



What Makes a “Great Resident”

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The intensity of preparing for a neurosurgical residency during medical school and nearly overwhelming patient care tasks during the intern and resident years make the stress of assisting the attending surgeon in the operating room challenging and exhausting. It is critical while assisting that the trainee maintain patient safety; it is the attending's job to guide the trainee regarding what tasks are safe and appropriate for the trainee to perform.

Defining a truly exceptional or “great” resident is a difficult undertaking, given the immense diversity of the tasks for which a neurosurgical resident is responsible. **Successful residents generally display qualities that include trustworthiness, efficiency, independent learning, strong work ethics, high attention to detail, and personability.** Similarly, the pillars of excellence for an attending surgeon (the 3 As) are availability, affability, and ability, in that order.

The attending surgeon should not and will not let a trainee operate under supervision or alone unless the surgeon is comfortable with that trainee's capabilities. Therefore, it is the resident's responsibility to demonstrate technical competence. Operating is a privilege, not a right!

Frequently during the early training years, a trainee will find himself or herself directly assisting an attending surgeon during critical portions of a procedure. Therefore, it is valuable for the trainee to understand the expectations of performing as an assistant before the surgery.

In this chapter, I discuss the general criteria for residents to perform as excellent assistants in the operating room. For additional discussion of the expectations of medical students during a subinternship on neurosurgery service, see the [Subinternships](#) chapter.

In the case of more senior residents, I personally believe that a resident is ready to perform a procedure if he or she has proven to be an exceptionally effective assistant. This philosophy is founded on the fact that the assistant can reliably foresee each maneuver in the operation and facilitate each step on the basis of both the previous and next steps.

I always tell my residents that it takes years to gain the complete trust of an attending surgeon, but it takes only minutes to lose that trust forever. As a consequence, they must always be cognizant of every one of their maneuvers. Personal responsibility is the cornerstone of reliability.

GENERAL QUALITIES

Trustworthiness

Trustworthiness is perhaps the single most significant characteristic required of a successful trainee and should be maintained as an essential quality by each resident. This quality is necessary for an attending to permit the resident to perform patient care responsibilities, to confer decisions based on the reported facts by the residents, and to safely teach the resident in the operating room.

Residents earn the trust of the attending surgeon only if they are aware

of their own limitations and consistently know when to call for help.

Asking for help is a sign of strength if done appropriately and not as a replacement for independent learning (see below). This can be applied to the operating room setting or when seeking consults, given that each task can present novel and challenging situations that will provoke the junior resident to recognize his or her own knowledge gaps and overcome these challenges by relying on senior residents and attendings for further guidance. It is this recognition of one's limitations that is necessary for a junior resident to demonstrate trustworthiness.

Taking trustworthiness one step further, a great resident is one who demonstrates independence in duties appropriate for his or her level of training but, importantly, can precisely identify when a case needs oversight by a senior resident or attending.

Independent Learning

Demonstration of a self-directed desire to learn serves to exhibit one's capacity for growth, admitting one does not have all the answers, and reassures observers that the trainee is committed to perpetual learning.

Independent learners do not require oversight to expand their knowledge base, but they proactively identify gaps that can be addressed autonomously.

Educational media can take many forms for a resident, including peer-reviewed research articles, textbooks, audio lectures, online resources, local and regional courses and conferences, national conferences, and patient care scenarios in the operating room, intensive care unit, clinic, or emergency department. The resident should use all of these learning opportunities.

The hallmark of a resident who is struggling in the area of independent education is one who relies on his or her superiors for learning and who lacks a self-motivated drive to acquire knowledge and experience.

Independent learning skills are critical for residents to practice throughout residency, starting with the basic principles of patient care when they are

interns and ending with mastery of surgical techniques as seasoned attendings. Each stage of training requires motivation to advance knowledge to the next level. **This philosophy is necessary for the continual growth of a surgeon throughout his or her career.**

Attention to Detail

The resident's attention to detail is often an innate personality trait that is easily identified by the resident's peers and superiors. Neurosurgery, in particular, demands immense attention to detail because of the critical nature of patients' conditions and the intricacy of the surgical procedures.

Taking call as a junior neurosurgery resident is a daunting task that demands compulsive attention to detail; the complexity of modern patient care can be easily compromised by omission of even minute tasks. A detail-oriented approach to all responsibilities in the realms of patient care and academics will demonstrate the resident's capabilities.

At the senior resident level, attention to detail generally takes the form of detailed operative planning and meticulous oversight of the junior residents who are assisting with patient care. This, in turn, promotes the education of the junior residents and improves patient care.

