprenticeship alone, has evolved over recent decades. The four Surgical Royal Colleges (RCS's) agreed on a single examination to mark the attainment of accreditation as a Neurosurgeon from 1978. This was followed by the introduction of a National Selection process, a rigorous interview round conducted in a single centre which has guaranteed a uniform and high standard of new entrants to the profession. Training became completed in a single centre or group of centres, instead of requiring reapplication to a senior registrar post halfway through a trainee's career, as previously.

Influential research has marked the turn of the Twenty-first century, particularly utilising the randomised controlled trial. Nimodipine, a calcium channel antagonist, was shown to be of benefit by reducing the incidence of vasospasm in patients following a subarachnoid haemorrhage. In Oxford, Andrew Molyneux and colleagues responded to the invention of coil embolization in the 1980s by setting up ISAT, a randomised trial comparing the outcome from coiling by a radiologist with direct clipping of aneurysms by the surgeon in subarachnoid haemorrhage. The finding of improved outcomes from coiling provided the spur for much greater development of interventional radiology.

Other trials examined the value of surgery for intracerebral haematoma which did not demonstrate a benefit. Interventions by the neurosurgeon in haemorrhagic stroke became more cautious and selective. In trauma, the value of decompression for raised intracranial pressure following brain injury has been endorsed by the Rescue-ICP trial. A two-year follow up analysis confirmed the late benefits of surgery over medical treatment in these patients. A sister study investigating the role of decompression in acute subdural haematoma suggests similar outcomes for patients in the treatment group to those not operated. In the spinal arena an Oxford-based trial compared outcome following spinal fixation in low back pain with a group treated with physical therapy. The conclusion was that cost-effective and low-risk physical therapy was as effective as surgery for these patients. A further randomised lumbar study suggested that transforaminal epidural steroid injection in sciatica secondary to herniated lumbar disc was as effective as surgery and attracted a lower incidence of adverse events. In neuro-oncology an ambitious global multicenter trial randomising patients with atypical meningioma between a radiotherapy arm and a non-radiotherapy arm is in progress to tackle this long-unresolved and important therapeutic question.



Figure 7. Prof. Keyoumars Ashkan carrying out awake surgery on a violinist at Kings College Hospital - 2020

A trend has been evident towards ongoing data collection in subspecialist databases to provide a valuable resource for derivative research. These have been established for shunt patients, and for cranioplasty patients. A National Vestibular Schwannoma Database recording all new schwannomas has been established by the British Skullbase Society, and is now moving from a data gathering to research phase. A similar database for spinal patients is the British Spine Registry, co-ordinated by the The British Association of Spine Surgeons. Populated by centrally collected NHS data, a National Neurosurgical Audit Project now monitors all Neurosurgical mortality in elective care, by unit and by consultant, with data publicly available. This provides a tool for enacting quality assurance in addition to measuring outcome.

Currently work in the emerging fields of molecular medicine, in robotics and miniaturization, and in the use of Artificial Intelligence is being driven forward by British workers.

Conclusion

Emerging from centuries of high-risk interventions in the nervous system, the United Kingdom led the way with the appointment of the first neurosurgeon Victor Horsley in 1886, leading to the establishment of this distinctive branch of surgery.

Of the next generation, Jefferson and Cairns carved out a clear path for British and Irish Neurosurgery with the establishment of the SBNS and then brought about a huge expansion of neurosurgical services resulting from the Second World War.

Post-war British ingenuity contributed to the major imaging advances of CT and MRI. The useful and unifying concept of the Glasgow Coma Scale is likely to prove the most enduring legacy to date of Neurosurgery in the British Isles, with its nod to the native city of the great pioneer who first began the endeavour of modern Neurosurgery, Sir William Macewen.

Jonathan Pollock
SBNS Archivist

'Copyright 2025 Society of British Neurological Surgeons'