

Attitudes Toward Cadavers and Teaching Methods in Anatomy

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## Attitudes Toward Cadavers and Teaching Methods in Anatomy

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Anatomy is considered to be the cornerstone of medical education. Current school of thought for anatomy pedagogy are the classic dissection and prosection. With technology, other ways of teaching anatomy are emerging. The continued use of cadavers to teach anatomy is currently a hot topic among anatomist, medical educators, and within anatomical associations and societies. Are cadavers still needed for teaching anatomy in medical education? There was limited research that took the students perceptions of how anatomy is taught into account. In this qualitative study, the attitudes of medical students toward cadavers and alternate teaching methods used in anatomy were analyzed. The study was specifically aimed at first year medical students currently taking anatomy at a medical school at a major university. 20 first year medical students were interviewed for the study. The findings of the study are important for those involved in budgeting and curriculum development in medical education. The findings of the study seem to be in line with the most accepted practice of teaching anatomy, and indicate that students find value in the use of cadavers as teaching method.

## Dedication

To Grandma Lou...my harshest critic and my biggest fan. Love you and miss you, Gram.

PREVIEW

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## TABLE OF CONTENTS

Dedication.....	iii
Acknowledgements.....	iv
Table of Contents.....	v
List of Tables.....	viii
List of Figures.....	ix
List of Appendices.....	x
Chapter 1: Introduction.....	1
Introduction.....	1
Purpose Statement.....	3
Research Questions.....	3
Significance of the Study.....	3
Delimitations.....	3
Conclusion.....	4
Document Overview.....	4
Chapter 2: Review of Related Literature.....	5
Anatomy in Medical Education.....	5
Pedagogy in Medical Education.....	8
Cadaver Dissection Used in Teaching Anatomy to Medical Students.....	9
Alternate Approaches to Teaching Anatomy to Medical Students.....	15
Anatomy Instruction.....	23
Definition of Terms.....	25

Summary.....	27
Chapter 3: Methodology.....	28
Purpose.....	28
Researcher Position.....	30
Research Design.....	33
Participants.....	34
Data Collection.....	34
Individual Data.....	35
Observations.....	35
Data Analysis.....	35
Trustworthiness.....	39
Ethical Issues.....	40
Summary.....	41
Chapter 4: Findings.....	42
Summary of Findings.....	42
Theme 1: Student Perceptions of Teaching Methods.....	45
Theme 2: Emotional Experiences.....	55
Theme 3: Donor Appreciation.....	59
Theme 4: Types of Learners.....	60
Theme 5: Student-Driven Collaboration.....	63
Conclusion.....	65
Chapter 5: Discussion.....	67
Relating to the Literature.....	67

Limitations.....	72
Implications for Practice.....	73
Recommendations for Future Research.....	74
Conclusion.....	75
References.....	77

PREVIEW



## List of Tables

Table 1 Participant Breakdown.....	42
Table 2 Teaching Methods Used in Anatomy.....	43

PREVIEW

## List of Figures

Figure 1 Relationship of Themes.....	44
--------------------------------------	----

PREVIEW

## List of Pictures

Picture 1 Cadaver Dissection Lab.....	44
---------------------------------------	----

PREVIEW

## List of Appendices

Appendix A: Participation Recruitment Email.....	85
Appendix B: Research Participation Consent.....	86
Appendix C: Interview Protocol.....	89

PREVIEW

## CHAPTER 1: INTRODUCTION

Pedagogy is a difficult yet encompassing word. The art and science of teaching (Merriam-Webster, 2018) may be the printed definition; but, it is actually much broader. Teaching practices are widely recognized as critical in defining the manner of student learning (Mintz & Tal, 2018). Good teaching should consider both content and pedagogy (Dillon, 2010). Knowledge on the topic alone is not enough. Pedagogy is important in delivering content in a way that helps the student better understand the knowledge.

