

Surgical Training – The Challenge of Change

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Abstract

The healthcare environment is continuing to change and so too is education and training of surgeons. We now live in an age of increased specialisation, of technology, of accountability, of greater patient education and expectation and mass media attention. The traditional apprentice method and emphasis too much on examinations will have to be changed to a more structured system of training with training standards, regular assessment and feed back. There are new skills to be learnt for future surgical practice and new ways to learn them to become competent. We need to make changes in the institutions and departments to create a learning environment and an organisational system to implement the training programme. The current shortage of surgical work force in the institutions and lack of sufficient teachers committed to teaching and training are major issues that need to be addressed.

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President of the College of Surgeons, distinguished guests, friends, ladies and gentlemen.

It is a great honour and a unique privilege for me to be invited to deliver a named lecture for a third time.

Twenty years ago, I gave the first overseas Joint Lecture of the Academy and the Royal College of Surgeons, at Edinburgh entitled “Surgery in Singapore – the Scottish link”.¹ In 1994, for the Chapter of Surgeons lecture, I chose the title of “General surgery in the era of specialisation”.²

For this pre-dinner talk I would have preferred to choose a lighter topic as an appetizer, especially after a serious research lecture. However, I did not want to diminish the importance of the occasion. The theme of surgical training is always of great importance to the College of Surgeons and of much interest to all surgeons and trainees. Furthermore, we are now at a crucial stage of reviewing our postgraduate training in Singapore in order to improve the training of our future specialists.

In this talk, I shall briefly describe the development of our postgraduate training, comment on the changes that are needed to improve our training of system and indicate some of the major challenges in making these changes.

Postgraduate Education in Singapore

As a background to the subject, let me take you back

some 50 years ago when I started my postgraduate studies in England. Hospitals and surgery then as you would imagine were very different. There was no such thing as a surgical trainee in the hospitals. You had junior HOs (House Officers), SHOs (Senior House Officers), Registrars and Consultants. If you had a special interest in surgery and wanted to become a surgeon, you looked for suitable surgical jobs to get the necessary experience and complete the requirement for the Royal College of Surgeon’s examinations. You stayed and worked in the hospitals and studied on your own initiative. Once you proved your competence in your clinical and operative skills and gained the trust of the consultants, you obtained the freedom to do a large number and variety of operations and take on increasing responsibility for the care of patients.

Although this apprentice type of training would be considered far from ideal by current standards, it had produced scores of brilliant surgeons and outstanding teachers of surgery in that era.

It was good for the self-motivated but bad for the average majority. You set your own standards and goals. There was certainly no spoon feeding and no formal feedback, but you were aware of your performance at the end of your 6 months appointment. It was all opportunistic and the consultant support varied significantly, from excellent to poor in different hospitals.

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In the UK, passing of the Primary or Part 1 examination and work experience got you a junior registrar job, while you must have a full Fellowship and good references to be considered for a senior registrar position.

Outside of the UK, in Singapore and other commonwealth countries, the Fellowship of the Royal College of Surgeons (FRCS) was a recognised higher qualification that was essential for promotion to become a consultant surgeon. Naturally for the majority of aspiring surgeons from overseas, passing the examinations seemed more important than getting good training!

In Singapore, there was no organised postgraduate education until the School of Postgraduate Medical Studies under the National University of Singapore was established in 1970. The main objective was to have our own postgraduate examination system with a high standard that is no less than that of the Royal Colleges so that local doctors would not have to go abroad just for postgraduate examinations. The School was responsible for organising courses in basic sciences and clinical surgery and the Master of Medicine examinations. Over the years, the MMed Surgery qualification was well recognised and in 1986 became a joint examination with the FRCS Edinburgh.¹

Changes in Surgical Education and Training

We are all aware of the many forces in the last 50 years that have drastically changed the practise of surgery today. The remarkable advances in science and technology and specialisation in surgery have altered the provision of surgical care. The advent of minimal invasive and robotic surgery since the 1980s has been pushing the limits of operations that can be performed. More and more surgical procedures are now performed on an outpatient and short stay basis. Our patients are more educated and have increased expectation of treatment outcomes. Easy access to information from the internet has not only helped physicians at work but also patients to make decisions about their treatment.

