

Neurosurgery Resident Competencies

In his 2003 Presidential Address to the [American Association of Neurological Surgeons](#), Dr. Heros discusses his personal additions to the six basic competencies for which all neurosurgical [residents](#) must be tested. The basic [competencies](#) are as follows:

- 1) [patient care](#)
- 2) medical [knowledge](#)
- 3) practice-based [learning](#) and [improvement](#)
- 4) interpersonal and communication skills
- 5) [professionalism](#)

6) system-based practice. To these, Dr. Heros proposes to add six supplemental competencies:

- 1) [intellectual honesty](#), which involves frank [discussions](#) about patient [complications](#) and admissions of the physician's frailties
- 2) scholarship—the art and science of medicine, which recognizes the value of evidence-based medicine but does not discount knowledge derived from experience
- 3) practicing in a hyperlegalistic society, which involves tailoring [informed consent](#) to fit individual patients' circumstances
- 4) time- and cost-efficient practices, in which the physician strives to conserve time and resources by forgoing testing that is not strictly necessary, doing only what is needed to return patients to [wellness](#)
- 5) approach to patients, which entails acknowledging and respecting the [dignity](#) of all patients
- 6) pride in being a neurosurgeon, which carries a sense of [elitism](#) without [arrogance](#) ¹⁾.

[Leonidas Quintana Marin](#) from the Department of Neurosurgery, [Valparaíso](#) University School of Medicine, [Chile](#), think the earliest stage to prevent a neurosurgical resident from “suffering” as the result of practicing a specialty that is highly demanding, both physically and mentally, is to perform, apart from the initial [interview](#) of rigor, a test that includes a psychological evaluation. This is not to weed out candidates for a neurosurgery residency of but to introduce applicants, seriously and with scientific evidence, to a reality that will accompany them the rest of their lives.

In his experience as a professor of neurosurgery, he observed that some of the applicants to neurosurgery residencies at the beginning of the [training](#) soon reveal hidden fears, for example, discomfort in seeing a patient bleeding profusely or with tissues necrosis in the emergency department. After a calming conversation, many of these residents have gone on to be trained as neurologists, neurointensivists, or endovascular imagenologists.

After this initial stage, and when making the first steps in their [training](#) as [neurosurgeons](#), it is important for us to analyze their attitudes to neurosurgery, which necessitates a special conduct in

their life.

Quintana wants to note that many “tools” frequently used in modern neurosurgery we already possess in our own brains and in our knowledge, so the professors, should “trigger” the correct way to be an excellent neurosurgeon and guide this process by providing good advice to future colleagues. ²⁾.

Lehecka, Laakso, and Hernesniemi stated 4 aspects that they believe are important for residents to be successful in neurosurgery:

1. The resident must be young because the learning period is long, a whole lifetime !!! They must be intelligent, flexible, they must get well along with very different people. At the same time, they must have a somewhat stubborn and tenacious character to fulfill their goals, often against the wishes of other people, sometimes even the chairman. They must be able to travel, and they must be fluent in the main languages of the international neurosurgical community, so as to be able to visit departments all over the world to learn new ideas and techniques. They have to be hard-working and have good hands, irrespective of their glove size !!! It is extremely helpful to be in good physical and mental condition by doing some sports or other hobbies which help to quickly recover from the many failures and complications encountered in everyday work.

2. To become a better microneurosurgeon, one should constantly study microanatomy of the brain as better knowledge of microsurgical anatomy leads to better surgery. Preparing yourself for some new or infrequent operation by reading, means that during the actual surgery your hands will be guided by those who had previously accumulated much more experience on this particular procedure.

By reading frequently you may save, first and foremost, your patient, but secondly also your time and your nerves. It is not enough to learn anatomy once; rather, one is forced to revisit the same topics over and over again before acquiring appropriate expertise in the matter.

3. Neurosurgery is not different from any sport or art; only hard practice gives good results. Go to the microsurgical laboratory to dissect animals and cadavers if possible. Knowing the anatomy and the different tissue properties results in a better surgery. Train your hands in the laboratory setting in increasingly demanding tasks.

Operating under the microscope should be started in a safe laboratory environment with enough time to familiarize oneself with all the instruments, devices, and techniques, not to mention to develop the necessary hand-eye coordination.

Many of the movements we perform with our hands under the large magnification of the microscope should become automatic, without the need to concentrate on them, like, e.g., placing microsutures. Practice special tricks in handling difficult situations, atraumatic manipulation of different kinds of tissues including the tiniest arteries and veins, dissection of important vascular and neuronal structures, and understanding the 3-dimensional relationship of different structures. It is possible to train most of the steps for any operation whether for vascular, tumor or spinal surgery in the laboratory setting. Not necessarily as a single procedure but as a collection of different techniques.

4. You should do everything you can to avoid fatigue, burnout, and cynicism toward your work. Remain a fighter, and never give up!!!; if you were thrown against a smooth wall, you should hold to it with fingers and nails like a cat. Keep up with mental training all the way throughout your career ³⁾.

For **Madjid Samii**, only those who were dedicated and **competent** in all aspects related to the patient's **management** went on to great **careers**, starting with a thorough **history** taking and a complete **examination** and analytical **evaluation** of neurologic, neurophysiologic, neuroradiologic, and laboratory findings.

Manual skills reflect the **intellectual ability** for **analysis** of different situations during **surgery**. He doesn't believe that a very skillful artist who is able to perform a very complicated piece repeatedly would necessarily become a skilled **neurosurgeon** ⁴⁾.

Impact of resident participation on morbidity and mortality in neurosurgical procedures

In a **multicenter study**, Lim et al demonstrated that resident involvement in the **operating room** was not a significant factor for postoperative complications in neurosurgery service. This analysis also showed that much of the observed difference in postoperative complication rates were attributable to other **confounding factors**. This is a quality indicator for resident trainees and current medical education. Maintaining high standards in postgraduate training is imperative in enhancing patient care and reducing **postoperative complications** ⁵⁾.

1)

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2)

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5)

Lim S, Parsa AT, Kim BD, Rosenow JM, Kim JY. Impact of resident involvement in neurosurgery: an analysis of 8748 patients from the 2011 American College of Surgeons National Surgical Quality Improvement Program database. J Neurosurg. 2015 Apr;122(4):962-70. doi: 10.3171/2014.11.JNS1494. Epub 2015 Jan 23. PubMed PMID: 25614947.

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Last update: **2024/06/07 02:51**

