Help Ophthalmology Residents Achieve Success

How to develop a comprehensive plan for evaluating surgical competency.

BY THOMAS A. OETTING, MS, MD

A paradigm shift is underway regarding the evaluation of competency in medical residency programs. Several years ago, various organizations—including insurers, patient advocacy groups, and hospitals—convinced the Accreditation Council for Graduate Medical Education (ACGME) that resident education must change.[1] These groups argued that the traditional model of residency programs left physicians with an unreliable skill set that did not meet the demands of the healthcare market. As a result, ophthalmology residency programs have been working over the past several years toward a new model of competency, as discussed in Lee and Carter's now classic article of 2004.[2]

This article outlines the program that my colleagues and I set forth at the University of Iowa in Iowa City to set stages and expectations for each of them, to identify resources for growth, and to use formative feedback to assess and document residents' progress on a path toward surgical competency.[3]

STAGES OF CATARACT COMPETENCY

The first step in creating a residency program based on the new model of competency is to determine the stages of competency. Andrew Lee, MD, introduced me to the Dreyfus model's stages of professional skill acquisition. According to this model, people learn professional skills in distinct stages by which they progress from novice to beginner, advanced beginner, proficient, and (rarely) expert.[2,3] Advancement through these levels is expected, can be measured, and can be influenced by education

TABLE 1. DREYFUS STAGES APPLIED TO CATARACT SURGERY		
Dreyfus Stage	**Characteristics**	**Typical Level**
Novice	Has desire and not much else	Early first year
Beginner	Has proven skills with the simulator/wet lab and can perform parts of cases with ample direction	Late first year
Advanced beginner	Can slowly perform entire cases on his own but is not always adept at bimanually directing instruments within the eye	Late second year
Proficient	Can perform cases with little help, is facile with both hands at directing instruments within the eye, and can handle most complications	Late third year
Expert	Can perform routine cases almost without thought, can handle any complex cataract case or complication, and can develop new techniques	Alumnus

TABLE 2. SAMPLES OF COMPETENCY-BASED EXPECTATIONS		
Stage	**Sample Expectation**	**ACGME Competency**
Beginner	Perform parts of cases, simulator and wet lab cases	Patient care
	Know the proper name of all instruments on a cataract tray	Communication
	Describe our system to ensure correct site and correct IOL for cataract surgery	Systems-based care
	Describe common complications of cataract surgery	Medical knowledge
	Participate in cataract journal club	Practice-based learning
	Demonstrate proper time out prior to retrobulbar block	Professionalism
Advanced beginner	Perform five uncomplicated phaco cases in less than 45 minutes	Patient care
	Attending assisting through paracentesis	
	Demonstrate consent of patient for routine cataract surgery	Communication
	Describe system to obtain accurate estimation of the axial eye length using A-scan and IOLMaster*	Systems-based care
	Describe steps to convert to extracapsular cataract extraction	Medical knowledge
	Calculate personal A-constant	Practice-based learning
	Demonstrate professional behavior in OR documented with feedback from OR team	Professionalism
Proficient	Perform five uncomplicated phaco cases using both hands in less than 30 minutes	Patient care
	Present cases at cataract M&M conference	Communication
	Discuss appropriate indications for CPT 66982 according to Medicare guidelines	Systems-based care
	Describe settings and indications for changing the settings on phaco machine	Medical knowledge
	Staff first years during portions of cataract surgery	Practice-based learning
	Attend AAO Annual Meeting	Professionalism

*IOLMaster (Carl Zeiss Meditec, Inc., Dublin, CA).

and practice. Table 1 shows how we defined our stages.

It is necessary to set expectations for each stage of competency that are measurable, meaningful, and realistic. They should be established at the start of residency and should not be a moving target. It is important for a program to weave in all six of the ACGME's competencies, including medical knowledge, patient care, system-based care, practice-based learning, communication, and professionalism.[1] Table 2 shows a few examples of expectations by stage and by competency that we use at the University of Iowa.

RESOURCES FOR TEACHING AND LEARNING

Video instruction, simulators, and wet labs can assist students' preparation for their first real surgery.[3,4] Additionally, the most experienced faculty surgeons should help to guide the more junior surgeons through early surgical cases. I recommend having residents start live surgery by doing part of a case, because I find it is better for them to perform a small portion of a perfect case than all of a bad case.

At the University of Iowa, we use a "backing in" tech-

Training Level:	R1	R2	R3	Date _____	

Facility:	VA		UIHC	No. of similar cases done:_____	

Procedure:	Phaco		Other: _____		

	Novice	Beginner	Advanced Beginner	Proficient	Expert	
Respect for tissue	Rough				Gentle	Not observed
Time and motion	Slow				Efficient	Not observed
Instrument handling	Awkward				Fluid	Not observed
Instrument knowledge	Poor				Perfect	Not observed
Use of both hands	Awkward				Fluid	Not observed
Handle complication	Confused				Aware	No complications
Time goal met	≥ 60 min	< 60 min	< 45 min	< 30 min	< 15 min	N/A

Samples of good behavior: _____

_____

_____

Areas to work on: _____

_____

_____

Corrective action:	Discussion	Present at M&M	Wet lab	Video

Faculty		Resident	

Figure 1. Cataract operative feedback.

