

Anatomy teaching 'in the Yemen': an ambitious project to build an anatomy school from scratch

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The nature of basic science teaching at the medical school at Lancaster University and its 'parent' – Liverpool – continues to fascinate and engage local clinicians and academics.

Those of us who remember our dog-eared second-hand copy of Cunningham's 'Manual of Anatomy', with its covering of fragments of greasy, embalmed human tissue stuck to the pages, may look back nostalgically on a bygone era of medical education, where time served in the dissection room was a rite of passage that distinguished medics from the rest; but the reality is that change was always on the agenda. Liverpool has replaced its dissection room with selected prosection specimens while allowing a few students the opportunity to dissect. Lancaster does not currently offer human tissue in any form apart from post-mortem room visits. Anatomy is taught, not as a separate stand-alone discipline, but in the context of a problem-based learning curriculum, in stages over four years. The teaching material includes models and a virtual reality mannequin that allows hi-fidelity ultrasound examination.

Does it work? At the Education Study Day in April, Dr Martin Armer, Lancaster Medical School's Head of Communication, introduced a provocative motion for a debate. The motion *'There is too much anatomy teaching in the undergraduate curriculum'* was bound to generate passion, both on the day



Professor Colin Ockleford is Director of the Clinical Anatomy Learning Centre at Lancaster. He was a former and is a current member of Council of the Anatomical Society of Great Britain and Ireland. He is a current member of its Constitution, Meetings, Research and Investment committees. He founded the Society's Education committee. He has also been a Member of the Education Committee of the International Federation of Anatomical Associations and is a

current member of the Court of Examiners of the Royal College of Surgeons of England and a Fellow of the Academy of Medical Educators.

Colin is chairman of the Lancaster Medical School Research Committee, where he has established an intercalated masters degree programme in medical research, and is its Post-Graduate Tutor. He is Visiting Professor and Head of the Laboratory for Developmental Cell Sciences at Leicester University. His research work on reproductive immunopathology has led to the award of the Symington Prize, Fellowship of the Royal College of Pathologists and a DSc from St Andrews University. He was recently a partner in the European Molecular Biology of Implantation Consortium (EMBIC) a network of excellence funded by the EU at a level of 7.4 million Euros. Since starting work at Lancaster he has published an original description of an allo-epi-endothelium at the human maternofetal interface and has attended a Gordon Conference on the endothelial cell phenotype at Maine University in the USA to disseminate the findings.



The Clinical Anatomy Learning Centre (CALC) on the Lancaster University campus offers a range of model specimens to assist in the teaching of anatomy. The absence of any human tissue on site means that students can have easy and informal access to the Centre. Staff are on hand during timetabled sessions to demonstrate anatomy. A range of hi-fidelity models of joints and specialised models demonstrating lymphatic drainage is available. Is it better than the 'skeleton in the cupboard' that we used to have?

and in an entertaining series of email exchanges after the event. He was opposed, as one might guess passionately, by orthopaedic surgeon Bryan Rhodes. Each speaker had clearly had a different educational experience in dissection that had influenced career choice and attitude to the way in which it was to be taught. On a show of hands, the motion was comprehensively defeated. There is not, according to this result, *too much* anatomy teaching in our curriculum.

But what does that mean? Does it mean that there is *enough* or as some of our more conservative surgical colleagues maintain, *not enough*? Does the exercise and ritual of dissection act as a good learning technique or is it not relevant, or indeed safe for today's students? Has modern technology provided a suitable alternative? Possibly not, argues Dr Adam Taylor, Lecturer in Anatomy at Lancaster, who recognises that anatomical variation is difficult to replicate outside of a dissection room. Is the issue one of 'content', eg the extent of anatomical knowledge required to become a medical graduate, or one of 'teaching methods', eg cadaver dissection vs other methods?

