Using Deliberate Practice to Maintain and Improve Surgical Skills

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Disclosures

• No financial disclosures
EXPERTS

Consistent, reproducibly superior performance
What do experts do differently to acquire and maintain their skills?

Deliberate Practice
Developing Skill: Surgeon Related Factors Matter

Figure 2. Risk-Adjusted Complication Rates with Laparoscopic Gastric Bypass, According to Quartile of Surgical Skill. (Birkmeyer et al. 2013)
Maintaining Skill:
Years of experience is not enough

Do physicians with more years of experience deliver higher quality care (i.e. do they perform better)?

Choudhry et al 2005

- Performance increased as experience increased: 4%
- No Association: 21%
- Concave (initial increase, plateau, then decrease): 3%
- Performance decreased as experience increased: 72%
Maintenance of Skills

Individuals that **deliberately practiced** maintained their specific skill set

Krampe and Ericsson 1996
So, how do you develop and maintain skills?

**DELIBERATE PRACTICE**
Models of Learning
Traditional Practice

• Learn the basics
• Perform the basic steps repeatedly
  – “see one, do one, teach one”

• **Expectation:** repetition alone will improve one’s performance

• **Goal:** Automaticity
  – acceptable performance with relatively little thought or effort
Fitts and Posner Model of Skills Acquisition

- Cognitive stage
- Associative Stage
- Autonomous Stage

Fitts and Osner. 1967
Purposeful Practice

- Learn the basics
- Perform focused exercises with well-defined, specific goals to achieve a skill set
  - Receive feedback

- **Expectation**: performance will improve with repeated practice and adjustments

- **Goal**: automaticity, higher level performance
Using Purposeful Practice to Perform at a Higher Level

Fitts and Osner. 1967
Deliberate Practice

- Perform well-defined exercises in a specific domain of practice
  - Purposeful and informed
  - Receive feedback
    - Based on this feedback -> new, modified training activities

**Expectation**: Expert performance will be achieved with repeated exercises performed under the guidance of a coach/teacher

**Goal**: optimal control and memory
  - Expert level performance utilizing **cognitive representations**
Models of Learning

- Traditional: Stays in a blended cognitive/associative stage
  - Effortless but Fixed

- Purposeful: Cognitive -> Associative -> Autonomous
  - Increased control and memory

- Deliberate: Increased control and memory
  - Effortless but Fixed
Acquired Cognitive Representations in Surgery

“Current surgical plan (generated in part pre-operatively)”

Representation 1
- Desired performance goal

Representation 2
- Representation for executing performance

“Carry out next step of surgery”

Representation 3
- Representation for monitoring one’s performance

“Observe outcome and if necessary, revise current plan”

Figure 3 Three types of internal representations that mediate expert surgeons’ cognitive processes during surgery. (Adapted from Figure 6, Ericsson KA. The scientific study of expert levels of performance: General implications for optimal learning and creativity. High Ability Stud.)
Sequence of States

Ericsson 2015
What do we know about acquiring and developing skill in surgery?

SURGICAL SIMULATION
Improved laparoscopic performance in the lab & OR

McCluney, Vassiliou et al. 2007
• Implementing a structured educational intervention, that includes hands-on learning and practice, can safely increase the utilization of non-open hysterectomies.

Table 2. Types of non-open hysterectomy 2008–2009

<table>
<thead>
<tr>
<th>Type of Hysterectomy</th>
<th>2008 (%)</th>
<th>2009 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laparoscopic supracervical hysterectomy</td>
<td>698 (27)</td>
<td>739 (23)</td>
</tr>
<tr>
<td>Total laparoscopic hysterectomy</td>
<td>444 (17)</td>
<td>786 (25)</td>
</tr>
<tr>
<td>Laparoscopic-assisted vaginal hysterectomy</td>
<td>641 (25)</td>
<td>780 (25)</td>
</tr>
<tr>
<td>Vaginal hysterectomy</td>
<td>806 (31)</td>
<td>877 (28)</td>
</tr>
<tr>
<td>Total</td>
<td>2589</td>
<td>3182</td>
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</tbody>
</table>

Andryjowicz and Wray 2011
What is available for acquiring and maintaining vaginal surgical skills?

FUNDAMENTALS OF VAGINAL SURGERY (FVS©)
FVS Trainer™
Exercises to Isolate Critical Tasks for Vaginal Surgery

1. One-handed knot tying
2. Two-handed knot tying
3. Running suturing
4. Vertical plication suturing
5. Horizontal plication suturing
6. Heaney transfixion pedicle ligation
7. Free pedicle ligation
How does a practicing surgeon get feedback?

COACHING & MENTORSHIP
Coaching & Mentorship

- Hands-on simulation courses
- Telepreceptorship
- Preceptor and mentorship for practicing physicians
  - Canadian Ob/Gyn Association CSEP (Continuing Surgical Education Preceptor Program)
  - ACS-accredited Education Institutes
How can you develop your vaginal surgical skills?

FVS© TRAINING SESSION
Vaginal Surgical Skills Training Session

- October 2019

- Surgical Simulation Practice

- Feedback on Skills
Why improve your laparoscopy and vaginal surgery skills?

ROUTE OF HYSTERECTOMY MATTERS
Optimizing Patient Outcomes

- Complication: 12.1%, 7.0%, 6.2%
- Readmission: 2.2%, 1.4%, 2.0%
- Return to OR: 1.0%, 0.9%, 1.0%

Legend:
- Abdominal
- Vaginal
- Laparoscopic
Reimbursement margin for hysterectomy by surgical approach

Dayartna, AJOG 2014

Net income, 95% CI

- Vaginal, $1260
- LAVH, -$1306
- Laparoscopy, -$4049
- Robot assisted LS, -$4564
Surgical Expertise

• Improves patient outcomes
• Takes work to develop and maintain
• Surgical simulation
• Route of hysterectomy matters

Thank you!