Rationale

It is generally acknowledged that anatomy is one of the basic medical sciences which form the essential foundations for the training of doctors in the discipline of medicine. In traditional medical courses over many years, dissection has been regarded as an essential and unique feature in the study of topographical anatomy but more recent developments in medical curricula and calls for change have challenged this approach so that many medical students now graduate without ever dissecting the human cadaver and yet appear to be competent and adequately prepared for postgraduate training. The abandonment of dissection is symptomatic of the ongoing debate and argument about how best to teach anatomy, since presently, there is a lack of consensus and scientific evidence in this area.

Interest in anatomy and dissection has varied over the passage of centuries with peaks of interest followed by decline. Are we now witnessing another decline in the scientific merit of anatomy as a subject due to its failure to evolve and adapt quickly enough?

The AMEE Guide No. 41 addresses in detail the debate and on-going arguments about how best to teach anatomy. It presents a careful review of the place of anatomy in medical education including its history as a discipline, and how it is learned, delivered and assessed in both traditional didactic and modern integrative medical curricula (Louw et al. 2009). The Guide also discusses the current challenges and future measures that need to be addressed to ensure the continued development of anatomy as a relevant subject in any medical curriculum.

Challenges

The restructuring of medical curricula to accommodate modern medical education and integrate new courses such as molecular biology and behavioural sciences resulted in pressure to reduce more traditional subjects. Anatomy appears to have borne the brunt of this with considerable reduction in teaching hours especially for dissection. In many medical schools dissection as part of the anatomy course has been abandoned or is being phased out. The change is partly due to philosophical changes in educational methods but also to changes in departmental structuring in which many departments of anatomy have been subsumed into large multidisciplinary units, adding considerable research strength but with fewer staff, in particular those medically qualified, whose prime interest is in teaching anatomy whilst the majority who are non-medically qualified pursue biological research driven by the need to obtain research grants, many of which determine their future career prospects.

The debate about how to teach anatomy polarises into those who favour dissection of human cadavers and consider it a mainstay of rigorous basic science training needed to underpin subsequent clinical learning (Newell 1995; Aziz et al. 2002) and those who support newer teaching modalities (e.g. self-directed and small-group learning, and computer-assisted learning) and argue about not only the educational value of the dissecting room experience, but also about ethical, moral, and legal aspects related to the use of human
materials in teaching (McLachlan et al. 2004; Lempp 2005). These standpoints tend to be supported by either the traditionalists (predominantly surgeons and anatomists) or the modernists (predominantly educationalists), respectively. This, however, does not address the fundamental reasons why anatomy is in decline.

Under old-style methods students were expected to learn detail with little understanding of relevance. Learning anatomy became a rite of passage rather than an educationally valid process, being regarded as didactic, traditional, overly factual and unable to adapt to modern educational methods – an obvious target for those looking to reduce curriculum content and modernise the learning experience. Anatomy is also subject to many extrinsic factors which puts more pressure on an overstretched system. The combination of an archaic image and an unsupportive academic structure may explain the decline of anatomy more than changes in teaching methodology in the last two decades (Turley 2007). Traditionalists perceive a decline in knowledge and attribute it to the modern methods of teaching and learning. Reformers point to evidence that modern approaches offer equivalent results in assessment when compared to traditional courses (Jones et al. 2001; Winkelmann 2007).

The principles of modern curricula are to give students authentic experiences and clinical exposure from the start of the course. The widespread introduction of Problem-Based Learning (PBL) has presented challenges and opportunities in teaching and learning, requiring attention to be focused on when, how much, and how to teach anatomy. Some educators believe it pointless in arguing for and against the so-called traditional and the PBL methods. Both have their strengths and weaknesses and neither has shown any clear advantage over the other (Yeager 1996). They are not mutually exclusive and schools often utilise a mixture of the two.

Besides dissection being very time consuming and creating pressure on the timetable for other disciplines, other factors may have compounded its decline, including increasing numbers of students entering medical school together with shrinking anatomy teaching budgets and availability of cadavers in some parts of the world (Harris et al. 1994), emotional impact and disturbance on students (Horne et al. 1990; Abu-Hijleh et al. 1997), high cost of providing and maintaining dissecting facilities, space restrictions, potential danger of working with infected material and chemicals (Demiryureck et al. 2002) and shortage of suitably qualified anatomists. While dissection is generally considered a ‘skill’ the question that has often been asked is whether dissection constitutes the best approach to achieve acquisition of anatomical knowledge. All of these may have led to less dissection, greater use of prosected and plastinated specimens, fewer lectures, more tutorials and peer learning and widespread use of web-based and computer-based resources to learn and teach anatomy (McLachlan et al. 2004; Pandey and Zimitat 2007).

**Future directions**

The focus of medicine is changing and the mere fact of something being traditional does not confirm its validity. Integration of knowledge between disciplines through coherent and collaborative course design is a central feature of the modern medical curriculum and PBL. Provided adequate anatomy learning objectives are set and provided these are assessed appropriately then contextualised learning is possible (Abu-Hijleh et al. 2005a, 2005b). The horizon of undergraduate anatomy must be broadened away from the historical restricted shadow of the surgeon and concentrate on providing a core curriculum that has relevance and applicability to the many branches of clinical medicine which can be reinforced later in clinical training (Abu-Hijleh et al. 2005a). By using problem-based scenarios, anatomical details are reduced but the ability to apply anatomical knowledge increases.

Anatomy teaching should encourage ‘deep learning’ and relevance rather than ‘superficial learning’ resulting from rote learning of traditional anatomy courses. Medical students who learn anatomy from prossections and audiovisuals perform just as well in anatomy
examinations as those who learn by dissection (Jones et al. 2001; Winkelmann 2007). Foremost in the anatomy teacher's mind should be how doctors encounter anatomy in clinical practice? The answer is through living and surface anatomy on the one hand, and through medical imaging on the other (Abu Hijleh et al. 1995, 2005b). Emphasis on these two aspects should dominate anatomy teaching for medical students from the beginning of their course. If the student's learning about anatomy is to change then it also follows that the nature of assessment must also change.

Conclusions

Although it may be considered optional in the undergraduate programme, experience of cadaver dissection at postgraduate level in the training of anatomists and surgeons should be mandatory. Electronic representations of the body as alternatives to cadaver dissection, whilst valuable DO NOT provide sufficient learning experience to understand the complex human body structure.

Anatomy is best taught and learned in context with emphasis on structure and function in health and disease. There is enormous potential in learning anatomy in the context of need. A core curriculum in anatomy should provide the basis for physical examination of patients, interpretation of medical imaging and competence in basic procedures including emergencies with room for flexibility of schools to utilise resources to best advantage. Assessment systems must be aligned with the teaching methods and the stated learning objectives or outcomes of the curriculum/course (Chakravarty et al. 2005). Finally of all the factors adversely affecting the teaching of anatomy probably the most pressing is that of available time. This must stimulate us to focus on the purposes of our teaching methods and what students really need to know to become safe and effective clinicians.

References


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