# 1st World Congress on Surgical Training

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## Congress Book

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# INTRODUCTION

Sweden is a small country often associated with terms like ”quality” and ”safety”. This could be illustrated by several practical examples, as the leading safety principles constructing cars and by the fact that the very first national register to count surgical results in a nation wide database was created by Pr Peter Herberts in Gothenburg in 1979 (“The national hip replacement register”). Today the national quality registers in different surgical specialties are spread worldwide. In addition, Sweden has established a so called “Zero Vision” for lethal traffic accidents.

In health care systems all over the world the question of patient’s safety is frequently addressed, and some hospitals have implemented quality systems like the ISO 9000. A new law concerning Patient’s Safety was established in Sweden on the 1st of January 2011. However, despite all the efforts paid in this area, the questions about surgical skills are seldom mentioned when discussing patient’s safety or ISO 9000 labelling. The need for structured learning in surgery, keeping the patient’s safety in mind - as well as the surgeon’s feeling of security entering the surgical profession - is probably one of the most actual questions in modern surgery. In our time the practical training is no longer time-based but competency based, and efficient stepwise training systems with in-built control functions are mandatory to form new skilled surgeons replacing the retiring generation.

The **1st World Congress on Surgical Training** is addressing these questions, gathering several key opinion leaders in surgery from different specialties all over the world. In addition the questions about the collaboration between universities, hospitals and surgical instrument companies concerning surgical training is also included in the program.

The intended target audience is a mixture of people dealing with these questions in their daily work, being surgeon’s in practice, surgical teachers, residents in surgical training and decision makers of educational programs in surgery - or surgical course creators in surgical instrument companies.

*Margareta Berg*
MD PhD
Consultant orthopaedic surgeon
Congress creator

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Mrs Furmark currently holds a position as Political Advisor to the Minister of Health and Social Affairs in Sweden. Her focus areas are Patient Rights, Patient Safety, Patient Choice- and Reimbursement Systems and eHealth.

Mrs Furmark started her professional life as a Registered Nurse in1980 and also holds a Bachelor Degree in Political Science and Economics, a Degree in Common Law and a Degree in Healthcare Administration.

She has been employed by the Federation of the County Councils in Sweden where she served as Director of the Executive Board Office.

Mrs Furmark has also served as Director of Office in the Swedish Parliament and she has had several expert- and consultancy assignments in Swedish Parliamentary Commissions and for the UN.

Between year 2002 and 2008, Mrs Furmark worked for Microsoft Corporation as Healthcare Business Development Manager in Sweden and Western Europe.

Before joining the Ministry Lena Furmark was the CEO of Caritea, a Swedish consultancy company focusing on business intelligence and knowledge transfer regarding healthcare change management and IT.

Mrs Furmark has been a member in several boards i e the Swedish Red Cross, the Swedish Alcohol Retail Monopoly, and Swedish Pharmacy International Inc.

# PROFESSIONAL MODERATOR

**Karin Klingenstierna**
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Karin Klingenstierna is a moderator, compère and artist from Gothenburg, Sweden. Over the years, she has worked with hundreds of events , congresses, seminars, festivals, TV and radio broadcasts, and concerts in Sweden and abroad. Her assignments as a moderator have covered a wide range of subjects and sectors: medicine and health care, pharmaceutical innovation , business and enterprise development, the automotive industry, urban planning, education, politics, environmental issues, public spending, culture, to mention a few. She counts among her employers The City of Gothenburg, AstraZeneca, AstraTech, The University of Chalmers, E.On, Volkswagen, Gothia Cup, Volvo, Öhrlings Pricewaterhouse Coopers, Lindholmen Science Park, The Swedish Agency for Economic and Regional Growth.

Karin Klingenstierna is also a soul and jazz singer and has been the leader of the band in one of Sweden´s most popular quiz shows, released a solo jazz album ”Come Closer” in 2007, and has written the librettos of two masses, broadcast on TV and radio in 2010. She is a qualified Upper Secondary School teacher of English, Swedish, Spanish and Drama but for the past fifteen years she has been running her own business as a consultant.

# Presentation of Faculty Members

# and

# Lecture Summaries

**1. Dr James C. Esch**

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When a patient needs a shoulder to lean on, Dr. James Esch offers a broad, empathetic one. Known for his gentle manner and common sense advice, this seasoned orthopaedic surgeon specializes in shoulder disorders. Combining humor with keen insight and analysis, Dr. Esch relates to patients of all ages and situations.

Dr. Esch graduated from Northwestern University Medical School, and completed his orthopaedic residency at Northwestern University. This was followed by two years as a Naval Orthopaedic Surgeon in San Diego and with the First Marine Division in Viet Nam.

Dr. Esch is Board Certified in Orthopaedic Surgery and a member of the American Shoulder and Elbow Surgeons. He belongs to a numerous professional organizations. In 2000-2001, he served as president of the Arthroscopy Association of North America. He has also served as assistant clinical professor of the Department of Orthopaedics at the UCSD School of Medicine.

In addition, he was named one of the best doctors in America by Woodward/White, Inc. For the past 24 years, he has chaired the renowned Shoulder Institute in San Diego. He has also lectured extensively on shoulder surgery in the United States, Australia, Asia, Mexico, South America and Europe.

Dr. Esch and his wife of 46 years, Diantha have four children and eight grandchildren.

## Opening lecture

## Observations on Teaching and Learning

James Charles Esch, M.D.
Orthopaedic Shoulder Surgeon, President San Diego Shoulder Institute
Oceanside, California, USA

"Teach me to play golf." This is a simple question I have presented over the past 40 years to all of my golf teachers. Each lesson ends with a reminder that I should spend time practicing. My handicap remains higher than average. Whose fault is it that my golf handicap is not lower? The teacher or the student? Who owns the problem?

Doctor Margareta Berg brings us together at this *First World Congress on Surgical Training* in this beautiful city of Gothenburg Sweden. Like Socrates she proposes a question: "How to educate a surgeon?" She reminds us "The main issue is the patient's safety, and the surgeon's security entering the surgical profession".

I began my journey of teaching surgery 28 years ago. My first teaching efforts focused on teaching shoulder arthroscopy to practicing orthopaedic surgeons using plastic models and sharing video tapes from surgery. I was aware that limited teaching methodologies were available. My goal was to perfect the technique of shoulder surgery. I later evolved teaching techniques to the implementation of cadaveric teaching. Subsequently, I developed a curriculum for the Arthroscopy Association of North America (AANA) by establishing a committee of known orthopaedic experts. The committee, not just me, designed a meticulous course of the steps necessary to perform a particular procedure such as a repair of the labrum or rotator cuff. These courses are currently taught at The Orthopaedic Learning Center in the AAOS building, Chicago, Illinois.
My educational journey ultimately evolved into the formation of San Diego Shoulder Institute (SDSI). SDSI actively promotes annual shoulder education in an effort to impact orthopaedic care on a global level. In an ongoing effort to validate the effectiveness of our teaching, SDSI has used various skill measurements. Two years ago, we documented an Objective Structured Assessment of Shoulder Arthroscopy (OSAT) learning assessment of the steps for a shoulder instability labrum repair. In this study, we used the measuring tools described by Dr. Rajesh Aggarwel, which I will discuss below. I am looking forward to Dr. Aggarwal's keynote lecture on "Objective Assessment of Surgical Performance." Hopefully I will "listen" rather than "hear" his address. Understanding is one outcome of the skill of listening.

My evaluation of SDSI's results of the OSAT project is based on: (1) the objective data from the project and (2) analysis of key critical elements of effective teaching based on 28 years of my teaching experience. It is obvious to me that students like the one-on-one contact and positive reinforcement from the teaching surgeon. Gentle positive correction such as changing hands, rotating the scope or asking the surgeon to plan and think out the steps is the mainstay of this teaching. Students do not like to be alone. They like to be watched and affirmed along the way. When working in pairs in the teaching experience, most did not like to help other students. Thus, effective teaching should be structured to be as individualized as possible.

Most practicing surgeons wish to learn new skills. Overwhelming feedback from participants in SDSI's OSAT project indicated the goal to learn. The rationale for a desire to learn varied

from having the patient recover faster to not losing the patients (and income) to other surgeons. Initial study results indicated that those physician students with a desire to learn new skills improved their practice. The study confirmed that watching a video followed by a practice opportunity improved surgical skills. Long-term results indicated 96% of the group was applying key principals learned during the project into their practice. The latter group of surgeon-students was impatient. They wanted to learn the procedure, but were often not willing to put in the time to learn a specific procedure. They were looking for a "quick fix", similar to what one would find with a golf or tennis lesson. They would not have high scores on an OSAT assessment. I know three surgeons who abandoned the learning experience because they did not have the time and interest to pursue shoulder arthroscopy.

Awareness is necessary to transforming specific surgical techniques into a skillful surgeon providing patient care. The step-wise learning process is similar to learning algebra. Flight instruction taught me to fly an airplane along the X, Y and Z axis by moving various controls. Guided by a one-on-one flight instructor, I learned to integrate controls to land an aircraft safely and with confidence. Later I obtained a flight instructor rating. Many golf instructors teach the meticulous positions of the hands and the club during the golf swing in relationship to the ball. Fred Shoemaker, in his book *Extraordinary Golf*, edifies a global teaching approach by having the student throw golf clubs at a target. These repetitive motor-skills are integrated within the brain. This activity corresponds to the creativity of the surgeon solving an intraoperative problem. Current surgical simulators can teach the use of the controls but have not reached the stage of complex aircraft simulators.

What is learning all about? Various philosophers have weighed in on this. Confucius has stated "To know that you don't know is the first stage of learning." Oscar Wilde's responses to a student saying "Teach me" was: "Education is an admiral thing, but it is well to remember from time-to-time that nothing that is worth learning can be taught."

Herbert Simon was an American political scientist, economist, sociologist, psychologist and professor most notably at the Carnegie Mellon University. Simon stated "Learning results from what the student does and thinks and only from what the student does and thinks." A teacher can advance learning only by influencing what the student does to learn. Our goal as mentors is to empower and instruct the teachers by helping them to develop a deep understanding of how students learn. The following small but powerful set of principles can make our teaching both become more effective and efficient. Let us look at the teaching principles of ***The Carnegie Mellon Institute***. Briefly, these principles involve the following:

- Effective teaching involves acquiring relative knowledge about students and using that knowledge to form our course design and classroom teaching. We not only teach the content, we teach students the content.
- Effective teaching involves aligning the three major components of instruction: learning objective, assessment and instructional activity. The instructional activities can be case studies, labs, discussion, and reading that support these objectives.
- Effective teaching involves articulating explicit expectations regarding learning objectives and policy. Learning to tie a surgical knot in a specific manner is a specific educational goal.

- Effective teaching involves prioritizing the knowledge and skills we choose to focus on. We have to focus on both what we will teach and what we will not teach.
- Effective teaching involves recognizing and overcoming our expert blind spots. We are not our students! We need to break tasks into component steps.

- Effective teaching involves adopting appropriate teaching roles to support our learning roles. We can be the gentle intraoperative teachers so the student is relaxed. We can aggressively challenge the student's preoperative decision making.
- Effective teaching involves progressively refining our courses based on reflection and feedback. This is the model of continuous improvement championed by The Accreditation Council for Continuing Medical Education (ACCME).

Think about this question:. Have you had a surgical procedure? How did you pick your surgeon? Society is asking us to structure surgical training so that the surgeon will have a "driver's license" for operations. The end result would be that our patients would know their surgeon is competent. Many surgeons' egos consider this an affront to their training as surgeons. Some of these surgeons are misinformed as to their own competence. Again, they ask us to teach them how to do the procedure but are unwilling to invest the time to learn the new procedural steps in such a manner that they are competent in performing these steps. The surgeon has learned the steps similar to a golfer, but then the surgeon has to operate in the operating room on a patient who trusts him/her. A golfer learns the various essential golf steps of driving, pitching, chipping and putting. These steps are learned on the driving range. Ultimately, the student has to play 'Golf" on a course, perhaps in a competition, and in varying weather conditions.

The golfer has a handicap that compares him/her to other golfers in the world. The surgeon does not have a posted handicap. Perhaps he/she has an internal knowledge or handicap of his/her own confidence. My golf teacher and magician friend A.J. Bodnar tells this story. "Gary Player talked about the skill development of his bunker shots, when he turned pro, at age 17 (assistant pro at a club in South Africa). He arrived at the club each morning at 6:30 a.m. (he had to open the pro shop at 8:00). He would hit bunker shots EVERY DAY, for that hour and a half. He could leave the practice bunker before the 8:00 o'clock time only if he holed-out 5 bunker shots. Doing this for over a year made him the best bunker player of his time. He certainly knew how to use his instrument, and the extraordinary practice regimen made him the "artist" of bunker play. Had he not understood how to use his wedge correctly, his practice regimen would still not have produced the extraordinary artistry he achieved in his career. Correct information plus endless practice is still the formula for doing great work...for magic/golf and medicine. It just makes sense."

I assessed what I learned from SDSI's OSAT project, and knew I could enhance learning for my students. Bill Ciccone and I integrated the above recommended repetition model on 10 registrants at the 28th San Diego Shoulder Course in June 2011. The purpose of the project was to assess the effectiveness of SDSI's shoulder training labs in improving physician competence and surgical skills. The specific goals of the project were to quantify the physician's surgical skill set improvement following a model lab, evaluate the benefit of repetition in arthroscopic training, and incorporate data into future lab training session experiences to maximize physician learning. The student was guided through a rotator cuff repair on a model by an experienced instructor. The instructor to student ratio was one on one. The instructor helped with the procedure as necessary and created a supportive

environment for learning. The identical procedure was repeated 3 times. Constructive feedback from the instructor to improve student performance was given as necessary on each repetitive procedure. A separate surgeon assessor scored the variables of portal location, anchor placement, suture passing, knot tying, suture management, scope mechanics, and confidence. I employed a neutral statistician to provide statistical relevance to our study. The results will be presented at this meeting.

One immediate observation was the focused concentration of both the surgeon-learner and the surgeon-teacher. Each repetition of the exercise was performed faster and with more confidence. The immediate "Ah-hah" moment from both the student and instructor was unanimous. Overwhelmingly, students indicated the experience was the *best teaching* they had experienced. This articulated to me the moment of a student's sudden understanding and recognition of how to perform a procedure, or that instantaneous moment when the student realized that the solution to a problem becomes clear.

I close with an additional question to you: Are we, as surgical teachers, impressed with our teaching skills? Do we have a tendency to overlook the learning needs and skills of the student? A perusal of this program indicates that we have sessions related to methods and structure of surgical training, the needs of modern society, simulators, competency-based education, human factors, and objective assessment of surgical performance. It appears to me that we are universally committed to enhancing surgical training on behalf of our colleagues and ultimately our patients. Through my years of experience, I have learned that being an effective teacher involves taking what we have learned from our students and continually improving our effectiveness. When do we stop teaching and learning? I propose that, in the interest of continually striving toward perfection, we will continually evolve and this process will be carried on to our successors.

I look forward to this exciting meeting organized by Doctor Berg as we share our ideas on the First World Congress in surgical training.

*Notes*

**2. Pr Anthony Gallagher, PhD**
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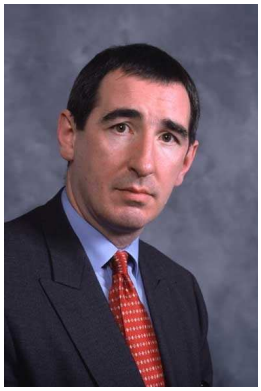

Dr. Anthony Gerald Gallagher completed a B.Sc (Hons.) in Psychology 1994-1988 at the University of Ulster at Jordanstown, in Northern Ireland. He was awarded a Scholarship to study for his Ph.D. in Psychology at the Trinity College Dublin between 1989 – 1992. During his Ph.D. he investigated drug resistant auditory hallucinations in schizophrenia. He also developed and validated new behavioral treatments for 'treatment resistant' psychotic symptoms. After completing his Ph.D. he was appointed at Queen's University Belfast, as a Research Officer (1992), Research Fellow (1993), Lecturer in Psychology (1995) and Research Director of the Northern Ireland Center for Endoscopic Training and Research. In 1998 he was appointed as Consultant Psychologist (Hon.) Royal Group Hospitals Trust and in 1999 Assistant Director, The Queen's University Centre for Health Care Informatics. He was the first academic from Ireland to be awarded a Fulbright Distinguished Scholarship and during this time worked with Prof. Richard Satava at Yale University (2000 – 2001). Before leaving Yale he was appointed as a visiting Professor in the Dept. of Surgery.

In 2003 he moved full-time to the US to take up appointment as Director of Research at Emory Endosurgery Unit and Adjunct Professor at Emory University. From 2005 – 2009 he worked as Professor of Human Factors at the National Surgical Training Center at the Royal College of Surgeons in Ireland (Dublin). In 2010 along with his colleague Prof. Gerry O'Sullivan (University College Cork) he completed an authored book, *Fundamentals of Surgical Simulation; Principles and Practices* which will be published in 2011.

