



The impact of shortened training times on the discipline of vascular surgery in the United Kingdom

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Abstract

Political initiatives and European health and safety working time regulations have combined to reduce the time available for surgical training in the United Kingdom in the future by a third. For the safety of patient care, surgeons must evolve strategies to cope with these reduced training times so that they preserve the current high level of competence exhibited by UK trainees when they attain the right to independent surgical practice recognized by appointment as a Consultant Surgeon. Such strategies include a focus on dedicated training time, the use of simulators, and a move towards progression based on satisfactory completion of a defined curriculum and competency assessment rather than the amount of time served. With insufficient time to train in every aspect of general surgery, a move towards fragmentation into its sub-speciality components seems unavoidable. Such a move offers an opportunity to re-evaluate conventional surgical training and to consider the evolution of a system-specific vascular specialist with patient-focused expertise in vascular surgery, endovascular radiology, and vascular medicine. © 2005 Excerpta Medica Inc. All rights reserved.

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The Working Time Directive

The Working Time Directive (WTD) is Health and Safety legislation applicable to all countries in the European Union, which aims to restrict all employees to a maximum 48-hour working week. It does not apply to the self-employed. Doctors in training employed by the National Health Service (NHS) have been allowed delayed implementation, but by 2004 were restricted to 58 hours per week, including 11 hours continuous rest in any 24-hour period. The weekly maximum falls to 56 hours per week in 2007, with full compliance at 48 hours per week in 2009. Working time includes time spent asleep on-call in the hospital, although not at home, further restricting the time available for daytime, elective training activities.

Surgical specialist registrars (SpRs) undergoing higher surgical training in the United Kingdom, working on a 1-in-6 emergency rota, currently spend just under 30 hours per week participating in the daytime elective service [1].

Moving to a 48-hour working week would cut the time available for elective service to 6 hours per week for SpRs on a 1-in-6 resident on-call rota, rising to 15 hours per week if they are not resident on-call [1]. The imposition of compulsory rest periods, which must be taken directly after the work that generated them, mean that SpRs must move to a 1-in-9 emergency rota to comply with the WTD. Although this means an increase in elective service time to 21 hours per week, it will reduce the exposure of SpRs to the number of emergency and elective patients by a third. In effect, this means that it would take almost 9 years to achieve the same experience currently achieved in 6 years.

There will be fewer SpRs available to deal with daytime elective work, putting pressure on them to cover the service rather than take up training opportunities. A reduced SpR presence also devolves service pressures onto the consultant staff, who may restrict training time in order to deal with the increased workload. To redress this balance, trainees will require dedicated training lists and clinics where the volume of patients is restricted to allow adequate time for training. In view of the clashes between compulsory rest periods and any one consultant's dedicated training list, trainees will need to work with teams of consultants, where they might

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take advantage of different trainees' weekly schedules to access at least 1 training list in the week [1].

With less training time available, it is also important to ensure that each trainee obtains adequate exposure to, and appropriate competency in, the full spectrum of activity in their chosen speciality area. This requires the development of a much more detailed surgical curriculum than is currently available. In the United Kingdom, a Specialist Advisory Committee oversees general surgical training on behalf of the Joint Committee on Higher Surgical Training, which is currently developing a web-based curriculum project giving specific definitions of the skills and competencies to be gained at the different stages of surgical training [2]. These skills include clinical judgement, technical and operative skills, speciality-based knowledge, and generic professional skills.

Surgical Training in the United Kingdom

Vascular surgery in the United Kingdom is a sub-speciality of general surgery. Graduates from medical school first complete a probationary year in medicine and surgery before entering the Senior House Officer (SHO) grade, where they spend 2 to 3 years acquiring basic surgical skills in rotations around different surgical disciplines such as Accident and Emergency, Orthopaedics, General Surgery, Urology, and others. After passing the Membership examination of the Royal College of Surgeons (MRCS), they then enter higher surgical training as a SpR. As competition for these posts is intense in general surgery, many trainees choose to spend 2 years in research undertaking a higher degree such as an MD, before entering the SpR grade.

SpR training lasts for 6 years and includes exposure to all the main sub-speciality areas of general surgery in the early years, moving on to more focused training in a single sub-specialty area such as vascular surgery in the last 2 years. Progression is time-based and subject to a satisfactory annual review by a training panel, although in practice very few SpRs are required to repeat a year and nearly all progress to completion of training. A Certificate of Completion of Specialist Training (CCST) is awarded on completion of 6 satisfactory years of higher surgical training, provided the candidate has also passed the Intercollegiate Examination to be awarded full Fellowship of the Royal College of Surgeons (FRCS). The CCST is an essential prerequisite to be entered onto the Specialist Register of the General Medical Council, which is a legal requirement for appointment to a consultant post in the United Kingdom.