In Singapore, surgeons have kept pace with current advances and are providing high quality of care for the patients. Under the existing training system, they would also have obtained satisfactory clinical and operative experience. Most of them would also have had the opportunity to complete their subspecialty training at an overseas centre of their choice.

Our patients are generally happy with the standard of service and believe our surgeons are competent and current in their knowledge and skills. There have been no adverse reports of surveys or inquiry findings in the media highlighting fatal mistakes or gross negligence. In fact, there are no good reasons to question the standard of surgical training.

Our strong linkage with the Royal Colleges of Surgeons

has given us the assurance that despite the many changes that are taking place in UK and other places, we are maintaining international standards in our postgraduate examinations. We have been able to organise common examinations, use their well structured questions, share the resources and expertise and their examiners.

The Need for Change in the System?

However, major changes have been taking place in the postgraduate educational scene worldwide in the last 3 decades.

In the 1990s, the Calman report kick started sweeping changes in the UK.³ The most significant ones were that the training time be shortened and structured and the completion of training to be marked by the award of a certificate. The training was divided into 2 parts, an initial 2 years of basic training applicable to all surgical specialties followed by a 4-year higher specialty training leading to a certificate of completion of specialty training. The growth of surgical specialties had reached a stage that in 1990 the surgical colleges decided to introduce specialty examinations in the form of intercollegiate examinations. The examination in basic sciences was replaced by a comprehensive basic surgical examination, now known as MRCS before entering advanced specialty training. Major changes have also been introduced in the UK training system following the formation of the Postgraduate Medical Education and Training Board.

In Singapore, we had also made several improvements over the years. This included publication of a curriculum of studies, yearly assessment of trainees with log books and supervisor's reports and ensuring that candidates completed the requirement before sitting the final examinations. The 6-year duration of surgical training was divided into 2 parts with 2 examinations, the MMed for entry into specialty training and an exit examination at the end of training and to become a Fellow of the Academy of Medicine. MRCS was recognised as part 1 for the MMed and full MMed degree was awarded on satisfactory completion of a dissertation.

These changes are an improvement in the summative assessment system, but a good examination system alone is not adequate for a modern training system. We do not have a process to evaluate training and trainers on a regular basis. We do not know much more than the pass or fail rates in the examinations over the years.

Every organisation periodically reappraises its mission, product and practices. Medical education and training is no exception even if the programme is considered by others to be excellent. Evaluation is therefore an integral part of any training scheme.

In recent years, there have been a significant number of overseas trained specialists from many different training systems joining our healthcare service. This has created

a need to study and assess the medical education and postgraduate training systems in other countries. It is also a good opportunity for us to review our own system to see if we can make improvements.

Yet another reason to review our training scheme is the medical school programme of the second medical school. The new Duke-NUS graduate medical school has followed curricular structure that is different from the traditional undergraduate system for their 4-year medical education programme. When the graduates from that school complete their programme in 2 years time, it will be difficult for them to be accommodated in our current postgraduate training system without any modification.

Singapore is a small country, fairly developed and with high quality medical care and healthcare financing system. It is essential to have a sound medical education and postgraduate training system to compliment the medical service and maintain the standards. The challenge is for our professional leaders to make the specialist training as best as we can.

The Challenges of Change

1. Teaching hospitals must have education as a priority

Our public hospitals have always been the training ground for both undergraduate and postgraduate education. Yet, the hospitals have never recognised medical education as a top priority. Since the restructuring of hospitals about 2 decades ago, there have been vast improvements in the structure and delivery of patient care. During this period, there has been no serious attempt made in creating an educational culture for clinical education and training in hospitals. In fact, a notable trend has been an over emphasis on revenue generation with consultants having to focus on larger patient volume than teaching or research.

The first challenge therefore is to make a culture change, creating an environment for teaching and learning.

