

## Where there is no surgeon: upscaling surgical skills transfer for healthcare professionals in developing countries

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### INTRODUCTION

Good health is a prerequisite for community development. The surgical treatment of patients in poorer societies is adversely affected by problems of access and quality. Solutions include better treatment by available surgical staff, and by other health-care workers (non-surgeons) trained in certain procedures (Cumbi et al 2007, Kruk et al 2007, Nundy 1984, Pereira et al 1996, Pereira et al 2007, , Vaz et al 1999, Watters et al 1987). For improved theoretical training of these groups, the choice lies between face-to-face classroom teaching and distance-mode (self-learning) – or a combination of both. Similarly for skills training the choice lies between apprenticeship (learning on the job) or the opportunity to learn surgical techniques first in a laboratory environment – or a combination of both. Time is often not available for centralized training. Similar resources have been used successfully in training engineers and scientists. The use of these methods helps offset the adverse effects of inadequate numbers and quality of teaching staff. The history of this project shows that the use of such resources is not a 'second class' option.

### Distance learning course/Surgeons-in-Training Education Programme (STEP)

The Royal College of Surgeons of England (RCS) has a distance self-learning course developed for trainee surgeons in the UK, the Surgeons In Training Education Program (STEP) ( Surgeons In Training Education Programme 1996), covering the basic theoretical knowledge-base for practice. This was developed partly to deal with variable facilities within England! This material was originally distributed to postgraduate surgical trainees in Sri Lanka: usage ranged from 25% to 75%, by

60% of trainees, with the comment that the material could be more relevant. This led to the idea of the RCS/STEP material being modified, with financial support from the Commonwealth of Learning (COL).

Under the CoL/STEP project, entirely new sections and supplements were added, relevant to countries where patients present late, or facilities are very basic, and also to the range of diseases in developing countries. New references to relevant authoritative publications were added, cross-referenced to the original STEP course. Also included were questions designed to stimulate the trainee to think of his/her own environment and answer appropriately and in an interactive manner. The original course manuals and tapes could now be better used.

This new resource was published as a floppy disc book, Into the Commonwealth and Millennium with STEP (Aluwihare 1999), in order to facilitate distribution and to reduce costs. This was dispatched gratis to 12 centres in Asia and sub Saharan Africa. One author had the opportunity to review onsite usage in a non-quantitative manner in centres in Bangladesh, South Africa, Nepal, Nigeria, and Sri Lanka. In all the material was felt to be relevant, and modifications useful. In the big centres trainees seemed to need much more support than trainees working in more isolated locations, and they also required more time to accept the discipline of teaching themselves (Aluwihare 2001-1).

The effort of modifying and supplying the COL/STEP course appeared justified, the new learning material was welcomed as being an effective way of upgrading the resources available to less fortunate communities, and the distribution in future

of such material to those learning surgery outside main centres seems desirable.

### **Practical Skills Training/Introduction to Surgical Skills (ISS)**

The Royal College of Surgeons of England (RCS) developed in 1993 a 3-day Basic Surgical Skills course, aimed at teaching junior trainees “one safe way” of performing basic surgical techniques. This course is accompanied by a course handbook and video/DVD (for trainees) and a faculty handbook. Trainees can also use these materials with mentors, or by themselves. These materials in their original format were also tested in the Sri Lankan environment, usefully supplementing a compulsory skills training program for entry level surgical trainees. Several of the suggestions in the video and handbook could only be implemented in rich settings. In view of the universal applicability of the principles in the teaching materials, and the earlier experience of adapting the STEP course, the Commonwealth of Learning and the RCS agreed to modify the materials, to include techniques and scenarios applicable in developing countries.

The trainee handbook, CD, and video contain text, illustrations and motion clips that deal with the preparation of the operating environment, scrubbing, handling instruments, tying knots, suturing of various kinds, arrest of bleeding, the cleaning of wounds and application of plaster. There are also sections on the suturing of various structures, and on the safe use of diathermy (heat coagulation to arrest bleeding or cut tissue) and on safe laparoscopic surgery. Techniques were added that are relevant in a developing world environment, including closing the abdomen under local anaesthesia, application of Plaster of Paris and arrest of bleeding in simple ways, and the insertion of improvised drains. The faculty handbook, which contains sections on technical preparation and delivery of the course, was also modified to suit a range of contexts.

This new resource, entitled Introduction to Surgical Skills, was launched in 2001 by the RCS and COL in CD ROM, text, and video formats and distributed gratis to

centres in Asia and Africa. These centres (of which there are now over 50) can use and reproduce the material for teaching purposes in toto or in modular form, for any audience that the particular country may need to train (Aluwihare 2002-2).