There are many different pedagogical approaches. Participatory, active, and experimental learning have all proved to be successful in higher education (Mintz & Tal, 2018). Other effective pedagogies include active, experimental, interdisciplinary, collaborative, and student-centered learning (Mintz & Tal, 2018).

All students learn in different ways. How the information is presented to the student might determine how or how much a student learns. “Learning is a complex and multifaceted phenomenon that has intrigued both researchers and educators for a long time” (Weurlander, Scheja, Hult, & Wernerson, 2016, p. 462). Medical students, in particular, face a very daunting task of learning a substantial quantity of detailed knowledge and integrating it into a coherent whole in a very limited amount of time (Weurlander et al., 2016). So, how does one approach teaching necessary information to medical students? A successful teaching strategy should include the actual experiences of medical students (Cotter, Tuner, McAuliffe, & Higgins, 2016). Active learning (Fatima, Arain, & Enam, 2017), observations and small group activities (Barrett & Scott, 2014), and problem-based and task-based learning (Ramzan, Mushtaq, Ansar, Bibi, Sabah, Maghal, Nadeem, & Waheed, 2015) are a few of the teaching methods medical

educators use. So, what is the most effective of those methods? Faculty and other medical educators have different ways of teaching gross anatomy; but, there is a deficit in the research on what approaches are the most effective for student learning experiences.

Pedagogy in medical education is often not thought about beyond content. In gross anatomy, information is delivered to first year medical students and they are expected to learn and retain the information. How the content is delivered is overlooked. Medical educators, like many professional program educators, do not generally have any formal or informal instruction in basic concepts and principles of education (McLeod, Steinert, Chalk, Cruess, Cruess, Meterissian, Razack, & Snell, 2009). Gross anatomy is often considered the foundation of medical science, and is often considered to be where medical students learn the “language of medicine” (Wisco, Young, Rabedaux, Lerner, Wimmers, Byus, & Guzman, 2015, p. 15).

With anatomy being the cornerstone of both medical education, as well as understanding pathology in the human body, it is imperative that the first year medical students are taught in a way that they are able to learn (Guzman, Young, Rabedaux, Lerner, Wimmers, Byus, & Wisco, 2015). The traditional pedagogical approach to teaching and learning gross anatomy is the dissection of the human body (Wisco et al., 2015). The current schools of thought for anatomy pedagogy are the classic dissection and prosection (Guzman et al., 2015). Dissection is the dissecting or cutting of a cadaver to study its anatomical structure and internal parts. Prosection is a dissection of a cadaver or a part of cadaver by an experienced anatomist in order to teach anatomical structure or to demonstrate the dissection.

### **Purpose Statement**

The purpose of this case study was to analyze the attitudes of medical students toward cadavers and alternate teaching methods used in anatomy. The focus was on first year medical students who currently were taking anatomy at a medical school at a major university.

### **Research Questions**

The research was guided by the following research questions:

1. What are the thoughts of first year medical students regarding the use of cadavers in teaching anatomy?
2. What are the thoughts of first year medical students regarding the use of alternate teaching methods in teaching anatomy?

### **Significance of the Study**

This research is significant for future anatomy educators, as well as those who design curriculum for medical school or for anatomy, as well as those involved in budgeting for a medical school or for an anatomy lab.

### **Delimitations**

The study took place during the winter quarter of the first year of medical school. The study was located within a major university medical school. The sample for the study was 20 first year medical students who agreed to participate in the study. The selection criteria consisted only of the fact that they were a first year medical student who wanted to, and agreed to, participate in the study. The participants were volunteers. Consent forms were reviewed with the participant; and, the participants signed the consent form at the time of the interview. The only risk to the participant was a breach of

confidentiality. To avoid that, all identifying information was omitted from all shared documentation, pseudonyms were used, and all documentation was destroyed by the primary investigator once the study was complete.

