

Undergraduate Surgical Training-Where are we Heading?

W T L Tan, **M Med (Surg), FRCS (Edin) & (Glas), FRACS*

Introduction

"The NUS undergraduate medical course aims to produce doctors who will serve patients and the community with care and integrity. They will be equipped with both scientific and clinical knowledge and skills to function effectively as house officers and have the potential to undergo further training leading to careers in primary health care, specialised health care and/or other biomedical disciplines. They should develop a healthy critical faculty and possess the desire and skills to continue self-directed learning to keep up with future advances in Medicine." Medical Faculty NUS¹

The Faculty of Medicine, 92 years old this year, undertook a major review of the medical curriculum in 1991. The Curriculum Review Executive Committee submitted its report towards the end of 1992. This report was accepted by the Medical Faculty and approved by the National University of Singapore Senate. Implementation began with the academic year 1993/94. At the time of this publication, the students on the new curriculum would be entering their final year of study in the Faculty of Medicine, National University of Singapore.

The new curriculum restated the overall aim of the medical course which was to produce doctors who will be capable of functioning as good house officers and who will be ready for further training on completion of housemanship to become general practitioners or medical specialists. Significant changes in the curriculum included increased vertical and lateral integration of subject matter, increased collaboration between basic science and clinical disciplines, and increased emphasis on primary health care training. The last point was of particular significance in view of the Singapore Ministry of Health's manpower directive that of each cohort of doctors produced 60% will be trained in primary health care and 40% will be trained in the various specialties and subspecialties.

The new curriculum is organised in 3 major blocks to allow for better integration between the subjects taught and to break down artificial barriers set up by departments in the old curriculum.² The 3 blocks are as follows:

(I) The Human Biology Block

This block comprises the subjects taught by Anatomy, Biochemistry and Physiology Departments. The aim is to provide the scientific foundation for the study of clinical topics. Much of this block will be completed in the first year of the medical course.

(II) The Human Disease (and Community Health) Block

This block comprises the subjects taught by Microbiology, Pharmacology, Pathology, Community Occupational and Family Medicine Departments. Much of this block will be completed in the second year of the medical course. The progression from studying normal human biology to human disease would prepare the student for the clinical years. With all the relevant information, the medical student can begin to apply this knowledge in the process of diagnosing and solving of actual clinical cases seen in the wards of teaching hospitals.

(III) Clinical Practice Block

This block covers clinical training in all the clinical disciplines with full day postings in Medicine, Surgery, Obstetrics and Gynaecology, Paediatrics, Orthopaedic Surgery, Psychological Medicine, Family Medicine and other minor specialties like Anaesthesia, Otorhinolaryngology and Ophthalmology. New postings in Emergency Medicine and Radiology have been added. There will also be time allocated for elective postings in any field the student may be interested to choose, either locally or abroad. This block will cover the last 3 years of the 5-year medical course.

The Undergraduate Surgical Curriculum

With the new curriculum, the time for clinical teaching including that for the teaching of Surgery and the surgical subspecialties has increased. Students are now posted for full day postings instead of half day postings. Full day postings allow for better integration of students teaching programme with the activities of the clinical surgeons and greater exposure to the full spectrum of surgical diseases with regard to elective and emergency situations. It also allows students more

* Head

Department of Surgery, National University of Singapore

Address for Reprints: Professor Walter T L Tan, Department of Surgery, National University of Singapore, 5 Lower Kent Ridge Road, Singapore 119074.

† This paper was presented at the 30th Annual Combined Surgical Meeting organised by the Academy of Medicine, Singapore from 31 October to 2 November, 1996.

opportunities to participate in the management of the surgical patient, with the final year student taking on the role of a "junior" house officer.

The student in Surgery attends 3 blocks of training periods as follows:

(I) Elementary Clinics (5 weeks)

These clinics are held immediately after the first professional examination at the end of the 2nd year of the medical course. During this period, the student is introduced to the surgical ward and operation theatre. Basic surgical skills in taking history, and performing physical examination are taught.

