

The 21st Conference of the Society for Medical Innovation and Technology
SMIT 2009 7-9 October 2009, Sinaia, Romania
 www.smit.de SMIT 2006 - Airlomar SMIT 2008 - Vienna SMIT 2010 - Trondheim

Which way shall we take for Training and Education in Surgery?

José M. Schiappa, MD, FACS



21st International Conference of SMIT
 Sinaia, Romania - October 2009

Which way shall we take for training and education in surgery ?

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Education in surgery is a complex problem especially to financial, medico-legal and ethical considerations. In fact, the surgical education has to answer to the three main questions: Which surgeons will we need? Which training and education will be appropriate? Which evaluation shall be used ? . The paper reviews the different training models used today for surgical training and education, from the Halstedian apprenticeship model ("see one, do one, teach one") to modern concepts and methods (simulators, assessment methods etc.). Conclusions: Surgery does need a complete change in training concepts and practice. It is absolutely necessary a standardization of methods leading to a common approach with flexible systems responding to local needs.

KEY WORDS: TRAINING IN SURGERY, SIMULATORS, VR
 SIMULATORS, LAPAROSCOPIC TRAINING


Conference presented to the 21-st Conference of the Society for Medical Innovation and Technology (SMIT), 7-9 October 2009, Sinaia, Romania

Surgeon's training

- **WHICH** surgeons will we need?
- **WHICH** training and education will be appropriate?
- **WHICH** evaluation shall be used?


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What will surgery become? Which role in the future?

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Training in Surgery

- Halsted model - See one, Do one, Teach one (beginning of last century)
- versus.. ??
- New paradigms (technologies, new educational practice, new teaching tools, sub specialities, ...)

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William Stuart Halsted (1852-1922)
 The training of surgeons 1904

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"Old" Foundations of Surgical practice - "The Grand Patron"

- **Knowledge**
 - Well based, Very broad
 - Non technology based
- **Character**
 - Extremely strong-willed, Imposing personality
- **Performance**
 - Quite good, Not always fully evaluated

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Trainees Assessment

- **Assessment of their theoretical knowledge**
 - Multiple choice questions
 - Oral examinations
 - Patient examining
 - Theoretical decision making
 - Subjective evaluation
- **Assessment of their technical skills**
 - Subjective opinions
 - Unsystematic observations
 - Unreliable log-books
 - (NO quality of the performance)
 - (NO outcomes evaluation)

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Assessment of Surgical Skills

- **In common practice - still nowadays**
 - Unstructured
 - Subjective
 - Biased (sometimes)
- **What should be in the future**
 - Standardized
 - Credible and Reliable
 - Objective
 - Validated by tools allowing repetition and comparison

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Training and Education in Surgery

- What is a "General Surgeon" in the XXI Century?
- What is the "approved" training for a "General Surgeon" in most countries?
- Do we have "standard structured requirements" for training?

We do not have and we do not know!!

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Training and Education in Surgery

Educational Changes (most brought in by Laparoscopy)

- Taking the training away from the patient
- Focus on Education
- **Standardizing teaching and procedures**
 - (in surgery standardizing can be only with simulators or other computer based tools)

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Basic foundations of Surgical education in 21st century

- **Knowledge**
 - Theoretical
 - Technological (Studying)
- **Practice (Attitudes)**
 - Common sense
 - Daily decisions
- **Skills**
 - Coordination
 - Timings
- **Evaluating Outcomes**

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Basic foundations of Surgical education in 21st century

- | | |
|--|--|
| • Knowledge | • Skills |
| • Voluntary - individual effort and motivation | • Involuntary - individual dependant |
| • Practice | • Evaluation |
| • Individual and Institution dependant | • Individual and Institution dependant |

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Communication

Individual and education dependant

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SKILLS

- Many studies have been done and many papers published on Surgical Skills necessary for the execution of **Laparoscopic** surgery
- Similarly, a lot of work has been done on training **Basic and Advanced Laparoscopic** surgery

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(Grantcharov, T. et al. ASSBI 2006)

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SKILLS

- 8 to 10% cannot learn laparoscopy
- Are these the same which will never be proficient in "general" surgical skills?

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(Grantcharov, T. et al. ASSBI 2006)

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Training in Surgery

Techniques training and skills proficiency

8 to 10% cannot learn (skills and coordination impaired)

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Training in Surgery

- Training "undifferentiated" "totopotential" "stem cell" surgeon/technician, able to do "operations"
- Training more specialized "agents" dealing with extremely differentiated pathologies, its biology, diagnostic tools and therapeutic technologies
- It depends on local (or regional) demand and needs

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Training and Education in Surgery

- Definition of type of work and working hours for the training period
- Adjust the training programmes with the minimal rules from EU directives
- **Short working hours = short educational hours (per week!!!)**