### **Conclusion**

Pedagogy is often difficult to describe or even define. Pedagogy in medical education can be even more difficult. Medical education is often thought about beyond just content, and often uses hands-on and clinical approaches in preparing students to become medical doctors. This study will work to understand how students learn and whether or not they appreciate the hands-on use of cadavers, or are more comfortable with or learn better from alternate methods of instruction.

### **Document Overview**

This research study was organized into five chapters: this chapter, which is the introduction, a review of the literature, the methodology of the study, research findings and conclusions, and discussion and suggestions for future research.



## CHAPTER 2: REVIEW OF RELATED LITERATURE

The literature provides a context for a qualitative study of teaching methods and approaches used in teaching anatomy to medical students. The review includes prior research related to anatomy in medical education, pedagogy in medical education, cadaver dissection used in teaching anatomy to medical students, and alternative approaches to teaching anatomy to medical students. The chapter concludes with a definition of terms and summary of the research study's contribution to the existing literature.

### **Anatomy in Medical Education**

Anatomy is often considered to be the cornerstone of medical education. For that reason, we must first look at anatomy in medical education and its importance in teaching and training future physicians.

Older (2004) provided an overview of why anatomy is a must for teaching the next generation of doctors. The author stated that a sound knowledge of anatomy is essential from the beginning of a medical education, and can only be achieved by exposing and examining the tissues and structures within the body. Older (2004) added that the best way to reveal these tissues and structures is through study by dissection. Since medicine is “the compassionate solving of problems by the application of scientific knowledge,” anatomy is essential to medicine. Older (2004) concluded that more focus should be placed on anatomy in medical education. If it is the aim of medical schools to train active, caring, and compassionate medical doctors who are compassionate to patient care, a well-designed cadaver dissection-based instruction in anatomy is a necessity to a well-rounded and complete medical education.

Medical students have opinions about anatomy in medical education, as well. Kurkcuoglu, Pelin, Zagyapan, & Ogus (2015) presented opinions of medical students about phase I anatomy education. Medical students have asserted that they do not believe they had received sufficient anatomy during their undergraduate education to be as successful as they need to be in medical school. Their lack of anatomy knowledge created deficiencies in anatomical knowledge as they embarked in clinical training and graduate gross anatomy courses. Students expressed their desire for more time dedicated to anatomy education in medical school, specifically to hands-on training in the anatomy labs. Students also acknowledged the importance of anatomy in later education, as well, and its reflection in clinical practice. For methodology of the anatomy courses, the majority of students indicated they wanted to do their own dissections and watch the teaching staff do dissections to better understand the anatomical structures and dissection techniques during the hands-on trainings. Kurkcuoglu et al. (2015) concluded in their study that it is important for medical educators to consider the opinions of the students. A clinically oriented, vertically integrated curriculum supported by increased hands-on dissection anatomy in the laboratory should be considered when designing an anatomy course for medical students.

Sbayeh, Qaedi Choo, Quane, Finucane, McGrath, O' Flynn, O'Mahony, & O'Tuathaigh (2016) also reviewed the relevance of anatomy in the perspective of medical students in their study. Not only did they look at the medical students' perspectives, but also those of clinicians and educators. The authors used a quantitative study to identify areas and requirements which medical education curriculum developers should consider when designing anatomy courses. Modern medical curricula scientifically undervalues

anatomy teaching as students have very few contact hours in didactic or laboratory portions of anatomy. All groups showed a high level of agreement that anatomy education is an important element of the medical curriculum. A dissatisfaction was expressed with the number of hours dedicated to learning anatomy within the curriculum. Lecturing and anatomical laboratory were the main preferred methods for learning and teaching anatomy across all groups. This supports the use of cadavers as a tool for teaching by dissection and/or prosection. The authors concluded that clinicians were more likely to question the link between anatomy education and clinical practice and suggested that anatomy education and clinical practice should be more closely linked. Students varied in their opinions on anatomy in medical education, but could agree that it contributed to the development of medical professionals.

