Scenes from Postgraduate Life

Is there a place for research in surgical training?

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An invitation to play devil's advocate is always welcome. On this occasion, it is hard not to take the side of the angels, since they seem to have many of the best tunes. The value of research by surgeons is immense. It includes the improvements in craft which have saved lives and reduced suffering for vast numbers of people, and continue to do so. Surgeons have also contributed to the understanding of basic biology, to an extent which is wholly disproportionate to our incidence. Our patron saint, John Hunter, virtually invented clinical research; five surgeons have received the Nobel prize for their discoveries.¹ Clearly the practice of research by surgeons needs no defence. However, the way in which it is organized is a legitimate subject for debate. I hope to convince you that current arrangements, which make research a *compulsory* part of surgical training, have deleterious consequences for both research and training.

The Association of Professors of Surgery have put their view with admirable clarity: '... a period of research activity has benefits not only in contributing to surgical science and knowledge *per se* but in helping to ensure that the individual has both the ability and motivation to continue to enhance his/her education throughout his/her professional life ...'² In a poll of its members, cited in the same statement, the Association found that among general surgical professors, 80% thought research essential to training; a further 18% considered it highly desirable. Among specialties, the figure was 47%. These official dicta both reflect and determine policy.

How effectively are the key objectives, contribution to knowledge and continuing education, being met? Research is a compulsory part of training in general surgery, and in some specialties. This is shown by Professor Taylor's data^{3,4} on applicants for senior registrar posts for the years 1982–1991 (see Figure 1; the numbers for short-listed candidates were, of course, higher).

Nine point six papers, 14.5 presentations to learned societies, and a higher degree by thesis in 2 years or a bit less! That was the norm for a new senior registrar in Wessex last year. A senior figure in another region insists that applicants with 30 or more papers are not unheard-of. This productivity is astounding and, as everyone acknowledges, market driven. Are all these budding surgeons making major contributions to nine new and important scientific findings, in a span of 2 years on the basis of no previous experience, often while carrying a clinical commitment? There is room for doubt.

The role of the market was forcefully brought home to me by a conversation with a friend, a surgical registrar to whom I would confidently take my family. He explained that he was not looking forward to 'doing' research. He felt it would remove him from treating patients, which he enjoys, and does well. But he knew he had to, so what topic should he pick?

'What interests you?', I asked.

'I don't know; nothing particularly.'

'What problem have you run across that you can't find the answer to in the books, which you might be able to dig into?'

'I can't think of one,' he replied.

Since then, I have had many similar conversations with other surgical registrars.

Figure 1 Publication and presentations by senior registrar applicants in surgery in the Wessex region 1982–1991. (data from refs. 3 and 4). ■—■ = presentations; *—* = publications.

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I believe, but cannot prove, that such attitudes: (1) are extremely common among dragooned researchers; (2) are not very likely to generate earth-shattering, or even moderately useful, advances in surgical knowledge; (3) intersect with the criteria of appointments committees to over-value the sheer quantity of publications at a significant cost in quality; and (4) are a major disincentive to research, and perhaps even to continuing self-education among many who have been appointed to district general hospital consultant posts.

What can be demonstrated is that by one widely accepted index of scientific value, British surgeons are publishing more and having less impact. More is not always better. Martin *et al.*⁵ have studied the worldwide rate of publication by scientific and medical specialties, using the Science Citation Index database over the years 1973–1984 (see Table I; it is worth noting the title of this article). They used the incidence of citation of papers by other workers as a measure of the value placed on them. Volume and content in British surgical publications are going in opposite directions; if publications rise by 43% and citations by only 8%, we are clearly doing something wrong. Similar arguments apply to many other fields in medicine. Maybe the obstetricians have a better method. They are saying less, and meaning more. Whether this arises by conscious intent, underfunding, or a macho disregard for science, is uncertain. However, their career ladder is less tied to publication.

Of course, citation indexing is, at best, an imperfect instrument.^{6,7} A recent review of references in papers in US surgical journals found that a majority of articles contained citation mistakes, or quoted references in ways which misrepresented their contents. The investigators concluded that 'the data support the hypothesis that authors do not check their references or may not even read them'.⁸ Perhaps an abstract of this excellent study should be nailed to the door of every clinical laboratory and postgraduate medical centre in the country.

The increasingly fierce disciplines of the market

are not the best stimuli to scientific creativity. They are also a powerful incentive to cutting corners, to minor, and occasionally major dishonesty. Dr Stephen Lock has made a study of malpractice in medical science. He classifies it as a continuum from errors made in good faith to outright fraud.⁹ Two elements in his schema are rapidly and effectively inculcated by doing compulsory, market-driven research: gift authorship (or 'you put me on yours and I'll put you on mine'); and salami slicing (or 'how many publications can I get out of the data?', also known as the minimum publishable unit). These minor infractions are unquantifiable, but it is likely that they account for a significant proportion of the nine publications and 14 presentations mentioned earlier.

