Mobile Assessment of Operative Skill

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Surgical Training as We Knew It

Apprenticeship model

- Residents learn while caring for patients
- Learning dependent on diseases and procedures encountered in practice
- Progressive autonomy
- Society tolerant (or unaware) of learning mistakes and costs
- Surgical competence determined by time and volume, and personal endorsement

William Halstead
Impetus to Change

- Concern over medical errors and patient safety
- Resident duty hour restrictions
- Medical legal environment / fear of liability
- Priority on efficient delivery of care
- Ever-expanding cognitive and technical skill set

- Decreased operative and educational opportunities in resident training
- Greater, broader skill set required

Sachdeva, Acad Med 2007
Paradigm Shift to Competency-Based Education

- **1999** – ACGME defines six core competencies

- **2002** – ASA, ACS, ABS, RRC-S form a Blue Ribbon Committee on Surgical Education

- **2009** – ACGME / ABMS Outcome Project
  - Comprehensive set of educational milestones developed for each specialty
  - Milestones articulate a continuum of observable behaviors to facilitate objective assessment

- **2013** – ACGME Next Accreditation System
  - Program’s CCC must submit resident milestones assessments

Pellegrini, Ann Surg 2006
Swing, J Grad Med Educ 2013
Competency-Based Education

Requires objective assessment of performance

Residents are advanced based on demonstrated skill

May make surgical training more efficient

Able to demonstrate accountability to patients, the public, and other stakeholders

Logistical challenges

Need for remediation process

Barriers to assessment***

Sachdeva, Acad Med 2007
Assessment of Technical Skill

- American Board of Surgery
  - 6 operative assessments must be submitted per resident to the ABS for board eligibility

- Williams et al.
  - A reliable assessment of operative skill requires 20 ratings per resident per year, by 10 different raters, within 72 hours of observation

www.absurgery.org
Williams, Ann Surg 2012
Assessing Technical Competence in Surgical Trainees

A Systematic Review

Peter Szasz, MD,* Marisa Louridas, MD,* Kenneth A. Harris, MD, FRCSC,† Rajesh Aggarwal, MD, PhD, MA, FRCS,‡ and Teodor P. Grantcharov, MD, PhD, FACS*

- Systematic review evaluating the validity and reliability of assessment methods, and quality of studies conducted
- 85 studies involving 2369 residents
- Likert scales most well studied, based on original OSATS
- Conclusion:
  - Recommend a Likert-type **global rating scale**
  - Further research in **standard setting** needed to differentiate competent and noncompetent performers

Szasz, Ann Surg 2014
## Likert Rating Scales

- OSATS (open)
- GOALS (lap)

### Global Rating Scale of Operative Performance

Please circle the number corresponding to the candidate’s performance in each category, irrespective of training level.

<table>
<thead>
<tr>
<th>SCALE</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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</thead>
<tbody>
<tr>
<td><strong>Respect for Tissue:</strong></td>
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<tr>
<td>Frequently used unnecessary force on tissue or caused damage by inappropriate use of instruments</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<td>5</td>
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<tr>
<td>Careful handling of tissue but occasionally caused inadvertent damage</td>
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<tr>
<td>Consistently handled tissue appropriately with minimal damage</td>
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<tr>
<td><strong>Time and Motion:</strong></td>
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<tr>
<td>Many unnecessary moves</td>
<td>1</td>
<td>2</td>
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<td>4</td>
<td>5</td>
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<tr>
<td>Efficient time/motion but some unnecessary moves</td>
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<tr>
<td>Clear economy of movement and maximum efficiency</td>
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<tr>
<td><strong>Instrument Handling:</strong></td>
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<tr>
<td>Repeatedly makes tentative or awkward moves with instruments by inappropriate use of instruments</td>
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<tr>
<td>Competent use of instruments but occasionally appeared stiff or awkward</td>
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<tr>
<td>Fluid moves with instruments and no awkwardness</td>
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<tr>
<td><strong>Knowledge of Instruments:</strong></td>
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<tr>
<td>Frequently asked for wrong instrument or used inappropriate instrument</td>
<td>1</td>
<td>2</td>
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<td>5</td>
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<tr>
<td>Knew names of most instruments and used appropriate instrument</td>
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<tr>
<td>Obviously familiar with the instruments and their names</td>
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<tr>
<td><strong>Flow of Operation:</strong></td>
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<tr>
<td>Frequently stopped operating and seemed unsure of next move</td>
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<td>5</td>
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<tr>
<td>Demonstrated some forward planning with reasonable progression of procedure</td>
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<tr>
<td>Obviously planned course of operation with effortless flow from one move to the next</td>
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<tr>
<td><strong>Use of Assistants:</strong></td>
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<tr>
<td>Consistently placed assistants poorly or failed to use assistants</td>
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<td>2</td>
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<tr>
<td>Appropriate use of assistants most of the time</td>
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<tr>
<td>Strategically used assistants to the best advantage at all time</td>
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<tr>
<td><strong>Knowledge of Specific Procedure:</strong></td>
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<tr>
<td>Deficient knowledge. Needed specific instruction at most steps</td>
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<tr>
<td>Knew all important steps of operation</td>
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<tr>
<td>Demonstrated familiarity with all aspects of operation</td>
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</table>