Medical school curricula are generally organized into two years of primarily basic science courses and two years of clinical rotations. In a study by Klement, Paulssen, and Wineski (2011), anatomy as the backbone of an integrated first year medical curriculum is explored. Moorehouse School of Medicine in Atlanta, GA chose to restructure their first year medical curriculum from the basic model that most medical schools practice to something a bit more integrated. The team in charge of designing this curriculum focused the first year curriculum on clinically relevant normal human biology, including the basic science courses of Human Morphology, Biochemistry, Physiology, and Neurobiology. The end result of the restructuring phase was that the course content from all four courses is organized around both a regional cadaver dissection and the body's organ systems. The authors concluded from the study that anatomy has long been recognized as important for all areas of medicine, and still is considered the backbone of

a medical education. Human dissection is the starting point in medical education, and in integrating other courses into the dissections and study of anatomy, a systems-based presentation of the normal human biology can be achieved to great success.

Over the years, teaching gross anatomy to first year medical students has gone from a 'stand-alone' discipline to one with more clinical emphasis. A study by Wilson and Nava (2010) from Loma Linda University School of Medicine in California indicated that student response to this progression was overwhelmingly positive. In fact, all students surveyed found that anatomy seemed more relevant, and most found anatomy easier to learn. The study also confirmed that first year medical students have a strong clinical orientation, which helps with both the teaching and learning of gross anatomy. To conclude, the authors suggested the incorporation of clinical emphasis in the gross anatomy course at the beginning of a medical student's career as being essential and more relevant.

### **Pedagogy in Medical Education**

Pedagogical approaches to teaching in the medical education realm vary from school to school, department to department, and professor to professor, just as with higher education in general. However, medical education is unique because of the intensity of the curriculum and the material. Students are exposed to many types of teaching and learning, including theory and lecture, hands-on laboratories, clinical training, research, and observations. This section will look at pedagogy in medical education.

Training medical doctors has not always been a part of education. Only in recent history has medicine as a teaching course and a scientific specialization taken shape

(Shok & Sergeeva, 2016). The current medical education structure consists of a complex organizational model that involves first a bachelor's degree in medicine and additional professional education, including residencies that provide for additional specialization (Shok & Sergeeva, 2016). According to the authors, medical theory is based on an integrated study and understanding of a complex living organism – the human body. An interdisciplinary approach to medicine connects the philosophical study of medicine with a clinical approach and connecting with patients. A working definition of medicine, in fact, is “the study of the interaction of a person and the surrounding natural environment, with a view to preventing disease, treating or alleviating it, is that branch of human knowledge known by the name of medicine” (Shok & Sergeeva, 2016, p. 41). The aim of medical education is to educate and develop students into critical thinkers. For this reason, when creating a course in medical education, it is important to take into account elements such as cognition, integration, fragmentation, continuity and professional orientation as these provide support to not only the student experience, but also to the direction and formation of the main concepts in his or her professional competencies (Shok & Sergeeva, 2016).

### **Cadaver Dissection Used in Teaching Anatomy to Medical Students**

A hands-on approach to teaching medical students gross anatomy, along with theory and lecture, is the most common form of pedagogy. This generally, but not always, includes some type of cadaver or cadaveric specimen dissection. It is important to look at this approach in teaching anatomy to medical students.

Gross anatomy for medical students has long been thought of as a “rite of passage” for medical students as they train to become medical doctors (Wisco et al.,