More dishonest practices include piracy, plagiarism, and forgery. These are defined in a recent report by the Royal College of Physicians on misconduct in medical research¹⁰ as the theft of ideas, or of data, or invention of data, respectively. The total incidence of such events is unknown, and probably unknowable. Lock contacted 80 eminent individuals including one professor of medicine and of surgery in each of 29 institutions in Britain enquiring about their awareness of such malpractice in research. Of 79 respondents, 46 knew of cases which had occurred in the UK. Since several replies cited more than one case, Lock came to a total of 61 separate incidents of misconduct.¹¹ In a recent poll of some 100 postgraduate clinical tutors over half expressed similar knowledge (poll conducted at National Association of Clinical Tutors Summer Meeting 1992).

Clearly, the problem exists, and may be larger than we would wish to believe. Such misconduct is embarrassing to the institution in which it occurs, and its investigation is hedged round by the laws of libel. While it is obviously important to protect the innocent, there is also a tendency to blame whistle blowers and to cover up.

Equally, salami slicing, duplicate publication, and the tendency toward the minimum publishable unit¹² result in a trend, described by the Royal College of Physicians, 'to produce minor and insubstantial articles that do not advance the subject'.¹⁰ Incidentally, they recommend a limit to the number of papers which can be considered in a job application. Perhaps it would be better to go even further, and insist that curricula vitae contain a 100 word summary of the most important implication of the candidate's research.

The ritualistic behavior of appointments committees and those who seek to satisfy them tends to make a fetish¹³ of quantity at the expense of quality, a wholly predictable consequence of the misuse of market forces. Making research compulsory is not the optimum way of increasing surgical knowledge. Nor is compulsory research achieving its other

Table I Trends in the British share of world scientific publications and citations 1981–1984, by selected field

Field	Papers	Citations
Surgery	+43%	+8%
Endocrinology	+22%	+1%
Anaesthetics	+13%	–4%
Obstetrics/gynaecology	–24%	+11%
All clinical medicine	+5%	–2%

Data from 'The continuing decline of British science' (ref. 5).

objective of encouraging 'the ability and the motivation to continue to enhance his/her education throughout his/her professional life.'² Forcing able and strong-willed individuals to do something which they do not particularly enjoy (and threatening them with unemployment if they fail) is more likely to immunize them against any desire to repeat the experience.

What skills and attitudes are most useful to continuing self-education? How can they be imparted more successfully? I believe that the most essential qualifications are curiosity and a desire to assess new observations, conclusions, and techniques critically. Versatility in literature searching, a healthy and informed doubt about statistical methods, and the opportunity to share this effort and its conclusions with colleagues are undoubtedly useful. These are precisely the objectives of the ideal journal club. Early exposure to journal clubs, and strong incentives for all staff to participate in them might do far more to enhance education than dragooned research. It would also be desirable to institute training in the critical evaluation of research. This could take the form of a compulsory course, leading to a higher degree. Contents could include:

1. The use of Medline and other search aids, to give trainees facility in getting to the frontiers of knowledge in any field which they might need to explore in the future.
2. Critical analysis of experimental design, statistical methods, and actual publications. (If this module conveyed an informed scepticism about statistical evidence for scientific claims, it would justify the whole endeavour.)
3. Case studies of the way in which research findings have been incorporated into clinical practice.
4. Practical experiences of analysing and deciding whether and how to apply other people's findings for the benefit of one's own patients. This could be coupled with audit, so that the trainee investigated the management and outcome of a

selected condition in his or her unit, and wrote a short dissertation on the subject.

This programme could probably be encompassed within 6 months. Current practice of 'two years research' would leave time for other desirable activities. These could include clearing waiting lists, a period in general practice to learn what really happens to patients after discharge from hospital, or assistance to third world countries. It would also free up a considerable amount of money for these purposes. (Two years' support at registrar rates, plus capital equipment, consumables, superannuation and national insurance leaves little change out of £50,000.)

The alternative of the short course plus a socially useful option would be of value to trainees who do not want to 'do' research, but who would make excellent consultant surgeons. Hopefully, there will also continue to be a small pool of perverse individuals who are internally driven to pursue questions scientifically. A 6 month training in research methods would prepare them better for this, and might also infect others with the same desire.

To summarize, compulsory research does not necessarily produce good science or encourage self-education in later life. It is a waste of resources and contributes to significant and avoidable problems. The desirable objectives of training could be better accomplished by offering a choice of two distinct career paths. In surgery, and in research, there are many right ways to an end; there are also many wrong ways. One way which is usually wrong is to insist that there is only one right way.

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