(II) Junior Clerkship in Surgery (12 weeks)

This 12-week course is held during the 3rd year of the medical course. It comprises of a 2-week **Foundation Course in Surgery** conducted at the Department of Surgery, National University of Singapore (National University Hospital) followed by a 10-week clinical posting at the Surgical Units of one of the following teaching hospitals in Singapore: Singapore General Hospital, Tan Tock Seng Hospital, Alexandra Hospital and New Changi Hospital.

The Foundation Course in Surgery at the National University Hospital takes the form of carefully planned student-staff seminars held daily over a 2-week period. In these seminars, vertical and lateral integration of the subject under discussion is integral, and teaching staff from Surgery and other relevant departments are present to guide the students in their deliberations and presentations. Staff from the Departments of Surgery, Anatomy, Physiology, Microbiology, Pathology, and Radiology will be in attendance during these seminars. The students are expected to discuss the assigned subject under the following headings: history taking, physical examination, making differential diagnoses, surgical anatomy, surgical physiology, surgical pathology, and diagnostic imaging.

The current topics assigned for the **Foundation Course** are as follows: Thyroid gland, Breast, Liver and Gallbladder, Oesophagus and Stomach, Small and Large Intestine, Urology, Hernia and Scrotal Swellings, Varicose Veins and Peripheral Vascular System, Trauma, and Wound Healing.

This programme is designed for greater integration between the subjects traditionally taught in isolation by the Departments of Anatomy, Physiology, Pathology, Surgery and Diagnostic Radiology. It also consolidates basic diagnostic skills of history taking and physical examination which was first taught during the Elementary Clinics. In addition, these seminars also promote active participation of students and staff and allow self-directed learning which should take place during the preparatory stages of these seminars. Lastly, these semi-

nars allow Faculty Staff from the various departments to be familiar with the subject matter as taught by the other Departments.

On completion of the Foundation Course, the students then proceed to full day postings of 10 weeks duration to the various Surgical Departments at Singapore General Hospital, Tan Tock Seng Hospital, New Changi Hospital, and Alexandra Hospital. The 3rd year posting in the old curriculum only provided students with half day postings, and students had to rush off for classes and tutorials by other non-clinical departments in the afternoons. With the new curriculum, the 3-year Junior Clerkship of full day postings allows more time for active bedside learning with the added benefit of a Foundation Course in Surgery. The main emphasis during this Junior Clerkship is training in history taking and physical examination and subsequently the making of a clinical diagnosis. Students are also constantly reminded to correlate the clinical findings with earlier knowledge obtained in basic medical science and pathology. Feedback on this Junior Clerkship has been very positive from both students as well as teachers.

(III) Senior Clerkship in Surgery (5th year)

The Senior Clerkship takes place during the 5th (Final) year. This covers an 8-week period and the students are posted for 4 weeks to the University Department of Surgery at National University Hospital under the supervision of senior faculty, and another 4 weeks at any of the other Surgical Departments at designated teaching hospitals.

During this Senior Clerkship, the students are taught to progress further than making a clinical diagnosis. The value of and interpretation of laboratory, radiological and other investigations are covered. In addition, principles of management of surgical conditions during the preoperative, intraoperative and postoperative periods are taught by a series of core lectures, group tutorials, and bedside sessions. In addition students are given exposure to outpatient consultation, ward procedures, operative surgery, and night duties. They are designated as "Junior Houseofficers" and given roles in clinical **teams**. Hopefully this will result in a smoother transition to the period of housemanship when the student has to function as a fully qualified doctor in training.

(IV) The Advanced Trauma Life Support (ATLS) Course

In July 1996 we incorporated the ATLS programme into the Medical Curriculum and taught this course to final year students. Of note is the fact that our Medical School is the only one outside the USA where approval has been given to teach this course. This course was introduced to fill the void in the old curriculum which failed to provide proper training in emergency **manage-**

ment of trauma patients. Feedback from the Singapore Armed Forces Medical Services as well as from the Accident and Emergency Departments of various hospitals, had indicated that our junior doctors were often at a loss when faced with a severely injured patient. The ATLS course was therefore brought to Singapore by the Singapore Armed Forces Medical Services together with the Chapter of Surgeons of the Academy of Medicine to upgrade the level of trauma management by our military doctors initially and subsequently surgeons and accident and emergency physicians. The first training centre for ATLS was set up at the Ulu Pandan Camp of the School of Military Medicine.