2. Organisation of training in hospitals

The School of Postgraduate Medical Studies (now known as the division of graduate medical studies under the University) since it was formed has had an administrative structure to organise various postgraduate courses and examinations. There is no such comparable authority and organisational structure in the hospitals to implement clinical training of postgraduates. A major change that has occurred is the supervision of teaching of medical students in the hospitals, which is now coordinated by the office of Associate Dean in the hospitals. For postgraduate medical education and training to be effective, the hospitals must have the necessary infrastructure, administrative organisation to implement training, dedicated teaching faculty and most importantly adequate financial support. The investment in

creating an educational environment will be in the long-term interest of enhancing the quality of patient care with better trained doctors and surgeons.

3. Teaching time must be protected and given equal recognition as service

When I was a house officer in an overseas teaching hospital, I remember that even with extremely busy clinics and all day surgical lists, teaching was a priority for the professors and consultants. They set aside regular times to teach in the clinics and wards. The nurses and other healthcare staff understood their responsibility and provided the facilities to make teaching possible in the wards and clinics without compromising patient care.

In Singapore, teaching was very much a part of surgeon's duties in the 1960s and in the employment contract of a consultant in government service.

During that time, there was little recognition for teaching by the University and not even token remuneration for teaching activities. Unfortunately, the introduction of faculty practice had only encouraged surgeons to see and operate more private patients to earn extra income to boost their salaries. It also allowed a 2-tier system of care, one for the care of private patient and the other for the subsidised.

An Emeritus Professor of the University with international reputation lamented that all clinical research and teaching activities in his department had suddenly ceased to exist.

There is no doubt that good training requires committed teachers and appropriate facilities. Therefore, it is important for consultants involved in training to have protected time and salary without having to count the number of private patients to operate upon!

4. Curriculum to be changed from examination based to training based

There have been several improvements in our curriculum in the last 2 decades but the modifications have been linked more towards requirement for examinations than for training and achieving specific standards. For example, we have defined the scope of knowledge and content, type and duration of clinical specialty rotations and variety of surgical operations that a trainee should have experienced in order to sit for the examinations. There are no standards or goals set for training, no regular appraisals and feed back and no assessment of competency. Trainees are more anxious of completing the requirement and taking the examination than attaining competency.

5. Clinical training in hospitals must be structured and curriculum based

The trainees are appointed in the hospitals mainly for service work with no special focus on education or training

needs. There is no learning agreement for the trainees when they are appointed in the hospitals, no written policies of roles and responsibility and no formal appraisals or feed back. Service demands in surgical departments can vary depending on the volume of work and availability of staff. It is a common knowledge that a lot of routine work may not have much educational value. The training opportunities are variable; supervision is loose and depends on the availability of time and interest of the consultant. It is known that even the log books of operations are not completed or reviewed by supervisors on a regular basis.

The purpose of surgical training is to produce competent surgeons who are well qualified to provide safe, effective and quality surgical care to patients. It is important for the training programme to have a curriculum structure with clear educational goals and objectives, expected outcomes and a plan to achieve them. The curriculum may be divided into key modules, each with clear objectives, expectations, comprehensive training and assessment of competence. It should be designed to deliver a graduated progression of learning and assist the trainee to progress systematically from a novice to an expert.⁴ The success of the programme depends on the commitment in the learning agreement between the trainee and supervisor which should be made at the beginning of training so that both are aware of the educational goals, processes and standards to be achieved.

The residency programme in the USA has had a long tradition of implementing such a programme.⁵ The essential features in the system include patient-based training with close supervision of trainee in all clinical activities, regular assessment and feed back, progression of training based on evaluation and evaluation of trainers and training programme.⁶

Another significant development in surgical training in recent years is to make surgical training a competency-based system. Although the importance of competency in surgical practice has been recognised for a long time, the move to focus competency-based training was recent. It was triggered about 20 years ago by a series of medical and surgical errors, accidents and variations in care that were widely publicised in the media in the USA and the UK and consequently raised much public concern.

