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REVIEW

The teaching of surgery in the undergraduate curriculum – reforms and results

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Abstract In the past decade, the teaching of surgery in the undergraduate curriculum has undergone considerable changes in quantity, mode and method of delivery. This is a result of the radical reforms of higher education, the health service and the undergraduate medical curriculum. These reforms are often interrelated and are occurring in conjunction with major changes in healthcare delivery. In this article we discuss this reorganisation, the rationale behind it and the impact on surgical teaching.

Background

The teaching of surgery has traditionally formed a major component of the undergraduate curriculum with medical students being guaranteed a surgical firm in their clinical years.[1] However, in the USA, Polk has described how during the 1990's the obligatory hours spent on surgical rotations has declined by 30% in years 3 and 4 of the medical curriculum with a resulting decrease in domestic medical graduates choosing surgical careers.[1]

In the UK, most UK medical schools have recently fulfilled curriculum reforms in accordance with the General Medical Council's guidelines in ''Tomorrow's Doctors''[2] and the recent review.[3] The enforcement of these recommendations is ensured through regular GMC inspections and by the recent quality assurance agency (QAA) appraisal of medical schools where scores were allocated to six aspects of undergraduate teaching, including curriculum development.[4] Many of the key recommendations from the GMC report relate to the acquisition of generic skills as well as the understanding of health and disease in the community.[2,3] As a result, there is a perception that the emphasis for undergraduate teaching

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should now be shifted increasingly towards the community (possibly as much as 30%)[5] and both the GMC and the Department of Health have recommended moves in this direction.[2,3,6]

Surgical teaching is a component of the undergraduate curriculum which may be at odds with the new ethos of increased community-based teaching. The pressure for a reduction in the surgical content of the medical curriculum may be divided into three overlapping sources; changes in higher education, changes in healthcare and changes in the medical curriculum.

Changes in higher education

Medical education in the UK straddles both healthcare and higher education, two public systems which are undergoing profound reform in order to keep pace with the relentless pressure for improved performance and expansion of capacity whilst maintaining budgetary restraint. In 1962, 6% of 18–21 year olds were in higher education compared with 43% of 18–30 year olds in 2003.[7] However, from 1989 to 1997 funding per student fell by 36%.[7] There is clearly a need for increased efficiency in the system and medical schools have not escaped such pressures with medical students increasing by 1000 per year.[5]

Despite this increase in the total number of medical students (which is controlled), they constitute a decreasing proportion of undergraduates.[8] As a result, medical schools have less influence on their parent university. The problems with funding higher education in general, have had a major impact on medical schools, with more local NHS staff undertaking teaching duties to meet demand and enable academics to focus more effectively on their research.[8]

The desire for high research assessment exercise (RAE) recognition may reduce the time available to teach medical undergraduates.[9] This 'desire' for a high RAE emanates from the individual surgeon for whom research of an international standard may lead to career advancement, larger grants and international recognition.[9] Pressure for high grades in the RAE also comes from the medical school and parent university with funding going only to highly rated units.[10–12] Multidisciplinary, clinical or health services related research has not in the past been as highly regarded as molecular or basic science research which often gets published in relatively higher impact factor journals.[11] As a result, surgeons not only focus more time and energy on research but also on research of a type which medical students are often less able to get involved with themselves. Interest in patients and clinical duties declines are increasingly seen as a (necessary) distraction from the research laboratory rather than an integral part of the job.[8] As it is no longer possible for individuals to excel in clinical practice, teaching and research, the need to become selective and focus on either research or clinical practice and education is increasingly advocated.[13]

The increasing separation of research from clinical practice is often encouraged by the parent university concerned with both the income from research grants, contracts and core research funding being determined by the next RAE.[8] Unfortunately this may lead to short-termism in the 'dash' to secure the highest RAE ratings. The unfortunate corollary of this situation is that teaching tends to come last in both the parent university and the individual surgeon's priorities with the rewards for good research far outweighing the benefits of teaching.

However, this situation may be counterproductive, as surgical research has been identified as important for both undergraduates and postgraduates.[14] If students aren't exposed to research, they are unlikely to be attracted to research in the future[10] creating a situation that may be counterproductive to the RAE's aim of trying to raise standards in the long term. At the same time pressures to improve teaching standards for undergraduates are increasing with Universities having to measure the performance of all staff against new teaching standards for higher education from 2006.[7] Furthermore, additional funding will be provided for good teaching and pay awards will be conditional on universities (and thus medical schools) rewarding and promoting good teachers.[9]

Changes in healthcare

The NHS is subject to increasing public scrutiny and its future is debated as a major political 'battle ground'. To compound this situation, there is also an increasing trend within society for consumers (of any service) to be more demanding and thus for patients to expect demand care which matches their rising expectations, creating further pressure on the NHS and its staff.[15–17] Furthermore, the public are now much more aware of the potential dangers as well as the benefits of modern medicine and of the misdemeanours of a minority of doctors.[18] This trend has led to the perception of students as 'customers' rather than dependents.[19] This results in a greater emphasis on value for money in medical education and also leads to

a greater sense of accountability; are standards being maintained and are targets for delivery being met.[19]

Hospital doctors have to fulfil increasing loads of service work in the modern target-driven NHS.[20] In a consultant-led service, this sets up a conflicting interest between four time-consuming activities; service work, training juniors, teaching students and research/audit.[20] Faced with continuing pressure to reduce waiting times[20] anything which affects throughput has to come second, especially as demand for clinical services is increasing.[6] Inevitably, undergraduate education is put at risk as the consequences are less than those for not fulfilling service commitments, training juniors and performing research. Furthermore, students have other options, they can always observe in clinic or go on a ward round (activities which will happen anyway) and thus teaching may be accorded a lower priority.[19] Interestingly, research in a Maxillofacial unit has shown that even the training of Senior House Officers can come second to fulfilling service commitments.[21]