Some surgeons were initially unhappy with this concept as they believed it might undermine the value of apprenticeship training. Now even the more sceptical have come to appreciate the value of having apprentices who can perform basic psychomotor skills well from early on in their training. The senior surgeon’s time is then better used, maximizing the benefit of any limited opportunities for face-to-face teaching. A trainee can become familiar with at least “one safe way”, and know it well. These resources support trainees in reaching this degree of competence and confidence – to a common standard, by the use of a standardised approach. These materials were developed initially for use in resource-rich situations, by a professional body, concerned to maintain standards. How much the more useful they can be in other environments – where patients are many more in number, but just as surely are not ‘guinea pigs’ on whom skills can be learnt in a trial and error manner (Aluwihare 2004)

The benefit of skills training in improving patient outcomes is well shown with respect to treatment of rectal cancer with total mesorectal excision in the Karolinska project where local recurrence and permanent colostomy rates were halved (Lehander et al 2000).

It is also very important to recognise that if the poor are ever to have any kind of equity in accessing basic surgical care, then innovative methods of training doctors (and even non-surgeons and non-doctors) to operate are needed. The modified STEP material and the ISS skills course can support this by providing “off-site” teaching and learning opportunities. The fact that these educational resources can be used with non-surgeons is welcome – this can only benefit patients in poor countries with little access to formal care.

### **DISTANCE/NON FACE-TO-FACE TAKE-UP AND USAGE, INCLUDING NEW AUDIENCES, AND LESSONS LEARNED**

#### **Theory/cognitive knowledge**

In Sri Lanka the modified RCS/STEP course has been purchased at a nominal fee by 117 trainees. Of the 17 who could have finished the course only 4 have done so, using all the course components. Of the others the progress rate is 45% of what could have been achieved. The trainees find the self assessment sections particularly valuable in developing thinking processes (74%). 34% find it difficult to use the material in a modular fashion in order to match the particular appointments they are doing. However in fact 51% use it like that. 64% found the floppy disc format for the update useful, but of these 52% would have liked a printed version given to them. Of the total, 61% actually printed out the floppy on their own. There was no problem in access to computers (92%). In Bangladesh the picture was similar but the proportion who used the material in a modular form was less (41%).

The feed back from Nepal and the sub-Saharan African area indicates that the greatest value was the challenge to trainees to think and work on their own. A universal comment was that trainees find the material useful in teaching them to pace themselves, and to make sure that no section of the knowledge-base is ignored. It was difficult to compare central and peripheral institutions as trainees rotate through both - but there was an impression that the use of the material was better away from the very big teaching centres (Aluwihare 2002-1).

### **Practical skills/experiential knowledge**

It needs to be stated that the Introduction to Surgical Skills course accepts the principles of adult education (Murphy et al, 2005, Knowles 1973), building on motivation and prior experience in order to maximise learning. Four key elements are present: setting of objectives; critiquing; practical skills teaching; and attitudinal awareness. Each module defines objectives. Critiquing includes careful feedback to the trainee and the trainers - given that the aim of the course is to introduce surgical trainees to safe techniques at the outset of their career. The faculty must provide a supportive learning experience for the participants and observe them in order to assess whether they have insight into the limits of their competence. A tutor demonstrates in

real time, using the course video as a teaching aid where appropriate. The participant talks the tutor through the steps, and finally repeats the exercise under supervision.

The course as used in the UK, and as modified and used for over ten years in the Department of Surgery at Peradeniya in Sri Lanka for the surgical trainees of the whole country, is immensely valuable. In Sri Lanka it is compulsory. In particular it benefits trainees whose practical experience is almost 'nil' before they embark on surgical training. In the tests done initially in Peradeniya on pre and post workshop trainee skills of early cohorts there is a scored twofold improvement in a skill in 48 hours (Aluwihare 2002-2, Aluwihare 2004). However in the most recent course 24 trainees required three days. Only 15% were judged satisfactory on the skin suturing and 23% on knot tying at the first test after two days. 23% and 17% respectively needed three days to achieve a satisfactory level, and two needed three and a half days. The material was extensively used on an individual basis on the evenings of the course. All trainees left with a CD incorporating the ISS material and other textual and visual guidelines for self-practice during the 3 weeks before beginning their clinical appointments - and 64% subsequently used this material in this three weeks. The importance of self-practice is now being reinforced by the distribution of the ISS video and CD so that trainees can work at home as well as in the formal workshop setting. In total 237 trainees have used the ISS CD and material over 6 years. Of the 156 who were given the CD to keep, the last 42 were asked if they used it at home - we had 24 responses of whom all had done so on average 5 times in the year. 8 said they found it very useful. 82% of the trainees at this level have computer access for this purpose.

This experience demonstrates in a quantitative manner what is said less precisely from Bangladesh, Nepal, and East Africa. The COL-ISS material was widely distributed in Asia and Sub-Saharan Africa. The current list of places supplied is (country and number of centres):- Afghanistan (2), Bangladesh (2), Ghana (3), Guyana (1), Ethiopia (1), India (1), Indonesia (13), Libya (1), Malaysia (1),

Mozambique (1), Nepal (1), Nigeria (1), Somalia (1), South Africa (2), Sudan (1), Tanzania (2), Uganda (1) and Zimbabwe (1). In several countries (eg. Sri Lanka - the single centre serves the whole country for skill training. Indonesia has used the material over ten years for 1,418 trainees in 13 centres, and also has put the ISS resources on a password protected website for trainees and trainers.