His principal research interests currently include virtual reality, minimal access surgery, endovascular interventions, pacemaker implantation and validation of medical devices for training and assessment. During his time at Yale he was the scientific lead in the first group to demonstrate in a prospective, randomized double-blinded study the power of virtual reality training for improved operating room performance. Dr. Gallagher is also a regular keynote and invited speaker at national and international medical, surgical, cardiology, science and ergonomics conferences. He is considered one of the leading exponents and international experts in the world for the design, application and validation of VR in medicine.

## Can anybody be a surgeon?

**Anthony G Gallagher**

Traditionally, surgical skills have been acquired and honed during training through experience gained during long work hours and from a large operative volume. Shorter work hours and changes in clinical practice have significantly altered that learning process. Minimally invasive procedures are replacing traditional open approaches to surgery and it is widely believed that the traditional skill acquisition process will of necessity be supplanted with training in the skills laboratory. There is now the imperative that both the open surgical and the Minimally Invasive Surgical (MIS) techniques must be learned against a background of reducing clinical exposure. MIS procedures make unique demands on the human operator - trainees have to overcome fundamental psychomotor and perceptual difficulties before even learning to perform MIS safely [1]. They have to learn to coordinate specially designed surgical instruments that pass through trocars in the abdominal wall. This means the loss and change of important tactile and haptic information. Furthermore, although the image from the laparoscope camera of the surgical site is of high quality, it is still a pixelated 2-dimensional image with important depth cues lost [2, 3]. These operating conditions require the brain to work harder than it would if it was processing the exact same information under direct vision [4, 5]. Perhaps the most significant obstacle to safe laparoscopic surgery is the counterintuitive movement of the instruments. Moving the handle of the surgical instrument to the right, results in the working end (inside the patient's abdomen) moving to the left on the monitor, and vice versa. This fulcrum effect, caused by the instrument pivoting on the abdominal wall causes a fundamental proprioceptive-visual conflict for the operator [6]. These complexities make learning the psychomotor coordination necessary to perform MIS difficult and protracted [6]. These human factor challenges are even greater for endovascular procedures where specialists need to operate on patients while attempting to limit procedure time and X-ray exposure levels that are amongst the highest encountered in medical imaging [7]. X-ray exposure time is critical when working and should be kept as low as reasonably achievable, i.e., the ALARA principle [8]. These challenges pose fundamental and not insubstantial problems for training systems [9] but also for credentialing organizations which quality assure the skills levels of experienced surgeons acquiring skills to perform these new image guided procedures. Other high-risk, high-skill disciplines (e.g., aviation, space, maritime and nuclear industries, etc) have faced and confronted similar problems. Their solution has been to select who they train partly based on aptitude assessment. The natural selection and attrition that probably occurred during the course of medical education and training in the past as a result of sheer operative volume and case exposure in front of a supervising surgeon can no longer be relied upon to 'guide' trainees' choices of career. Surgery must give serious consideration to aptitude assessment as an important factor in determining who should become a surgeon.

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**3. Professor John A Windsor**

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Professor John Windsor is a Professor of Surgery and Head of the Department of Surgery, Faculty of Medical and Health Sciences, at the University of Auckland New Zealand.

He founded the Pancreas Research Group in 1992, established the Surgical Skills Training Centre in 1993 and set up New Zealands first HPB/Upper GI Unit at Auckland Hospital in 1994.

The University of Auckland awarded a personal chair in Surgery in 2003. He has a busy clinical practice including pancreatic and oesophageal surgery and he has pioneered a number of laparoscopic procedures in New Zealand. He has an active research program with a primary interest in investigating aspects of the pathophysiology of acute necrotizing pancreatitis particularly the role of toxic mesenteric lymph and mitochondrial dysfunction. Other research interests include gastric electrophysiology, simulation and surgical skills training. He is Secretary General of the International Hepato-Pancreato-Biliary Association, Chairman of the RACS Section of Academic Surgery, and has been awarded the Sir Arthur Sims Commonwealth Travelling Professorship for 2011 and been elected as an Honorary Fellow the American Surgical Association.

Professor Windsor has a long interest in the role of simulation in surgical skills training. He is the Founding Director of the Advanced Clinical Skills Centre and a Director of SIMTICS Ltd which won a Kiwi Start Up award in 2005 for the development of the Integrated Cognitive Simulator. He was an invited speaker at the International Conference on Surgical Education and Training, Dublin 2010 speakng on “Simulators: What is available and what is needed”. And more recently a keynote speaker at the Balliol Colloquium, University of Oxford & Oxford Deanery, Oxford 2010 speaking on “Surgical Simulation: transient fad or necessary tool”.

## Can procedural skills training be accomplished by cognitive simulation?

**John A Windsor**

There is a need to shift our thinking away from hardware based VR simulators situated in skills centers, to a more personal delivery of simulation training e taking advantage of portable and online technologies.

### Conceptual framework

Basic or core skills in surgery include how to pick up a scalpel, how to hold and cut with a pair of scissors, how to tie a knot, how to dissect, how to cannulate, ligate, aspirate, suture, intubate, cauterize and retract.. Competence in these core skills must become 'unconscious' and 'automatic' before the surgical trainee can concentrate on putting them together in a meaningful way to complete a procedure. Procedural skills include learning how to open and close a body cavity, dissect out the pathology, reconstruct and anastomose. These skills require an in-depth knowledge of the relevant anatomy, pathology and technical options. A third level of skill is not formally taught or assessed inmost training programs. These non-technical or meta-cognitive skills involve verbal and non-verbal communication, leadership, decision-making and judgment and they also involve an understanding of the respective roles of all members of the team. In current training programs there is little attempt at an orderly and graduated acquisition of skills. The traditional apprenticeship model requires the young surgical trainee to master the various core skills, carry out a procedure under the pressure of time and supervision, and relate to other staff in the complex operating room (OR) environment and all at the same time.

### Hierarchy of skills and the role of VR simulation

Surgical core skills can be taught without the need for expensive equipment, using inanimate models on bench tops. These skills can be taught by technicians, can be self directed and this approach is inexpensive, accessible, repeatable, reliable and valid. It is a misapplication of VR simulation to teach core surgical skills and that this is happening reflects the pressure that companies are under to provide a return on investment. At the other end, surgical team skills are difficult to teach, and we know that surgical competence in the operating room requires a combination of technical skills, knowledge, decision-making, communication and leadership skills. Important progress has been made in this area with the development and validation of scoring systems for non-technical skills. Reproducing a fully functional operating room and removing whole surgical teams from the clinical environment to simulate surgical scenarios in order to learn and assess these non-technical skills is not sustainable. The early experience with virtual worlds (e.g. Second Life) suggests a potential role for VR simulation in non-technical skills training. Early experiences with complex clinical scenarios have demonstrated a high level of engagement, despite some limitations in interpersonal interaction, making this a promising field for further exploration. In the middle of the conceptual framework is procedural training and the question is whether VR simulation, as currently available, is actually the best approach. Procedural training requires a detailed knowledge of how to efficiently and effectively carry out a procedure. It also entails an understanding of the variations in anatomy, pathology and techniques and how these can impact on performance. Mastery of a procedure requires both cognitive and technical skills, and probably more of the former. A strong case can be made for learning technical and cognitive skills separately so that procedural skills can be mastered without the distraction of either technical skills acquisition or clinical implementation. This is what we have termed 'cognitive simulation' and it means that a surgical trainee comes to the clinical setting with the advantage of having the technical and cognitive skills to take full advantage

of the training opportunity, know their own needs and be able to concentrate on 'putting it all together'.

**Cognitive simulation**

The following are elements that were considered important in the design of the 'Integrated Cognitive Simulator' from SIMTICS Ltd and serve to illustrate an innovative, flexible and cost-effective approach to procedural and surgical simulation. Fundamental was the view that learning should be driven by 'adult learning' educational principles and not by technologic capability, and be focused on cognitive rather than technical skills. Learning was to be efficient by integrating and synchronizing the multiple learning media including rich and hyperlinked text, 3-D interactive anatomy tailored to the procedure, a high definition audio visual demonstration of the procedure by an expert, simulation in learning and test modes that use pre-rendered sequences (computer graphics or video) in response to decisions (right or wrong). There is a flexible learning pathway to enable individuals to cater for their own learning style(s). It was also considered important that learning should be readily accessible for 'just in time' learning and for that reason the Internet was chosen as the means of delivery. As such, on-line training supervisors are able to monitor progress and provide timely feedback, even in real time. The economic benefits of a software based system are obvious and by using a generic platform new modules can be readily produced with drop-in content. It was also considered important that the approach to simulation should be globally applicable, reaching those in remote and less advantaged settings. Such an approach to simulation makes it possible to provide task relevance, understanding, demonstration, interaction, rehearsal and assessment.

Cognitive simulation, as described, would not replace traditional and highly valued training in the clinical setting or the operating room, nor would it replace courses that enable deliberate and repeated practice to acquire technical skills. It does, however, add value by addressing learning needs before and after valued clinical learning opportunities. Users come to these opportunities better prepared, aware of their own specific learning needs and there is the opportunity to maintain knowledge and skills by repeated practice afterwards, when and where convenient. It has also been possible to demonstrate that procedural skills training by this sort of cognitive simulation can be linked to defined pre-requisite technical skills training and can also be embedded in team training scenarios in virtual worlds.

If the gap between what is available and what is required in surgical simulation is going to be closed, it is going to be important to address at least three priorities: 1) to make simulation affordable, 2) to embed it within an improved surgical curriculum, and 3) to better define the role and benefits of simulation through improved evaluation, particularly to demonstrate transfer of skills from the simulation to the clinical setting and to show that, in doing so, there is an improvement in patient outcome.

**Conclusion**

Surgical simulation, particularly VR simulation, has significant limitations and there remains a significant gap between what is available and what is needed. This gap can be bridged but it will require fresh thinking. VR simulation, as currently promoted, is not required for learning core technical skills. Cognitive simulation has been developed as an educationally sound approach to learning procedural skills. Pre-requisite technical skills can be nominated and be learnt concurrently. The increasingly precious opportunities for operating room training can be enhanced by structured prior learning and rehearsal of technical, procedural and non-technical skills. The implementation of surgical simulation that is appropriate to the needs of surgical trainees around the world will require a greater commitment to affordability, to training that is well embedded in a structured surgical curriculum and more rigorous evaluation, including the impact on patient outcome.

*Notes*

**4 Jeffrey S. Levy, MD**

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Dr. Jeffrey Levy is a physician, educator, entrepreneur and e-Learning expert. He is the Medical Director and Chief Learning Officer for MedErgy, a medical education and communication company. Prior to MedErgy, Dr. Levy was Co-founder, CEO, and Chief Educational Officer of MedCases, an online medical education company providing continuing education through a case-based approach to hundreds of thousands of physicians across the world. Dr. Levy is credited with developing one of the world's first Surgical Simulators (Virtual Reality Hysteroscope), some of the earliest educational CD-ROMs in medicine and dozens of the most sophisticated 3-D surgical and anatomical animations.

Dr. Levy has also served in academic roles including Medical Director of Education and Technology Initiatives for the University of Pennsylvania Health System and the Associate Chairman of the Department of Obstetrics and Gynecology and Director of Resident Education and Medical Student Education at Albert Einstein Medical Center in Philadelphia, Pennsylvania.

Dr. Levy has presented over 100 national and international lectures, has authored numerous abstracts and scientific papers and has developed several patents and inventions.
He received his M.D. degree from the University of Missouri-Columbia Medical School and completed his residency in Obstetrics and Gynecology at Michael Reese Hospital and Medical Center in Chicago, Illinois, USA.

**ASSET: The use of surgical simulation in surgical education, training, performance assessment and lifelong professional development.**

**Jeffrey S Levy**

Drs. Richard Satava and Jeffrey Levy co-chaired consensus conferences that brought together senior leadership from a diverse cross-section of surgical specialties in the United States and international surgical societies, surgical accrediting organizations, US government, US military and industry. The represented organizations collaborated to create a common vision to improve the quality and safety of patient care by establishing simulation as a pillar in surgical education, training, performance assessment and lifelong professional development.

After sharing information, it was confirmed that all of the organizations represented were actively pursuing curriculum development and implementation of simulated learning at various levels and detail. Even though most of the organizations had similar philosophies about how to approach simulation for education and evaluation, each one had its own methods and many were redundant. It was determined that there is a need for a common base and communication among the specialties to streamline efforts across the many organizations represented. As a result, the organizations formed ASSET, the Alliance for Surgical Simulation in Education and Training.

ASSET set goals and priorities in areas of policy, education, process and implementation. They include:

- Establishing metrics and standards for curriculum development in surgical simulation
- Disseminating best practices in simulation-enhanced surgical training and performance assessment
- Promoting innovation and collaborative research and development
- Designing sustainable educational business models

Projects are ongoing to meet these goals.

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**5. Bengt R Johansson, MD, PhD**,

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Pr Johansson was born on November 29, 1947, received the MD title in 1980, and worked as an Assistant Professor in Anatomy 1978-2002.

**Academic history:**

**Ph.D.,** September 22, 1977 in **Medicine/Anatomy**;
**Thesis:** THE MICROVASCULATURE IN SKELETAL MUSCLE **–** An electron microscopic study with special reference to the endothelial permeability to macromolecules.

Full time employment at the University of Gothenburg since 1972 at the Department of Anatomy, from 1992 the Institute of Anatomy and Cell Biology and from 2006 the Institute of Biomedicine.

Head of Gross Anatomy teaching from 1980.

**Current position:**

**Professor of Anatomy** from May, 2002.

**Head of the Electron Microscopy Unit** from the beginning of 1999.

**Anatomical dissections: A frightening experience for students at the preclinical stage - or a resource for specialists' skill development?**

**Bengt R Johansson**

Some individuals make a remarkable decision – to donate their bodies after death for medical teaching purposes. This makes the basis for classical anatomical dissection studies within the *curriculum* of programmes in medicine and related disciplines. It is beyond doubt that the analyses of dissected bodies add a host of information that remains hidden for students that rely on text books or IT only when struggling with anatomy. Besides promoting an understanding of "the real thing" the work in the dissection theatre confronts the students with central ethical and own professional development issues.

In a Swedish perspective anatomical departments suffer from a relative shortage of human donors. One effect is that less time is given for student-performed dissection exercises in favour of demonstrations done by the staff. In our department student training in dissection techniques is reserved for those interested students that are affiliated to the teaching as demonstrators (junior teachers) after having passed their own basic courses in anatomy. Is the use of a limited number of human body donations during an early period (fourth semester) for inexperienced students optimal? Would these unique resourses (donors *and* infrastructure) be better utilized if the priority was reversed: that the facilities of anatomical departments were first dedicated to training of personell in a more advanced stage of their career? It might even be a win-win situation if students at the basic level could learn from exercises performed by surgeons.

This contribution will further elaborate the author's view on possibilities and obstacles for an extended co-operation between the academic anatomical department and the specialist training organizations.

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6**. Martin Ålund MD, PhD**

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Born in 1954.
Basic medical education in Munich, Germany, 1972 - 1978.

German PhD degree in 1981.
Fully licensed MD in Sweden 1983.
Specialist in orthopaedic surgery in February 1986.

Swedish PhD degree in 1993.

Senior consultant orthopaedic surgeon since 1999.

Head of the section for Foot and Ankle Surgery since 2008 at the Sahlgrenska University Hospital, Gothenburg.

Co-organizer of the first Swedish Surgical Skill Courses in Fore- and Hindfoot Surgery in Gothenburg 2009 and 2010.

## The importance of anatomical dissection in surgical training

**Martin Ålund**

Basic medical education
The human anatomy is learned during the basic medical education – or is it? Which modalities exist when presenting the anatomy of the body to the student? Can the clinical relevance be teached at this early stage of education?

Postgraduate surgical education
In which ways is surgical anatomy learned during the postgraduate training – or is it at all learned? What are the requirements for the future surgeon? What role do the postgraduate dissection courses play?

Anatomical dissection
Two important issues are surface anatomy and deep anatomy. Knowledge of the surface anatomy is critical for incision-placement and control of injury to nerves and vessels. Knowledge of the deep anatomy is critical when it comes to dissection skill and time control. This is of utmost importance for extremity surgeons working in bloodless fields.

Excellent surgery
Two important requirements for excellent surgery are 1) the fundamental understanding of what is going to be achieved with the surgery and 2) a thorough knowledge of the anatomy so that the surgery can be performed with a minimum of traumatization of healthy tissue. Can surgical errors be tolerated and forgiven?

Training alternatives
Clinical training in the operation theatre is mandatory. As for the complex and unusual cases the surgeon must feel comfortable while approaching the surgical field from different directions, thus seeing the anatomy in different ways. This versatility in surgery can be trained in a cadaver lab.

Discussion
Where do we stand today? Although numerous education and training alternatives are present in different countries there may be a lack of universal requirements for the future surgeon. Ideally, there should be a “gold standard” in surgical training, is this possible to achieve?

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**7. Dr. Richard L. Angelo, M.D.**

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Richard L. Angelo, M.D received his medical degree from the University of Washington in Seattle and completed his orthopedic residency at the University of Utah in Salt Lake City. Fellowship studies in Arthroscopy and Sports Medicine followed. He has served as a Clinical Professor in the Department of Orthopedics at the University of Washington, as one of the team physicians for the University of Washington Huskies, and as Chief of Surgery for Evergreen Hospital Medical Center. He participated on the American Academy of Orthopedic Surgeons Sports Medicine Subcommittee for Evaluations and as a Board of Specialties Education Subcommittee Member.