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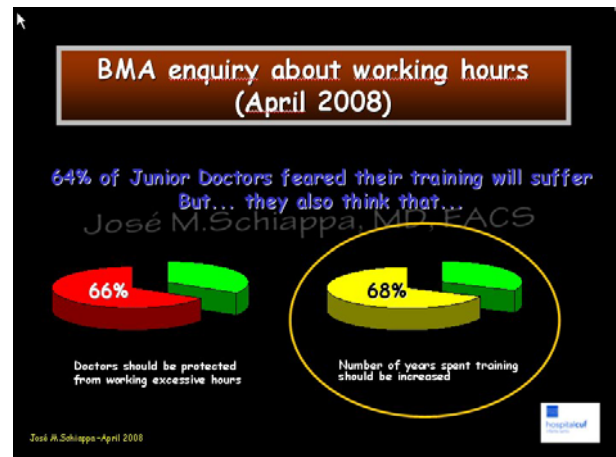
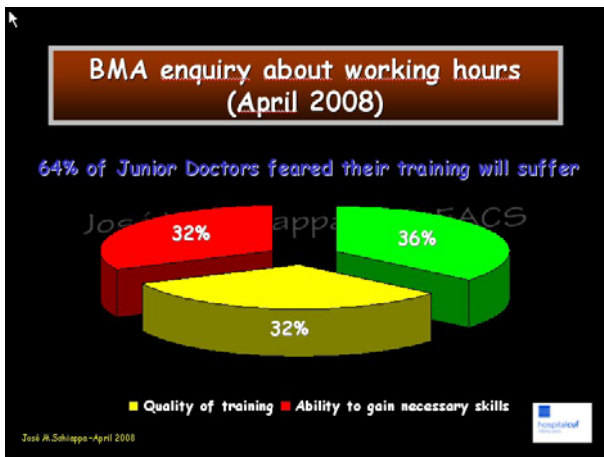
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- **European Working Time Directive**
- From 1 August 2009
- Restricts the time junior doctors can spend in hospital to 48 hours a week
- The former limit was 56 hours (UK)
- (US: 96 hours per week -> 80 hours)

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Training in Surgery

Trainee's real role and position

- A person to be fully trained by the Institution, under accepted rules

or

- A work-horse more for the Institution?

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- The passage from Resident to Surgeon is much more than being exposed to a pre-defined number of cases or situations
- A well prepared Surgeon possesses a very complex set of competences (when or not to operate and why, what to do and why, ethics ...)

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- 15 YEARS TO BECOME A SURGEON
- 5 Years to learn **HOW** to operate
- 5 Years to learn **WHEN** to operate
- 5 Years to learn **WHEN NOT** to operate

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Components of OR performance

- Knowledge
 - Structured Education
 - Defined periods of time
 - Continuous and Periodic Evaluation (tests, exams...)
- Manual Skills
 - Structured Training with the use of several Tools
 - No specific training Time (with a limit!)
 - Continuous evaluation
- Technological Skills
 - Involves Knowledge and Practical Skills training
- Clinical Judgment
 - Peer continuous Evaluation under normal working conditions

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New Challenges

- Now we must demonstrate our skills outside the OR:
- **Negotiation** (Joseph A. Schiappa, MD, FACS)
 - Public speaking
 - Coalition-building
 - Art of persuasion.
 - ...Not speaking of administrative situations

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"Learning curves"

- Review of suggested "learning curves" for MIS surgery:
- **Cholecystectomy** 30 (Joseph A. Schiappa, MD, FACS)
- **Fundoplication** 28
- **Colectomy** 40
- **Herniorrhaphy** 25

J of Endiatric Surgery 2000 33:220-224

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Training in Surgery

EBSQ (European Board of Surgery Qualifications) - UEMS

- Minimal requirements for each of these fields are set as follows:-
- **GI tract surgery** (Joseph A. Schiappa, MD, FACS) 280
- **Traumatology** 100
- **Thoracic** 80
- **Urology, gynaecology, pelvis** 40
- **Vascular surgery** 100
- **Head and neck** 50
- **Miscellaneous** 100

» TOTAL 750

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Training in Surgery

EBSQ (European Board of Surgery Qualifications) - UEMS

| | Minimum | Maximum |
|---|---------|---------|
| • GI TRACT | | |
| • Hernia and abdominal wall | 20 | 20 |
| • Appendectomy | 30 | 70 |
| • Small bowel resection, Meckel's, gastro-enterostomy | 10 | 30 |
| • Biliary procedures | 25 | 60 |
| • Gastric procedures | 20 | 50 |
| • Spleen and liver resections | 5 | 30 |
| • Colon operations | 20 | 50 |
| • Acute abdomen (peritonitis, trauma, haemorrhage, Obstruction) | 20 | 50 |
| • Proctology | 25 | 50 |
| • Minimum number of endoscopy GI procedures | 80 | |

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Training in Surgery

Having "fixed" and "accounted" goals for "correct Full Training"

- ALL UNREALISTIC

LEADING TO A CULTURE OF
"NUMBERS FIXATION"

- NOT CONSIDERING THE INDIVIDUAL

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Training and Education in Surgery

Tools

- **Structured teaching and Training** (Joseph A. Schiappa, MD, FACS)
 - Courses
 - Department teaching (plus scientific societies and Hospital programs)
 - Role models
 - ...
- VR simulators, Live models, Inanimate models
- Check lists
 - OSATS (Objective Structured Assessment of Technical Skills)
 - Eubank's scales

