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Educational Paradigm Change To Dissect to Prosect or to Game (Simulation) that is the question?

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Introduction

There is no question that a thorough knowledge and understanding of the gross architecture of the human body underlies sound medical practice and, therefore, comprises an early curricular goal. Thus, the exploration of palpable human anatomy in the dissection laboratory addresses the pivotal goal of establishing a comprehension of the three-dimensional relationships underlying clinical applications and practice. To accomplish this objective, the 2 more obvious pedagogical issues revolve around content and process: "What anatomical facts does every competent practitioner need to know?" and "What instructional or educational method(s) will likely succeed in attaining the desired learning objectives?"

Current thinking

Those engaged in teaching basic sciences and in particular gross anatomy, primarily to medical students, have expressed a variety of opinions about the most appropriate means of introducing students to human anatomy. What distinguishes any gross anatomy program is the continuing requirement for a laboratory experience with cadaveric materials. But does the traditional course format, which has included extensive student effort in the laboratory, warrant retention in today's curriculum? Sound arguments can be developed in defense of a range of positions. Some programs consider that complete cadaver dissection by every student constitutes the best way for them to learn gross human anatomy; others find that facilitated sessions with prosected bodies accomplish a comparable outcome more effectively and efficiently. Others are completely convinced that dissection through advanced technologies such as gaming and simulation may be the answer in today's modern age.

Current Dilemma

When one is looking at the Health professionals training in Ontario College education we must recognize that there are limitations to the training in pure Human Anatomy. Due to the limitations of licenses for cadaveric dissection (under the Human Tissue Act), the need for creativity in delivering meaningful anatomy lessons for Nursing and all the para-allied health disciplines is needed. Mattonne (2008) stated that in order to keep up with the current demand for workers in the burgeoning health care field, many Colleges are instituting new or modified programs to prepare students for future employment. Several factors (Table 1), which will be discussed in turn, must be taken into consideration when deliberating over which format to select. Included among the most important are: 1) the curricular orientation of the institution (whether student or course-centred), 2) efficiency in an environment of increasingly limited time and physical resources, and 3) the success of students in passing exams. According to McLachlan et al. (2004) and Parker (2002), research has shown that student learning from prosected specimens is just as effective, if not more effective than traditional dissection.

The University of Sydney (2014) describes on their website the broad differences between dissection and prosection. They state that "there are two main types of anatomical preparations; dissection and prosection. Dissection involves the progressive identification and removal of tissue and structures whilst prosection requires the preservation and presentation of specific structures for further teaching purposes".

In the chart below one can see the pedagogical differences between the two training methods. We can also identify the relative merits of each educational opportunity.

Table 1.

Dissection	Prosection
• process-oriented	• content-oriented

• heavy emphasis on facts and detail	• facilitates problem-based learning and critical study of principles
• does not permit review of previously dissected material	• permits review of earlier course material
• difficult and time-consuming	• maximizes efficient use of student time
• leads to destruction of tissue (preservation not possible for future prospective students)	• preserves valuable resource material
• wasteful of limited resource material	• maximizes efficient of resource material
• provides in depth training to specialists	• provides similar outcomes on exams

Curriculum Objectives

An essential role of anatomy teaching in undergraduate medical education is to provide students with the anatomical skills which enable them to practice medicine. It is irrefutable that the observation of the whole body provides a solid understanding of human morphology, essential for good medical education. But the word anatomy is derived from the Greek word *ana* = up, and *tome* = a cutting, hence cutting up of a body (University of Sydney glossary of terms 2014). It follows that it is the role of the anatomist to dissect. However, medical, nursing and other para- allied health are not anatomists. While dissection of the whole body is a method of learning and has certainly a strong heuristic appeal, it may be suggested that it is not the process of dissection which is important but, rather, the opportunity to examine the resulting specimens, provided that the course is carefully structured. This is definitely a great advantage that gaming capitalizes on. The sheer use of technology is also an instructional medium which today's generation of students gravitate to, identify with and enjoy.

Modern medical education is evolving and demands problem-based, student-centred active learning programs. All health professional schools today are searching for a reduction of factual teaching, a more critical study of principles, and more free time for study. In a student-centred approach to learning, students are encouraged to develop research, intellectual and diagnostic skills. Suitable problem-based exercises encourage students to cultivate and maintain an active mind. However, this intent is invariably defeated with a more traditional approach, where the logistics of dissection, and its lengthy and time-consuming nature, lead to a false emphasis on process, rather than content. The critical study of principles is not the most conspicuous feature of dissecting manuals, and students following this program will have little free time for critical analysis, for dissecting the whole body is notoriously time-consuming and detail-oriented. Rather than gaining an understanding of form, function and anatomical relationships, students invariably spend an exorbitant amount of laboratory time deciding how or what to cut. The head, for example, like the pelvis, was not designed with dissection in mind, and the time and ingenuity needed to dissect the infratemporal fossa is emphatically not educationally worth the effort.

Moreover, we can scarcely defend the process of human dissection on the grounds that it instills in the student a detailed knowledge of human topography. Dissection is, by its very nature, destructive and reductionist. Thus, the success of dissection *presupposes* an accurate and detailed topographical knowledge of human anatomy that is more the domain of the specialist rather than the novice. For students enrolled in programs outside of surgical specialties, the degree of minute and systematic details required to produce a quality dissection is unnecessary and, indeed, impossible to achieve, since student efforts are invariably met with the destruction of the very tissue they are attempting to observe. Many of same objections may be leveled at the practical skills which students are said to acquire while making a dissection of the whole body. But these considerations too are poorly applicable in many of the health science fields given that they all possess different learning outcomes and competencies. Even amongst the hierarchical training of medical students the degree to which anatomy training through dissection is being questioned. Certainly as student's

progress to their specialties (surgical residencies) the need for more anatomical exploration through cadaveric dissection is paramount.

Today we are currently in an age where technological APP's are being developed in order to serve and educate the current batch of future health care professionals. The beauty of the technological APP is that the instructor may dial into the Anatomy application at any level, novice, intermediate or advanced. This advantage allows the professor a way of reaching their particular audience regardless of where the student falls on the spectrum of healthcare practitioner (primary care physicians to para -allied health professionals). The ability to experience the exploration of the human body at a self-directed pace is truly a modern day gift for the aspiring student. Not only can the professor demonstrate the various of architecture of the human body, but the students may playback and review the approaches at their own leisure at a later time.

Conclusion

The art of gaming and simulation with respect to educational delivery of curriculum method of learning is expanding on a growth curve that is record setting. The future looks very bright for this type of subject matter engagement. Our once touted only ways of delivering curriculum are being challenged and will certainly push the learning in a symbiotic way between instructor and student. Will the practice of cadaveric dissection become extinct? I don't think so. What I do know is that it is exciting to be both a student in Health Sciences and a teacher today. The teaching of human anatomy is at the forefront of pedagogical change. I know that our students are being academically prepared today in a very modern and diverse environment. I look forward to seeing more changes as we blend different modes of delivery into existing curricula.

When speaking with a number of traditionalists who teach anatomy, I am reminded of the first time experience when the Health Science student (future practitioner) is introduced to their cadaver. For a lot of students this will be the first time that the students experience death and a glimpse into their own mortality. For me, this was a valuable lesson that I still believe the APP's will have a hard time simulating. Only time will tell.

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