His involvement with the Arthroscopy Association of North America (AANA) has led to chairmanship of the education committee, participation as one of the board of directors, and teaching as a Master Instructor at the Orthopedic Learning Center. Over the past decade, his passion for arthroscopic education has led to the institution of innovative new methods to assist surgeons in acquiring the knowledge base and mastering arthroscopic surgical skills. He recently instituted and chairs the AANA Magellan Project to explore a new paradigm in arthroscopic education by travelling outside of orthopedics to "sail around the world" across all disciplines, businesses and professions in search of the best and most effective methods available to educate and train surgeons in the discipline of arthroscopic surgery.

He has given over 160 national / international presentations, authored numerous scientific articles, and edited several textbooks, including co-editing of the Shoulder Volume in the AANA series on Advanced Arthroscopy for 2010. He will serve his term as the 31st President of AANA during 2011 – 2012.

## The Magellan Project

**Richard L Angelo**

The primary mission of The Arthroscopy Association of North America (AANA) is education. A primary purpose for AANA is to offer the finest and most innovative educational programs available to learn the principles and best practices of arthroscopic surgery. Traditionally, a "bottom-up" approach has been taken, looking at the programs we already have and asking, "how can we make them better"? This approach has led to incremental improvements in our educational offerings. In an effort to make a quantum improvement in the educational offerings, the question was asked, "what if we engaged in a top-down approach?" What if we searched the entire world across all disciplines, businesses, industries, etc to identify the most effective strategies available to enhance learning and facilitate the acquisition of arthroscopic surgical skills. Further, leadership sought to harness the ingenuity resident within AANA's membership to implement those strategies throughout the entire educational programming of AANA. With the intent to "sail across the world" searching for pearls of education and training, the Magellan Project was born. Five subcommittees were formed, including didactic (fund of knowledge, surgical / arthroscopic principles, decision-making, indications / contra-indications, complications); surgical skills (3-dimensional visualization, triangulation, tissue-handling, etc.); simulation (from simple knot-tying boards to biosimilar models / materials, animation, to higher fidelity computer simulation); electronics (webinars, on-line educational modules, harnessing smart phone technology); and metrics and outcomes (documentation of the impact of academic programming and surgical skill labs). These groups obtained insights from the trainers of astronauts at NASA to fighter pilot instructors at Miramar, from academic psychologists to laproscopic surgeons, from the makers of Apple to HTC Droid smart phones.

In addition to the Magellan Project, a second focus is on the broader concept of "synthetic experience". The literature is replete with documentation of fewer complications, shorter operating times and improved outcomes with greater operating experience. The majority of surgeons don't have the surgical volume of a specific procedure to acquire the experience of those who are established experts in their field. The ability to formulate synthetic experience will require not only modeling to permit manual and perceptual skill acquisition through practice, but also cognitive simulators to refine pre-, intra-, and post-operative decision-making. The successful implementation of these initiatives will begin to bridge the "experience" gap and lead to improved patient outcomes.

Finally, the next generation of surgeons learn in a manner different than those established in practice. The electronic delivery of knowledge via the internet using computers, tablets and smart phones and the like will replace hardcopy and textbooks to a varying degree. It is be imperative that "teaching" methods match the needs of the "learners". The most dramatic change will be the paradigm shift from the apprenticeship model to proficiency-based progression through training.

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8**. Carlos A. Pellegrini, MD, FACS, FRCSI (Hon.)**

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Carlos A. Pellegrini received his M.D. in 1971 and completed a residency in general surgery in 1975 at the University of Rosario in his native country of Argentina. He came to the United States in 1975 and took a fellowship in esophageal surgery with Dr. David Skinner at the University of Chicago where he also completed a second residency in general surgery. In 1979 he was appointed to the faculty of the University of California, San Francisco where he rose rapidly through the ranks to become Professor of Surgery in 1989. During his years at UCSF he developed a major clinical practice on upper gastrointestinal surgery while continuing his research on esophageal physiology. He was recognized several times for his dedication to the education of students and residents.

In 1993 Dr. Pellegrini was appointed Chairman of the Department of Surgery at the University of Washington in Seattle. In 1996, in recognition for his role in the strengthening of all clinical, teaching, and research programs of the Department he became the first holder of The Henry N. Harkins Endowed Chair, honoring the first Chairman of the Department of Surgery at the University of Washington; as such, his commitment is to support new research in gastrointestinal and oncologic surgery.

Dr. Pellegrini is a world leader in minimally invasive gastrointestinal surgery and a pioneer in the development of videoendoscopy for the surgical treatment of gastroesophageal reflux disease and esophageal motility disorders, particularly achalasia. Shortly after coming to the University of Washington he developed the Center for Videoendoscopic Surgery, and the Swallowing Center. Working in combination, these centers have attracted numerous patients with gastrointestinal disorders, from the state of Washington and beyond. This steady flow of patients has made the department an ideal training ground for physicians

wishing to learn physiology, pathology and management of esophageal disorders and provided opportunities to develop outcome studies and other research projects related to these problems. In 2005 Dr. Pellegrini developed the Institute for Simulation and Inter-professional Studies (ISIS), a comprehensive, multidisciplinary and multi-institutional center for teaching and research using state-of-the-art modeling and simulation techniques. Today he chairs the Board of Directors of this world-renowned institute.

Dr. Pellegrini has devoted much of his career to leadership in the foremost national and international surgical associations. For example, he has served as President of the San Francisco Surgical Society, The Northern California Chapter of the American College of Surgeons, The Society for Surgery of the Alimentary Tract, and has been Chair of the Digestive Disease Week Council. In 2005 he was elected President of the American Surgical Association, the oldest and most prestigious association of surgeons in the United States. In 2008 he presided over the World Congress of the Organization for Specialized Studies of the Esophagus (OESO). He has served the American College of Surgeons in several capacities and was elected to the Board of Regents in 2003. In 2010 he became Chair of the Board.

In the area of medical education he has strived to make the UW Department of Surgery known for its educational programs. Innovation in education, changes in the structure and functioning of the residency program and development of unique learning methods are recognized features of the UW Department of Surgery. His work in this field led him to be appointed to the American Council of Graduate Medical Education (ACGME), where he served first as a member of the Residency Review Committee for Surgery (of which he eventually became Chair), later as one of 3 surgeons members of the panel that developed the work hour limitations for residency programs, and now as a member of ACGME's Appeals Panel. Additionally, he served 6 years as Director of the American Board of Surgery and currently serves on the National Advisory Committee of the Robert Wood Johnson Foundation Clinical Scholars Program.

Dr. Pellegrini serves on several editorial boards, and publishes regularly in the field of minimally invasive surgery for upper gastrointestinal diseases, esophageal cancer, and related areas, as well as education, simulation and new technologies for preparing the next generation of physicians and surgeons His bibliography includes more than 300 articles, chapters, editorials, and books, as well as 11 surgical videos and movies.

## Reforming the Structure of Surgical Training to Suit the Needs of Modern Society

**Carlos A. Pellegrini**

In the last decade profound changes in the values placed by society with regard to the care of patients have taken place. In addition, our knowledge of how the most effective education takes place and the availability of new educational tools as well as a strong information technology platform have completely transformed the way in which we train the next generation of surgeons.

Societal pressures in the United States are perhaps best identified in the landmark report on Quality issued by the Institute of Medicine. The report identifies the six components of quality in the delivery of medical care as: effective, efficient, patient-centered, safe, equitable and timely. The bodies in charge of supervising the structure upon which medical education is imparted, define a new type of physician, one that emphasizes the values required to attain quality as defined above. These are known as the "competencies" which are required to practice medicine and they include: medical knowledge, patient care, communication, professionalism, systems-based practice (or the ability to work in teams) and learning-based practice (or the ability to continuously learn from the practice of medicine and improve constantly based on identified gaps on knowledge and skills. The bodies that certify graduates of residency training program emphasize these values as those needed to achieve initial certification and create the concept of "maintenance of certification" as an on-going way to demonstrate competency.

The constant change in technology requires that the training be directed primarily at the identification of gaps and at the acquisition of a skill that allows the surgeon to choose from so many innovations which is the most appropriate for him/her to undertake. Thus, the educational focus switches from imparting information to developing the skills needed to chose the right tool to seek information that is needed. The availability of simulation – under fairly realistic conditions, provides tools to the educators that allow them to teach psychomotor skills and procedures away from the patient. Additionally, simulation provides an adequate platform to assess skills acquired and thus training is designed to achieve a certain level of proficiency rather than simply be based on "time". Simulation also makes available the possibility of training entire teams rather than just individual surgeons emphasizing the appropriateness of communications and team performance. Incorporation of professionalism, measurement of professional standards through new tools, some related to emotional intelligence facilitate training as well.

Quality in the delivery of care is emphasized from the very moment training starts. Safety becomes a primary concern and systems are created based on an understanding of human failure factors and designed to prevent errors of commission or omission as is frequently the case when individual memory is the only element to prevent them. Reliance on complex systems requires thorough development of electronic medical records that are "intelligent" enough and offer enough information to prevent errors. Transfer of care is viewed as a system, designed to be complete, standardized and efficient. Trainees are brought up with the idea that quality care is a fundamental base of their training.

References: See page 151-152

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**9. Professor Gerald O'Sullivan MB, MCh, FRCSI, FRCSG(Hon), FRCSEd(Hon), FACS(Hon)**

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Professor Gerald C O'Sullivan is currently a Consultant Surgeon at The Mercy University Hospital Cork, Professor of Surgery at University College Cork and Director in Chief of the Cork Cancer Research Centre. He is the immediate past President of both the Royal College of Surgeons in Ireland and of The European Surgical Association.

He qualified in medicine in Cork in 1969 and did his post graduate training in Ireland, Canada and USA. He is a Fellow of the Royal College of Surgeons in Ireland (RCSI), and Honorary Fellow of the Royal College of Physicians and Surgeons in Glasgow, The Royal College of Surgeons Edinburgh and the American College of Surgeons.

His research Interests are in Gene therapy and immunology of cancer , Biology and treatment of Esophageal Cancer, Minimally invasive Surgery , endoscopic gene and drug delivery to gastrointestinal tumours and tissues. He has a long interest in probiotics – and isolated several potential therapeutic bacteria – one of which is on sale in the United States for Irritable bowel syndrome after two prospective double blind controlled trials.

He has published over two hundred research papers, directed twenty eight doctorates and is a holder of eight patents. In recognition of his contributions to surgery and to his community – he has received over forty awards including six community awards, five Honorary Fellowships, Visiting Professorships, and 12 eponymous lectures.

He has a deep commitment to surgical training and while President established a partnership between the Royal College of Surgeons in Ireland and The College of Surgeons of East Central and Southern Africa (COSECSA) for the establishment of surgical training programmes in 10 African countries.

## Surgical Research and Development of Critical Thinking

**Gerald C O'Sullivan**

Although there has been continued medical progress through the improved understandings of disease processes, the innovations in therapeutics and the developments in healthcare delivery, surgery will remain an indispensable treatment of many disorders particularly those due to trauma, cancer ischemic and infective diseases. Thus surgical research is necessary to generate and to evaluate new and extant knowledge, to develop more effective and safer treatments and to respond to the economic and regulatory imperatives of modern health care delivery. Surgical practice takes place against a background of continued change and in a work environment of increasing complexity where the rate of innovation demanded and occurring exceeds our systemic capacity to validate and to implement. This continued transformation is profoundly influencing each of the pillars of surgery: patient care, research and education.

Stresses and drivers of change include medical and technological advancements, aging and demographics, increases in chronic illnesses, growth in major trauma, an emphasis on wellness and prevention and the demands of more informed consumers. Pressures on healthcare systems are requiring more transparent approaches with emphasis on therapeutic efficacy and cost containment. The convergence of technologies in the life sciences and information technologies are enabling a shift towards a personalised healthcare with a greater emphasis on preventive medicine and on disease treatments informed by genetic, behavioural and environmental information.

Thus surgeons by training and by achievement must have the capability to continuously source and to evaluate new developments and to introduce new methods and techniques with both safety and advantage. In addition to clinical training doctors will need the intellectual skills and attitudes to enable innovation and critical appraisal of information. Traditionally these higher order skills are acquired during time spent in fulltime research or during fellowship training in specialist units of clinical investigation and treatment.

The future surgeon will have to guide constant innovation and will work in a rapidly changing organisation where structures will be transient. Such a person will need the training and skills to be not only an agent of change but also an agent of order providing leadership in clinical, strategic, political and in managerial roles. Surgery will need leaders who have a real understanding of the emerging forces - postmodernity, scientific, socioeconomic and medicolegal – and who will have the capacity to cope with complexity from interrelated demands. Surgeons will need the knowledge and skills to examine clinical outcomes, to incorporate new developments, to diagnose and eliminate errors from the system and to design and validate new systems of training. Surgeons will be required to lead discovery and clinical application in the fields trauma, oncology, cardiovascular diseases, transplantation, tissue engineering, regenerative medicine, prosthesis and implant development, fetal surgery, computer brain interfacing and smart and functional technologies. Surgeons will need to provide the collaborative bonds and focus to multidisciplinary teams and agencies involved in the design and development of new systems and technologies extending from discovery through treatment of surgical conditions.

Therefore it will be necessary for all surgeons to have a validated training in scientific methods to develop abilities to evaluate critically and contribute to ongoing developments. The surgical training programmes of the future will need to have the flexibility to accommodate a validated training and experience in research and published work.

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**10. Dr Richard Hanney**

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Dr Richard Hanney is a General Surgeon and Clinical Senior Lecturer in the University of Sydney Department of Surgery.

He obtained his FRACS in 1995 and completed a Clinical Fellowship in Upper GI surgery at the Royal Infirmary of Edinburgh before taking over a retiring colleague's surgical practice in western Sydney in 1999.

He is a former elected member of the RACS NSW State Committee, and in 2005/6 chaired the RACS Younger Fellows Committee which represents 1500 fellows of the RACS. A significant achievement during this period was establishing the RACS Trainees Association in conjunction with other colleagues. He has a strong interest in medical education, having instructed ATLS courses in Australia and the UK, directing courses in Australia since 2001. He has been Supervisor of Surgical Training at Mt Druitt Hospital in Sydney and a member of the regional Board in General Surgery since 2002. He is the Australian Medical Association Federal Councillor representing the craft group of Surgery.

Since 2008 he has convened the "Developing a Career in Academic Surgery" course which has had a significant role in helping reinvigorate interest and activity in academic surgery in Australia and New Zealand.

## An international collaboration to recruit and engage academic surgeons

**Richard Hanney**

Since 2008 the Royal Australasian College of Surgeons' (RACS) Section of Academic Surgery (SAS) and the Association for Academic Surgery (AAS) have combined their developing relationship with the provision of educational opportunities regarding career pathways in academic surgery. The dominant vehicle for this has been a one day course presented by faculty selected from both organisations and titled "Developing a Career in Academic Surgery".

The course's goals are defined as:

- To promote the positive, inclusive aspects of academic surgery
- To inspire and recruit potential academic surgeons
- To provide an insight into academic practice
- To further develop a relationship between the SAS and the AAS

Participant evaluations, from medical students through to Department Heads. reflect strong satisfaction with the curriculum being delivered.
Membership of the Academic Section of the RACS has grown from 62 to 105 in the last two years, contributed to by this and other initiatives.
The course immediately precedes the RACS Annual Scientific Congress (ASC). With up to 8 prominent AAS visitors taking part as faculty in the course, the RACS has separately funded their participation in the ASC, where they have contributed significantly.
This cohort of expert visitors travels to and from the ASC through academic centres in multiple cities in Australia and New Zealand, enabling opportunities for collaboration at multiple levels.
The RACS is extending this initiative by engaging medical student surgical interest groups now networked across Australia and New Zealand, offering them complimentary course registration. This cohort, and prevocational doctors (in their first 2-3 years post-graduation) have not traditionally had such educational opportunities provided for them by the College.
In 2011 the first day of the ASC, immediately following the DCAS course and as a further initiative, has been structured to accommodate medical students with concessional registration.
The AAS held a combined educational and clinical course in West Africa prior to partnering with the RACS in this venture, which has also continued annually. The DCAS model, however, is both reproducible and transferable. A DCAS course was held in Colombia in 2010, and courses are funded and planned in Paris in 2012 as well as possibly India in the same year. The AAS has constructed a template to consider in establishing such a course in new regions. The 2012 DCAS course will be held in Kuala Lumpur on Monday, May 7.
The AAS and RACS Section of Academic Surgery gratefully acknowledge the allocation to this course of an annual nonaligned educational grant from Johnson and Johnson Medical, without which the course could not take place.