Time Management and Efficiency

The demand for efficiency from neurosurgical residents has been progressively apparent with increasing patient volumes, meticulous documentation requirements, and the 80-hour work-week limitations imposed by the Accreditation Council for Graduate Medical Education (ACGME). The resident must perform all facets of patients care with speed and accuracy to successfully meet the volume of patient care goals.

Data from a European cardiac surgery residency program using precise training modules demonstrated a maintained operative caseload by the residents despite work-hour limitations. Therefore, efficiency should be a quality encouraged and facilitated by educators to enhance residents' work and training.

This high level of efficiency is not an innate skill of any resident, but it can be developed with practice and guidance. It is critical that during the learning process, speed should follow accuracy, given that accuracy ensures that a superior level of patient care is upheld.

Efficiency is not only an essential facet of a resident's workflow but, even more importantly, also to an attending; efficiency enables the surgeon to meet the immense demands on his or her time clinically, academically, and personally.

Personal and Professional

Professionalism is a critical element for maintaining the high quality of care associated with each residency program. Similarly, the resident must be personable, optimistic, and convey a sense of positivity in the work environment. He or she must be able to relate to patients and provide a comfortable environment for clinical care.

Together these tenets promote high-quality patient care that is perceived by individual patients and that will be apparent to observers in the local and national communities.

Leadership

Resident physicians must cultivate and eventually possess an innate sense of leadership. This trait is even more critical for neurosurgical residents, given that there is often a high volume of patients who are under the care of a single resident, making [teamwork and communication](#) absolutely critical for providing high-quality care.

Senior residents must develop leadership and mentorship for their junior counterparts. Conflict resolution and organizational leadership skills must be actively studied and practiced during these informative years.

PRINCIPLES OF ASSISTING DURING SURGERY



Preoperative

The trainee should communicate with the attending surgeon after case assignment to confirm his or her involvement in the case and create a roadmap for the operation. The trainee should also thoroughly review the patient's medical history, symptoms, and surgical indications for further reference during the intervention.

After confirmation of the operative plan with the attending surgeon, the trainee should introduce himself or herself to the patient on the day of surgery. The patient should be marked preoperatively.

According to the Centers for Medicare and Medicaid Services from the Department of Health and Human Services in the United States, the admission and presurgical assessment must be performed within 30 days before the scheduled surgery. If the assessment is documented more than 30 days before the surgical procedure, a new thorough assessment should be performed and documented before the patient undergoes surgical intervention.

The trainee should evaluate the patient in the preoperative care unit to establish the patient's baseline function levels for comparison in the postoperative setting.

The trainee should be present promptly in the operating room, preferably before the patient arrives. To effectively perform any neurosurgical intervention, the preoperative imaging should be reviewed and made immediately available during the surgery. To accomplish this, the trainee should prepare the imaging on the Digital Imaging and Communications in Medicine (DICOM) library.

To avoid delays, the resident should have his or her surgical loupes and lead apron (when appropriate) available before the attending surgeon arrives. If the trainee is comfortable with positioning the patient on the operating room table, this can be performed before informing the attending of the patient's arrival in the operating room. The operative plan should be reviewed with the anesthesiologist and the surgical staff in the room. Appropriate preparation, including a discussion of intraoperative needs (specific instruments, etc), can significantly improve the efficiency of the operation.

The trainee may apply the skull clamp if sufficient experience and familiarity with the preference of the surgeon has been secured. It is important to review every patient's imaging and surgical history before skull clamp application to avoid pinning over a sinus, previous craniotomy defect, or shunt reservoir. For additional details on this step, see the [Skull Clamp Placement](#) chapter.

Next, the trainee can mark the anticipated location for the surgical incision and apply a presurgical skin scrub. At this point, the trainee can inform the attending that the surgical site is being sterilized. Most attendings prefer to check the positioning and incision before the surgical site is prepped. **A junior resident who is self-aware, a good listener, and proactively responsive to the needs of the operating room team will prove his or her superior competency. Constructive criticism should be welcomed.** [Emotional intelligence](#) and mindfulness are especially important here.

Intraoperative

As mentioned above, the resident's first step in demonstrating competency to the attending surgeon and providing assurance of trust

and capability is to convey the impression of being an effective assistant during the procedure.

Residents must be mindful that the surgeon will be, and should be, uncertain of an early trainee's capability. Therefore, the trainee should verbalize each step that he or she is comfortable performing while being observed by the attending surgeon.

I highly recommend that junior residents spend ample time in the microdissection cadaver laboratory familiarizing themselves with working under the microscope. Handling the tissues and drilling, as well as understanding the intricate skull base anatomy, should all be practiced before arriving in the operating room and expecting the attending to watch you operate while you hope to impress everyone. Hope is not a persuasion strategy. In fact, the first impression of your technical abilities is most important and will leave a lasting impact about your future competency.