A corollary of increasing subspecialisation[22,23] is that the acquisition of generic skills and the likelihood for the development of an undifferentiated graduate in a surgical environment may be diminished.[24,25] The increasing emphasis on day-case or short-stay patients[26,27] has resulted in follow-up assessments being undertaken in the community rather than in hospital. Despite the increase in day surgery only 45% of day surgery units in one study were used for teaching.[28] Furthermore, surgical teaching in day surgery units can be rather opportunistic[29] leaving students dissatisfied.[30] In 83% of these units, the medical students attended only a single operating list and only 7% took the students for more than one day per week.[31]

The increase in the proportion of minimally invasive and laparoscopic procedures has also had an impact with medical students having less opportunity to 'scrub-up' and get involved in the operation.[32,33] Furthermore, there are fewer opportunities for medical students to undertake minor surgery in casualty because of the risks to patients.[32] Increased commitment to structured postgraduate surgical training[34] and the decline of academic surgical units[35,36] may also have played a role in the reduction in surgical teaching.

Changes in medical education

The key to long-term success for medical students, surgeons, hospitals, medical schools and the government lies in trying to achieve a programme of instruction which incorporates the desirable elements of surgical teaching but achieves them in a modern hospital. This requires strong leadership ideally from local academic departments of surgery who know the dynamics of the local teaching environment. However, this function has been delegated to central administration in many medical schools, predominantly due to the emergence of an integrated medical curriculum.[37] One of the consequences of the pressures on staff described above is that there is little resistance to this new organisational structure with many decisions being made by central educational committees.

The purpose of undergraduate medical education has also been redefined over the years. In the past, a medical graduate was expected to be able to perform all the tasks relevant to medical practice, including carrying out operations.[4] Today, many years of further training are required before an individual is permitted to practice independently. According to the GMC, the purpose of undergraduate medical education is to ''allow the graduate to function effectively and develop as a pre-registration house officer and commence further training.''[3] Hence, graduation signals the ability or entitlement to enter further training. This change in emphasis has arisen in part because of the increase in the body of medical knowledge, which makes it impossible for the student to learn all there is to know within the undergraduate period of 5 years. Previously, the GMC had defined the objective of undergraduate teaching as having to teach a common core comprising about two-thirds of the total and covering the essential knowledge, skills and attitudes, with the remainder coming from student selected topics.[2]

The emphasis of undergraduate teaching should now be on the acquisition of generic skills with the production of a 'pluripotent' junior doctor within 5 years,[38] who then has an additional 6 or 7 years to develop into a specialist. This 5 year period is thus precious with the acquisition of core values, knowledge and skills being of paramount importance. When the GMC published 'The New Doctor' in 1995[39] it was in recognition of the changing role of doctors in modern society and the changing dynamics of the doctor–patient relationship.

There was a need to define a 'core' curriculum which would ensure that every undergraduate attained a minimum compulsory knowledge-base. The problem lies in defining what the core actually is. From the first Medical Act,[40] to the present day the knowledge-base has grown considerably and thus the proposed core has become progressively smaller relative to the total amount of knowledge

available. Inevitably, in shaping the core knowledge there was a need to get rid of the excess, remove esoteric facts and focus on what's important for the new objectives of learning to be competent at the level of a pre-registration house officer, increased capabilities in self-directed learning,[3] evidence-based medicine[3,41] and the development of the appropriate professional attitudes and behaviour.[3,42]

The drive to reduce the curricular content which was perceived as overloaded,[43,44] led to the decrease of more technical subjects like Anatomy (and possibly Surgery)[45] and their replacement with generic skills and knowledge, such as communication skills and medical humanities[32,41] which are relevant to all doctors irrespective of their eventual specialty or location. The required technical skills are those needed to work as a closely supervised house officer, such as intravenous access, catheterisation, the suturing of simple wounds and so on. Doctors do not operate in their pre-registration house officer year and thus undergraduates should not spend time learning surgical techniques or spending hours assisting in the operating theatre, especially since the majority will not be embarking on a surgical career anyway. The shift towards a more community-based medical curriculum was also an acknowledgement that most graduates will enter general practice and that is where most patients are to be found, in addition cost-effectiveness and the ability to handle large numbers of students may also have played a role.[46]

Work force planning factors may also have had a role to play in the reduction in surgical teaching. Competition for surgical posts remains relatively intense; in contrast vacancies and unfilled posts in general practice remain unacceptably high.[47] The Department of Health voiced its concerns in its latest *Planning the Medical Workforce* report.[48] It is conceivable that the shift towards community-based teaching may be geared towards increasing the number of graduates entering general practice.[49] Just as advertising any product or service often leads to increased consumption or sales,[50] more exposure to primary care settings has been shown to influence positively career decisions to go into general practice.[51–56] Such a shift is given credence when research has shown that community-based teaching programmes are well organised[57] and performance in final examinations, grades or clinical skills learnt by undergraduates stationed in primary care settings are not significantly different from those in tertiary centers[58–62]; students themselves perceive an enriching experience with many reporting a good level of supervision and teaching.[63–65] Furthermore, as only a minority of medical students go on to become surgeons with around 40–45% going into General Practice,[66,67] greater exposure for medical students to a community environment is justified.

In essence, medical education has followed patients into the community where an increasing proportion of healthcare is now delivered. Surgery has been identified as not being an isolated or unique experience for patients any more,[49] with surgeons now working closely with physicians, nurses, psychologists, chemotherapists, radiotherapists and others in tight-knit multidisciplinary teams (especially in common conditions like heart disease or cancer management) for the benefit of patients and students need to gain experience of this new emphasis.

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