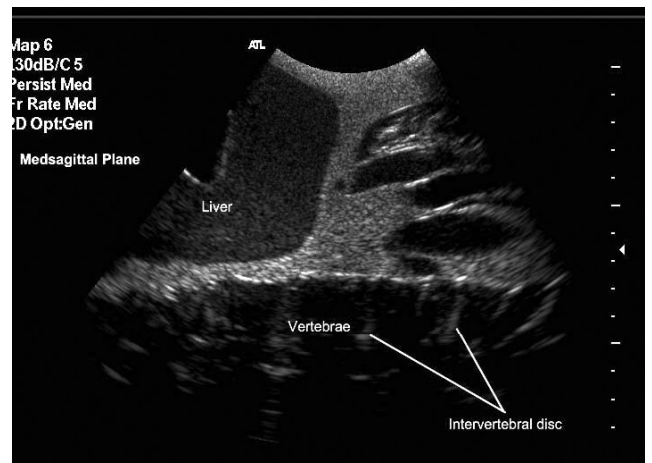


Adam Taylor was appointed Lecturer in Anatomy at Lancaster University in October 2011. He is at the forefront of delivering anatomy to Lancaster's cohort of medical students as part of their problem-based learning programme. He graduated from the Human Anatomy and Cell Biology course at the University of Liverpool before undertaking his PhD and maintaining his anatomical interests as an anatomy demonstrator to the University of Liverpool's cohort of medical, dental, anatomy and allied health professional students. Adam has extensive experience of undertaking and supervising dissection as well as teaching with prosected material, models and ultrasound. When not teaching anatomy his research interests lie in the rheumatology field with specific interests in arthritis, alkaptonuria and bone function and turnover.

The subsequent email trail sheds interesting light on the current state of the science. Rhodes himself is unrepentant in his defence of the traditional curriculum, quoting the experience of University College London's Professor Dean, whose anatomy department continues to teach by dissection:

... basically our students all dissect, all 350 per year, and they have four lectures on thorax, five on abdo and pelvis in first year, then 11 or so on limbs and vert column, and eight on head and neck. Each lecture is followed by two hours average on dissection in the lab with associated e-learning and imaging SPL. All medics can choose from several anatomy and applied anatomy SSMs in their first two years as an added extra. Students say they choose UCL because we dissect still and they ask for more anatomy not less. We are currently introducing anatomy and imaging as a vertical module to run through the clinical years with revision before each clinical attachment in applied anatomy and imaging as appropriate, for example orthopaedics, medical attachments, neuro and endocrine etc etc ...

Local academic leaders have responded vigorously to Rhodes's challenge. Colin Ockleford, Professor of Anatomy at Lancaster, confirms that revision sessions on anatomy are currently planned in Lancaster to coincide with clinical attachments. Former consultant in Intensive Care Medicine



Ultrasound imaging is a useful technique for demonstrating the relationship between visceral organs to students. Familiarity with ultrasound imaging technology is now an essential skill for many medical specialties — anaesthesia, respiratory medicine, gastroenterology, rheumatology and cardiology, as well as radiology. Exposure to it in the undergraduate curriculum seems sensible. The image displayed is taken from a model abdomen designed for this purpose. In theory, students could themselves examine each other using ultrasound in the laboratory, but in practice the risk of unexpected diagnosis (including an apocryphal tale of pregnancy!) poses some ethical and governance challenges.

Dr Mark Smith, who currently leads the clinical skills programme at Lancaster, takes a characteristic radical approach, describing the subject of anatomy as a 'postgraduate discipline'. Smith argues that the current curriculum design prepares a student for the next level of training and describes a continuum between the student years and the foundation years that makes the study and examination of a single subject such as anatomy at undergraduate level unnecessary. He describes how a student might be expected to have a basic level of proficiency in intermediate life support on qualification but would wait till foundation training to acquire advanced life support skills. According to this argument, the only anatomy that is required of the new medical graduate is that which is required for the practice of being a foundation year (FY) 1 doctor. The curriculum is already full enough and there is currently no evidence that traditional teaching methods make for more complete FY doctors. He explains:

... putting more in, eg anatomy teaching, means something has to come out. This is the reason why the

Burke and Hare, or proteonomes? What is anatomy?

