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Canadian Neurosurgery – A Glorious Past and Bright Future

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Neurosurgery was officially recognized as a specialty in Canada in 1923 when Dr. Kenneth G. McKenzie, the first neurological surgeon and founder of the specialty, established the first neuro surgical unit at the Toronto General Hospital and the University of Toronto. After training with Harvey Cushing he limited his practice to operations on the nervous system and soon established a reputation as one of the world leaders in the new specialty. A gifted technical surgeon, McKenzie made significant contributions to operative procedures for spasmodic torticollis, glioblastomamultiforme, acoustic neuroma, and chronic pain. Dr. McKenzie served as the President of the Harvey Cushing Society, President of the Society of Neurological Surgeons and was a member of the founding Editorial Board for the Journal of Neurosurgery serving as editor from 1943-1950.

During his 28 years in practice McKenzie trained a number of men who distinguished themselves as world leaders in Neurosurgery. One of his first trainees was W. S, Keith who in 1933 became Canada's first full-time pediatric neurosurgeon and helped lay the foundation of the subspecialty of Pediatric Neurosurgery in Canada. He helped establish the first pediatric neurosurgical unit at the Hospital for Sick Children in Toronto. Together with the important contributions made by his successors including, Drs. Bruce Hendrick, Harold Hoffman and Robin Humphreys and James Rutka, it became and remains among the leading pediatric neurosurgical units in the world attracting post-graduate trainees world-wide.

Dr. Harry Botterell trained under McKenzie in 1936 and became Chief of Neurosurgery in Toronto in 1953. He and Dr Alan Jousse, the father of Canadian Rehabilitation Medicine, established the first hospital for spinal cord injured patients in Canada. Dr. Botterell made significant contributions to the field of cerebro- vascular surgery including the establishment of one of the first grading systems, the "Botterell-scale", for patients with subarachnoid hemorrhage. He was also a strong proponent of neurosurgical training and along with the Montreal school of neurosurgery (see below) trained many neurosurgeons for the rest of Canada including Dr. Frank Turnball who was the first trained neurosurgeon in western Canada.

Dr. Charles Drake also trained in Neurosurgery at the University of Toronto and was greatly influenced by both Botterell and McKenzie. He made great contributions to the study and surgery of cerebral aneurysms especially of the vertebro-basilar system as well and arteriovenous malformations. In 1974 he became Professor and Chairman of the Department of Surgery in London Ontario, which became a Mecca for neurosurgeons interested in training in cerebrovascular neurosurgery.

Recognized internationally by his peers Dr. Drake was elected President of the Canadian and American Surgical Colleges and the American Association of Neurological Surgeons. His productive collaboration with the well-known neurologist Henry Barnett resulted in the formation of a Department of Clinical Neurosciences. The collaboration between neurologists and neurosurgeons and other neuroscientists resulted in among the first randomized studies in neurosurgery on extracranial- intracranial bypass operations and carotid endarterectomy, the results of which significantly changed the practice of neurosurgeons in these areas. Thus he was an early proponent of interdisciplinary co-operation among neuroscientists and helped foster the concept of evidence based medicine, a major goal and mission of the International Neurosciences Journal.

The legacy of cerebrovascular neurosurgery in Canada was further strengthened by Dr. William Lougheed, Dr. Botterell's second resident , who was a superb technical microneurosurgeon and surgical innovator. Dr. Lougheed was among the first to establish the clinical application of hypothermia and temporary circulatory arrest for aneurysm surgery. Among Dr. Lougheed'sother contributions to modern-day neurosurgery was his early use and popularization of the operating microscope for intracranial neurosurgical procedures. He also developed the Lougheed-Kerr aneurysm clip, an innovative spring- loaded, multi-angled multi-rotational clip with differential closing pressures. He introduced carotid endarterectomy in Canada and is credited with carrying out

the first long vein bypass for cerebral re-vascularization in the world.

Dr. Thomas Morley, born in England, trained in neurosurgery under Sir Geoffrey Jefferson succeeded Harry Botterell as Head of the Division of Neurosurgery and Chairman of Neurosurgery at the University of Toronto in 1964. As Chairman he expanded the training program to include more residents trained each year. Dr. Morley was also the model for the subsequent genre of the academic surgeon, "the Surgeon-Scientist". While an excellent technical surgeon, he also supervised a laboratory carrying out basic research on brain tumours.

