

Editorial **Quality control in neurosurgery training***

J. T. Hoff

Section of Neurosurgery, University of Michigan, Taubman Health Center, Ann Arbor, USA

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The following paragraphs describe changing methods of neurosurgical training over time. Patient expectations, governmental regulation, and scientific advances all contribute to the need for change and adaptation of quality control into neurosurgery training.

From apprenticeship to a training curriculum

Early training in neurosurgery was based on the apprenticeship method. An apprentice learned from the master, then set up practice with newly acquired skills. Surgeons who began our specialty in the late 1800's, including Victor Horsley, Ernst von Bergmann, William MacEwen, and others, taught in a similar way. They stimulated the early separation of neurosurgery from general surgery. Later, Harvey Cushing established his "school" of neurosurgery which had a structured curriculum. This was a training approach that his mentors, William Osler and William Halsted, had acquired decades earlier during their wanderjahres in Germany [6]. The Cushing experience featured a one-year curriculum including pre- and post-operative management and intra-operative participation. That year was grueling by all accounts, but it produced a remarkable number of surgeons who established their own "schools" in North America and Europe. One of Cushing's trainees, Hugh Cairns, described his year vividly: "... the Battle of the

Marne was nothing compared to the stress and strain of being Dr. Cushing's assistant for a year." [9] Kenneth MacKenzie, Canada's first neurosurgeon, described a similar experience [8]. Many of Cushing's trainees had a major impact on the development of neurosurgery early in the last century, including Geoffrey Jefferson (Manchester), Otfried Foerster (Breslau), Clovis Vincent (Paris), Norman Dott (Edinburgh), Herbert Olivecrona (Stockholm), Paul Martin (Brussels), and others from the United States [9].

The evolution of quality control

Neurosurgery developed rapidly in the United States after it was "defined" in 1905 [2]. The two World Wars had little adverse affect on subspecialty development in America, but Europe and the Far East suffered greatly because resources, talents, and time could not be spared to advance the surgical specialties rapidly. Consequently, the first neurosurgery society was formed in 1920, the first certification Board in 1940, and the first training program accreditation process in 1981, all in the United States [4]. Neurosurgical societies were instituted in some European countries in the 1920's and 30's but expansion and development of training awaited recovery from the Second World War. Thus, although the Society of British Neurological Surgeons was formed in 1926, accreditation of training programs in the United Kingdom was delayed until the late 1970's and certification of specialists in 1996 [7]. The Japanese Neurosurgery Society was formed in 1948 and a certification Board

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began to examine candidates in 1966 [5]. Governmental agencies and quasi-governmental organizations have assumed responsibility for accreditation of training and periodic review of training programs in other countries [3]. Certification of trainees has been less consistent, however. Professional societies in developed countries have formed more uniformly, but with less focus on training methods including certification of trainees and accreditation of programs.

Education outreach

The World Federation of Neurosurgery Societies (WFNS) and the European Association of Neurosurgery Societies (EANS) focus on scientific and educational programs to improve neurosurgery training in underdeveloped countries. Improving education in neurosurgery has also been a goal of the Foundation for International Education of Neurological Surgeons (FIENS) in America. The mission of these organizations has been to accelerate the development of neurosurgery in underdeveloped countries.

The EANS has established its own Board and taken on the challenge of providing high quality training in 30 European countries with different languages, cultures, traditions, governments, and economic foundations [1]. Despite these barriers, the process, which includes didactic courses and examinations, seems to be working and the EANS project is widely acclaimed.

Teaching and measuring competency

Teaching and measuring the competency of doctors has been a recent addition to training curricula in a few countries. In the United States, for example, residency training programs are required to teach competency including patient care, medical knowledge, interpersonal patient skills, professionalism, practice-based learning, and system-based practice. Assessment of the adequacy of teaching in each of these categories is soon to be a requirement of all medical and surgical training programs in America [3]. Program directors are struggling to find reliable methods to teach competency as well as valid methods to measure teaching efficacy. Competence in the operating room has been the focus of training program directors in the United Kingdom, using a self-assessment method by the trainee and the trainer to judge levels of competence at three intervals during the training period [7].

Raising the bar

The belief that Board certification is proof of competency is fading in America. Certification, while important, is regarded as no more than documentation that a training process has been completed successfully. In other words, certification implies but does not equate with competency. As a consequence, competence must be achieved during training and thereafter by continued learning that keeps pace with societal and scientific demands.

As our specialty evolves, patients will expect better care and neurosurgeons must provide it. Over the past 125 years, we have come from apprenticeships to a structured curriculum for neurosurgery training, to teaching refinements which include progressive responsibility for the trainee, to measurement of competence by direct observation and periodic examinations. As educators and practitioners we are entering a new era, perhaps more relevant than any before, as we find ways to teach competence, achieve it, measure it, and maintain it.

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Julian T. Hoff

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Correspondence: J. T. Hoff, Section of Neurosurgery, University of Michigan, Taubman Health Center, Ann Arbor, USA.