Reference: See page 152

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## 11. Torsten Olbers MD, PhD

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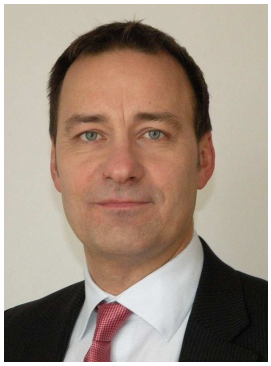

Mr Torsten Olbers did his medical education to MD at University of Lund, Sweden. After finishing his PhD at Sahlgrenska University Hospital, Sweden he was the director of Minimal Invasive and Trauma surgery unit and thereafter director of surgical Obesity Centre.

He did a post doc research fellowship at Harvard Medical School, Boston (Beth Israel Deaconess Medical Centre and Massachusets General Hospital).

He is currently leader of a research group in the field of Obesity research including people from different specialities at Sahlgrenska, Sweden.

From March 2009 he is employed at Imperial College, London in a 25% senior researcher position and as Consultant surgeon. He is sub-specialised in upper GI surgery and has performed over 2000 bariatric procedures, mainly lap Gastric bypass, lap Sleeve and lap Duodenal switches.

## A "staircase" for training in laparoscopic surgery

**Torsten Olbers**

Since the late 1980ies laparoscopic surgery has developed from being an experimental, time-consuming surgical approach to currently be the preferred access in most of the general surgical procedures where being proven feasible. However, the laparoscopic surgical technique requires a specific set of skills that surgeons under training need to acquire.

We have defined four steps in the development of laparoscopic skills:
1. Basic skills, including accurate spatial orientation and safe movement of instruments.
2. Skills for performing simple tasks, typically needed in operations including minor resection of organ (appendectomy, cholecystectomy).
3. Low grade complex reconstructive lap operations (lap hernia repairs)
4. Complex laparoscopic operations usually requiring perfected ambidextrous skills (reconstructive surgery including surgical anastomosises requiring laparoscopic suturing skills).

To follow the development in skill set level and in order to have a continuous development we suggest the use of a "laparoscopic staircase" where trainees should gradually develop their laparoscopic skills though climbing in a "staircase" (ex Diagnostic laparoscopy> lap appendectomy/cholecystectomy> lap spleen resections> lap hernia repair> lap colon surgery> complex laparoscopic procedures (gastric bypass/Whipple/esophagectomy/rectal). To our experience the lap hernia repair plays a nadir role in enabling ambidextrous skills. Complex procedures can preferably be broken down to certain subtasks and thereby enabling even complex surgical procedures for training in more basic skills.

In summary we suggest that trainees in laparoscopic surgery aim at developing aim at consciously climb in a "laparoscopic staircase" from performing simple to more complex procedures.

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**12. Torben Nordahl Amorøe, MD**

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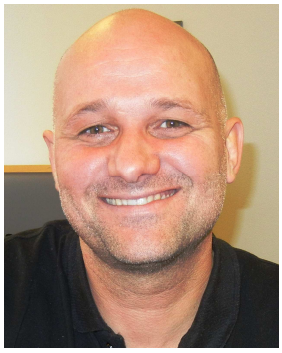

- Director at the Simulation Center West, Gothenburg, Sweden
- Course leadership for several graduate and undergraduate courses e.g. team work and leadership
- Speaker and faculty at numerous local and international conferences on Simulation and Health Care
- Consultant anesthesiology and intensive care, Department of anesthesiology and intensive care,, Sahlgrenska University Hospital, Gothenburg
- Certified Simulation Instructor, Danish Institute for Medical Simulation, Copenhagen
- Medical Anthropology, Supplementary Program, Department for Ethnography and Social anthropology, Århus University, Denmark
- Public Health Medical Officer, Danish National Board of Health, Copenhagen, Patient Safety and Quality Assurance
- District General Practitioner and Anesthesiologist, Maniitsoq, Greenland
- MD at Copenhagen University, Denmark
- Reserve Officer, Danish Emergency Management Agency

**Simulation of surgical teamwork**

Torben Nordahl Amorøe

For the last decade there has been more and more focus on patient safety issues. Knowing patients die from hospital staff errors, there has been efforts for bringing down complications due to for example wound infections, patient identification errors and using virtual reality simulation for improving individual dexterial and procedural skills.

Root cause analysis show that damages rarely rises due to errors done by individual staff members, but due to a string of conditions and/or due to poor team work. It has been shown that poor leadership and communication among surgical teams gives rise to complications under and after surgery [1)]. Being a surgeon is not only about individual operational skills but also about being a member and a leader of teams. These are so called non technical skills that few physicians have ever had any education or training in – but never the less are required to master and accordingly to take command when needed. This lack of education and training in these kinds of skills causes insecurity among doctors and teams and ultimately kills patients.

This short lecture will show you how we try to improve awareness on patient safety issues and social skills in full scale simulation at the Simulation Center West[3)] in Gothenburg. The center provide possibility to train surgical teams solving more or less stressful situations as a team in a safe environment – safe to both patients and participants.

These methods are inspired by simulation training and safety awareness in aviation. We present a widely used pedagogical method and a system for evaluation and learning that is developed for surgeons [2)] and surgical teams.

1) Mazzocco K, Petitti DB, Fong KT et al. Surgical team behavior and patient outcomes. The. American Journal of Surgery 2009; 197:679-685.

2) The Non-Technical Skills for Surgeons (NOTSS) System Handbook. www.abdn.ac.uk/iprc/notss

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**13. Dr Goldie Khera, BSc MBChB MRCS FRCS (Gen Surg)**

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Goldie Khera is newly elected President of ASiT – The Association of Surgeons in Training from the UK. Our association represents UK and Irish trainees from all surgical specialties and is one of the largest specialty groups with over 2200 members.

Originally from Birmingham, he has been in Liverpool for 19 years. Graduating from Liverpool University in 1998 with an intercalated Physiology BSc Hons and MBChB - all of his house jobs, senior house jobs (gaining a fantastic grounding in A+E, Orthopaedics, General Surgery, Paediatric surgery, Paeds Neuro, Paeds Plastics, ENT, Urology, ITU and Cardiothoracic Surgery) where in the Mersey Rotation. Post MRCS he escaped to do his first Surgical Registrar post in Brisbane, Australia.

Subsequently he returned to UK and has just completed 6 years as a Specialist Registrar on the Mersey Rotation with an interest in Laparoscopic Upper gastro intestinal and general surgery. He has recently been appointed as a Bariatric fellow in North Tyneside after completing his exit FRCS exam.

**Surgical resident's dream scenario** – The current British EWTD nightmare.

**Goldie Khera**

The United Kingdom's surgical trainees remain opposed to European Working Time Directive restriction of working hours. Surgery is particularly vulnerable as a craft speciality to the inevitable reduction in training opportunities and experience accompanying this. Patient safety and timely treatment is also jeopardised through reduced cover, multiple handovers, and a lack of continuity in patient care.

That the EWTD is evangelically promoted as essential health and safety legislation is disingenuous given that the resulting shift work results in more irregular hours and longer periods of on-call. The 48-hour rule is averaged over a 26-week period; 7 consecutive night shifts is entirely permissible and far more likely to see a tired, error prone doctor at the end of it.

In 2009-10 the Association of Surgeons in Training (ASiT) undertook an EWTD implementation survey. The results from 1,510 surgical trainees highlighted that 67% attended clinical work while off-duty to protect their training and gain experience. Non-compliant rotas were most frequently reported in Plastic (64%), Maxillofacial (62%) and Paediatric surgery (55%), small acute specialties that are struggling to provide service let alone training in restricted working hours. 74.9% of trainees were not happy to be working a EWTD compliant rota; 83.5% had seen no improvement in work-life balance; there were no significant gender differences. Only 1.6% reported improved training opportunities.
In fact NHS trusts are being penalised for not being rota compliant so are finding more ingenious ways of massaging the reported hours in order to comply and not be fined centrally by the Department of Health. Surgical training has therefore been driven underground with unreported and unregulated working hours.

ASiT has proposed a working up to a maximum of 65-hours, depending on hospital, speciality and local demands. What we need to protect is the world class end product of a specialist consultant surgeon who is ready and able for independent safe surgical practice. Also by over populating the on call rotas work force planning constraints mean that there will not be Consultant jobs available for trainees upon completion of training.

I envisage a dream scenario for the surgical trainee to be free from the shackles of EWTD regulation, training to be delivered by designated trained charismatic trainers with a zeal for leadership and quality patient care and outcomes involving Continuing Professional Development, exams and research. Surgical training models need to become more focused onto achieving set competencies, utilising simulator opportunities and reducing the surgical learning curve safely. Performing this within the constraints of a worsening economic situation and within the service needs of a National Health Service is the challenge.

## 14. Dr Jessica Montori MD PhD

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Dr Montori obtained her school-leaving certificate from the Liceo Linguistico Sperimentale Assunzione, Istituto Pio XII in Rome. I took my degree in Medicine and Surgery at the Faculty of Medicine and Surgery of "La Sapienza" University in Rome, with a final mark of 110 with honours (the equivalent of a First Class Honours) with the honour of reading out the Hippocratic Oath. My experimental degree thesis "Linfectomia nel cancro dello stomaco" (Lymphadenectomy in Stomach Cancer) was published in the journal "Quaderni di Chirurgia".
First placed in the competitive examination to enter the Scuola di Specializzazione in Chirurgia Generale (School of Specialisation in General Surgery) at Surgery Clinic 3 of Policlinico Umberto I in Rome where she passed the Public Qualifying Examination.
Her specialisation thesis was entitled "L'impianto di sfintere anale artificiale nel trattamento dell'incontinenza fecale severa" (The Artificial Anal Sphincter System in the Treatment of Severe Anal Incontinence).
Member of the Directorate of the Società Polispecialistica Italiana dei Giovani Chirurghi SPIGC, first as a member of the Secretariat, then as Auditor General, subsequently Treasurer, and finally Councillor in the SPIGC Directorate. Since 2009 I have been SPIGC Vice-President. Assistant Editor of the SPIGC Internet website (www.spigc.it), for which she looks after the pages “Medicina ed Arte” ("Medicine and Art") and “La donna in chirurgia” ("Women and Surgery").
Assistant organiser of the 6th World Congress of Endoscopic Surgery in Rome, of which my father was President. I have collaborated in the drafting of some chapters of surgery treatises (Paletto, Mazzeo).
Dr Montori has published many works and taken part in numerous national and international medical congresses as organiser, speaker in Italian, English and French, chairperson, and participant. Member of various surgery societies, both Italian and international. She won the SPIGC award for the best report presented during the SPIGC 2004 National Congress, and she has won the "Ettore Ruggeri" award.

## "The surgical resident's dream scenario"

**Jessica Montori**

In a time where economical and practical interests rule most aspects of our world, the chance to imagine the surgical resident's dream scenario is not only exciting but also challenging. Really few where the times when, as a resident, I was asked what would work for me, so now let's try and figure things out!
What would a surgical resident expect from his training?
What would a teacher want to achieve with his efforts?
Standardization of the program is essential.

Of course I can speak considering the italian surgical training system.
The first ideas that come to my mind are the following: the need of extending the active hours a training surgeon spends in the operating room performing major surgery as first or second operator; the possibility of having access to new technologies and time for research. Dealing with patients, studying and preparing the patient for the procedures are well explained and the student gets to master these aspects during the residency, the crucial point is that the training surgeon must have more real access to surgery, a "hands on" program! The lack of independence in the operating room and the difficulties in being able to perform major operations may result in a loss of interest and commitment on behalf of the young doctor.
The excitement and the greed of learning may leave the place to frustration and indifference resulting in a disappointing and dramatic mediocrity!

The teacher's responsability in preventing this situation from happening is massive. Rotations in surgical intensive care units and in the different surgical fields should be organized for the resident instead of leaving the initiative to the single student or teacher. Residency is the young surgeon's moment to learn and he/she should make the most of it. Where the resident lacks, the school should guide him/her, just like parents do teaching or assisting their children in learning all about the outside world.
It should be easy for surgical students to have access to courses and seminaries that should be presented to them so that they can pick what they are interested in and not waste their time hunting on the internet for what could be formative for them. This would result in more time the resident can dedicate to his /her work and being informed. Technologies are continuously evolving and changing quickly ( for example in MIS) and a a surgical resident must keep updated without forgetting the traditional procedures!

In order to form competitive surgeons in their country and abroad, it is the trainer's duty to expose the residents to as many realities as possible giving them the chance to explore and experiment. Explore all aspects of surgery and experiment technologies and devices even if that could require sending the students on formation periods in other realities, in order to give the residents all the tools and knowledge to make their own choices, hopefully the correct choices!

**15. Dr Ninos Oussi**

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Dr Oussie went to the Faculty of Medicine at the Karolinska Institute, Stockholm 2001-2005, and was an ambassador for the Karolinska Institute during the same period. He made his internship at the Malar County Hospital, Eskilstuna 2006-2007, and is actually in his Residency in General Surgery and Urology, in Eskilstuna and Stockholm from 2007. He is an educated ATLS instructor since 2009, and elected President for KIRUB (The Association for Younger Surgeons in Sweden) for the period 2009-2011. He has also attended several leadership courses, and is the team physician for the football club Assyriska FF (second highest league) since 2006.

## A Look into the Crystal Ball

**Ninos Oussie**

Behold the future of surgery!

Technology's progress, not least in the field of medicine, has exploded in the last decade. This rapid advancement forces one to question the methods for improving residents' education, especially in the field of surgical skills. Will we loose our ability to operate due to more efficient **robots**? Can we benefit from outstanding technical devices to improve our practical training skills, thus becoming better surgeons?

"I have a dream..." Dr. Martin Luther King Jr. once said.
Allow me to share with you my personal dream of the Surgical Resident's Education Dream Scenario.

In order to develop the requisite skills and judgement, a resident needs an education program with **structure** and good **planning**. I suggest a stepwise teaching system, where the resident starts with the basics, attains graduated responsibility to advance to more complex procedures as his/her knowledge and practical training increases. This graduated responsibility is interspersed with checkpoints so the resident is examined prior to advancing to the next level.

The education program includes mandatory courses planned from day one, and the resident must pass mandatory exams along the way. Instead of one final exam at the end of the residency, it is preferable to have exams throughout the program, for example, after each course or each level of knowledge according to the structured stepwise education plan. This concerns not only the practical training and scientific theory, but also leadership skills.

Each resident shall have at least one supervisor during the residency. The supervisor sets the individualized stepwise education plan on a yearly basis, together with the resident and the head of education/department. The core structure is the stepwise education plan, as outlined by the Association of Surgery in respective fields, and shall be adjusted to the individual needs of the resident. The supervisor is also a mentor, who guides and supports the resident through the program, and takes time to get to know the human-being within the surgeon with regular meetings. The supervisor and resident work together to develop a plan for remediation if the resident has not achieved the requisite levels of knowledge and/or practical skills. A resident may have more than one supervisor or may have one surgeon as supervisor and another as mentor. The key point is that experienced surgeons serve as role models to the resident in a formalized relationship.

When it comes to operating skills, the resident needs to rehearse the **anatomy and its variations** for each surgery performed, and to also think of **risks and possible complications** of the procedure preoperatively. **Cadaver training** will give the resident the feeling of handling the tissue, and over time, technology's progress will also provide us with more **reality based simulators** that we can train on prior to surgery.

Before we operate on patients, we need to learn more about the patient's history, diagnosis and indications for surgery. It is essential that the operating resident meet the patient before, during, and after the surgery as well as follow the patient in clinic, particularly in the case of complications. This gives a feeling of security and trust to both the patient and the young surgeon. One more method for preparing for and enhancing the operation skills is to use

cadaver training before each operation. The cadaver training can be in collaboration with the surgery department and the Institution of Anatomy. This requires both time, money, administrative planning, and of course, numerous cadavers prepared by adequate staff. However, this also shows the limit of using only cadavers for training, so let's push one step further to look at simulator based training.

According to the diagnosis and treatment plan, the patient undergoes **pre-operative mapping.** The data gained from the pre-operative mapping (e.g. MRI, PET-scan, CT-scan, Ultrasonography etc.) will then be extrapolated and used in an individualized virtual simulator that can make the data "viable and real". The resident then operates in the virtual simulator with his/her supervisor, before the real operation is performed. One can repeat the operation several times and gain more confidence before performing the operation on a patient. This is particularly important in difficult cancer operations with distorted anatomy.

Everything is calculated; the risks of surgery for that particular procedure, e.g. tumour radicality, anatomical variations, risk for bleeding etc. The operation is video-recorded, but also the operators to see how they act in a stressful environment, how they act in the operating group, and the ability to lead the team. There should be instant debriefing to evaluate what was good as well as what might have gone badly or what could have been improved, etc. All of this is judged and discussed after the operation.

Afterwards the resident and supervisor operate on the patient in real time. Both procedures should be done together with the supervisor. Everything as mentioned will be **video-recorded** (both through the operation lamp and set cameras in the operation theatre) to get both instant and post-operative feedback. It's preferable to do the operation together with a supervisor or a more experienced surgeon as well as one or two residents, hence providing a good teaching environment for more than one resident at the time. In addition, the assisting residents can learn from assisting as well as prepare for being placed in the operating role. The ability to **lead the team** in the operating theatre should also be evaluated.

The reality-based simulators evaluates every step a trainee makes, and includes each step in a scoring system where total performance is calculated, and tracked over time.