The attending–resident dialogue should be carried out with confidence and imperturbability to provide reassurance that the trainee is capable of executing the necessary surgical maneuvers. Controlled confidence during safe and accurate maneuvers (along with the absence of unassertive and ambivalent movements) represents the hallmark of technical competency.

The attending surgeon must possess an especially patient demeanor for the assistant to be successful. It is my philosophy not to ask for maneuvers to be performed only my way; rather, I accept a variety of maneuvers that are safe so that the assistant can feel comfortable with safe experimentation without constantly guessing what I am expecting.

The trainee should be mindful of the attending surgeon's perspective on the situation. The attending surgeon has the responsibility of executing surgery safely, performing the procedure in an efficient manner, and educating the trainee simultaneously. Being mindful of these goals allows the trainee to understand the motivation of the attending surgeon's actions and to align his or her goals in accord with these motivators.

Working too hard to impress everyone in the operating environment is not productive and can lead to distrust. The hallmark of a great leader is to lead by influencing and not by telling everyone what they want to hear. In fact, if you prove that you are able to affect others positively in a professional manner while advocating for the patients' interests, you will gain an unparalleled level of respect from your colleagues, surgical staff, and supervising surgeons.

Each resident often creates special bonds with one or two attendings with whom he or she feels most comfortable. In addition to proactively asking for feedback about his or her performance periodically from all of the attendings in the department, the resident should leverage these special bonds to inquire candidly about his or her performance in depth. This form of feedback not only rectifies potentially undesirable behaviors but also reinforces good behaviors.

Learning Curve

The learning-curve concept is defined as the number of procedures (usually 30–50 relatively similar cases) that are needed to complete the procedure with a reasonable outcome. Not everyone can become an accomplished complex spine surgeon or skull base microsurgeon, and residents must be honest with themselves. Reasonable expectations of one's abilities can set the stage for practical metrics that will allow the resident to monitor his or her progress during the residency.

I believe there is a critical point during residency when a resident acquires enough expertise to feel comfortably safe to perform independently in the operating room on cases of average technical difficulty. This turning point typically occurs at the end of the senior year and later during the chief/last year. Unfortunately, some residents never reach this stage of technical maturity for reasons related to their mentorship or their own innate technical skills. Fellowship experience usually cannot address this deficiency.

Considering the case exposure limitations related to work-hour restrictions, I highly recommend to my residents that they announce their

area of concentration (cranial, spine, endovascular, or an associated subspecialty) some time before the mid-third year of their training. This goal enables resident to focus on participating in cases of interest and monitoring their own learning curve. Faculty are also more likely to mentor residents with recognized areas of concentration more effectively both technically and academically. This strategy allows for deficiencies to be identified early and remedied.

Microsurgery is not a spectator sport, and direct involvement of the resident is mandatory for achieving technical competence. The current model of observership in neurosurgical training is archaic; more structured models are necessary to gradually advance the technical prowess of residents along the learning curve during their training.

Postoperative

After conclusion of the surgery, the trainee should be involved in removing the skull clamp (as applicable), transferring the patient from the operative table to the patient transport bed, and ensuring stability of the patient in the postanesthesia care unit. The trainee should also perform a thorough assessment of the patient after recovery from anesthesia and discuss the findings with the attending surgeon.

The assistant/resident will be closely involved in planning the postoperative care; this plan should be discussed in detail. Items to discuss include the postoperative imaging studies desired, antibiotic/seizure prophylaxis, steroid management, pain medication regimens, postoperative bracing, mobilization schedules, drain management, and disposition plans.

After sufficient experience by the trainee, these facets of patient care can be proposed to the attending as a postoperative plan to demonstrate competence by the trainee.

When performed meticulously, these simple tasks assure the surgeon that the assistant has a goal of quality patient care, compulsion for detail, and thoroughness. With repetition, this enables the surgeon to have trust and

confidence in the trainee.

PEARLS AND PITFALLS

- The most difficult situations arise when the resident/assistant overestimates his or her expertise. This situation always leads to harm to the patient and compromise of the assistant's training, because the operative privileges for the trainee will be minimized.
- “Cowboy” and rushed operative maneuvers without at least some thought about their consequences are recipes for disaster.
- The most common causes of resident failure are dishonesty, poor medical knowledge, and inadequate technical skill.
- One of the most common mistakes of assistants is to feel entitled to operate independently early in the training period. This impulse can alienate and infuse a sense of mistrust in the supervising surgeons. Understanding one's strengths and weaknesses takes time, and this understanding is the ultimate ingredient for technical maturity.

Contributor: Benjamin K. Hendricks, MD

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