What is the prevalence of ophthalmology trainees who struggle with surgical competency? The issue of ophthalmology residents who struggle to develop surgical competency is common. According to a national survey of ophthalmology residency programs conducted by Binenbaum and Volpe in 2006, 9% of residents were labeled as having a significant problem mastering surgical skills. Almost every training program that responded to the survey reported having at least one resident with surgical difficulties over a ten year period.

How do you detect a trainee that is struggling with surgical competency? Wet-lab assessment tools may be helpful in determining competency prior to entering the operating room (Volpe et al, 2007). Simulation models are available for strabismus surgery (http://simulatedocularsurgery.com/simulation/strabismus/). Golnik, Motley et al have published a surgical competency assessment for strabismus surgery to provide consistent feedback regarding performance in the operating room.

What is a suggested time line for strabismus surgery development? Surgical skill development will differ between training programs due to differences in wet lab experience, rotation schedules, etc. The diagram below depicts an example of standard progression in surgical skill for a residency program with 3 pediatric ophthalmology rotations.

What are problems these trainees face in developing surgical skills? In addition to sufficient knowledge and judgment, ophthalmic surgery requires the use of physical abilities. Two common physical barriers to performance in the operating room include tremor and poor eye-hand coordination. In addition, visual problems such as decreased visual acuity (amblyopia) or lack of stereopsis may cause problems, especially when using surgical loupes. Over-confidence and anxiety or over-cautiousness present emotional/psychological challenges to surgical success for trainees. Other special issues include trainees with substance abuse problems or trainees who are “beyond help.” In “beyond help” situations, the trainee is unable to improve his/her performance and/or no longer wishes to continue with surgical training.

Table 1. Types of Problems Learning Surgical Skills*

<table>
<thead>
<tr>
<th>Problem Description</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor hand-eye coordination</td>
<td>24%</td>
</tr>
<tr>
<td>Poor intraoperative judgment</td>
<td>22%</td>
</tr>
<tr>
<td>Inability to listen to supervising surgeon</td>
<td>16%</td>
</tr>
<tr>
<td>Tremor</td>
<td>14%</td>
</tr>
<tr>
<td>Questionable behavior (ie. poor case selection)</td>
<td>11%</td>
</tr>
<tr>
<td>Inappropriate reaction to operating room stress</td>
<td>10%</td>
</tr>
<tr>
<td>Visual problems</td>
<td>3%</td>
</tr>
</tbody>
</table>

*Table adapted from Binenbaum and Volpe, 2006
What methods can be used to assist trainees who are struggling with surgical competency? In the survey conducted by Binenbaum, residency programs reported using various forms of resident management including (1) extra time in the practice lab, (2) extra cases with the “best” teaching surgeon, (3) counseling, (4) an outside microsurgical course, (5) disciplinary action [i.e. probation], (6) restriction of surgical repertoire (7) medication for tremor and anxiety, and (8) extended residency training.

Table 2 lists specific problems and their management recommendations. Many times utilization of more than one method of management is necessary. Often, residency program directors are at the forefront of developing specific management plans, but all surgical faculty preceptors must be willing to participate. Management should be personalized to the needs of the specific trainee.
<table>
<thead>
<tr>
<th>Problem</th>
<th>Management Techniques for the Trainee</th>
</tr>
</thead>
</table>
| Tremor                          | • Reduce stress and anxiety (see anxiety/over-cautiousness)  
                                  | • Get adequate sleep  
                                  | • Avoid tremor inducing agents such as caffeine, nicotine, energy drinks, β-agonist inhalers  
                                  | • Use a wrist/arm rest  
                                  | • Take medication such as propanolol (10-40mg PO 1 hour prior to surgery) or timolol (0.5% 1-2 drops sublingually 30 minutes prior to surgery) |
| Poor eye-hand coordination       | • Examine trainee for medical issues that limit eye-hand coordination such as strabismus (convergence insufficiency or decompensating intermittent exotropia) or decreased visual acuity (amblyopia)  
                                  | • Practice skills in the wet lab with faculty mentoring or coaching  
                                  | • Practice basic pre-surgical training tasks on a surgical simulator (repeatedly if necessary to achieve acceptable success and time rate)  
                                  | • Review video of operative performance, independently and with staff  
                                  | • Play music that induces an energetic vibe and positive mood (so called “Mozart Effect”) in the operating room  
                                  | • Participate in sports that require high levels of eye-hand coordination (http://www.topendsports.com/fitness/sports-coordination.htm)  
                                  | • Perform exercises/drills  
                                  | • Play video or virtual reality games that utilize the visual system’s ability to recognize and manipulate objects (http://greatist.com/fitness/apps-improve-hand-eye-coordination) |
| Over-confidence/not listening to supervising surgeon | • Recognize and admit the problem exists  
                                  | • Use audio and video when recording cases for review  
                                  | • Utilize feedback from assessment tools (see appendix A)  
                                  | • Be aware of strict guidelines regarding adherence to institutional supervision policies  
                                  | • Request assignment of dedicated surgical preceptors |
| Anxiety/over-cautiousness | • Use structured curriculum in wet lab and with simulators (see appendix B)  
• Utilize surgical checklist tools  
• Receive education and reassurance  
• Participate in an outside surgical skills course (see appendix C)  
• Focus on the present  
• Practice positive self-talk  
• Improve middle order skills with mental rehearsals and pre-operative flight plans  
• Practice meditation/prayer/deep breathing techniques  
• Take medication  
• Undergo psychology or psychiatry evaluation |