TABLE 3. SUMMARY OF IOWA'S PROGRAM			
Dreyfus Stage	**Expected Samples of Behavior for This Level**	**Typical Rotation at This Level**	**Resources to Grow Beyond This Level**
Novice	Desire to learn	N/A	Books
			Videotapes
			Observation
Beginner	Demonstrate sterile technique	VA,* first year	Books
	Know all instruments in tray		Wet lab
	Know all steps of cataract surgery		Simulator
	Demonstrate prep and drape		Videotapes
	Demonstrate retrobulbar injection		Observation in OR
	Demonstrate microscope's use		"Back in" to cases
	Use pig/cadaveric eye with faculty		Formative feedback
	Demonstrate capsulorhexis with simulator		
	Demonstrate IOL's folding		
	Demonstrate IOL's placement		
	Demonstrate use of I/A device		
	Demonstrate suturing technique		
Advanced beginner	Complete five cases in less than 45 minutes	VA,* second year	Wet lab
	Know steps to convert to extracapsular cataract extraction		Simulator
	Know steps for vitreous loss		Videotapes
	Demonstrate use of capsular dye		Formative feedback
	Demonstrate effective consent		
	Demonstrate continuous curvilinear capsulorhexis during topical anesthesia case	UI,* second year	Deliberate practice of continuous curvilinear capsulorhexis
	Assist efficient cataract surgeon		Videotapes
Proficient	Complete five cases in less than 30 minutes	VA,* third year	Videotapes
	Be facile with both hands		Formative feedback
	Demonstrate topical anesthesia cases		
	Demonstrate small pupil techniques		
	Demonstrate capsular tension ring		
	Demonstrate chopping techniques		
	Lead Cataract M&M		
Expert	Demonstrate IOL suturing techniques	Alumni	Videotapes
	Develop new techniques	Rare third year	
	Complete five cases in less than 15 minutes		

*VA indicates Iowa City Veterans Affairs Medical Center; UI, University of Iowa.
Modified from Oetting TA, Lee AG, Beaver HA, et al. Teaching and assessing surgical competency in ophthalmology training programs. Ophthalmic Surg Lasers Imaging. 2006;37:384-393.

nique developed by Mark Wolken, MD, wherein the attending or senior resident starts the case, and the training surgeon takes over toward the end. The resident gradually undertakes more and more of the surgical steps until he performs the case from start to finish.

A similar strategy toward surgical competency is for the junior surgeon to use only the main wound, while the attending surgeon directs instruments through the paracentesis (eg, for difficult parts of the case such as the removal of nuclear fragments). This approach allows the training surgeon a comfortable transition from one hand to two.

> "The availability of learning resources is important, but the timing of these resources' presentation is crucial."

Most residents and faculty consider the capsulorhexis to be the most difficult part of the case to master. A. Tim Johnson, MD, PhD,[5] has developed a strategy for the capsulorhexis based on the idea of K. Anders Ericsson, PhD,[6] in which the purposeful practice of difficult parts of a skill leads to ultimate mastery. First, Dr. Johnson creates a paracentesis and wound. Next, the resident performs the capsulorhexis but is quickly relieved if necessary. Dr. Johnson records all of the cases so that he may postoperatively review each capsulorhexis in detail with the resident.

The availability of learning resources is important, but the timing of these resources' presentation is crucial. The world's greatest wet lab held 9 months before a resident's first case is less useful than an OK wet lab just prior to his initial surgery. I therefore suggest making resources available when residents need them, rather than when it is convenient for faculty or the program.[7] Placing key lectures on a Web site or local server, for instance, makes them available to residents 24 hours a day.[4]

A lack of resources may exist for certain expectations within a stage. For example, we expect our beginning surgeons to know the names of and typical use for the instruments on the phaco tray, but finding even a simple list proved difficult. To answer this need, we made a video that named all of the instruments on the tray. Our residents helped to refine this resource via flashcards and a Web-based resource.[8]

PROVIDING FEEDBACK

Medical education typically employs summative feedback. This format does little to help improve residents' competence, because the commentary occurs after a task is complete, often when the trainees have moved on to the next task. At the University of Iowa, we provide formative feedback throughout the rotation to promote directed growth. Essentially, we establish our expectations, tell residents what they did well and what needs work, and, most importantly, indicate resources for improvement.

Our feedback (Figure 1) is closely tied to the Dreyfus stages, which may help to reduce the inflation of grades and closely ties performance to expectations.[3] Sondra Lora Cremers, MD, and colleagues at Massachusetts Eye and Ear Infirmary have developed more detailed systems to document surgical competence.[9,10]

PUTTING IT ALL TOGETHER

The University of Iowa's plan for residents' competency incorporates stages, expectations, and resources (Table 3).[3] Although training programs' plans may vary slightly, the ACGME has clearly mandated that competency-based resident education is the new standard. Although any paradigm shift is painful at first, this one has brought us new insight into our training program. Developing tools and resources gave our faculty renewed purpose, and our residents seem to appreciate the clarity of defined expectations. ∎

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