Hopefully, in a not so distant future, we will start operating in a 4D virtual hologram programme. This will give us the opportunity to see, feel and conduct the surgery as if it were real.

Overall this training program requires **time**; time to learn, time for the patient, time to prepare before surgery, time for surgery, **time for feedback, time for reflections, time for video-recording and discussions** and so forth.

The resident's role is not as an employee; rather he or she should learn and develop to become an efficient and secure surgeon. This future requires both money and time, with time being taken away from service to acquire knowledge and learn practical skills.

For this dream to become reality, we MUST discuss ideas and work together to make surgical education integrated with cutting-edge technology and safer for both patients and operators. We MUST shorten the learning curve, shifting from time-based to competency-based surgical training; ultimately our goal is to develop confident, skilled young surgeons in whose hands we can place the safety of our families.

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**16. Professor Spencer Beasley**

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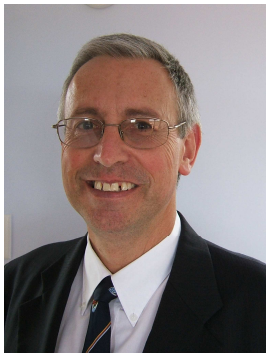

Spencer Beasley is a paediatric surgeon, formerly at the Royal Children's Hospital in Melbourne, but now working at Christchurch Hospital, Christchurch, New Zealand from where he set up the South Island regional paediatric surgical service. He is a past President of the Australasian Association of Paediatric Surgeons and the New Zealand Society of Paediatric Surgeons. He is on Council of the Royal Australasian College of Surgeons, the Chair of the Court of Examiners and Deputy Censor-in-Chief. Until recently he was the Chair of the Board of Surgical Education and training. He has a professorial appointment at the Christchurch School of Medicine and Health Sciences, University of Otago, and runs a paediatric surgical research unit. His research interests have included oesophageal atresia, the VATER association, and the influence of Sonic Hedgehog on early embryogenesis of the foregut and hindgut.

His interest in surgical education started when he was Chair of the Board of Paediatric Surgery, RACS and senior examiner in paediatric surgery RACS. He was involved in the development of the RACS Surgical Education and Training (SET) programme. He has an ongoing interest in assessment of higher cognitive function in surgeons. His 7 books and over 200 publications have meant he has not spent as much time with his 7 children as he might have (or should have) but nevertheless he sees them as his most important achievement.

## The new RACS training structure: the move from time-based to competency-based training, and its effects on the exit Fellowship examination

**Spencer W Beasley**

Part of the purpose of the recently-introduced RACS SET (surgical education and training) programme was to move from time-based training to competency-based training. It was expected that this would improve the efficiency - and shorten the duration - of surgical training in an environment where there were a limited numbers of training posts, and a looming shortage of surgeons. While many of the other goals of SET have been achieved, this one has proved to be the greatest challenge and has been only partially successful.

SET forced each of the nine specialties to review its curriculum, and to ensure that assessments were aligned to the syllabus and the required surgical competencies. This highlighted the need to determine which assessment tools were best to test which specific competencies, and when during training each was best done.

There is educational sense in acquiring, and confirming acquisition of, relevant basic science knowledge early on in training. This knowledge can then be applied to the clinical situation. Consequently, learning and assessment of generic basic sciences is undertaken early on in training (previously pure anatomy and pathology were tested in the exit examination), and specialty-specific surgical sciences next. Later in training, the focus of assessment is on the clinical application of knowledge. This has placed much greater reliance on formative assessment, including regular in-training assessments and direct observation of procedural skills.

Now, the main purpose of the final Fellowship examination is to test the clinical application of knowledge e.g. professional judgement and operative decision-making. Recent refinements to the final Fellowship exit examination (2 written papers, five vivas) include blueprinting to provide not only a matrix against the scope of syllabus, but also against the specific surgical competency being tested, and Bloom's taxonomy level (with a trend to assessing higher levels of cognitive function in relation to clinical application of knowledge and clinical decision-making).

Already we are seeing training boards reducing the duration of training of their better trainees, and extending that of the slower trainees, on the basis of competence. Ongoing challenges include: (1) improving the quality and reliability of formative assessment; (2) integration of all assessment processes to ensure all competencies are adequately tested (and at an appropriate time) during training; and (3) coping with the logistics of variable training periods.

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## 17. Dana K. Andersen MD, FACS

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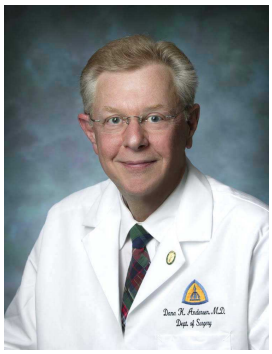

Dr. Andersen completed his undergraduate and medical degrees at Duke University, where he also trained in Internal Medicine as well as General Surgery. His career includes appointments at the State University of New York (SUNY) Health Sciences Center in Brooklyn, at the University of Chicago and Yale University, where he was Professor and Chief of General Surgery, at the University of Massachusetts where he was Chairman of Surgery, and at Johns Hopkins where he was Vice-Chair and Chief of Surgery at Johns Hopkins Bayview Medical Center.

His research on pancreatic and gastrointestinal hormone physiology has been funded by the National Institutes of Health, where he was a member of the Surgery and Bioengineering Study Section. Dr. Andersen's clinical interests focus on the treatment of disorders of the pancreas. He is an expert on the use of limited pancreatic resection methods for the treatment of chronic pancreatitis and pre-malignant lesions of the pancreas, and has published extensively on the metabolic complications of chronic pancreatitis, and the physiology of gastrointestinal hormones.

His educational interests focus on the application of simulation methods in surgical education. He is a past president of the Association for Academic Surgery and is an editor of Schwartz's *Principles of Surgery*.

## How do we Simulate the Essentials of Surgical Judgement?

**Dana K. Andersen, M.D.**

### What is Expert Judgment?

In cognitive psychology, experts are defined as individuals capable of a variety of advanced skills, including constant, rapid, accurate, effective diagnosis and solving of complex problems. Expertise is characterized by the effective combination of automatic, non-analytic activities, as well as effortful analytic behavior. Automatic processing requires less intentional capacity which, in the expert, frees up cognitive resources to invest in risk awareness, problem solving, and the anticipation of the results of intervention. The individual who makes exclusive use of non-analytic resources and automatic processes is unlikely to manage novel or unusual situations expertly, and has been defined as the "experienced non-expert." Lack of situational awareness leads to errors in judgment, and failures of situation awareness are contributed to by the fact that cognitive capacity is limited. Experts may devolve into experienced non-experts through hubris, complacency, or fatigue. The transition from automatic, non-analytic behavior to cognitive, analytic function is characterized by slowing down to permit contemplation. This transition process can also become automatized by repeated experience, such that experts may be unaware of how and when this occurs.

### How Can We Determine (and Measure) the Elements of Expert Judgment?

Cognitive task analysis (CTA) is a system for assessing and defining the steps involved in expert task performance, developed by industrial psychologists who realized that the apprenticeship model for learning complex tasks is seriously flawed. The process involves interviewing intermediate and advanced experts to identify a representative sample of domain-specific problems that need to be solved. CTA has been applied to surgical procedures, surgical simulation development, and surgical curriculum development. CTA identifies the key decision points in a series of task or steps, and allows focused training on the best approach to these points of hazard or uncertainty. The technique has been shown to have a long-lasting benefit when the resulting process map is added to technical skills training. Error analysis, termed human reliability analysis, identifies points of risk-related decisions through careful analysis of videotaped operations. The technique also identifies the decision strategies and techniques which are most effective in avoiding error and achieving good outcomes. Objective approaches to assessment of clinical skills, such as the Objective Standardized Clinical Examination (OSCE), the Objective Surgical Assessment of Technical Skills (OSATS), the Global Assessment of Laparoscopic Skills (GOALS), and the Operation Rater (OpRate), have been validated, although more emphasis is placed on an evaluation of technical skills than judgmental ability.

### How Can Simulation Applications be Developed to Teach, Learn, and Assess Expert Judgment?

Current surgical task simulation applications are used enthusiastically by novices and advanced beginners while experienced non-experts and experts are less motivated to use them. Whole-patient simulation models have been used successfully for learning advanced management skills in anesthesia, trauma, and peri-operative surgical care. When cognitive skills training is added to a technical skills course, the trainees' ability to detect errors and

prevent them significantly improve. By combining direct feedback and instruction by expert observers during simulated procedures based on the CTA-guided analysis of procedures, residents significantly improve their simulated intraoperative decision making, and more correctly perform the simulated procedure on modified box trainers. Cognitive simulation is a web-based application where variations in knowledge (data) can be introduced to assess the resulting behavior in simulated scenarios. Surgical simulation models need to be developed in which the user's situational awareness of key decision points can be assessed, and challenges and demands on the user can be progressively increased as skill attainment allows.

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**18. Sanjiv Kanagaraja DDS, PhD**

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Dr. Sanjiv Kanagaraja graduated from the faculty of Dentistry, University of Gothenburg in 1994. His research focused on foreign body reactions in the human body, especially in the field of implants. He obtained his PhD in 2000 and became a Consultant in Oral and Maxillofacial Surgery in 2006.

He currently works at the Department of Oral and Maxillofacial Surgery, University of Gothenburg and is head of the Orthognathic and Craniofacial division of this department and a member of the Craniofacial team of the Sahlgrenska University Hospital, Gothenburg.

He has extensive experience in all minor and major dentoalveolar and reconstructive surgery, with a special focus on implant and orthognathic surgical procedures and an interest in computer based surgical planning and treatment.

**Guided Maxillofacial Implant Surgery**

Sanjiv Kanagaraja

The outcome during rehabilitation of patients with dental implants and/or using orthognathic surgical procedures depends to a large part, even today, in the skill and experience of the surgeon. It is more of an art than a science, with a large individual variation depending on the surgeon. There is a limited possibility to accurately predict and get reproducible post-operative results.

In the end of the 1990´s there were commercially available computer based planning programs for treatment of patients with dental implants. However, it was not until the middle part of the 2000´s that these products had reached such accuracy that they could be used in the clinical situation with more or less predictable results. Similar programs were developed in the field of Maxillofacial Surgery in order to plan and execute osteotomies and movement of the maxilla and mandible. In these programs, the post-operative soft tissue prediction remained a problem. The computer based planning programs today offer very good accuracy. However, problems still remain in how to accurately transfer the treatment planning to the operating table.

Some of the issues that will be discussed are:

- What are the major computer based programs that are commercially available today for maxillofacial and implant surgery, and how accurate are they?
- What are the advantages /problems with these computer based systems?
- At what point of time in the training of surgeons should these programs be introduced?
- Does the clinical experience of the surgeon in training and the time of introduction of the computer base treatment system have an impact on the post-operative accuracy?

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19. **LtCol Robert Persson**

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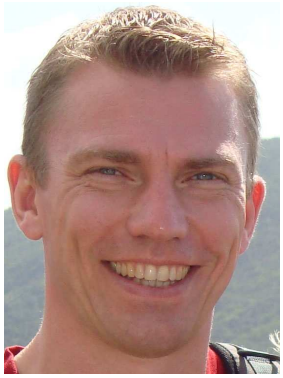

Lieutenant Colonel Robert Persson, Swedish Air Force, is Wing Commander Flying and Commanding Officer of the Air Operations Unit at the F7 Wing based at Såtenäs Air Force Base. The main task for this unit has since 1998 been the conversion training of Swedish pilots for the Swedish multirole fighter, JAS 39 Gripen. Since 2004 the unit also trains foreign Gripen pilots.

LtCol Persson joined the Swedish Air Force in 1988 and after two years of basic and tactical training on the Saab 105 jet trainer he flew the Viggen fighter from 1990 to 1999. During this time he flew all five versions of the Viggen; ground attack, air defence, sea surveillance, photo recce and the trainer version. In 2000 he did the conversion training to the JAS 39 Gripen and has since 2001 been an Instructor Pilot with experience of training both novice and experienced Swedish pilots. From 2006 to 2009 LtCol Persson was the Squadron Commander at 1st Squadron and in charge of the conversion training for Czech and Hungarian pilots. During 2010 the unit has also trained 4 pilots from the Royal Thai Air Force and another batch of Thai pilots recently started their training at the Wing.

LtCol Persson has spent the last 10 years either as an instructor pilot or as a commander of other instructors and has extensive knowledge and experience of military pilot training. He has throughout his career used many different types of simulators and computer based training aids, both as a student and as an instructor. He has also been lecturing about the Swedish Air Force Training Philosophy which emphasis the necessity to reduce stress during pilot training.

## Using Simulators as a Training Tool in Military Pilot Training

**Robert Persson**

Military pilot training has a number of characteristics that creates a unique training environment. Demand for high precision, fatal risks in case of errors and big challenges in creating a "realistic" training environment. In order to overcome some of these obstacles the usage of simulators is a key element in the pilot training.

In the Swedish Air Force different types of simulators have been in operational use since the 1960's and was initially introduced together with the J 35 Draken fighter. The main types of simulators used are:

- Part Task Trainers
- Mission Trainers
- Full Mission Simulators
- Combat Simulation Centres

The different types of simulators are used in different stages of the training and for different purposes ranging from basic aircraft functions to large scale combat scenarios. The main reasons for the usage of the simulators are the reduction of potential risks, the possibility to train in scenarios that are difficult to recreate in the "real" world and finally economic reasons.

The simulators also form one essential part of the Swedish Air Force training philosophy which focuses on reducing negative stress during basic training. The simulators facilitate the adaptation of the training to each pilot's individual training needs thus increasing the chances to meet the training objectives.

The usage of simulators will most probably continue to be of high importance in the pilot training. The modern fighter aircrafts are increasingly complex and very expensive to operate which will make the future for simulators a prosperous business.

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**20. Richard Reznick**

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Richard Reznick, is married to his wife Cheryl and they have three children, Joanna, Josh and Gabe. He was born in Montreal and received his undergraduate university education and medical degree from McGill University. He did his general surgical residency at the University of Toronto. He spent two years in fellowship training, the first in medical education receiving a Masters' degree from South Illinois University and the second in colorectal surgery at the University of Texas in Houston, Texas.

Since his appointment to the faculty at the University of Toronto in 1987, Dr. Reznick has been active in both colorectal surgery and research in medical education. His research interests have been devoted to medical education. He was instrumental in developing a performance-based examination, which is now used for medical licensure in Canada. He ran a research program on assessment of technical competence for surgeons and supervised a fellowship program in surgical education. He was the inaugural Director of the University of Toronto Faculty of Medicine Centre for Research in Education at University Health Network (The Wilson Centre) from 1997 to 2002. In 1999 he was appointed Vice President of Education at University Health Network. He served eight years as the R. S. McLaughlin Professor and Chairman of the Department of Surgery at the University of Toronto from 2002-2010. In July, 2010 he assumed the position of Dean, Faculty of Health Sciences at Queen's University and Chief Executive Officer of the Southeastern Ontario Academic Medical Organization (SEAMO).

Dr. Reznick has received numerous awards for his work in education including, the Royal College of Physicians and Surgeons of Canada Medal in Surgery, the Association for Surgical Education Distinguished Educator Award, the National Board of Medical Examiners John P. Hubbard Award, the Daniel C. Tosteson Award for Leadership in Medical Education, the 2006 Inaugural University of Toronto President's Teaching Award and the Karolinska Institutet Prize for Research in Medical Education.
Dr. Reznick is the author of over 120 peer-reviewed publications and has given over 200 lectures to hospitals, universities and scientific organizations around the world.

## Competency Based Education: plus ca change, plus c'est la meme chose

**Richard Reznick**

The events of the last two decades have resulted in stresses on the training of residents to a degree that has not been seen before. These changes are structural, philosophical, political, and pedagogical. Indeed, throughout the world there have been concerns expressed about the need for reform in postgraduate medical education; but to date reform has come slowly and for the most part, in the form of minor changes at the fringes of our educational programs that basically preserve the current architecture of the curriculum.

We argue that trying to solve these problems by tinkering at the edges of a conventional curriculum will not adequately address the multitude of issues that we face. What is needed is radical curricular reform superimposed on a competency based framework of resident training. The essential elements that will help us restructure residencies are not to solely to deploy a competency based framework, but rather to fundamentally change the curriculum of our training schemes.

We present our data for the first two iterations of a new training scheme in orthopaedics that is a proof of principle experiment. Six residents have entered the program at University of Toronto and are being treated in a very different way from conventional trainees. The principles of the program include:

1. Achieve competencies through modular based training
2. Dramatically accelerate the pace of procedural skill acquisition
3. Diminish wasted time in residency
4. Incorporate meaningful assessment into day to day activities
5. Promote team care and develop a culture of collegiality
6. Competency based as opposed to time based

References: See page 152-153

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**21. Dr. med. Kai Olms**

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Since 1990 training in Atlanta, Chicago, Houston, Pittsburgh, San Francisco.
Scientific director of several meetings and workshops in Germany (12 seminars in Munich, Düsseldorf, Tegernsee, 11 work shops in Lübeck (saw-bones and wet lab).
Founding President of the Foot surgery foundation' in Germany 1996
Giving international lectures in the field of foot surgery in Atlanta/Georgia, Dallas/Texas, Sanibel Island/Florida, San Francisco/California, St.Petersburg/Russia, Mexico City, Helsinki/Finland, Wels/Austria, Doha/Qatar, Miami and Houston/USA, Beirut/Lebanon, Riyadh/Saudi Arabia, Skien/Norway, Budapest/Hungary, Honkong and Kanton/China, , Ho Chi Minh City and Hanoi/Vietnam.