A new pattern of training for all medical disciplines in the United Kingdom is being introduced, through the agency of the Modernising Medical Careers (MMC) initiative, supported by the Department of Health. Training time will be shortened even further by the abolition of the SHO grade and the introduction of seamless training. Training after graduation from medical school will comprise 2 Foun-

ation years, with a focus on the management of acutely ill patients rather than the acquisition of surgical skills. There would then be competitive entry into a 6-year surgical training program. The Royal College of Surgeons of England are currently proposing an initial probationary year during this period, where trainees would need to pass a formal assessment including a basic surgical science examination before progressing with a further 5 or 6 years in general surgery training incorporating a sub-specialty interest.

The end result will be a Certificate of Completion of Training (CCT) equivalent to the current CCST and will allow earlier appointment to general surgical consultant posts than happens at the present time. The newly appointed consultant will be trained to the level where they are able to take responsibility for general surgery emergencies. While achieving some exposure to sub-specialty training during this time, there are some areas of more complex general surgery such as upper gastrointestinal cancer surgery and potentially much of vascular surgery, where it seems unlikely that the newly qualified general surgical consultant will have the necessary skills to manage the patient without more experienced assistance from a specialist surgeon.

To gain these more specialist skills, a further 2-year period of post-CCT specialist training is proposed, although the details of where and when this training is to take place have yet to be finalized. The majority of existing training posts will already be occupied by pre-CCT general surgery trainees and no additional funding has yet been identified for extra posts. There are also no formally proposed mechanisms for assessing the knowledge and competency of such trainees at the completion of their specialist training.

Vascular Specialist Training

The current trend in the United Kingdom is to move towards sub-specialization within general surgery. Breast and gastrointestinal surgeons are no longer comfortable with providing emergency care for vascular patients and this has led to a re-evaluation of the way in which vascular emergency services are delivered [3]. Adjacent hospitals are joining forces in clinical networks to provide 24-hour, 7-day per week emergency cover by specialist vascular surgeons, moving either the patient or the surgeon according to geographic circumstances and local protocols. The networks allow continuing local delivery of elective services in each hospital by smaller vascular teams, while offering an acceptable level of on-call activity for each surgeon within the network. More than 40% of UK hospitals surveyed by the Vascular Society currently participate in such emergency vascular networks and a further 30% have active plans to do the same. Over 20% of vascular surgeons in the United Kingdom no longer provide cover for gastrointestinal emergencies and the number is steadily rising as consultants drop out of the general surgery emergency rota to focus on

vascular emergency cover. Given this trend, and the limitations of available training time, there is a compelling argument against training young vascular surgeons in the finer intricacies of breast or gastrointestinal surgery, as these are skills they are increasingly unlikely to use in their subsequent consultant career.

Instead the idea has evolved that the vascular specialist of the future might better be trained in a system specific program, rather than a generalist one. Vascular surgery shares the treatment of circulatory disorders with interventional radiology, vascular medicine, diabetes, stroke medicine, cardiology, and cardiac surgery. This offers the opportunity for a common trunk training in vascular sciences, with subsequent focus for peripheral vascular specialists in a combination of vascular surgery, vascular medicine, and interventional radiology. Such a system specific training program has already been designed and accepted for the neuroscience specialties in the United Kingdom.

The Vascular Society in Great Britain and Ireland has been exploring the possibilities of training such a new breed of hybrid specialist with the relevant training authorities and has so far met an encouraging response, although all accept that there is still a long way to go. In the meantime it is important to ensure that vascular specialist training achieves adequate competencies within the existing generalist system, given the shortened time available for training.

In Denmark, doctors have been limited to working 40 to 45 hours per week for some time, giving the vascular surgical trainee exposure to 1 all-day operating list and 1 outpatient clinic per week plus emergency duties. During the course of a targeted vascular fellowship in this system, Danish vascular trainees achieved a median of 75 aortic operations and 80 infra-inguinal bypasses as the principal operator over a 3-year period [4]. A survey of senior British vascular trainees between 1997 and 1999 showed that they needed to undertake a median of 23 aortic operations, 22 carotid endarterectomies, and 20.5 infra-inguinal bypasses before they felt competent to perform each one unassisted by a trainer [5]. It therefore does seem achievable to obtain the requisite experience within the 48-hour per week constraints of the WTD, but perhaps only by focusing training on a single sub-specialty area.

There is also an increasing emphasis on the acquisition of wire skills for radiologic intervention amongst vascular surgeons with the advent of endovascular stenting for aortic aneurysms and the introduction of balloon angioplasty for carotid disease. Under these circumstances, the guidewire becomes the equivalent of the gastrointestinal surgeon's laparoscope, allowing the use of minimally invasive procedures. The United Kingdom is now one of only 4 countries out of 16 in Europe where endovascular training is not mandatory [6]. Time needs to be set aside in training for the young vascular surgeons of the future to acquire these skills. Again should time currently spent training in breast or gastrointestinal surgery be better spent acquiring those endovascular skills that will be of more practical benefit in

future vascular consultant practice? With limited training time available, a majority of that time needs to be spent in the acquisition of relevant vascular skills, and this makes the case for considering separation of vascular surgery from general surgery training. Indeed vascular surgery is already a mono-specialty separate from general surgery in 50% of European countries [6].

