The value of
“See one, Do one, Teach one”

Surgery Grand Rounds

April 18th, 2011

Daine Bennett, M.D.

PGY 1 General Surgery Resident

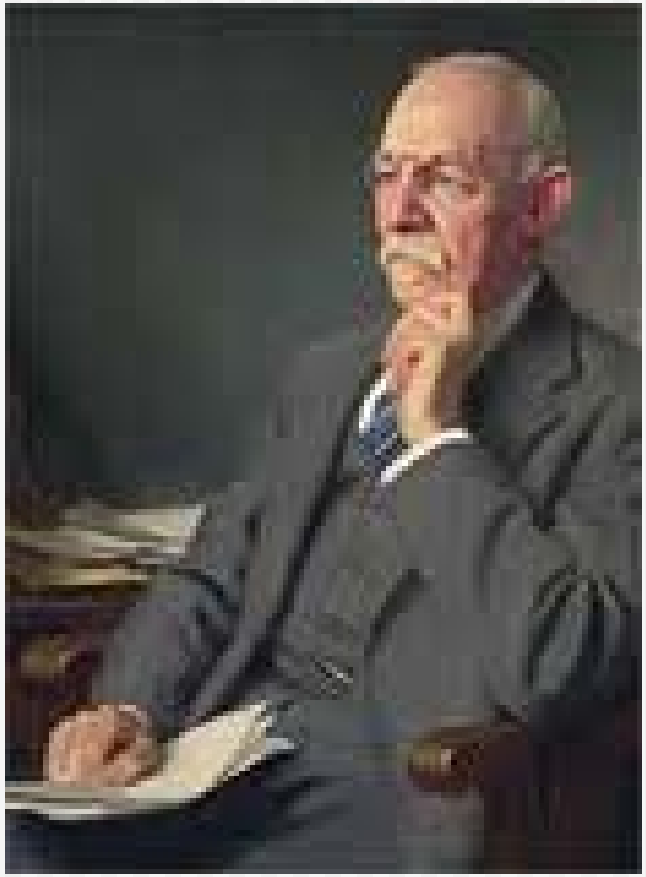
University of Colorado Denver

“See one, do one, teach one”

- Fluid relationship
  - “See one, do SOME, teach one”
- Basis for acquiring surgical skills during residency training

William Stewart Halsted

- Designed the first surgical residency program in the U.S.



Dr. Halsted's Approach

- Previously no formal training
- Trainee focused
- End goals for surgical training
- Multiple years as an assistant then promotion to house surgeon
- Average time was 8 years to graduation

Apprenticeship Model

- Modeling - “See one”
- Coaching - “Do one”
- Forms a scaffold

Collins A, Brown JS, Newman SE. Cognitive apprenticeship: teaching the art of reading, writing, and mathematics. In: Resnick LB, editor. Cognition and instruction: issues and agendas. Hillsdale, NJ: Lawrence Earlbaum, 1990

Apprenticeship Model

- Articulation - “Teach one”
- Reflection
- Exploration

Collins A, Brown JS, Newman SE. Cognitive apprenticeship: teaching the art of reading, writing, and mathematics. In: Resnick LB, editor. Cognition and instruction: issues and agendas. Hillsdale, NJ: Lawrence Earlbaum, 1990

What has changed?

- Introduction of surgical simulators for residency training

Is “See one, Do one, Teach one” still valuable?

YES!!

Why?

- Observation of experts
- Simulation does not supply all the answers
- Teaching is a valuable learning tool

Observation

- Crucial component of learning technical skills

the cross-cutting edge

Action representations in perception, motor control and learning: implications for medical education

Digby Elliott,[1,2] Lawrence E M Grierson,[2,3] Spencer J Hayes[1] & James Lyons[2]

Medical Education

Elliot et al.

- “Mirror Neuron System”
  - Cells in the brain fire similarly when performing goal-directed action as well as when observing another
  - These cells are associated with areas involved with perception of motion, movement planning and feed-forward motor control

Elliot et al.

- Observational groups were able to reach similar skill levels as physical practice groups
- When coupled with instruction and feedback, observers are able to develop error detection and correction mechanisms

“See One”

- Observation of an experienced surgeon’s technique allows the trainee to synthesize appropriate motor skills to complete the task in the future.
- Professionalism

Simulation Training

- Multiple studies show improved OR time, fewer errors and acceptable transferability of skills.

- Incomplete
  - Not as effective when done in mass
  - Cost
  - Availability

ORIGINAL ARTICLES

Teaching Surgical Skills: What Kind of Practice Makes Perfect?

A Randomized, Controlled Trial

Carol-Anne E. Moulton, MB, BS, FRACS, MEd, Adam Dubrowski, PhD, Helen MacRae, MD, MA, FRCSC, FACS, Brent Graham, MD, MSc, FRCSC, Ethan Grober, MD, and Richard Reznick, MD, MEd, FRCSC, FACS

Annals of Surgery

Moulton et al.