Chairman of instructional wet labs in the USA, Mexico, Europe, Lebanon, China and Russia.

**2002** Certified Foot and Ankle Surgeon , Association for Foot Surgery, Germany
**2003** Honorary member in the American College of Foot and Ankle Surgeons (ACFAS)
Affiliate member of the Podiatry Institute Atlanta, Georgia

Publications:
Translation (English/German) - Comprehensive textbook of Hallux valgus surgery, Marcincko 1994
Update 2004, Podiatry Institute Atlanta
Several papers in scientific journals

## The Power of PowerPoint

**Kai Olms**

With respect to all the time and monetary resources we spend teaching an audience, the outcome is often unsatisfactory and sometimes more than disappointing as we tend to bore the listeners unwillingly. This is not a matter of the contents of the talk but rather the way we deliver the message. We have to launch a debate on how we teach, rather than on what we teach. After the time of overhead transparencies the framed slides seemed to open a new door for presenting ideas. We all experienced the disadvantages of the usage of that medium and picked up the idea of the electronic way of presentation with enthusiasm. This type of presentation is almost equivalent to the term "Power Point Presentation". The Microsoft based program offered endless templates, backgrounds, animations, pictures and colours. However, like with a lot of issues in the digital world, changes happen faster than we expect. What is the "After the Power Point era "like? But, is it necessary to have an era after that? How can we make use of the power point software to deliver the message better than before?

The acceptance of a presentation is dependant on several factors. These can be altered in different ways more or less effectively. To change the speakers way of presenting is the most difficult and time consuming part of the development process and is independent from the applied medium.

Power point presentations are using the typical defaults, thus creating the same title and subtitle type of slides, which in consequence may bore the audience. They seem to be the manual for the speaker rather than a visual help for the audience to understand the topic.

An important change from the typical power Point structure of a presentation to the assertion-evidence slide without using power Point defaults is critical to maintain the awareness of the audience. Instead of have a title for each slide, the assertion-evidence slide uses an assertion as a title and the slide as a visual evidence. Important additional details of the slide design include : fonts, colours, number of words, animation and other visual aids. In addition the change of the design of a single slide, the sequence of the slide is as important. By showing key slides at the beginning of the presentation the interest of the audience is stimulated, a process which can be called "Prime the brain". The last slide again is very critical as it determines the difference between understanding and remembering of the contents of the talk.

The presentation will focus on the structure and design of a slide presentation avoiding power point defaults. The change from a title - subtitle to the assertion-evidence slide will be demonstrated.

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## 22. **Professor Sean Tierney BSc MCh FRCSI**

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Sean Tierney trained as a Surgeon in Ireland, the USA and the UK and was appointed as a Consultant Vascular Surgeon in the Adelaide & Meath Hospital, Tallaght, Dublin in 2000. This is a teaching hospital of Trinity College Dublin medical school where he holds the position of honorary lecturer.

He has a long standing interest in surgical training and was chairman of the Irish Surgical Trainees Association in 1998. He was part of the editorial team for BeST (basic electronic surgical training) developed by RCSI in 1999. In 2003, the College established an internet based case based discussion forum for surgical trainees called "*School for Surgeons*" and Sean was recruited to run this programme which he continues to do.

Initially designed for trainees in Ireland, the *School for Surgeons* is was later extended to trainees in both the Middle East (Bahrain) and Africa in collaboration with the College of Surgeons of East, central and Southern Africa (COSECSA). Sean was appointed Professor of Surgical Informatics in RCSI in 2009. Sean has also served on he Consultant Committee and the national council of the representative body for Irish doctors (the Irish Medical Organisation) and was elected President in 2010.

He has research interests in both the clinical and surgical educational areas. He won the Silver Scalpel awarded by the Surgical Trainees representative committee in 2005.

## Informatics and e-learning in surgery

**Sean Tierney**

Shorter working hours, specialisation, increasing patient expectations, the growing complexity of surgical procedures and cost constraints are among the challenges that surgical training programmes must overcome to provide high quality training to the next generation of surgical specialists.

In addition, regulators require training programmes to carefully quality assure the training process, inspect and accredit training centres and trainers, and define the completion of training using competencies rather than time spent in the programme.

The key competencies of a surgeon can be grouped under the headings of knowledge/scholarship, technical skills (both clinical and operative), and human factors. In the Royal College of Surgeons in Ireland (RCSI), we use a blended learning approach using e-learning to provide and/or support a taught programme in each of these domains of competency. Our "**School for Surgeons**" is delivered using **Moodle™** as our elearning platform – it is open source and used for 50,000 educational sites worldwide.

Clinical knowledge and judgement is developed using online asynchronous case-based discussions in small peer groups. Participation is mandatory but there are no summative assessments. Operative skills are taught and assessed in a simulation laboratory but supported with online teaching material. Human factors is taught using role play and group work but includes reflective exercises online.

Trainee rotations, assessments, and their appraisal of the training posts are managed using a Sharepoint (Microsoft) based training post management system (the "**Colles Portal**") which also includes recruitment, and post matching. In addition, all operative procedures are recorded by the trainees in an online logbook (**www.elogbook.org**) which provides a valuable objective profile of the training post in a national context.

Data on the contribution of the trainer is also recorded and exported to their personal and professional competence portfolio.

Careful use of linked information systems can provide access to relevant training material (when and where it is required); map the trainees' progress as they acquire competencies; and record the contribution of the trainers while reducing the bureaucratic burden on trainers.

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**23. Thomas Skoglund, MD, PhD**

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Thomas Skoglund received his medical degree from the University of Gothenburg, Sweden, in 1994 and presented his thesis in 1997, in the field of computer based reconstructions of the cellorganization in the cerebral cortex.

He completed his neurosurgical residency at Sahlgrenska University Hospital, Sweden, where he also currently is working as senior consultant and associate professor.

His current fields of clinical interest are deep-brain stimulation, intracranial by-pass surgery, endoscopic pituitary surgery and neurotrauma and neurointensive care. His principal research interests include studies of patients with traumatic brain injury using diffusion-tensor imaging and studying the visual pathways after pituitary surgery.
He has been interested and involved in teaching since 1991 and in 1996 he received the pedagogical price “Pedalen” from medical students at University of Gothenburg. He has initiated and participated in projects for computer-based eduction in neuroanatomy, radiology and neurosurgery since 1993.

He is the co-founder of NEUROSURGIC.com, the global online community for neurosurgeons.

## Using Social media in surgical education – an example from neurosurgery

**Thomas Skoglund**

Inspired by the evolution of online social media like Facebook, Youtube and LinkedIn we set out to examine the possible need for an online meeting place and educational platform for neurosurgeons.

The primary idea was to create a free professional networking website, where neurosurgeons of all levels around the globe, can come together and learn from each other, share their experience, and tie new professional bonds. A secondary goal was to provide the neurosurgical community with regular updates, various useful resources and educational material.

The website, called NEUROSURGIC.com, was developed using Joomla, which is a free open source content management system platform for publishing content on the internet. The programming and layout have been made by the author and Steen Fridriksson, who both are working as senior consultants in neurosurgery at Sahlgrenska University Hospital, Gothenburg.

The website contains several sections:

• In the Community section neurosurgeons can interact with each other using our personal message system and discussion Forums, by blogging and uploading interesting cases.

• The Updates section helps the busy neurosurgeon stay updated on the latest professional news, upcoming courses and conferences, and on the latest neurosurgical journal abstracts.

• The Resources section offers a neurosurgical bookstore, comprehensive list of neurosurgical journals, and a directory of neurosurgery related weblinks.

• The Education section offers a collection of neurosurgical reference articles, a multiple choice question database for board review preparation, and links to neurosurgical videos.

Since the launch of NEUROSURGIC in 2008 we have had visitors from 185 different countries and register about 18000 visits per month. NEUROSURGIC has over 2900 registered members (May 2011) who contributes to the website by blogging, Forum posting, uploading neurosurgical cases and participating in neurosurgical polls. From the increasing number of visitors to NEUROSURGIC we conclude that there is a need for a free global online meeting place and educational platform for neurosurgeons, serving as a complement to existing neurosurgical societies.

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**24. Pr MariAnne Karlsson**

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I.C. MariAnne Karlsson is Professor (chair) in Human Factors Engineering at Chalmers University of Technology. She is also Deputy Head of the Department of Product and Production Development with special responsibility for the post-graduate education, as well as Head of Division Design & Human Factors.

MariAnne Karlsson has since the beginning of the 1980s carried out research on the relation between people and technical artefacts on different levels in the human-technology-system. One important theme has been developing and evaluating efficient and effective methods and tools for identifying customers' and users' needs and requirements for technical products and systems, as well as for evaluating design solutions from a user and use perspective. A second theme has been investigating the prerequisites for people's acceptance and adoption (or rejection) of new technology, how new technology is "domesticated" and how it becomes an integral part of people's everyday life.

MariAnne Karlsson has published a large number of research reports, conference papers, and journal papers primarily in the area of customer-centred/user-centred product development and design, and human-machine interaction (HMI).

She has also developed and taught a substantial number of courses at Chalmers University of Technology as well as at other universities in Sweden. In addition to university courses, MariAnne Karlsson has taught courses and given seminars addressing a professional, product development audience. She has also given a large number of seminars at different conferences and meetings, national as well as international.

## New Technology and Working Life: A Human Factors Perspective

**I.C. MariAnne Karlsson**

Domain knowledge is knowledge which is specific to an application, "… distinguished from general strategic or control knowledge that is independent of the details of any particular application." Different specialists and experts develop and use their own domain knowledge. For instance, professional bakers have a great deal of knowledge about different types of baking techniques. Experienced process engineers hold considerable knowledge on what factors influence a production process, while medical nurses have specific knowledge about certain medical procedures and medical terminology.

However, working life has over time become increasingly "technified". The professional baker is required not only to manage the art of baking but also, or perhaps even instead, be able to e.g. program and keep track of a semi-automated baking process. The process engineer no longer walks through the plant to get an understanding of the state of the process but instead has to interpret and interact with the process through a graphic interface in a distant control room. The medical nurse has to be able to manage the relation with the patient and interpret the information received from the patient, as well as program and understand the information received from the user interface of different life support systems.

The reasons behind the introduction new technology in working life has most often been associated with assumed "improvements" in terms of cost reductions (e.g. reduction of staff, reduction of space), improved productivity, and/or improved quality of work. However, several studies have shown that this is not always the case, be it because of failure or rejection (the new technical solutions are rejected by the individuals that are supposed to adopt them), or because of marginal gains (the new devices are only used for some of their proposed purposes, or because the new technical equipment is not used in the intended way).

From a human factors, or rather a socio-technical perspective, it is clear that the introduction of new technology in working life is a complex problem. Several prerequsities have been identified:

- New technical systems and devices are most often introduced into a technical context why compatibility with the present systems becomes a key issue to solve.
- In addition, the new technology is introduced into an organisational context. It must consequently be developed taking organisational issues into account (as must organisations be developed whilst considering the possibilities as well as the constraints of the prevailaing technical systems). Research has shown that the introduction of new technology, in particular information technology, will almost inevitably require also organisational changes in order for its benefits to emerge.
- A successful exploitation of new technology depends, evidently, upon the ability and willingness of the staff to use the technology. The baker, engineer or medical nurse cannot be assumed to simply "plug in and play" new technology as part of their expertise. Rather they have to be given proper training and the necessary time to develop new knowledge and new skills in relation to the new technology – possibly even new kind of domain knowledge in which the new technology become an integrated part. Furthermore, learning and using the new technology must be considered "worth the effort" for the individual. The benefits cannot be allocated the organisation only.
- Finally, and fundamentally, the new technology must be developed with the intended users and the intended use in focus. Successful implementation of new technology depends upon the participation of relevant "stakeholders". The product developer will bring knowledge about development processes, methods and tools, and about technical possibilitis and limitations but in order to design a new technical device for a particular domain, for users with particular tasks and particular skills, people with expertise in the area, i.e. domain experts, must be involved in the design process.

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## 25. Rajesh Aggarwal, PhD, MA(Cantab), MBBS, MRCS Eng

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Rajesh Aggarwal began his medical training at Selwyn College, Cambridge University and completed clinical studies at The Royal Free Hospital School of Medicine, London, graduating with Honours. Subsequently he has completed basic surgical training in London teaching hospitals, and a PhD thesis at Imperial College London entitled 'A Proficiency-Based Technical Skills Curriculum for Laparoscopic Surgery'. His work has been published in over 90 peer-reviewed papers, including Annals of Surgery, British Journal of Surgery and New England Journal of Medicine. In 2010 he has been elected to the prestigious National Institute of Health Research Clinician Scientist Fellowship, awarded by the Department of Health, U.K.

The research has focused upon the use of simulation techniques to train and assess surgical technical skill, foremost within a laparoscopic surgical environment. The use of synthetic, animal-based and virtual reality simulators have been extensively investigated for acquisition of basic and advanced surgical skills, with regard to open and minimal access techniques (i.e. laparoscopy, endoscopy and endovascular surgery). This work has proceeded in tandem with the development and use of tools for assessment such as motion tracking devices and observational rating scales. The integration of training and assessment tools has led to the development and subsequent definition of proficiency-based curricula in surgical specialties.

The continued expansion of the research domain led to the investigation of surgical performance beyond technical skills alone. The incorporation of simulated operating suites into the assessment of technical skill enables healthcare professionals to train and be assessed in realistic environments. The subsequent evaluation provides evidence of non-technical skills, not only of the surgeon, but also of the operating team. A further development was the integration of technical and non-technical skills assessments for a project to evaluate the performance of independently practising surgeons within the UK. Assessments were based upon bench-top models, together with a local anaesthetic operative procedure in the simulated operating suite (SOS) upon a standardized patient. Other academic interests include the importance of design solutions to healthcare environments, with the aim of improving patient safety. Dissemination of research is actively pursued through membership of committees directed by the Department of Health, the Royal College of Surgeons of England, the European Association of Endoscopic Surgeons and the Society of American Gastrointestinal Endoscopic Surgeons, together with the delivery of presentations to a number of audiences worldwide.

## Objective Assessment of Clinical Performance

**Rajesh Aggarwal**

The last decade has witnessed a number of high profile cases of surgical incompetence leading to unacceptable morbidity and mortality of patients. Public and political pressure to evaluate the skills of operating physicians has grown since the publication of the landmark report “To Err is Human” by the Institute of Medicine, suggesting that between 43,000 and 98,000 preventable deaths occur annually in American hospitals. The introduction of new technologies, most notably minimally invasive techniques, has led to further problems such as the modes of credentialing to enable healthcare practitioners to perform these procedures safely.

Traditional methods of assessment for fitness to practice rely upon subjective evaluations by senior staff members, case record, and upon occasion, complication, and mortality rates. These have been shown to be neither valid nor reliable measures of technical proficiency.

But why is it necessary to objectively measure operative performance? Not only is this fundamental in terms of credentialing healthcare practitioners to perform invasive procedures on their patients, but can also satisfy a formative role whereby an individual (or their trainer) can mark their career progression, and compare this against that of their peers. With the development of competency-based training curricula, objective measures of performance are crucial to determine advancement onto the next stage of training, or re-entry after a career break.

Aside from an individual perspective, measurement of innovative or adjunctive training outcomes can be performed quantitatively, and costed in terms of degree of improvement compared with traditional methods of skill acquisition. Enrolment of surgeons into clinical trials that compare 2 modes of treatment can also ensure that procedures within the same treatment arm are being performed to the same exacting standards.

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**26. Pr. Shekhar Kumta**

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Director of Teaching and Learning Resource Centre
Faculty of Medicine
Prince Wales Hospital
Shatin, N.T.
The Chinese University of Hong Kong
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Prof Kumta is an orthopaedic surgeon and is also the Assistant Dean of Education for the Medical Faculty. He is also the director of the Teaching and Learning Resource Centre at the medical faculty.

Prof Kumta is intensely involved in the application of new technology in Medical education, particularly in areas of formative assessment, simulation and in the acquisition of skills. He also is involved in clinical service and has developed a niche area in the palliative management of advanced sarcomas.

He is an active researcher and his interests include target therapies for Giant Cell Tumor of Bone, and the application of advanced imaging and visualization in the management of complex resections and reconstructions in patients with sarcomas.

## Evaluation of Surgical Skills in Residency Training

**[1]Prof Shekhar Kumta, [2]Prof. Andrew Burd, [1]Dr. KC Wong, [1]Dr. Tse Lung-fung, Thomas**

**[1]Department of Orthopaedics & Traumatology, The Chinese University of Hong Kong, [2]Division of Plastic and Reconstructive Surgery, Department of Surgery, Chinese University of Hong Kong.**

The demonstration of the ability to acquire surgical skills and their appropriate application in patient care are two of the most important qualities that one looks for in a surgical trainee. These two attributes must go hand in hand as there have been tremendous technical advances in recent years in surgical interventions that require advanced and sophisticated skill acquisition, but if they are applied for the wrong diagnosis surgical procedures can still result in poor outcomes.