The Royal College of Physicians and Surgeons of Canada were the first to define the clinical and non-clinical skills that are important to all doctors in future.⁷ Since then, the American Board of Medical Specialties has instructed that all physicians be trained in 6 core competencies namely medical knowledge, patient care, interpersonal and communication skills, professionalism, practice-based learning and improvement and systems-based practice. The Accreditation Council for Graduate Medical Education in the USA has mandated that these competencies be

included in the curricular structure of postgraduate training and trainees be assessed for competency throughout the residency training.⁸

In the UK, the Joint Committee for Surgical Training has suggested training time in 4 blocks (foundation, initial, intermediate and advanced) with explicit standards for clinical judgment, specialty-based knowledge, technical and operative skills and generic professional skills based on General Medical Council's publication of "Good Medical Practice".⁹

There is no doubt that the implementation of competency-based curriculum has been a formidable challenge. New technologies, such as minimally invasive and endoscopic surgery, have expanded the range of surgical skills that a surgeon in training must acquire. Structured skill programmes using simulators and computer-based tools in skill laboratories are becoming increasingly popular.¹⁰ In many centres, the training is started first with simulated models and clinical situations in the skills laboratory. After the predefined criteria for proficiency are achieved, the trainee advances to the next stage of clinical and operating room experiences. It has been observed that the quality and consistency of surgical skills can be rapidly improved and objectively measured in the skills laboratory.

A major emphasis in training in recent years is the teaching of non-clinical and technical skills. Neither the system nor the programme can make a good surgeon. The importance of professionalism and interpersonal communications cannot be overemphasised for those in training.

Trainees must learn how to develop personal responsibility and place the well being of patients as the highest priority. They need to be reminded of retaining professional values regarding morality, altruism, service and integrity. These values no doubt will influence the development of appropriate behaviour towards patients. Dr Claude Organ Jr a former President of the American College of Surgeons wrote "discipline is not a bad word for trainees. Some form of it is required in every successful walk of life, whether it be honesty among gamblers, truth among politicians or compliance among bankers." It is worth reminding ourselves that "it is attitude and not aptitude alone that determines altitude".¹¹

The selection of trainees and assessment of training are 2 important parts to surgical training that need to be considered.

In-training Assessments

The main purpose of assessment during training is to ensure trainees have achieved the standard necessary to advance to the next stage of learning.

Surgical competence includes knowledge and skills for

clinical diagnosis, decision making and clinical judgment, operative procedures, communication and behaviours.

In order to assess such a varied and complex set of clinical skills and abilities, different methods or tools are found to be required.

1. Clinical performance: The work place-based assessment to evaluate clinical performance is gaining popularity. In the UK, the Postgraduate Medical Education and Training Board (PMETB) has adopted direct observation of procedural skills (DOPS), mini clinical examination (Mini CEX), case-based discussion, procedure-based assessment for operative skills and mini peer-assessment for behaviour by different observers and a global rating system.

2. OSCA (Objective Structured Clinical Assessment) has been used for a variety of situations because of feasibility for standardised clinical presentation for all trainees and standard check list for assessment. OSCA has been successfully used for assessment of junior trainees for about 20 years. A recent addition is the use competency scales to assess all the important competencies.

3. Operative skills. Although most training programmes require documentation of operative experience, the mere listing of a number and variety of cases operated or assisted does not indicate the level of skills achieved. Direct observation of operative procedures and immediate feedback has been highly recommended. The major disadvantage is that surgical procedures on patients cannot be standardised and is labour intensive. Some centres have used simulations and models for testing procedural knowledge and some key clinical skills at the early stage of surgical training.

4. Cognitive knowledge can be assessed by using well formatted multiple choice questions. This is popular with most examination boards throughout the world. A standardised annual in training examination (ABSITE) is given by the American Board Surgery (ABS) to monitor progress of residents and compare with peers across the country.

Completion of Training and Final Assessment

It is well known that formal assessments and examinations drive learning. We are all aware that the worry about a looming examination is always a potent stimulus to study! But a good examination must provide a test that should be reproducible and valid.