ISS is also used increasingly by non-surgeons. The "outback" GPs in Australia have been using parts of the original Basic Surgical Skills course, which has also been used in South Africa with medical students. In Peradeniya in Sri Lanka the BSS and ISS material are used in medical student skills workshops. In a recent test of 82 students the ability to tie a knot correctly, rated on 10 steps, improved from 22% to 74%. Skin suturing improved from 46% to 74%. High value was placed on the availability of the visual material for use after-hours. In Somalia material has been used for the trainers of medical students, nurses and midwives. More significant still is the acceptance of the ISS materials for the training of community midwives (22), pupil midwives (18) and student nurses (46). The material has been used in teaching hospitals, medical school, field clinics and elsewhere. They welcomed the mix of techniques, and were happy to use the course as it stood, without adaptation. They would also welcome a basic clinical skills package.

Teaching Aids at Low Cost (TALC)([www.talc.org](http://www.talc.org) et sequi) - a charity developed originally by Professor David Morley of the Institute of Child Health, University of London – have included the ISS materials on one of their CDs. These are a UK government funded (DfID) initiative to provide resources and know-how at low cost to developing countries – their circulation is in the region of 10,000. In a recent survey TALC received a 30% reply rate indicating approval for the CD concept in various health fields. Although the CD goes to many kinds of health workers the responses were mainly from doctors.

There is some argument as to the extent to which individual centres or trainers should modify and use the material, as compared to the RCS sending teams to run the course with minimal changes. The

basic philosophy remains to provide a resource that local centres can use in whatever way they see fit, and in the event there is unanimity on the value of the combination of text, CD, and video and the modular nature of the material. Given the scale of the exercise, to get quantitative or qualitative feed back has proved very difficult!

## SUMMARY OF LESSONS LEARNED

1. The use of non face-to-face teaching methods with modern audiovisual aids such as CDs is a good methodology used in both advanced and developing countries. These are not "second class" methods for the 'disadvantaged' only.
2. These work best as a package of "blended" techniques reinforcing each other – for cognitive knowledge, didactic face-to-face teaching reinforced by distance-learning; for acquisition of practical skills, on-the-job instruction reinforced by offsite practice.
3. The material seems to work well for doctors in specialisations other than surgery, medical students and other health personnel, and for faculty development.
4. Most persons welcome some degree of mentoring in addition to the self-learning required.
5. This kind of resource can comprise a whole range of independent modules of varying degrees of difficulty and theatres of use.
6. The level of technology used is widely acceptable.
7. For visuals a combination of video and still pictures is very useful.
8. The three way collaboration in modifying the STEP material and in preparing the ISS material between the RCS, COL, and Sri Lanka is a useful model, as are the links between the RCS, TALC, and many surgical and other centres in using the material.
9. Wide distribution with the help of organisations like TALC remains desirable even though good feed back is difficult to obtain.

10. These resources have been designed to support professional learning. However, at some stage the competence of trainees must be formally assessed, before they are allowed to treat patients unsupervised, or practise independently.

#### **FUTURE DEVELOPMENTS: WHERE THERE IS NO SURGEON**

1. It is anticipated that the theory material will be updated soon, with sections for non surgical staff

2. There is a perceived need and also demand for material on basic **clinical** skills covering topics such as: wound dressing and debridement; abscess drainage; hand infections and injuries; infection control; hand washing; asepsis and sterilization; naso-gastric tube insertion; intravenous cannula insertion; male urethral catheterization; cutdown onto a vein; insertion of an intercostal tube; cardio- pulmonary resuscitation; charts for monitoring; use of local anaesthesia etc. Information on these subjects will improve further the chance for those far removed from major centres to learn and offer high quality basic care to patients. The modular basic clinical skills material, once it is ready, will also be of

use to paramedical staff who have to carry out basic procedures.

3. The task transfer from doctors to nurses (in surgery for endoscopy, hernia surgery, basic GP work and so on) may unexpectedly create a new market for these methodologies in the developed world.

Our concern in this project is the care of the surgical patient “where there is no surgeon” – and what that means in terms of upscaling surgical skills transfer for healthcare professionals in developing countries. One has to reiterate that if the poor are to have, with any kind of equity, some access to basic surgical care, innovative methods of training doctors and even non- surgeons and non- doctors to operate are now urgently needed. The resources described here are a response to this challenge. They are being used by surgical trainees to supplement and reinforce their apprenticeship, thus saving valuable surgeon time. They are also being used by non-surgeons – where this is appropriate, and where non-surgeons are required to undertake minor surgical procedures. This is welcome as these users will be inducted into methods of good practice, which can only benefit surgical patients in developing countries, who have little access to formal care.

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