Dr. Alan Hudson succeeded Dr. Morley as Chairman of the Division of Neurosurgery in 1979. A skilled neurosurgeon and surgical anatomist he subspecialized in peripheral nerve surgery contributing to both the clinical and basic science aspect of this subspecialty. He strengthened the academic focus of neurosurgery, encouraged research as part of training and helped train a generation of residents as surgeon-scientists, many of whom have assumed faculty positions in Neurosurgery across Canada. Following completion of his term as Chairman, he was subsequently appointed as President and Chief Executive Officer of an amalgamation of Toronto University affiliated hospitals that became known as the University Health Network, providing a role model in stressing the importance and need for physicians, including neurosurgeons, to play a leading role in health administration.

Dr. Charles Tator, who succeeded Dr. Hudson as Chairman, was a very strong proponent of the academic neurosurgeon. He is best known for his work on spinal cord injury, a field in which he made significant contributions both in the clinical management of patients and through an active laboratory in basic spinal cord injury research. Dr. Tator promoted and encouraged virtually all neurosurgical trainees to undertake formal research programs as part of their training in neurosurgery, many obtaining their M.Sc. or Ph.D. degrees and subsequently establishing themselves as surgeon/scientists in academic neurosurgery in Toronto and throughout North America.

While Toronto provided a major seed for Canadian Neurosurgery, Dr. Wilder Penfield, with the help of his colleague William Cone established the Montreal Neurological Institute (MNI) at McGill University in Montreal. Under his leadership the MNI became one of the world's most successful academic centers for the study of the nervous system. Penfield served as Professor of Neurology and Neurosurgery at McGill and Director of the Montreal Neurological Institute from 1934 to 1960 and made significant contributions to neurosurgery including the mapping of the human cerebral cortex. He and his pupils also helped develop and advance the surgical treatment of epilepsy. He was a promotor of neurosurgical education and under his leadership the MNI had trainees from many countries many of whom later became leaders of neurosurgery around the world. With his interest in neurosciences, neurosurgeons were encouraged and were actively involved in the scientific activities of the Institute which promoted interdisciplinary co-operation in neurosciences with neurosurgeons, neurologists, neurophysiologists, neurochemists, and neuropathologists working together. Indeed the first studies on the alleviation of cerebral oedema by cortisone were performed by Miguel Prados at the MNI, a neuroscientist who also played an important role in the foundation of psychoanalysis in Montreal.

Among other trainees of the MNI was Dr. Claude Bertrand who became the "father "of neurosurgery in French Canada. He founded the Neurosurgical department at Hopital Notre-Dame and the University of Montreal where in later years Dr. Jules Hardy revolutionized transsphenoidal microsurgery with the introduction of the binocular microscope. Dr. Bertrand, along with Ted Rasmussen and Dr. Ronald Tasker in Toronto, elevated functional neurosurgery in Canada to world-class status - a reputation that continues today. Dr. William Feindel, another graduate, opened the first Department of Neurosurgery at the University of Saskatchewan in Western Canada.

Dr. Dwight Parkinson, a well-known Canadian neurosurgeon, is one of the few neurosurgeons in Canada who did not train in either the Montreal or Toronto programmes. Although he obtained his medical degree at McGill University, his residency training in neurosurgery was carried out in the United States. Following his training, he moved to Canada and became the Chief of the Section of Neurosurgery of the University of Manitoba from 1957 to 1981. He made important contributions to the surgical anatomy of the cavernous sinus.

The concept of the "International Neuroscience Journal" (INJ) is unique as a neurosciences journal, the goal of its scientific content being to bridge the gap between basic and clinical neurosciences. We in neurosurgery have come to realize that our specialty can no longer act in isolation and that the rapid advancements in the different areas of neurosciences may be not only relevant but critical to future progress in neurosurgery and the welfare of our patients. While there are numerous clinical and basic science journals in the neurosciences the stated aim of the INJ is to publish on both clinical and research topics in the neurosciences and provide this information in an interdisciplinary forum encouraging closer cooperation among the neuroscientists with the ultimate goal being to improve the care of patients with diseases of the nervous system.

To this end the Regional Editorial Boards of each country or region have been encouraged to include not only neurosurgeons but importantly neuroscientists in other related disciplines. Indeed the Canadian Regional Editorial Board includes both neurologists, neuro-radiologists, radiation oncologists and surgeon-scientists with expertise in both clinical and basic sciences.

As editor-in-chief of the Canadian Regional Board, my members and I are pleased to participate in this exciting endeavor together with many other countries and regions of the world.