Most surgical organisations have relied on a summative examination before certification as a specialist. Traditionally these examinations have consisted of written papers followed by oral and clinical examinations. Such examinations have been criticised as “making the measurable important, rather than the important measurable” (McNamara’s fallacy - Rowntree, 1987)

In the last 2 decades, there has been increasing concerns regarding the validity and reliability of these examinations. In the late 1980s when I was examining at the College of Surgeons in London, there was an educationist shadowing the examiners to study the validity of oral examinations. The major changes that were introduced in the 1990 were an attempt to improve the validity of the examinations.

These include multiple choice questions in place of the essay type questions, more structured oral examinations and short and medium type of clinical cases and standardised OSCE replacing the traditional long and short cases. A major criticism of the traditional type of clinical examination has been the difficulty to standardise the patients seen and the assessment method. It may be noted that the ABS does not have clinical examination of patients in the final assessment examination.

The MMed Surgery Examination

The MMed examination has been a recognised postgraduate degree qualification for almost 40 years. As we introduce changes in our training system to make it more structured and the assessment to a formative type, there is likely to be much concern regarding the MMed examination and whether it may become redundant.

A major strength of our examination has always been its emphasis on clinical assessment. The demonstration of proficiency by actual examination of patients and interaction and communication with patients in clinical setting are essential components of postgraduate examinations. A failure in clinical part of the examination is deemed a failure in the examination and cannot be compensated by high scores in written or oral examination. It is vital that assessments of clinical competence should include a clinical examination. It will be a sad day if a surgeon in future will be incapable of performing a clinical examination and resorts to costly investigations instead.

All trainees have aspirations of obtaining a degree or specialist diploma of a recognised educational institution after qualifying examinations. The MMed being a university degree is therefore an important qualification for the local postgraduates. It is not inappropriate to have a comprehensive intermediate assessment during the long training period. A first year primary school student cannot be expected to complete school with only a final examination! Even if some changes are introduced in our training, MMed examination can continue to be relevant if the examination can be modified as an in-training examination with clinical assessment as a major component.

Selection to Surgical Training

Selection of candidates with suitable attributes for surgical training is important to ensure good surgeons of the future.

Most selection committees generally place strong emphasis on academic scores. Good academic record with poor aptitude and attitude cannot make a good surgeon.

I knew of a highly intelligent surgeon who was a wizard in mathematics but an absolute disaster as a surgeon. There was another who had serious hand tremors and was dreaded by his assistants because he took several hours and made every operation a difficult one!

In Singapore, the selection of trainees to surgical training was introduced when the traineeship was launched in the 1970s by the Ministry of Health (MOH) under the manpower development scheme. For the surgical disciplines, the number of applicants was 2 or 3 times the number of available positions. The selected trainees were provided specific clinical rotations, study leave, sponsorship for courses and examinations.

The criteria of selection were good academic record in medical studies, relevant clinical and operative experience based on reports and an interview. Passing of Part I surgical examination was given extra weight. A semi-structured interview was also held to assess general aptitude, motivation, communication skills and any relevant educational or research achievements.

The selection process has been found to be particularly difficult in some countries when it was made soon after graduation and without previous clinical experience.

Some centres have tried to minimise the problem by using objective tests for fundamental ability or aptitude and personality tests to help with selection. Others have used both the traditional criteria and the skills laboratory for assessment of skills and fundamental abilities. The testing of fundamental abilities such as psychomotor skills, visuo spatial ability and depth perception are becoming increasingly important especially for minimal invasive and endoscopic surgery.

There are 2 other major issues that need to be addressed. Restriction of working hours resulting in reduced time for training and shortage of surgical manpower for clinical service and training can seriously impact on surgical training:

1. Strict restriction of working time is not good for surgical training:

In 1984, an 18-year-old girl with viral fever collapsed and died in a New York hospital after injection of a drug that caused severe adverse reaction. The drug was ordered over the telephone by a tired intern without seeing the patient. After much bad publicity following an inquiry, several recommendations were made regarding residency training in the USA which included round the clock supervision of residents, direct in-person supervision by attending surgeon of all surgical operations and an 80-hour work week for residents. Many other countries have introduced

such restrictions. The European Union work time directive mandates a greater reduction of work time to 48 hours per week.

The impact of reduced work hours on surgical training for the last 5 years has been varied.

