

Educational Forum

Designing an effective student evaluation of teaching (SET) questionnaire for cadaveric dissection

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ABSTRACT

Recent changes in curriculum have seen a curtailment in the time devoted to the teaching of gross anatomy, one of the most integral components of medical education. This has resulted in the reduction, and in some cases the elimination of cadaveric dissection, most significantly due to the huge amount of resources involved in conducting a cadaveric dissection program. Nevertheless, cadaveric dissection still comprises a significant part of the time devoted to the teaching of gross anatomy. Hence it is of paramount importance that maximum benefit be derived from cadaveric dissections since it offers unique advantages, most significant being the appreciation of the three-dimensional concepts of body organization. The key part of effective anatomy teaching using cadaveric dissection is having the best instructors for this task. While student evaluation of teaching (SET) questionnaires have been used to evaluate instructor proficiency in lecture classes, there is no SET questionnaire that has been specifically designed for the assessment of instructors involved in cadaveric dissection. The aim of this article is to design a questionnaire specifically for the evaluation of the competency of instructors involved in cadaveric dissection, and reinforce the arguments for the continued use of cadaveric dissection in the teaching of anatomy.

Keywords: Cadaveric dissection, Student evaluation of teaching

IMPORTANCE OF ANATOMY

The study of anatomy is one of the cornerstones of medical education, and forms the basis of the understanding and appreciation of various other medical disciplines.¹

It is crucial for the acquisition of clinical reasoning skills and eventually patient management.² Time spent in cadaveric dissection has been postulated to improve professionalism, teamwork and communication skills among medical students.³ However, due to recent changes in the medical education curriculum anatomy courses are facing the ever increasing challenge of

providing fundamental understanding of anatomical concepts in the face of drastic reductions in the time devoted to the learning of anatomy.⁴⁻⁶

This has been reflected in the concerns of anatomists and clinicians about physician competency and patient safety, and the feeling of insecurity among medical students about their anatomical knowledge.^{6,7}

These issues have also been reflected in an increase in litigation cases related to surgical malpractice and physician incompetence and insurance claims due to an increase in anatomical errors.^{8,9} Hence, it is of utmost importance to maximally utilize the time devoted to the

study of cadaveric anatomy based on the available resources.

Since a reversal in the medical curriculum in highly unlikely, strategies need to be devised to teach anatomy with maximum effectiveness within the limited time period. An examination of medical curriculum has shown that majority of medical schools in the United States devote 41-80% of the allotted time for gross anatomy for cadaveric dissection.¹⁰ Since, students typically spend more time in cadaveric dissection than they do in lectures, it is necessary to ensure maximum enrichment and student engagement during this time period. Though cadaveric dissection is recognized as an integral part of the learning process in anatomy as it provides a three dimensional vision of human anatomy and helps in the development of haptic skills, cadaveric dissections have been reduced or eliminated in medical schools due to the huge amount of resources required to run an extensive dissection program.^{1,4,11-14} Further, arguments that have been offered against cadaveric dissection are that it is time consuming, extravagant, possibly hazardous and emotionally stressful.^{5,14} For medical schools still running cadaveric dissection programs it is imperative that the most efficient teaching occurs during those valuable student contact hours. As it is obvious that effective teaching is heavily dependent on having the most efficient instructors, this article attempts to design the most effective student evaluation of teaching (SET) questionnaire for evaluating instructor competence during cadaveric dissection. It is significant that, a literature search did not yield any information regarding studies that have specifically evaluated the skills of an instructor in a cadaveric dissection class as a measure of the effectiveness of teaching in a gross anatomy course.

METHODS OF TEACHING OF ANATOMY

Changes in teaching techniques and curricula, many of which reflect prior anatomical learning, have resulted in a shift from the traditional methods of teaching anatomy, which includes mainly didactic lectures and cadaveric dissection.^{11,13,14} These methods are being gradually replaced by the introduction of Computer based learning (CBL) and medical imaging both of which rely on highly detailed images of body parts using computed tomography (CT), magnetic resonance imaging (MRI), and ultrasound.

While it is an established fact that knowledge acquisition is most efficient when multiple senses are involved, this aspect is missing in computer based teaching modalities where students most significantly lack the sense of touch, which is one of the most important advantages of cadaveric dissection. In addition, computer based programs most significantly undermine the fundamental concept of anatomy which emphasizes that organs need to be laboriously and elaborately uncovered before being available for study. For example, students often fail to realize that the sharply delineated collateral bands of joint

capsules as they appear in computer generated images are artificially created, and are 'nothing more' than distinct regions within the connective tissue continuum of the joint capsule.

Another approach that is being adopted by some institutions as a substitute for cadaveric dissection is the use of the living anatomy using peer physical examination (PPE), body painting and ultrasound examination. This method, however, has a very restrictive use due to ethical and personal constraints such as gender, religious beliefs and the location of the body region to be examined. The use of prosected and/or plastinated specimens has also been offered as an alternative to cadaveric dissection. Plastinated and prosected anatomical specimens are body parts that have been previously dissected by anatomy staff. However, these methods can only enhance learning by supplementing, rather than replacing cadaveric dissection, since students often lack the appreciation of the three-dimensional orientation of deeper structures such as the heart, large vessels and some abdominal and pelvic organs.^{15,5} In addition, plastination, a specialized method of preserving prosected specimens, suffers from limitations of tissue shrinkage, and most significantly the loss of natural texture and tissue color. Hence, it is reasonable to assume that there is no effective replacement for cadaveric dissection.¹

NEED FOR EFFICIENT TEACHING OF ANATOMY

One of the key factors determining teaching effectiveness is the competency of the personnel involved in the teaching process. The best lecturer in the classroom is not necessarily the best instructor for cadaveric dissection. So, while it is obvious that the most efficient instructors are required during cadaveric dissection, the major challenge lies in testing their competence.