In July 1996 the second ATLS training centre was set up at the National University of Singapore and housed within the facilities of the University Department of Surgery at the National University Hospital. This course is solely for the teaching of final year medical students who receive the certification on passing the MBBS final examination. This course concentrates on teaching a systematic protocol for diagnosing and resuscitating the trauma patient during the first hour post injury." It is taught as an intense 2-day course by a series of didactic lectures, skill station demonstrations and live animal operative surgery sessions. All the students are provided with the American College of Surgeons' ATLS Manual which provides the core content of the course and they must study the book before attending the course proper. Students are assessed by an MCQ paper and a clinical viva using a simulated trauma patient. Feedback from students on this course has been excellent and the passing rate has been as good as courses run for qualified doctors.

Assessment and Examination in Surgery

The medical students in Surgery undergo continuous evaluation during the various stages of their training period and are assessed by the teaching staff of the departments they are posted to. The current system in force allocates 20 per cent of the final mark in Surgery to continuous assessment and 80 per cent of the final mark to the final surgical examination taken at the very end during the final professional examination. The quantum for the daily assessment will be raised to 30 per cent by next year, to reflect the University of Singapore's policy to gradually increase the importance of continuous assessment of students.

The final examination in Surgery comprises of 3 theory papers and a clinical examination. The theory papers comprise of, firstly, an essay paper of 4 questions, secondly an MCQ paper of 180 questions, and thirdly an OSCA (objective and structured clinical assessment) of 30 questions. The clinical examination comprises of a long case examination and several short case examinations. Borderline or potential distinction

candidates as determined by the panel of examiners will be required to attend a special viva examination conducted by the chief examiner and the external examiner in Surgery. In general the passing rate in the Surgery finals averages from 90% to 95% of the class.

Where are we Heading in Surgical Education?

In conclusion, surgical education for medical students in Singapore has undergone a major revision. The traditional didactic approach has given way to a more integrated and structured programme with the emphasis on self learning which should continue beyond the final examinations. There is now a de-emphasis of factual retention and to replace this with critical thinking and self-driven problem-oriented learning. The explosion of knowledge has led to the realisation that we must assist our students by identifying a core of knowledge that all students must learn, and that this core knowledge should be regularly reviewed to ensure its relevance in the constantly enlarging pool of new knowledge.

The new information technology should be used as another tool for surgical education. Our MCQ and OSCA examinations are now fully computerised and past questions (with the answers) are on the Department website on the Internet for students to access and practice on. Lecture notes and handouts will no longer be necessary as all lecture outlines and literature references will in future be posted on the Internet for the students to access and download for their study.

Finally, with regard to basic surgical skills development, a fully comprehensive surgical skills laboratory for medical students and junior doctors is being planned to train the student on the practical aspects of surgical procedures like vein cannulation, venous cutdown, intubation, chest tube insertion, urinary catheterisation, and simple suturing and knot tying to name just some of them. This will ensure that when the student or young houseofficer is called upon to perform any procedure on a patient, he would already have had the benefit of training and practice on a simulator in the surgical skills laboratory.

It is our hope that with these changes in the Surgical Curriculum, teaching methodology and methods of assessment, the final product of our education system will be a better doctor, well-trained and ready to serve the needs of our future patients.

REFERENCES

1. A Continuity of Ideals, Commemorating 90 Years of Medical Education (1905-1995). Singapore: Medical Faculty, National University of Singapore, 1995:11-29, 99-106, 131.
2. TK Ti. Med Views. Medical Faculty News and Research Information 1986 April / May; No.4:11-12.
3. ATLS Manual. USA: American College of Surgeons, 1992.