For many doctors, the whiff of formaldehyde stimulates the amygdala to recall long hours dissecting: a rigorous discipline supervised by surgeons in training. The original 1961 anatomy curriculum adopted by the University of Birmingham certainly was physically taxing — 44 hours each on lower limb and upper limb, 98 shared between thorax and abdomen and 117 hours on head and neck. It is possibly not surprising that the value of this investment, and the techniques of learning that went with it, have been scrutinised by those charged with delivering a workable undergraduate curriculum for the 21st century. But this view of anatomy fails to understand the breadth of the subject, which like all others has to adapt to reflect new technology and current scientific and educational priorities. Today's university anatomist is a scientist with a broad background in biological sciences and, in the case of Lancaster's team of Ockleford and Taylor, has a wide-ranging and relevant research base. Interest in proteonomes, a 'cutting edge' of cell research, is already developing in Lancaster and the department of anatomy is part of this advance. Professor Jim Morris, himself a Morbid Anatomist, sees the reputation of the University's department of anatomy determining the longterm security of the Lancaster Medical School. Morris teaches anatomy by demonstration at hospital post-mortems, which all students attend. He notes with interest that students ask about the cause of death during the demonstration. To him this is a clear sign that the students have already dismantled the arbitrary boundaries that the various scientific disciplines created for themselves: no longer the 'ologies' but 'structure and function in health and disease'.

GMC encouraged the design of new curriculum and teaching techniques as led through Tomorrow's Doctor publications. There is too much medicine for a medical student to learn in five years. Contextualised learning is best. I would argue that undergraduate education is about right. Postgraduate has to catch up with the changes. Why teach a medical student the anatomy required by an orthopaedic surgeon? Wait until the student has embarked on their specialist training.

Smith has a point, though the continuing discussion as to what should be in the curriculum will continue to frustrate and divide opinion over the coming years as Lancaster's medical school seeks to achieve independence from Liverpool. There are many subjects which could be added to or taken out of the curriculum. The recent appointment of clinical tutors in physiology and microbiology will drive this change, but change must be consistent with the strategy of a problem-based curriculum.

It might be several years before we can be confident that the curriculum delivers a satisfactory product. But as far as the introduction of new material is concerned, Smith and his University colleagues, Professor Anne Garden and Professor Jim Morris, insist that anybody seeking to teach the Lancaster students has to accept that the University determines the nature of the curriculum and pays the NHS Trust for its delivery. As far as they are concerned students have chosen or been selected for a problem-based experience.

It is an approach which satisfied the General Medical Council at its recent visit. It is entirely consistent with its 2009 Tomorrow's Doctors strategy, to which Ockleford provided advice about a curriculum in anatomy. And, judging by the number of applications for the course, it is delivering satisfaction.

Undergraduate microbiology teaching

After returning to microbiology after only six years as Medical Director, I found myself surprised at the changes in clinical practice over such a short time. There were many more frail elderly patients in most clinical areas. Patient journeys had become much more complex with greater rates of complications and prolonged hospital stays for many. Infective complications were commoner, antimicrobial use had risen and antimicrobial resistance was becoming a public issue attracting political interest. Yet, at a time when more sophistication was required in infection management, trainee doctors and medical students appeared to have become much less literate in microbiology. I was aware that microbiology had fallen off the curriculum in many medical schools but was still surprised that it is possible to graduate as a doctor knowing no microbiology at all. Ignorance was widespread

and this was having a major impact on the hospital ecology. The longterm solution lies in rectifying this so, for the past six years my work has naturally taken me into educational issues. Building on our university experience with the science students, we have started to raise the profile of microbiology amongst the medical undergraduates by exploiting opportunities in the curriculum and providing a little structured teaching. With the help of microbiology colleagues in Morecambe Bay and nearby trusts we are giving the students exposure to microbiology in the first, third and fourth years together with opportunities for SSM's and SAMP's. My aim is to give exposure in every undergraduate year and create a new generation of infection-literate doctors.

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