Role of Anatomy in Outcome Based Integrated Curriculum for Medical Undergraduates

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Background
In traditional curriculum dissection, osteology, surface anatomy, microanatomy and developmental anatomy are considered as essential. Forty five percent teaching hours of basic sciences phase is allocated to anatomy. It is now recognized that the body of information with potential relevance to medical practice is far too large for instructors and students. It is rapidly becoming impractical to try and include everything in the undergraduate curriculum. Anatomy as a subject has been overly didactic and traditional. As a result, it does not match with clinically trimmed subjects of 21st century medicine. The new system-based curriculum at many medical schools includes less than two hours of gross dissection per week, down from eight hours in the core traditional curriculum. Some schools have removed cadaver dissection from the classes. Studies conducted in integrated problem based learning medical curricula had shown that innovations used in teaching anatomy, such as interactive multimedia resources, have not replaced students' perceptions about the importance of dissection. It is required to discuss challenges and measures needed for continued development of anatomy as relevant subject.

Challenges
Medical education has seen changes driven by evidence from the fields of psychology and education. Retention of knowledge is promoted when students are actively involved in their learning. Learning is a constructive process in which learners collect new information to their existing knowledge networks, thereby forming and strengthening meaningful connections between concepts. Many medical schools have incorporated active learning methods into their course. This leads to shift from “Traditional” teacher centred education to innovative student centred education which focused on active self-directive either in groups or individually. The rise of integrated curricula and approaches that are different from traditional didactic methods has given rise to concern about the level of knowledge attained by students graduating from innovative programs.

There are two directly competing realities concerning the pre-clinical years: fast expansion of knowledge in basic medical disciplines, requiring more teaching time and a strong tendency to reduce teaching time, particularly in problem-based curricula. Debate on anatomy teaching polarises into two groups: first those who favour dissection of human cadavers mainly supported by traditionalists (predominantly surgeons and anatomists) and second those who support newer teaching modalities (e.g. self-directed learning, problem-based learning (PBL), and computer-assisted learning (CAL), mainly supported by modernists (predominantly educationalists). Ethical, moral, and legal issue related to the use of human materials in teaching have been raised regarding dissection of human body.

Reduction in curricular time and inadequate revisiting of the topics are effecting students knowledge in integrated curriculum. Spiral curricula in integrated medical education is stressed, but clinical topics are easily integrated, while integrating basic sciences in the later curricular years appears to be difficult. Traditionalist have put their view that dissection itself ideally suited as part of self-directed learning. Traditionalists perceive a decline in knowledge and attribute it to the modern methods of teaching and learning. In PBL based learning, medical school curricula were developed based solely on small group, student-centred learning. It is assumed that problem-based rather than memory-based learning created a more usable body of knowledge and second that the medical skills that were most important for treating patients were problem-solving skills rather than memorisation.

PBL students develop a backward reasoning technique (hypothetical-deductive) to explain clinical cases, while traditional lecture-based students use forward reasoning. As argued by educationist the benefit of a structured problem-based learning group is due to its relation with psychotherapeutic principles and positive effects on student communication skills. Studies reveal considerable variation in duration and staffing of anatomy teaching, according to the type of curriculum. As we are using different type of curriculum like system based, PBL based or traditional...
in different schools, studies suggest there may well be substantial variation in the level, content and depth of anatomical curricula across different schools and it should be quantified. A “competition for space and time” between recently introduced but quickly accepted perspectives (e.g., surface and imaging anatomy, applied and clinical anatomy, anatomical variations) that are becoming an integral part of the anatomy teaching, is also an emerging issue.5

Future directions

The focus of medicine is changing and the mere fact of something being traditional does not confirm its validity. Evidence is available that knowledge retrieval is facilitated when knowledge is acquired in a situation resembling those in which it will be applied. Differences between students in perceived and actual knowledge of anatomy are not related to innovative (PBL) or traditional curricula.2 PBL is supposed to facilitate integration of students’ knowledge, transfer of concepts to new problems, application of basic science concepts to clinical problems, intrinsic interest in subject matter and development of skills to solve problems, learning how to learn, self-directed learning, and motivation for lifelong learning.13 By moving towards problem-based scenario, anatomical details are reduced as argued by surgeons and traditionalists but the ability to apply knowledge increases. In traditional system, anatomy knowledge is taught in first two year of curriculum. It is required to emphasise on vertical integration of anatomy in developing curricula as evidence showed that integration of basic sciences in clinical years is relatively difficult. This will expose students to anatomy teaching throughout undergraduate (preclinical and clinical), postgraduate and later professional training. It is proved that there is positive effect of visual-spatial ability on medical student’s performance in a gross anatomy courses.1 We should move towards living anatomy, surface anatomy and medical imaging with inclusion of live body scans, virtual three dimensional images, and plastinated models as learning resources.

Conclusions

1. It is unlikely to prove supremacy of one teaching method over another. Curricula should be developed by content experts with taking care of spiral approach.
2. Vertical integration of anatomy with clinical subjects should be dealt with coordination of educationist and content experts to avoid trimming of important and relevant content of basic science subjects.
3. Core curriculum of anatomy should be designed keeping in mind skills required for basic medical graduate for e.g. physical examination of patients, interpretation of medical imaging, competencies required for basic procedures.
4. Dissection should not be labelled as synonymous of traditional courses and regard it as antithesis of PBL. There is need to focus on moving from passive, didactic, highly detailed courses towards functionally and clinically relevant courses irrespective of the method of teaching. Effects of clinically oriented teaching combined with recurrence of topics in the curriculum are more powerful than those of traditional or innovative didactics.
5. Assessment systems must be aligned with teaching methods and curriculum outcomes. After agreement of core knowledge, the assimilation must not assessed rigorously only in the first year of medical school but with on-going assessments throughout clinical school and even beyond. It will stimulate to focus on teaching tools and knowledge of anatomy students really need to be safe and effective clinicians.

References