Surgical skill is arguably one of the most important qualities of a resident trainee that one looks at in any form of surgical training. Given the tremendous technical advances in recent years, much of surgery (including orthopaedics) has become technically demanding and technology dependant.

In addition to their generic surgical abilities, residents are increasingly required to develop procedure-specific competencies particularly in the handling of complex instrumentations such as for joint replacement or spinal surgery.

Almost all residents consider that acquiring skills is perhaps the most important aspects of their training. Proper evaluation of surgical skills remains the cornerstone of a good residency training program. However, opinions differ greatly, as to the most effective and constructive means of achieving such assessments.

To acquire surgical skills, residents need to participate in surgical operations and be given gradually increasing responsibilities and tasks, commensurate with their level of skill. A residency program within which formative assessment of a resident's surgical skills is conducted through close supervision and mentoring is vastly superior to one in which surgical skills are deemed to have been attained if a certain minimum number of cases have been done by the resident. In our view mere logging of cases is a poor surrogate of surgical skills.

The pressure to participate in on-call and surgical cases needs to be balanced with the service needs of the hospital and the institution. This is becoming increasingly evident in some busy units particularly in tertiary referral centres in Hong Kong. Manpower shortages and imbalance between trainees and trainers adds to these constraints.

It is tempting to consider the concept that there may be an optimal number of index procedures that will best assess a resident’s surgical skills. The number of procedural assessments that provide optimal value for the residents and program directors seem quite difficult to define. One also needs to consider how to intervene for residents who do not perform satisfactorily.

The successful training of a surgeon should ultimately be the responsibility of his mentor and immediate supervisor. An unbiased fair and balanced assessment of skills at every stage of a resident's career is likely to provide the most realistic appraisal of surgical acumen in any form of surgical residency training.

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**27. Ann Van Heest, MD Professor**

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Ann E. Van Heest MD is been a Professor of Orthopaedic Surgery at the University of Minnesota. She trained in medical school and orthopedic residency at the University of Minnesota. She completed a Hand and Upper Extremity fellowship at Harvard University in 1993.

From 1999 to the present, she has been the Orthopedic Surgery Residency Program Director . She most recently won the ACGME Parker J Palmer "Courage to Teach" award for Program Director excellence, which is a national award given to outstanding residency program directors. She has received the Graduate Education Teaching Award for Outstanding Contributions to Graduate and Professional Education at the University of Minnesota.. She has served on the Board of Directors for the AOA Council of Residency Directors since 2009. She is the former President of the Ruth Jackson Orthopaedic Society.

During her tenure as residency program director, she has designed and implemented surgical competency texting in upper extremity surgical skills for the past 5 years, assessing carpal tunnel release, trigger digits, and distal radius fracture fixation. She works with her colleagues at the University of Minnesota in the SIMPortal Surgical Simulation Lab developing basic arthroscopic skills simulation teaching, as part of an AOA Omega grant.

## Objective Structured Assessment of Technical Skill in Upper Extremity Surgery

**Ann Van Heest**

This study attempts to examine the role of surgical skills evaluation in upper extremity surgery. According to the American Board of Orthopaedic Surgery, the most common upper extremity surgical procedures submitted in the Part II certification examination case mix between 1999 and 2003 were open carpal tunnel release, fixation of distal radius fractures and trigger finger release. Amongst the twenty-five most common procedures performed by orthopaedic surgeons seeking certification, these three procedures were 3rd, 20th and 22nd respectively.

At the University Of Minnesota Department of Orthopedic Surgery, a cadaveric multi-station model for testing surgical skills competence for these three common procedures (trigger finger release, open carpal tunnel release, and open plate fixation of distal radius fractures) has been developed. Over the last five years, orthopaedic surgery residents and hand surgery fellows have participated in a yearly assessment of upper extremity surgery technical skill using a multiple station Objective Structured Assessment of Technical Skills (OSATS) format. During this time, the process of testing has been refined.

The goal of this work is to report the inter-station reliability as well as the construct validity of a multiple bench-station evaluation of technical skills in three common upper extremity surgeries trigger finger release, open carpal tunnel release and open reduction/internal fixation of distal radius fractures, using pass/fail, global rating scores, and detailed checklists as assessment tools. The role of cognitive testing and timing of length of the procedure will also be discussed.
In 2010, twenty-seven residents (6 PGY-2, 8 PGY-3, 8 PGY-4, and 5 PGY-5) participated in the examination. Three stations, trigger finger release (TFR), open carpal tunnel release (CTR), and distal radius fracture fixation (DRFF) were completed by each resident performing the surgery on a cadaveric specimen. A CAQSH-certified surgeon evaluated trainee performance at each station using a procedure-specific detailed checklist, a validated global rating scale, and pass/fail assessment. A resident post-testing evaluation was collected.

Construct validity with correlation between year-in-training and detailed checklist scores was demonstrated for TFR and CTR; between year in training and global rating scores for TFR, and DRFF; and between year in training and pass/fail assessment for TFR. Criterion validity was demonstrated by the correlation between global rating scale scores, detailed checklist scores and the gold standard – pass/fail assessment for TFR, and for CTR, but not for DRFF. Time to complete the surgery was not correlated with surgical performance. Residents rated the multi-station OSATS format as highly educational.

This study reports that a surgeon's ability to release a trigger finger does not correlate specifically to his/her ability to perform a carpal tunnel release or to perform plate fixation of a radius fracture. The results of this study would indicate that for three different surgical simulation stations, representing procedures of varying complexity, assessments by either a single assessment tool is not adequate. To completely understand a residents abilities, assessment by checklist (understanding the steps of the surgery), by global rating scales (assessment of basic surgical skills in light of lesser or greater complexity surgeries), and pass/fail assessment (examination of adverse events) are all necessary components.

Ref: See page 153

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**28. Li Felländer-Tsai MD, PhD**

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Li Felländer-Tsai was appointed Professor of Orthopaedics at Karolinska Institutet in 2006. She is the chairman of the Department of Clinical Science, Intervention and Technology at Karolinska Institutet and Director of the Center for Advanced Medical Simulation and Training at Karolinska University Hospital. She is active in orthopedic education, training and research as well as advanced surgical technology.

She has developed and implemented a technique for monitoring of synovial tissue metabolism and inflammation with intraoperative and postoperative microdialysis. Other fields of research include virtual reality image guided and surgical simulation. She is board member of the Royal Institute oh Technology (KTH), the Swedish Orthopedic Association and the Swedish ACL Registry (Quality register for cruciate ligament reconstruction). She also chairs the research network Tissue and Motion at Karolinska Institutet and chaired the process of Accreditation of the Center for Advanced Medical Simulation as an American College of Surgeons Level I Educational Institute.

## Training of Cognitive Skills for Future Surgeons

**Li Felländer-Tsai**

Simulator training is becoming increasingly important in clinical education. Health care organizations are becoming less tolerant towards patient risks and time loss, leading to increased demands on simulated training of health care professionals. A systematic approach is thus crucial in order to maximize efficiency and output. It has been shown that cognitive skills training significantly improves the quality of performance in virtual reality simulators. Systematic training of these skills could increase minimal invasive surgical skills in general. The training of basic psychomotor skills in a safe environment as well as the ability to quantify performance and giving continuous feed-back are some of the most important methodological advantages identified.

Research has shown that there is a transfer effect from surgical simulator training to real surgical tasks, and that it may be an effective way of acquiring certain technical skills. Simulators have been used in order to test different training programs as well as to examine the abilities needed for minimal invasive surgery. Working memory, the ability to retain information during a delay and act upon that information, is one of the abilities that has been identified to predict simulator performance. Visual spatial ability, used when mentally manipulating and rotating 3D figures, is another ability proven to be important. Systematic video game training for five weeks has also been shown to improve simulator performance in a group of surgical novices.

In order to develop new surgical training methods we need to know more about the factors that facilitate the acquisition of technical skills. The link between theoretical knowledge and surgical simulator performance is also a relevant issue. In order to maximize the efficiency of training, individual factors such as sex differences should also be considered. When designing future cognitive and psychomotor training programs as well as testing regimes, one should consider that the design must be adjusted in accordance with the specific surgical tasks to be trained.

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## 29. Dr Dirk Ghadamgahi MD

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Dr Dirk Ghadamgahi undertook his surgical training at Universität zu Köln, Germany, and the University of Southern California, USA, before taking up practice as a registrar and consultant surgeon; working at both St. Marien Hospital, Koeln, Germany and the Luton & Dunstable Hospital, Luton, UK.

During many successful years practicing as a surgeon and undertaking much research in sports medicine and traumatology, Dr Ghadamgahi developed a passion for educating and training, and applied this passion as he embarked on a new stage in his career at Johnson and Johnson in 2003 as the Training and Education Specialist in Computer Assisted Surgery (CAS) and I-Orthopaedics. Here, he developed and implemented a series of surgeon training programmes for techniques such as navigation in Total Joint Replacement (TJR) and CAS and established three bespoke surgical training facilities in Germany, Australia and the USA.

Dr Ghadamgahi's dedication and passion to surgical education, combined with his experience as a surgeon make him a highly knowledgeable, experienced and respected educator. As such, he is an expert in his field and has been instrumental in the development and dissemination of surgical education in many of the groundbreaking surgical techniques used in surgical practice throughout the world today.

Dr Ghadamgahi has now been at Johnson and Johnson for eight years, during which time, he has contributed greatly to the educational offering the DePuy Institute provides to the surgical community. His current position as Director of Medical Education gives him the responsibility for developing and providing world-class surgical training across many areas including orthopaedics, traumatology, sports medicine, spine and neurosurgery. By collaborating with leading surgeons, he has ensured that the educational offerings from the DePuy Institute are of the highest quality and created by professionals, for professionals. As such, the majority of educational courses offered by the DePuy Institute EMEA are CME accredited.

His commitment and passion for world class, pioneering surgical education led to him founding the award-winning Do-Surgery.com website four years ago. The Do-Surgery website acts as an online resource which has been created by leading surgeons to assist and educate the surgical community, no matter their job role or stage in their professional career. Do-Surgery currently has an ever-growing membership of over 6,000 members from over 93 countries around the world and won the Web Marketing Association Outstanding Website Award in the Medical Category in 2009.

Dr Ghadamgahi is a member of many professional associations, including Bund Deutscher Chirurgen (German Surgeon Federation), Marburger Bund (Federation of Clinical Surgeons) and the Hartmann Bund (German Doctor's association). He lives with his wife and two small sons in Cologne, Germany.

**Industry Insights: Assessing the evolving needs of the surgical community**

Dirk Ghadamgahi

Most members of the surgical community will attend a training course supported by the medical / surgical device industry at some point during their career. To this end, Industry plays a significant role in the professional development of the surgical community today. However, the validity of Industry as an educational partner is sometimes questioned. Industry strives to develop high quality training programmes which; are accessible and tailored to an individual's training needs; provide support throughout the physician's career; raise standards of surgical practice; and ensure positive patient outcomes. To make sure these objectives are met, Industry training programmes are often developed, delivered and validated in partnership with a faculty of leading experts or medical society to ensure that course content and method of delivery meet the needs and demands of the end user.
To understand this further, the DePuy Institute has recently conducted an extensive, independent market research project to ascertain stakeholder perceptions of education. A total of 788 surgeons throughout Europe, Middle East and Africa were asked to participate in a survey, answering questions on course content, barriers to training and the future needs and requirements of surgical training.

Results showed that on average, surgeons attend 3.9 Industry-sponsored educational courses a year. Participants expressed no preference between industry sponsored courses and those offered by independent bodies or organizations; many obtaining surgical training from a combination of the two. Factors most likely to drive attendance at surgical training courses were identified as the opportunity to train with cadavers, obtain CME accreditation and for the course leader to be a highly reputable surgeon. Time constraints were highlighted as the greatest barrier to surgical training, with many respondents suggesting that these restrictions are likely to increase in the future. In turn, this suggests that time available for vital training will potentially decrease, and reliance on web or smartphone applications to supplement on-site events will become a significant component of future educational offerings.

The results of the survey show that surgical training, whether delivered by Industry or independent bodies and organizations, is both integral and highly valued by the surgical community in helping to raise surgeon confidence and competence. In turn, barriers to access this vital training have been identified and must be addressed to ensure that the needs of the surgical community are met and make sure that patient outcomes are not compromised.

By addressing and adapting to the ever-changing needs and requirements of the surgical community, Industry is able to provide high quality, tailored and accessible educational courses and provide support at each stage of a surgeon's developmental career. As such, Industry can be seen as a valid partner in surgical education and training and is able to assist the surgical community in raising levels of surgical practice and ensuring positive patient outcomes.

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## 30. Rickard Brånemark, M.D., M.Sc., Ph.D.

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Born in Malmö, Sweden, February 13, 1960.

1987 : M.D., Göteborg University, Sweden.
1987 : M.Sc., Technical Physics, Chalmers University of Technology, Göteborg, Sweden.
1989 : Authorization to Practice the Medical Profession as a Physician.
1995 : Specialist of Orthopaedics.
1996 :Ph.D. Thesis ”A Biomechanical Study of Osseointegration. In-vivo measurements in rat, rabbit, dog and man”. Department of Orthopaedics, Institute of Surgical Sciences and Institute of Anatomy and Cell Biology, Göteborg University, Göteborg, Sweden.

1998 : Founder, Integrum AB
1999- : Director, Centre of Orthopaedic Osseointegration (COO), Department of Orthopaedics, Göteborg University, Sahlgrenska University Hospital.

**Present research areas:**

Experimental studies on osseointegration and osseoperception. Clinical evaluation of bone anchored prostheses. Biomechanical analysis of bone anchored prostheses.

Experimental studies on osseointegration and osseoperception. Clinical evaluation of bone anchored prostheses. Biomechanical analysis of bone anchored prostheses.

**Who is responsible to certify surgeons for new surgical procedures and how can this be done? Illustrations from my experience as surgeon, researcher, inventor and entrepreneur.**

**Rickard Brånemark**

During the last 20 years we have at the Department of Orthopaedics, Sahlgrenska University Hospital, developed a new surgical treatment for amputees. The treatment consists of two surgical steps and includes installing an implant in the amputated leg. In the first operation (S1) an inner the part of the implant (the Fixture) is inserted into the skeleton, but no part is at this stage penetrating the skin. At a second operation (S2), normally six months later, a second part of the implant (the Abutment), is attached to the Fixture and penetrates the skin. The part of the Abutment that is penetrating the skin is used to connect to an artificial prosthetic limb. The conventional technique is to attach the artificial prosthetic limb to the remaining part of the amputated leg by using a socket prosthesis that is attached to the outside of the amputated limb. This conventional socket technique is a less good biomechanical solution and is frequently causing substantial problems such as skin sores, shafing, pain when loading etc. The new treatment is invasive and at potential greater risk for serious complications such as infections, but also due to the invasive nature of the treatment there are risks associated with the surgical procedures. It is therefore of great importance that the transfer of technology related to this treatment is carried out under strict and optimal control.

How do we teach and educate others in this treatment?

The tentative educational plan contains a 2-days course as introduction and theoretical and practical teaching. We use a variety of teaching methods ranging from lectures to Sawbone sessions to video animations.

To be a certified surgeon it is required to fulfill the course and then to perform a certain number of surgeries under supervision of a certified supervisor. All surgeons must use a web based database for registration of data. This data base is primarily for research, but might serve as a means for measuring treatment results on an individual or team level. Who should be in charge of the database?

Reference: See page 153

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**31. Dr. Heidi K. Jauch**

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Heidi K. Jauch, Dr. iur., Vice President, Compliance Officer EMEA, Zimmer GmbH oversees the Zimmer Compliance Program for Europe, Middle East and Africa. She has a legal background as in house lawyer and an extensive international experience in legal and compliance related topics in the Medical Device Industry.

She is an active member in Compliance Committee in various Medical Device Industry Associations on a European and national level. Dr. Jauch took over the lead of the Compliance Department for the EMEA region in January 2010 after 8 years as Associate Counsel in the Legal Department in the European Headquarters of Zimmer GmbH, and its predecessors Centerpulse and Sulzer Medica.

Prior to joining Zimmer, Dr. Jauch served several years as Legal Counsel in SAir Group, the holding entity of Swissair Ltd. After gathering experience in numerous fields of law and specifically in the highly regulated world of air law she supported the winding up of the company as a member of the task force after the grounding of the Swissair fleet and the subsequent bankruptcy filing of Swissair.

Dr. Jauch graduated from the Eberhard-Karl University of Tubingen, Germany with a degree in law and obtained her second state exam in law at the District Court Constance, Germany. She holds a Ph.D. in law from the University of Berne, Switzerland.

**How to ensure compliant and ethical business practices for the cooperation between Industry and Surgeons?**

**Heidi Jauch**

What is Compliance:

- Compliance is deemed to be the
  - adherence to legal, regulatory and internal provisions;
  - the observance of the costmary standards and rules of professional conduct within the markets i.e. for the Medical Device Industry Eucomed (EMEA) / AdvaMed (US);
  - ethical business conduct and integrity.