2015, p. 15). It has traditionally been the forum in which medical students not only learn the language of medicine, so to speak, but they also experience their first relationship of a professional nature with a patient, learn how to work with colleagues to accomplish a difficult task, and for many, face mortality for the very first time in their lives (Wisco et al., 2015). The traditional pedagogy for gross anatomy has been dissection of the human body. For this, students typically dissect human cadavers and possible cadaveric specimens. Doing so, they discover anatomical structures and relationships as they go from superficial to deep (Wisco et al., 2015). The dissection pedagogical approach requires a large amount of contact time with faculty and teaching assistants experienced in dissection. As a comparison to dissection, the prosection pedagogical approach is one that uses pre-dissected cadavers and cadaveric specimens for teaching and learning (Wisco et al., 2015). Different schools use prosection differently, possibly viewing dissected specimens or through teamwork and palpation of structures. The authors point out that during a lab utilizing the prosection pedagogical approach, students spend the entire lab time studying and learning about anatomy instead of just finding anatomy (Wisco et al., 2015). At David Geffen School of Medicine at the University of California Los Angeles, students are given the option to participate in a dissection gross anatomy course or a prosection gross anatomy course. They also participate in an anatomy course utilizing both pedagogical approaches. At the University of California Riverside/UCLA Thomas Haider Program in Biomedical Sciences, students learn anatomy through dissection only. All students come together during their clerkship years. For this study, Wisco et al. (2015) reported student's attitudes and thoughts toward the educational approach to mastering anatomy, with students coming from all approaches mentioned:

dissection only, prosection only, or both dissection and prosection. Online surveys were used annually for three years to all students participating in the study. Students were asked the question “What value does gross anatomy education have in preclinical medical education?” (Wisco et al., 2015, p. 17). All students who responded viewed anatomy as a highly valued part of the medical curriculum; however, the anatomy pedagogy did influence how students valued their anatomy experience. Dissection only students from UCR/UCLA thought it would have been helpful for them to receive contextual or clinical context, while prosection./dissection students from DGSOM at UCLA overwhelmingly advocated for a first year curriculum of prosection pedagogy (Wisco et al., 2015). They did, however, acknowledge the importance of dissection, but possibly later during their medical education.

Human dissection in medical education has even been considered more than just anatomy. For Rehkemper (2016), medical education should be more than simply fact-driven instruction, but also connected to a mission for professional acculturation. Rehkemper (2016) points out that human dissection courses are important for many other things. Human dissection courses have often been linked to a psychological challenge, mostly due to its position at the beginning of a medical curriculum (Rehkemper, 2016). The author also explained that it has key components like establishing values, the concept of humans, and physician competencies (Rehkemper, 2016). Without human dissection courses, these things are lost. And even since the 1970s, when time expenditures and the intensity of supervision of the human dissection courses started to diminish, these things have begun to get lost (Renkamper, 2016). These are important experiences for future medical professionals, and are being overlooked due to budgetary

restrictions, health concerns, and other factors. Rehkemper (2016) argues that human dissection should remain an integral part of medical education, not just to learn anatomy, the more humanistic things, as well. Self-reflection at the end of a dissection course as the students pay tribute to their “patients” is an essential part of the psychological process for these young minds (Rehkemper, 2016). Human dissection should remain part of the curriculum and focus on being a good platform for these students to learn to become healers and advisors for life decisions (Rehkemper, 2016).

A study was conducted to determine the role cadavers play in anatomy education by using a survey sent to randomly selected medical and dental schools (Appaji & Kulkarni, 2012). The survey included questions regarding the status of the cadavers, the courses which were offered, the presence of voluntary body donation programs, the registrations of the body donation programs, the concept of organ donation, and the practice and the mode of disposal of the cadavers (Appaji & Kulkarni, 2012). The authors of the study believed that a strong basic science foundation is essential for effective training of medical professionals, and that human cadavers are very much needed in order to teach anatomy (Appaji & Kulkarni, 2012). For the study, a list of all medical and dental colleges in the country was obtained, with random sampling of 96 institutions selected (Appaji & Kulkarni, 2012). Of the 96 colleges selected, only 55 responded to the survey. Of the 55 colleges that responded, 49% of the institutions had an ideal student cadaver ratio of 10:1 (Appaji & Kulkarni, 2012). The other colleges had a mixture of unclaimed bodies and donated bodies, with voluntary body donation programs observed in 70.9% of the institutions who responded (Appaji & Kulkarni, 2012). Most of those with body donation programs were in the early stages of the