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Training and Education in Surgery

- Surgical Simulators
- Measuring Training tasks and giving Feedback
- Using Augmented Reality
- Using the "Show, Practice and Measure" model of training
- Real Haptics, real instruments, valid metrics
- Mixed real and virtual realities

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Developing proficiency with ProMIS



1. Show

- Augmented reality, graphics, video and audio provide guidance and instruction

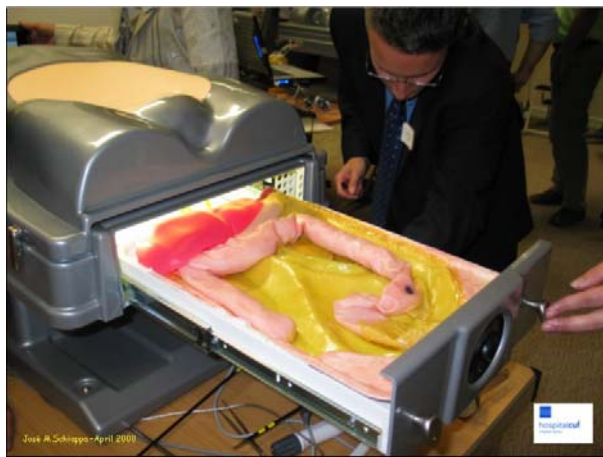
2. Practice

- Physical and/or virtual anatomic model
- Tactile feed-back
- Real instruments

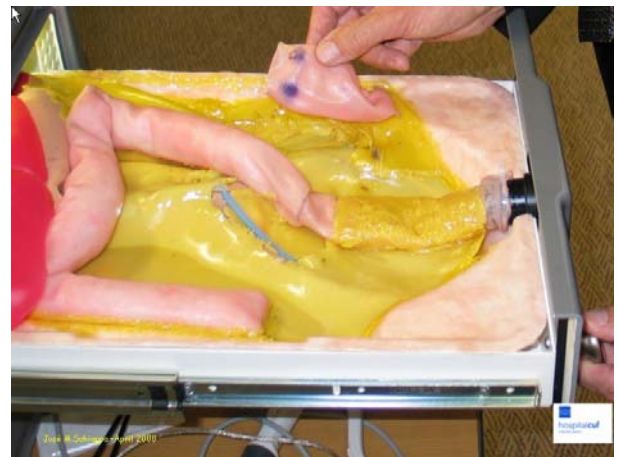
3. Measure

- Objective metrics & proficiency indicators
- Self-assessment
- User and group records

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Objective Structured Assessment of Technical Skills (OSATS) Sample Checklist.- part 1

SMALL BOWEL ANASTOMOSIS
INSTRUCTIONS TO CANDIDATES
You have just resected a segment of small bowel. Perform a single layer, interrupted, end-to-end anastomosis to restore continuity.

| ITEM | Not Done or Incorrect | Done Correctly |
|---|-----------------------|----------------|
| 1. Bowel oriented mesenteric border to mesenteric border, no twisting | 0 | 1 |
| 2. Stay sutures held with hemostats | 0 | 1 |
| 3. Selects appropriate needle driver (Gen surg. medtip/med on short length) | 0 | 1 |
| 4. Selects appropriate suture (atraumatic, 3.0/4.0, PDS/Dexon/Silky/Nylon) | 0 | 1 |
| 5. Needle loaded $\frac{1}{2}$ to $\frac{2}{3}$ from tip | 0 | 1 |
| 6. Index finger used to stabilize needle driver | 0 | 1 |
| 7. Needle enters bowel at right angles 80% of bites | 0 | 1 |
| 8. Single attempt at needle passage through bowel 90% of bites | 0 | 1 |

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Training and Education in Surgery

- "Components" training
- Training by tasks - done over and over again, into moving into a more complex task
- Reverse training (by reverse steps, ending with the pneumoperitoneum and trocars)
 - Training - control of haemorrhage
 - Arterial, venous, surface

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- Training by "disease focused" practice (clusters different specialities interested - new ideas, new knowledge, new diagnosis, new algorithms, better outcomes, improvements in treating patients)
- Training by "technique focused" practice (clusters "tool users" - limited potential for better outcomes and improvements in treating patients)

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Changes in evolution

- Progress shall be dependent on performance
- Shall be Proficiency controlled
- Use Evidence Based tools for teaching
- ... and for evaluating...

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- Focus on techniques will only lead surgeons to be "executors" of other people's opinions
- Focus on diseases and knowing the different approaches will allow the role of "team leaders" to surgeons

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Assessment of Surgical Skills

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- What should be in the future
 - Standardized
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Training and Education in Surgery

**Surgery in general
(Standard Education and Training)
DOES NEED**
a complete change in training concepts and practice!!

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Training and Education in Surgery

**We need
Standardisation of METHODS
leading to a common APPROACH
with flexible SYSTEMS
responding to local needs**

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