Why is it important:

- Cooperation between Industry and surgeons is key for the development of new/improved products for patients benefit beyond every financial interest.
- Increased regulatory environment and awareness for ethical conduct forces Industry and surgeons to compliant conduct.
- MedTech companies have faced a series of investigations in the recent past with respect to inappropriate cooperation with surgeons.
- For the individual surgeon it can result in disciplinary measures up to termination as well as (criminal) sanctions.

Background:

- Surgeons are operating in an environment that bears the risk for conflict of interest. On one hand surgeons are (actual or potential) customers for the industry products and on the other hand surgeons are vendors of services that are required for the patient benefit.
- A separation of industry staff with sales responsibilities and staff with responsibility for education, development and other consulting type of activities of surgeons must be implemented in order to avoid unduly influence for the selection of surgeons engaged as a vendors to provide consulting services.

Fields of appropriate Cooperation of Surgeons and Industry:

- Training & Education (active & passive)
- Research & Development
- Clinical Studies (PMS, CE, etc.)

4 Guiding Principles for Cooperation:

- Separation in Education/Training and Commercial Activities
  - No inappropriate influence or the perception of inappropriate influence.
  - Corporate support to surgeons as vendors and commercial support to surgeons as customers.
- Transparency in Surgeons Interactions
  - Prior written notification to institutions or government bodies.
  - Purpose and scope of the transaction must be disclosed.

- Equivalence - Fair Market Value (FMV) for services is properly evaluated and documented
    - Ensures independence and “arm’s length” transaction.
    - Fees and other payments can be perceived as a “kickback” when greater than the established FMV.
- Documentation is available to support the above principles
    - Interactions must be captured in a legal instrument prior to an event and/or payment.
    - Activity reports, programs, etc., to support requests and payments.

Role of Industry in Surgical Training:

- Information on best training methods and required training fields to be provided by surgeons.
- Appropriate selection and remuneration of surgeons trainers needs to be ensured by Industry.
- Educational content, faculty appointments, venue selections, etc., need to be under the control of Corporate .
- Separation in education/training and commercial activities within the Industry.

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## 32. Margareta Berg MD, PhD, Consultant orthopaedic surgeon

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Dr Berg was born in 1956 and obtained her MD and PhD degree in Orthopaedic Surgery at the University of Gothenburg, Sweden, and worked at the Sahlgrenska University Hospital/ÖS 1980-1992. During this period she initiated and organised 'The Hip Replacement Project', where the usual production of 200 THR/year was increased by another 100 THR/6 months. The project was repeated 2 years later with the same figures.

In 1989 she founded the association for female orthopaedic surgeons in Sweden, after her first visit to the AAOS meeting in Las Vegas 1985 where she joined a meeting for the Ruth Jackson Orthopaedic Society.

At the age of 35 she was employed as a consultant orthopaedic surgeon at Skene Hospital, where she stayed for 6 years. During this period she became interested in medical informatics and became project leader in a major regional project dealing with computerised patient's records. As a consequence she worked as the head of the Informatics Department and member of the hospital direction the NU-Hospital group of 5 hospitals with 5000 employees and 2500 computers 1998-2000, when she also was a member of the regional and national boards of medical informatics.

For 4 years, 2001-2005, she worked for Pr Pascal Boileau at the Centre Hospitalier Universitaire de Nice, France, responsible for the research activities and organiser of the 1st and 2nd version of the "Nice Shoulder Course" in 2003 and 2004. During the same period she was Medical Advisor at two different French companies making surgical implants and equipment, where she worked with the registration process of new surgical implants in accordance with the EU standards and directives.

Back home in Sweden she has organized courses in practical surgical training since 2008.

Dr Berg has been invited guest lecturer at the South Brasilian Orthopaedic Society in Florianopolis 2003, at the 50-year jubilee meeting of the Indian Orthopaedic Association in Mumbai 2005 and at the Ruth Jackson Ortopaedic Society in San Diego 2011. In 2009 she was named "Ambassador for female entrepreneurs" by the Swedish Minister Maud Olofsson.

The organization of the 1st World Congress on Surgical Training was initiated by Dr Berg and has been a voluntary project, besides the work as a consultant orthopaedic surgeon at out-patient clinics.

## Compliance between the University, Hospital and Industry in Surgical Training: Are we happy as it is - ?

**Margareta Berg**

### Background
Several examples can be given about industrial support of extensive character to physicians and surgeons in the past. We are all aware that some of this was inappropriate.

Due to the major reaction against this situation, the compliance rules of today were created under political pressure. It is of utmost importance to understand the climate under which those new rules were born. The new regulations were made to *prevent* further scandals of the same kind – not to *create* a sane and healthy partnership between two collaborating partners (1, 2, 3). In this way, the pendulum has moved from one extreme position - to the opposite side. This means, that company representatives feel unsecure about buying a cup of coffee for a doctor, despite the fact that the doctor is sometimes not even the customer any more:

### Public procurement rules
The act of public procurement is regulating every purchase of hospital equipment, meaning that the surgeon is no longer the customer but reduced to an end user.

### Budget for surgical training
In most European countries - Sweden as an example, surgical residents have long left the University and are employed by public hospitals, where they serve to 100% in the production of health care. As far as I know there has never been a defined budget for "surgical training" during residency, at least in European countries. Counting European surgeons wages, there is no margin to finance a continuous surgical training and education throughout a lifelong career.

### Who should pay for the patient's safety?
So – the conclusion is – if the industrial partners can not help surgeons with surgical training courses, the residents have left the universities, the public hospitals where they are employed have no budget for surgical training and the salaries are not allowing private payment of surgical courses etc: ***Who should finance the surgical training, mandatory to obtain and maintain high surgical skills?***

### Conclusion
My personal answer to this question is crystal clear: We should take the lead. We, that is surgeons and instrument companies in a sound and healthy partnership, should work out the solutions and take the lead in this area. We are professionals in surgery, and should not be the victims of decision makers without insight and competence in the surgical area. In fact, the patient is the victim – in case the surgeon is supposed to use an instrument that he never saw before, which was bought by the hospital in a perfectly correct act of procurement fulfilling every rule about equal competition and best price.

Finally, my question is: *Do we need a new, interdisciplinary, international and non-governmental work group of surgeons and industrial partners, to tell the world what we need for a modern, competency-based stepwise training and accreditation of new surgeons?*

References: See page 153

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# FREE PAPERS & POSTERS

**Free paper, Session 6, Friday Sept 9th 2011**

## Simulation-Based Mastery Learning Improves Patient Outcomes in Laparoscopic Inguinal Hernia Repair: A Randomized Controlled Trial

**Benjamin Zendejas**, MD*[≠] ; David A. Cook, MD, MHPE [±] ; Juliane Bingener, MD*; Marianne
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**Objective:** To evaluate a mastery learning, simulation-based curriculum for laparoscopic, totally extraperitoneal (TEP) inguinal hernia repair.

**Summary Background Data**: Clinically relevant benefits from improvements in operative performance, time, and errors after simulation-based training are not clearly established.

**Methods**: After performing a baseline TEP in the OR, general surgery residents randomized to mastery learning (ML) or standard practice (SP) were re-assessed during subsequent TEPs. The ML curriculum involved Web-based modules followed by training on a TEP simulator until expert performance was achieved. Operative time, performance, and patient outcomes adjusted for staff, resident participation, difficulty of repair, PGY-level, and patient comorbidities were compared between groups with mixed effects-ANOVA and generalized linear models.

**Results**: Fifty residents (PGY1-5) performed 219 TEP repairs on 146 patients. Baseline operative time, performance, and demographics were similar between groups. To achieve mastery, ML- residents (n=26) required a median of 16 (range 7-27) simulated repairs. After training, TEPs performed by ML-residents were faster than those by SP-residents, with time corrected for participation (mean ± SD), 34±8 vs 48±14 min; difference -13, 95%CI -18, -8, $p<0.001$). Operative performance scores (GOALS, scale 6-30) were better for ML residents (21.9±2.8 vs 18.3±3.8; $p=0.001$).Intraoperative complications (peritoneal tear, procedure conversion), post-operative complications (urinary retention, seroma), and need for overnight stay were less likely in the ML group (adjusted Odds Ratios 0.14, 0.04, and 0, respectively; all $p<0.05$).

**Conclusions**: A simulation-based ML curriculum decreased operative time, improved trainee performance, and decreased intra- and postoperative complications and overnight stays after laparoscopic TEP inguinal hernia repair.

ClinicalTrials.gov Identifier: NCT01085500

**Poster presentation**

## A Danish regional organisation for multidisciplinary surgical skills training

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Lars Hoj, consultant gynaecologist
Charlotte Green Carlsen, PhD student, surgery
Representatives of MIUC, Danish Educational Region North

In a small country like Denmark surgical training has become increasingly difficult. Factors such as the EU working directive, the 37 hour work week, small number of cases per trainee, increased focus on patient safety, productivity and economy, increasing complexity of procedures and subspecialisation have made it inappropriate to expect basic surgical training to take place primarily in the clinical setting.

Most national skills courses are placed well into the specialist training programme. We present a regional organisation with emphasis on PGY1 (where important career decisions are made based on surgical talent and ability). The basic surgical skills training programme is aimed at trainees in surgery, gyaecology and urology in an interdisciplinary setting with a 1:2 teacher trainee ratio and teachers from all 3 specialities. It comprises courses in open surgery, laparoscopy and endoscopy based on simulators, simple models and porcine operations. A total of 8 days' training is offered in PGY1. (3+2 days laparoscopy, 2 days open surgery, 1 day endoscopy).

When the trainees become more advanced there are speciality specific laparoscopy courses (masterclasses) where national and international participants are invited, and interdisciplinary courses in laparoscopic handling of bleeding and adhesions are under way. We expect more surgical specialities to join the organisation thus benefitting from skills in organisation, course planning and didactics.

Each course is under constant evaluation and the trainees are assessed individually with personal feed-back and certification for further training in the clinical setting.
The programme is financed by the Danish regional health care providers (Region Midtjylland and Nordjylland). The teachers are specialists from the regional hospitals. There is a steering committee consisting of representatives from the surgical specialities, universities, hospitals and regions.
The programme started in 2005. In 2010 there were 76 couse days with 210 participants.

We believe that a combination of skills training and a module based personal education plan in the clinical departments is the way towards optimal surgical training. A PhD project evaluating module based training in hernia and laparoscopic cholecystectomy in a randomised controlled study is under way.

For further information please see www.miuc.dk

**Poster presentation**

**General surgery training in Turkey: A survey study of the Turkish Surgical Association**

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**Introduction**
It is essential for each country to develop an appropriate model for surgical training that will cover existing health care system, needs and the future requirements. Although the basic features of surgery have undergone limited changes since Halsted, today's surgery residency programs in many countries have become structured, monitored programs, subject to continuous evaluation and accreditation processes. When considering the standardization and quality improvement of general surgery residency training in Turkey, it is essential to reveal the current situation and listen to the voice of the trainee. In 2010, Turkish Surgical Association (TSA) Residents Commission performed a survey among the residents of general surgery. The aim of the survey was to show the opinions of general surgery residents on some basic issues, including education programs and implications, working conditions and on duty/on-call system, training infrastructure of the clinics, and contributions of faculty; and assessment of the clinics from the residents' perspective.

**Methods**
The survey was performed in 2010 and web based to be answered online. The number of residents invited to the survey with actual e-mail addresses was about 670 out of 1005. The targeted response rate was set to 50%. Residents have received two reminder e-mails one month apart. Likert scale responses, yes/no answers and free text responses were used in combination. The average time to complete the survey was 30 minutes. There was no obligation to answer all the questions. All the analysis was performed using SPSS 11.0. Saphiro Wilk and Kolmogorov-Smirnov one-sample tests were used to test the appropriateness of numeric variables to normal distribution. Nominal variables were compared with chi-square analysis and numeric variables with the Mann-Whitney U test or the Kruskal Wallis variance analysis. Spearman's rho test was used to analyze associations between two ordinal variables. Median and 25-75% percentile were used for data that did not follow a normal distribution. The alpha level of significance was set at 0.05.
The survey was performed anonymously; the respondent's personal data were not recorded on the questionnaire.

**Results**
Our country has a total of 1005 general surgery residents. Almost 60% (625) of them work in university hospitals, whereas the rest in the Ministry of Health Research and Training Hospitals. Only 670 (67%) of 1005 residents with accurate contact information could be invited to participate in the survey. A total of 435 general surgery residents responded to the survey. The completion rate of the survey was 65%. Considering the total number of residents, the rate of residents completing the survey was 43%.
The median age of the subjects was 29 years, with no differences in age between male and female residents (p=0.261). Eighty eight percent were male and 12% were female residents.

The median number of operations performed by residents were found to be 15 for appendectomy, 12 for hernia repair, 5 for cholecystectomy, 1 for thyroidectomy, and 0 for colectomy and varicose vein surgery. According to these results, there is a risk of not being able to follow the standards in terms of index operations in our country, including colectomy and varicose vein surgery.
In general, 61% of the residents stated that they were not satisfied with the number of operations they performed as a primary surgeon.
Nearly 66% of the residents did not have a mentor and 76% of them did not have regular meetings with their mentors. Seventy percent of the residents have not been given printed educational curriculum and 69% of them were not aware of the minimum number of operations that they should perform during their training period. Only 56% of the residents stated that the log book system has actually been in their clinics. Seventy two percent of the residents who had a log book indicated that the log book had not been used effectively.
Nearly half of residents stated that didactic/formal meetings for residency training were not performed. In the clinics, where meetings were performed, the time allocated for this training was very low (2 hrs /week) and found to be insufficient.
Thirty two percent of the residents have reported poor quality in residency training in their clinics. The median weekly work time of residents, including on duties, is 100 hours. The longest median duration of work without any break was 60 hours and the median work time of routine daily activities was reported as 12 hours.
The median monthly number of on duties was 10, and the rate of every other day on duty was 65% (without any rest permission for the following workday).
Eighty percent of the residents were not aware of the legislation in EU countries which restricts the working time, although 85% of them stated that such an arrangement was necessary for our country. The rate of the residents who believed that such an arrangement would not adversely affect the surgical training was 66%.
Forty eight percent of the residents agreed with the statement “I think my workload is too heavy in terms of responsibility of patients as a surgical resident” and 34% of them were responsible for 20 to 30 patients within working hours.
Almost 43% of the residents were not satisfied with the training they have received. This negative impact was significantly higher in university hospitals (p=0,017).
Only 58% of the residents agreed with the statement that “If I was given a chance to choose my career again, I would still choose to be a general surgeon”.

**Conclusion**
The primary finding of this study is an urgent need for a serious reform for the modernization of general surgery residency training in our country. This study revealed that the general surgery residency training has major shortcomings, lacks basic standards, and general surgery residents were not happy with the education they receive.
We found serious problems in almost every phase (structure, process and outcome) of the general surgery training. Thus, a comprehensive reform in the general surgery residency training that addresses and meets the current requirements should take place as soon as possible in line with opinions and recommendations of all the parties, including the Ministry of Health, the Council of Higher Education, and the medical faculties, the Turkish Medical Association, TSA and TSA Board Committee.

Acknowledgement: This study was supported by Turkish Surgical Association.

**Poster presentation**

## Preoperative standard informed consent practice at a private, teaching, tertiary care hospital situated in a rural area

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**Objective:** To evaluate the standard preoperative informed consent practice in a tertiary care private sector teaching hospital.
Settings: General Surgical & Urological Units of Muhammad Medical College, Mirpurkhas.

**Design:** Prospective observational study.

**Duration:** January 2007 to December 2007

**Patients and Methods:** All patients who underwent elective surgical procedures in Surgical Unit, Muhammad Medical College hospital, Mirpurkhas from January 2007 to December 2007 were included in this study. A total of 1032 patients underwent elective surgical procedures during the study period. All of these patients who had undergone elective surgery were interviewed randomly during the study period under routine practice conditions. All the patients were asked a set of standard questions post operatively related to the information they were provided before the procedure as a part of standard informed consent practice. Questionnaire included the patient's knowledge about pathology, operative risks, type of anesthesia given with its risks, alternate treatment option, results of no treatment, patient's satisfaction about the information given and whether consent form was signed.

**Results:** A total of 200 randomly chosen patients (121 males and 79 females) were included in the study. In 16 (8%) of patients the surgeons were involved in taking consent themselves. Only 90 (45%) of patients were told about the nature and purpose of procedure and 89 (44.5%) of patients knew about the possible complications of surgery. 143 (71.5%) of patients were told about the type of anesthesia required but only 30 (15%) were informed about the risks of anesthesia. 40 (20%) of patients were allowed questions to be asked while taking consent. Interestingly, most of the patients 156 (78%) were still satisfied by the information provided to them during informed consent.

**Conclusion:** This study highlights the poor quality of patient knowledge about surgical procedures and the scarce information provided. The current standard informed consent practice which is being practiced by the doctors in public/private sector teaching hospital of Pakistan and the other world is below standard to international and ethical acceptability. Yet, a large number of patients were satisfied by the information provided during the informed consent process.

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