The current practice in most institutions is to evaluate teacher competency using the results of SET questionnaires.¹⁶ However, SET questionnaires have been widely criticized since it has been observed that students can favourably rate a lecturer based on charisma, and appearing to be knowledgeable, rather than on the actual proficiency of the lecturer.¹⁶⁻¹⁸

However, due to the lack of sufficient tools to measure teaching effectiveness that strongly correlates with student learning, SET questionnaires continue to be a useful, but ultimately imperfect, measure of teaching effectiveness.^{2,7,17-19}

These concerns regarding the accuracy and predictability of SET questionnaires can be allayed to a certain extent during cadaveric dissection where instructor proficiency is directly judged on the capacity to guide the dissection, help in locating anatomical structures and provide a clear understanding of the spatial relationships of the human

body. Also since SET questionnaires have been shown to be most accurate with small class sizes, it is reasonable to assume that they will be more reliable in the assessment of instructor proficiency during cadaveric dissections where students typically work in small groups.^{2,10}

DESIGNING AN EFFECTIVE SET

The focus of cadaveric dissection class is not just on being able to locate anatomical structures. It is key to developing three-dimensional visualization concepts, and contributes to the development of motor skills, empathy and an appreciation of the value of group work. In fact, a study by Nwachukwu et al, 2014 have shown that better quality of dissection is directly related to better performance in Gross Anatomy and Embryology examinations conducted by the National Board of Medical Examiners.²⁰

At the very onset, in trying to evaluate the efficiency of instructors in the supervision of cadaveric dissection it needs to be emphasized that only responses from students who attend classes regularly provide the most accurate evaluation of teaching proficiency of instructors.^{21,22} So, it is imperative that the responses from students who have attended at least 70% of dissection classes only be included during the analysis of the questionnaire. While it is customary to enquire about the success and effectiveness of the dissection course, a more relevant enquiry would be the willingness to retake a similar course in the future. In terms of instructor effectiveness, the key focus should be on the clinical knowledge, competency and clarity of the instructor.

Also, an instructor should work towards developing empathy, one of the core values in an effective physician-patient relationship, and use the experience of cadaveric dissection to develop professionalism, and communication skills in medical students towards the establishment of the beginning of a physician-patient relationship. It is also vital that an instructor has appropriate interaction with students to solicit student attention and foster student participation. The aim of this questionnaire is to design a valid and reliable SET for the assessment of the competency of an instructor involved in cadaveric dissection.

A point of much debate in the use of SET questionnaires to judge teaching proficiency has been the timing of the administration of these questionnaires. Typically, SET questionnaires are conducted at the end of the term, which denies the lecturers the opportunity of make changes in the course that they are being evaluated. Hence, it might be more reasonable to conduct these evaluations in the middle of the term when there are still opportunities to make changes to the teaching methods. A sample questionnaire is provided that might serve as a template for evaluation of the competency of a faculty as an instructor in the cadaver lab (see attachment).

CONCLUSION

The time devoted to teaching anatomy is likely to decrease rather than increase in the coming years. Though an eclectic approach can be adopted towards the teaching of anatomy, cadaveric dissection presents the best opportunity to teach anatomy and with the current available tools it cannot effectively be replaced by other teaching methods. Hence, research needs to be directed towards the how students can derive maximum benefit from cadaveric dissection towards the learning of anatomy. Though SET questionnaires are not considered to be imperfect for assessing teacher competency, they nevertheless provide the only useful option currently available. Hence if SET questionnaires are to be used to determine instructor proficiency in anatomy, they are most relevant during cadaveric dissections.

Hence instructors need to be evaluated on their abilities to develop constructive, collaborative and contextual learning techniques in students, and encourage skills that emphasize “directed self-learning” rather than “self-directed learning”. An instructor in the cadaveric dissection class should be able to provide the right type and amount of support and guidance, and be able to fade at the appropriate time and rate to facilitate student learning.

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Questionnaire

1. I attended dissection classes more than 70% of the time: True/False.

	Question	Strongly agree	Agree	Disagree	Strongly disagree	Not applicable
1	If the dissection course was offered I would retake it					
2	The instructor was able to provide spatial relationships of organs within the context of the human body					
3	The instructor helped me to study efficiently					
	The instructor helped me in learning group work and leadership skills					
4	The instructor helped me to develop intuition and deeper understanding of important anatomical concepts					
5	The instructor was able to apply concepts learned in class in the dissection class using examples or illustrations					
6	The instructor was able to stimulate intellectual curiosity and answer challenging questions					
7	The instructor enhanced my respect towards the human body					
8	The instructor helped me to reduce my fear/apprehension of dissection					
9	The instructor helped me to appreciate that a cadaver is a real person					
10	The instructor spoke clearly at an appropriate volume and pace					
11	The instructor encouraged students to ask questions or make comments during dissection					
12	The instructor advised students on how to prepare for tests or exams					