- Randomized controlled trial
- Studied training strategy for microsurgery
- 38 surgical residents randomly assigned to massed vs. distributed training
- 4 sessions in 1 day vs. 4 sessions over 4 weeks
- Pre-test, Post-test, Retention, Transfer

Moulton et al. Teaching Sugical Skills: What Kind of Practice Makes Perfect? A Randomized, Controlled Trial. Ann Surg 2006;244: 400-409

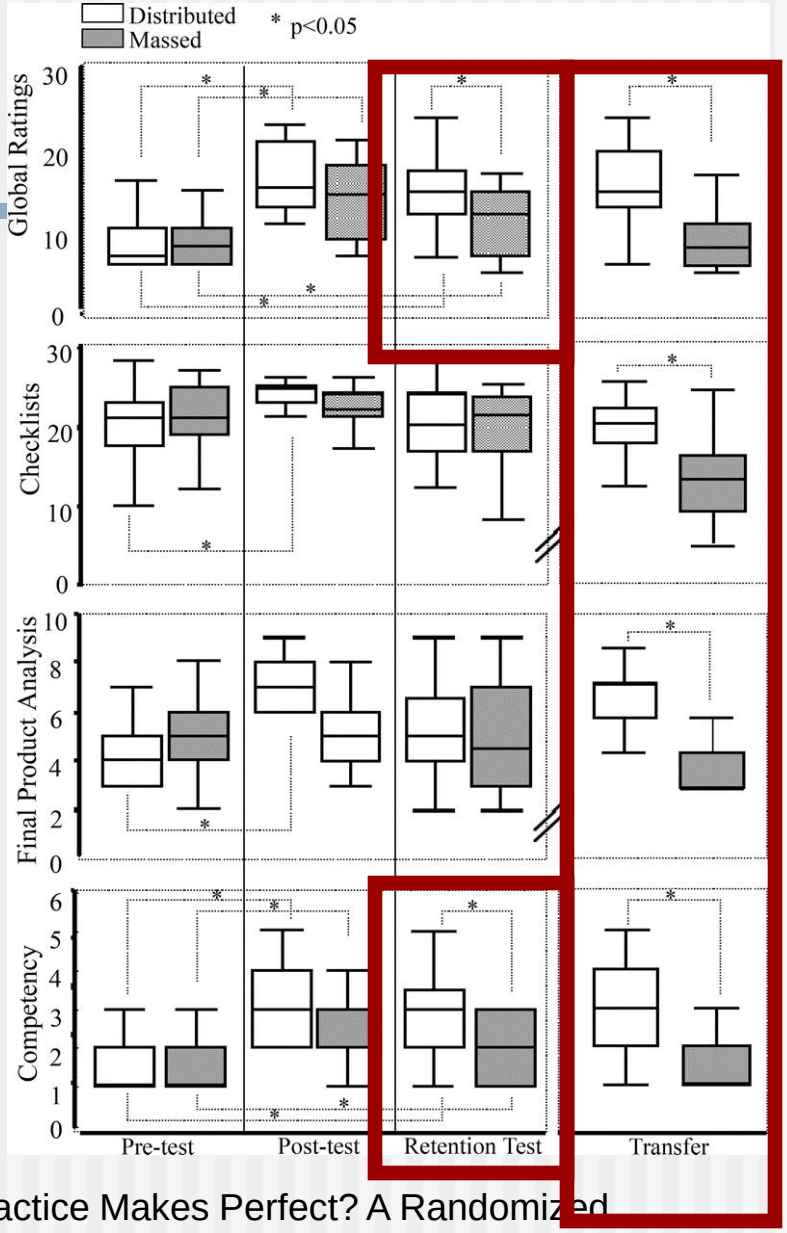
Moulton et al.

- Outcomes measured
  - Checklist - surgical maneuvers
  - Global Ratings - surgical behaviors
  - Final Product Analysis
  - Competency - acceptable for OR
  - Time - Computer analysis
  - Number of Movements - Computer analysis

Moulton et al. Teaching Sugical Skills: What Kind of Practice Makes Perfect? A Randomized, Controlled Trial. Ann Surg 2006;244: 400-409

Moulton et al.

- Statistically significant difference favoring distributed group



Moulton et al. Teaching Sugical Skills: What Kind of Practice Makes Perfect? A Randomized Controlled Trial. Ann Surg 2006;244: 400-409

- Weekend training courses and isolated simulation events less effective
- Need instruction spread over time to allow for reflection and reinforcement
- Bedside procedures offer reinforcement of skill over time

Cost

- Simulator equipment costs
  - Central Line $1340, $435
  - Chest Tube $1560
  - Laparoscopic Simulator $50,000
  - daVinci Simulator $100,000
- Staffing and space

Availability

- Not available to all trainees
- Not possible to simulate all scenarios

“Teach one”

- Requires superior knowledge of procedural steps and potential outcomes
- Encourages autonomy and responsibility
- Develop teaching skills necessary to train future residents

Summary

- Remains a critical aspect of surgical education
- Simulation is a valuable training tool but not complete
- Teaching to learn
- Well established system of training for the past 100 years