### Diagram 1. The Peak Performance Pyramid.
The pyramid is used in positive sports psychology as a model of the emotional/psychological skills. It demonstrates the mental components needed for optimal physical performance. [http://www.thesportinmind.com/articles/positive-psychology-for-peak-performance/](http://www.thesportinmind.com/articles/positive-psychology-for-peak-performance/)

<table>
<thead>
<tr>
<th>Special Problems</th>
<th>Management Techniques for Program Director and Faculty</th>
</tr>
</thead>
</table>
| Lack of preparation (trainee with insufficient knowledge of surgical steps and judgement paradigms and/or insufficient technical practice with indifferent attitude) | • Provide trainee with a corrective action plan that details required steps of remediation with specific timeline  
• Assign individual macro- and micro- surgical mentors who will provide detailed progress reports  
• Require trainee to maintain a log of study/practice hours  
• Utilize the Clinical Competence Committee (or a subset thereof) to arrive at joint decisions regarding progress and recommendations  
• Be willing to activate probation and dismissal protocols if progress is not achieved  
• Recommend neuropsychological evaluation to make sure treatable mental health issues are not overlooked |
| Substance abuse | • Have trainee undergo a “fitness of duty evaluation”  
• Have trainee obtain treatment-inpatient, outpatient, partial hospitalization, residential (see appendix D)—most institutions will have policies to follow in this regard |
| Beyond help | • Provide an honest interval evaluation for all trainees to allow for early recognition  
• Shift primary surgeon experiences to earlier in residency in order to aid in identification and management of residents who are slow learners in the operating room  
• Push for Association of American Medical Colleges (AAMC) development and utilization of a metric for technical competence in medical school to enable
What happens long-term to trainees that struggle to obtain surgical competency? There is limited data on the career outcomes of surgically challenged ophthalmology residents. In Binenbaum’s study which was published in 2006, career outcomes were known for 153 of the 199 residents who had difficulty achieving surgical competency. A little over half (57%) were “thriving” as a surgical ophthalmologist. About ¼ (24%) of them pursued medical ophthalmology. 8% were not working as an ophthalmologist. The remaining 11% fell into other miscellaneous categories.

What medicolegal issues are involved? The program director (PD) and faculty have a responsibility to keep formative assessments of residents confidential but to share results openly and honestly with the resident. If a corrective action plan is implemented, close communication with the Graduate Medical Education Office and Designated Institutional Office is required to ensure that proper institutional, state, and federal guidelines are followed. Conversations with the resident during progress may occur with two faculty members, and written summaries should be completed and signed by the PD and the resident on an ongoing basis. Again, joint decisions among the CCC are wise for fairness to the resident and substantiation of the PD’s final decisions on implementing or lifting the corrective action plan, moving toward probation, or recommending additional training beyond 36 months.

When summative information on graduates is requested, eg., via credentialing or licensing boards, it is the responsibility to provide full and honest information regarding probation of disciplinary actions. Many entities will inquire as to this, but few do so regarding corrective action plans, so the latter is a wise approach, as residents who successfully complete this will not experience untoward consequences.
Appendix A-Published Surgical Assessment Tools for Various Ophthalmologic Procedures

Forms available for download at http://www.aao.org/competency-evaluation-toolbox

Cataract


Strabismus Surgery and Retinopathy of Prematurity Examination


Lateral Tarsal Strip


Appendix B-Structured Curriculum for Wet Lab and Similator Use During Residency Training


Appendix C-Partial Listing of Available Micro-Surgical Courses

| International | • http://education.lvpei.org/education_lvpei/ophthalmology/hands-term-training.php |
| • http://www.uniteforsight.org/volunteer-abroad/ophthalmology-residents |
| • http://www.phacotraining.org/?gclid=CL7mwI0g4scCFUdfugodno8OIQ |
| • http://training.newvisionindia.com/?gclid=CJ-x0qKg4scCFUMjgQodM1EO2g |
| • http://www.drnavingupta.com/ |

| Domestic | • http://www.masseyeandear.org/education/ophthalmology/meetings-courses/cataract-course |
| • https://www.coursera.org/course/cataractsurgery |
| • Resident courses through Alcon, Bausch and Lomb, and AMO (consider repeating if already completed) |
Appendix D-Resources for Substance Abuse Treatment

- Institutional
  - Confidential programs through employee health
  - Neuro-psychological evaluations
- Community-referral
- State licensing boards-physician rehabilitation program