The Use of Simulators

An increasing number of courses outside the workplace are offering simulator training and the simulators are becoming more and more sophisticated with the advent of virtual reality devices in the endovascular field. These simulators offer not just a chance to examine the competence of trainees without putting patients at risk but also a significant opportunity to practice and develop technical skills in the trainee's own time away from the workplace and the demands of the WTD. Rare is the surgical trainee who complains that they get too much operating time, and although no substitute for clinical exposure, simulators will undoubtedly play an increasing role in the acquisition of technical skills in the future.

Competency Assessment

It is recognized that as training time shortens, it becomes more important to assess the degree of competence achieved in the time available. Failure to achieve the necessary competencies laid down in the surgical curriculum should act as a trigger to prolong training until they are achieved and there is considerable variation in the experience needed for this to happen between different trainees [5].

The existing methods of assessment do not measure technical competence directly, relying instead on the subjective opinions of trainers and a logbook count of the number of procedures done. Early studies of more objective methods of competency assessment suggest that there is no significant correlation between the volume of procedures done and competence at doing them (Beard JD, personal communication), such that each trainee follows an individual learning curve rather than attaining competence after completing an arbitrary numerical value of procedures.

More objective tests of competence include the use of checklists, where an operation is broken down into its component parts with ticks given for the satisfactory completion of each component. Such checklist systems have been compared with global rating score systems, where the performance of a particular task such as instrument handling is graded on a 1–5 scale against a standardized spectrum of competence where tentative and awkward scores 1, occasionally awkward scores 3, and fluid moves with no awkwardness scores 5. Results indicate better interobserver agreement and validity for global rating scores than for

checklists [7]. Global rating scores also correlate well with surgical technical skills measured using motion analysis of surgeon's hand movements, both of which discriminate clearly between groups of surgeons with greater or lesser experience [8]. A similar correlation was not seen with checklist scoring.

Global rating scores offer a more objective method of assessing technical competence in specific tasks, such as high saphenous ligation or distal arterial anastomosis performed on a simulator model in the examination setting. Simulator scores correlate well with scores from live or videotaped surgical operations. Not only do they discriminate between levels of experience, but they also provide a measure of technical competence independent of and additional to the specialty-based theoretic knowledge tested in conventional examination settings [9]. Such operative skill assessments using global rating scores are now an integral part of the examination for the European Board of Surgery Qualification in vascular surgery.

These types of assessment may provide a valid measure in the future for individual trainees to decide whether to progress to the next stage of training or to delay progression, based on the level of competence they attain. Such checks and balances offer a reassurance that the future products of shortened training times do not find themselves in positions of responsibility beyond their level of competence. Similar objective tests of clinical judgement, previously accumulated by long hours of experience during training, will also be required to assess trainees whose experience has been limited by significantly reduced "flying hours."

Summary

The limitations in vascular training produced by shortened working hours can be addressed, but need a re-evaluation of traditional general surgical training. More focused

training with a smaller curriculum can be achieved in the time available by targeting individual sub-specialist areas within general surgery rather than trying to cover the entire syllabus. Practical skills can be developed on simulators outside the workplace and developments in virtual reality may allow similar simulations of clinical scenarios in the future. Within the workplace trainees must be given every opportunity to focus on dedicated training opportunities rather than service provision and their limited experience requires more careful and objective assessment of their competence before they achieve independent surgical practice.

References

- [1] Chesser S, Bowman K, Phillips H. The European Working Time Directive and the training of surgeons. *BMJ Career Focus* 2002;325: S69.
- [2] Canter R, Kelly A. A new curriculum: pre-piloting from January 2004. *Ann R Coll Surg Engl* 2005;87 (suppl):42–4.
- [3] The Provision of Vascular Services 2004. London, UK: The Vascular Surgical Society of Great Britain and Ireland; 2004.
- [4] Sandermann J, Panduro Jensen L. The Danish specialist training in vascular surgery. *Eur J Vasc Endovasc Surg* 2002;23:353–7.
- [5] Darke SG. Training in operative vascular surgery: gaining experience and competence. *Ann R Coll Surg Engl* 2001;83(suppl):258–60.
- [6] Liapis CD, Paaske WP. Training in vascular surgery in Europe—the impact of endovascular therapy. *Eur J Vasc Endovasc Surg* 2002;23: 1–2.
- [7] Regehr G, MacRae H, Reznik RK, et al. Comparing the psychometric properties of checklists and global rating scales for assessing performance in an OSCE-format examination. *Acad Med* 1998;73:993–7.
- [8] Datta V, Chang A, Mackay S, et al. The relationship between motion analysis and surgical technical assessments. *Am J Surg* 2002;184: 70–3.
- [9] Pandey VA, Wolfe JHN, Liapis CD, et al. Fellowship of the European Board of Vascular Surgery (FEBVS): a pilot study of technical skills assessment in a high stakes surgical examination. *Br J Surg* 2005;92:503.