It is believed the perception of quality of life of trainees has improved because of more time for the junior staff to rest, read and spend more time for family and social life. Unfortunately many studies have noted a decrease in quality of patient care with delayed ordering of tests, increased errors associated with hand offs, cross coverage and communication. Reduced operative experience especially to number of emergency cases performed by trainees has been a major concern in many countries. Not surprisingly, resident surveys in USA noted that majority of trainees did not believe that strict adherence to 80 hours a week is good for their training.

There should be a balance between resident duty hours and rest periods that will ensure continuity of care and safety for patients and clinical experience for trainees. It is obvious that in surgical disciplines one cannot mandate strict work time restrictions.

2. Service demands should not compromise teaching and learning:

The rapid expansion of hospital services and creation of new services due to specialisation have resulted in severe shortage of surgeons in our public hospitals.

During the last few years, there has been an active programme to recruit foreign-trained doctors and specialists into Singapore to meet the service needs. It seems unlikely that this will make any significant improvement in our training needs in the near future.

An even more pressing issue is the constant leakage of specialists from the public to private sector. This will not only aggravate the existing shortage of surgeons for service needs and adversely affect the quality of service but also the teaching and training of students and trainees as well.

I tend to believe that our current system does not maximise the use of available local expertise.

Visiting Consultants and Private Hospitals

We have had a long history of appointing surgeons from the private sector as visiting consultants in the public hospitals. Most surgical departments can boast of a long list of visiting consultants. It is well known that the scheme as it exists today has not been a success at all. It is all too common to see experienced consultants from public hospitals after only just a few months in private practice showing little or no interest to return and contribute as visiting consultants to public hospitals.

As Singapore has a number of well equipped hospitals

and a thriving private practice, there will always be opportunities and migration of specialists from the public sector into private practice. While it is important for public hospitals to strive hard to retain their specialists in public institutions, it may not be possible or even healthy to completely stop the flow of specialists into private sector. We must therefore acknowledge the fact that the private sector has a large number of specialists of whom there is a significant number of experienced clinicians and teachers. I believe that many of them will have the time, interest and will to make contributions to the public service hospitals. However, the current scheme for visiting consultants does not seem to make it favourable for them to make any worthwhile contributions.

Perhaps it is time for the College of Surgeons or other organisations to make a detailed study and look into the causes of failure of the visiting consultant scheme, and recommend how this valuable source of manpower can be better utilised in public hospitals.

I do not believe it is for want of remuneration or the opportunity to manage complicated problems that many senior specialists stay away from public hospitals. Perhaps it may be a lack of recognition, basic privileges or appreciation of their services in the public hospital or it may be work organisation or personality problems, or perceived barriers in departments? Whatever the reasons, the visiting consultants do feel alienated in many departments.

The public hospital departments should make the organisational improvements to ease the visiting consultant participation in their activities. They should be given clear definition of their roles and due recognition of their contribution. The visiting consultants on their part should make a firm commitment to fulfill their obligation. There is much scope for a greater integration of the visiting consultants with full time staff in the departmental activities.

I also believe that currently our private hospitals with all their resources and specialists can play a greater role in teaching and training of doctors and specialists. It is not feasible under the existing practice arrangement of specialist in private sector. The first step in this effort is for the senior specialists in the private hospitals to come together and create the structure of key departments. A department can then take greater responsibility for developing and coordinating educational activities. Such an organisation will improve the standing of private hospitals and pave the way for them to take in medical students and postgraduates. There are

several well established private hospitals in the USA which are also teaching hospitals with outstanding reputation.

Conclusions

Surgical training with all its complexities in a rapidly changing environment is a major challenge today. The traditional apprenticeship type of training of the past era which was mostly unstructured, prolonged and inefficient is not adequate for the training of future surgical specialists.¹² There is an urgent need for reform to a structured competency-based curriculum with graduated and integrated progression of training and assessment. While the public hospitals have a greater responsibility for implementing the patient-based training, the College of Surgeons and members of the College have all got an important role to play in affecting the change for the education and training of future surgeons. Charles Darwin once said “It is not the strongest of the species that survive but the one most responsive to change”.

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