Faulkner, Acad Med 1996
Barriers to Faculty Evaluation of Residents

- Electronic open-ended survey to general surgery residency program directors and surgical educators
- Qualitative analysis to identify barriers to completion of resident assessments
- N=63

**5 main themes**

<table>
<thead>
<tr>
<th>Assessment Factors</th>
<th>Rater Factors</th>
<th>Rotation Factors</th>
<th>System Factors</th>
<th>Resident Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ease of Access</td>
<td>Time</td>
<td>Insufficient contact with resident</td>
<td>Reimbursement</td>
<td>Fear of retaliatory feedback</td>
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<tr>
<td>Length</td>
<td>Motivation</td>
<td>Time delay b/w event and eval</td>
<td>Lack of consequence</td>
<td>Emotional upset</td>
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<tr>
<td>Clarity</td>
<td>Training re:</td>
<td>Content</td>
<td>Culture</td>
<td></td>
</tr>
<tr>
<td>Content</td>
<td>use of instruments</td>
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<tr>
<td>Form fatigue</td>
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- #1 main theme: Rater factors / Time
- #2 main theme: Assessment factors
Mobile App for Operative Assessment

✅ Mobile App
  • Accessible
  • Fast
  • Easy

✅ Links to MedHub

✅ Assessments
  • Open surgery – OSATS
  • Lap surgery – GOALS

✅ Faculty can initiate “on the fly”

✅ Residents can “push”
Resident name: Cara Liebert
Procedure name: Total Thyroidectomy
Date of procedure: May 2015

Case difficulty:
1. Straightforward anatomy, no related prior surgeries or treatment
2. Intermediate difficulty
3. Abnormal anatomy, extensive pathology, related prior surgeries or treatment (for example, radiation), or obesity

Respect for tissue:
1. Frequent unnecessary tissue force or damage by inappropriate instrument use
2. Careful tissue handling, occasional inadvertent damage
3. Consistently handled tissue appropriately, with minimal damage
✓ Primary Aim

- Frequent
- Timely
- Specific
- Actionable

FEEDBACK
Secondary aim

- Large volume of performance data in order to establish normative standards per PGY level
Do Residents Want It?

- Electronic survey to Stanford general surgery residents
- Assess resident satisfaction with attending feedback on operative performance
- N=34 (43% response rate)
- Resident **overall satisfaction** (10-point scale): **5.79**
- Specifics (5-point scale):

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<tbody>
<tr>
<td><strong>Amount</strong> of feedback</td>
<td>3.26</td>
</tr>
<tr>
<td><strong>Quality</strong> of feedback</td>
<td>3.24</td>
</tr>
<tr>
<td><strong>Timeliness</strong> of feedback</td>
<td>3.47</td>
</tr>
</tbody>
</table>
Do Residents Want It?

- 94% want feedback at least every OR day
  - Every OR case (62%)
  - Every OR day (32%)

- 100% of resident expectations would be met with < 5 min of feedback
  - Less than 2 minutes (68%)
  - 3-5 minutes (32%)
General Surgery pilot ongoing

- Faculty usage
- Faculty satisfaction with platform
- Resident satisfaction with platform, feedback
- Data collection to track resident performance and faculty rating practices

Expansion to subspecialty programs: urology, vascular, and plastic surgery

Addition of other assessments to the platform (e.g. endoscopy, robotic surgery, and outpatient clinical assessments)
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  - Jen Tran
- General Surgery Residency Program
  - Marc Melcher
  - Natalie Kirilcuk
  - JoAnn Smithson
- Beta-Testing Teams
  - Jeffrey Norton, Dana Lin / Surg Onc 1
  - James Lau / MIS
  - Natalie Kirilcuk / Colorectal
  - Marc Melcher / Transplant
- Vice Provost for Online Learning

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