

Lessons from the Dead:
The Experiences of Undergraduates Working With Cadavers

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ABSTRACT

Dissection of a human cadaver is a time-honored tradition for teaching anatomy in medical education. However, in recent years, for a variety of reasons, including costs and ethical concerns, some medical programs have ceased cadaver dissection in exchange for virtual dissection of cadavers in cyberspace. Past research suggests that students find work on a cadaver to be distressing, but also rewarding. This study analyzed journal entries from 21 undergraduate students working with a cadaver in a gross anatomy course. An empirical-phenomenological analysis of the data identified 19 common themes among the participant's journal entries. In addition, the analysis disclosed how participants usually felt a need to justify the act of dissection. Finally, the analysis identified how students differed in the varied ways they coped with the ambiguous status of the cadaver, which was sometimes viewed as a deceased person while at other times experienced as a fascinating machine. Based on the findings, the researches offer recommendations for helping students to better cope with the experience of cadaver dissection and to use the experience pedagogically to better prepare students for the stress of the medical world, especially issues surrounding death and dying.

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This research study aims to investigate how the gross anatomy course, and work with cadavers in particular, functions to socialize students into a medical way of understanding, experiencing and coping with the body and mortality. The issue has importance because some evidence suggests that medical students could benefit from a course process that helps them to develop better coping methods for dealing with the stress of mortality salience. Without a process that facilitates adaptive coping mechanisms, medical workers can inadvertently develop maladaptive coping patterns, which can lead to later burnout or to dehumanizing treatment of patients. The research will also investigate how the evidence highlights the pedagogical benefits and consequences of using a cadaver for instruction purposes.

In universities and colleges across the country the most common form of teaching advanced anatomy involves the dissection and prosection of a human cadaver. The practice of using human cadavers as a learning tool has been used for over five hundred years (Kemp & Wallace, 2000; Richardson, 1989; Sanner, 1997). In recent years there has been much controversy surrounding the ethics and effectiveness of using human tissue as a learning tool. In particular, there has been concern that work on cadavers may have negative consequences for students that may outweigh the benefits of using a human body as a learning tool. In some cases, institutions of higher learning have switched over to the use of virtual cadavers (McLachlan, Bligh, Bradley, & Searle, 2004). However, some research suggests that learning anatomy with actual cadavers generates more knowledge of the human body, even if the students' scores on the written portion of the

exam are no better than students receiving only lecture and readings (Jones, Paulman, Thadani, & Terracio, 2001). In addition, some commentators have speculated that learning from a dead human's body could instill a sense of compassion in the student which may generalize to work with living, breathing people.

The anatomy laboratory serves as a functional learning tool for the students; it is the first time they are viewing the body from a perspective different from a textbook (Madigan, 1999). Diagrams and plastic body parts all have a "classic" look to them in text books, but when a student makes a dissection of a human, the body parts show real differences among individuals. Nevertheless, viewing a human cadaver may be quite unnerving for students. A study of 100 Australian students found that students were affected both physically and emotionally when they encountered a cadaver for the first time (O'Carroll, Whiten, Jackson, & Sinclair, 2002). Thirty percent (30%) experienced dizziness, sore eyes, nausea, and constant references to the "horrible smell." Another thirty percent of the group reported having psychological effects such as post-dissection anxiety and depression. Another study found that ten percent (10%) of students exhibited a stress reaction one week following their first dissection, with percentages dropping to 6.3 at one month, 3.6 at eight months, 2.1 at one year, and zero at 2 years (Hancock, Williams, Taylor, & Dawson, 2004).

Students use a range of different coping mechanisms to deal with the stress that is related to the experience of dissection and prosection of humans. The most commonly reported mechanism for coping was discussing with family and friends the emotions and experiences the students were going through (O'Carroll, Whiten, Jackson, & Sinclair, 2002). The most frequently reported negative forms of coping were avoidant coping and

denial, including intellectual detachment (Hafferty, 1988; Charlton, Dovey, Jones, & Blunt, 1994; Nnodim, 1996). Some researchers fear that, if students are not taught to properly deal with the stress they may experience while working with the cadavers, they will be unable to appropriately deal with the stresses of working with live patients (Hafferty, 1988; Gustavson, 1988). Consequently, some researchers have recommended the inclusion within the curriculum of courses on emotions and how to manage them (Marks, Bertman, & Penney, 1997). Others have suggested that students should be gradually introduced into the experience so that it is not such an initial shock all at once (Arraez-Aybar, et al, 2004).

While researchers have conducted a variety of empirical studies on students taking gross anatomy and working with human cadavers, further work was required to clarify the unfolding, qualitative process of students' experience over the course of a semester. In particular, we expected to find students struggling with the ambiguity of the cadaver's status as both a learning tool and a dead person. One primary aim of this research is to identify strategies for coping with this ambiguity and the emotional consequences of these strategies in undergraduates working with a cadaver.

Drawing upon the phenomenology of embodiment (Leder, 1990), we found it helpful to consider the different meanings the body can have depending on the intentionality of the experience. In German, the language permits a distinction between the meaning of the body as *korper*—the body taken up as a thing, as in anatomy—and *leib*—the lived body as it appears through the first-person experience of an embodied human being. In anatomy, the student approaches the body in such a way that the body is constituted as having the meaning of *korper*, literally a corpse or cadaver, which is the

foundation of medical knowledge and education. But when the sole focus of the student is upon this medical, anatomical body, then it is easy to forget that the body in everyday life rarely appears through this medical lens but more often appears as the lived body that is intentional and self-effacing in its engagement with various important projects in the world.

In work with the cadaver, the body of the other in death might also have a similar ambiguity. When looking at the body of the cadaver and using it as a learning tool to further their education in anatomy, the students may be found to describe the body in more cool and dispassionate language, along the lines of the Germanic body of *korper*. And yet the deceased body can just as easily, if not more readily, lend itself to being a memorial body, such as the body laid out at a funeral or wake. The medical body of anatomy may lend itself to precise terms for parts and an appreciation for the mechanical relations among those parts. In contrast, the memorial body may call instead for a narrative (Gillies & Neimeyer, 2006) The body of the deceased seems to demand from the viewer a story about the former life of the body and even stories about what comes after death. In short, our analysis will pay special attention to the ways that students grapple with the ambiguity of the body, and how these perceptions of the body are reflected by and in turn illuminate the emotional dynamics of the student confronted with these lessons from the dead.

Method

The participants included 21 Daemen College students who were enrolled in Gary Styn's anatomy course. Students volunteered to write journal entries about the experience of working with the cadaver. Journal entries were collected at two time points in the semester – two weeks into the course, when students had just begun work with the cadaver, and during the last two weeks of the course, when students had worked with the bodies over the course of almost the entire semester.

For our analysis, we focused primarily upon the initial journal entries for this study. We found that the second set of journal entries did not add substantially to the information already contained in the initial, very richly descriptive batch of journal descriptions.

We took a phenomenological approach to data analysis (Giorgi, 1985; Polkinghorne, 1989; Robbins, 2006a, 2006b; Robbins & Parlavecchio, 2006; van Manen, 1990; Wertz, 1983). We read each description with empathic absorption into the world described by the participant. Next, we read through each of the journal entries multiple times, and coded portions of the journal according to emerging, common themes. When we had an exhaustive list of all the themes identified in the journal entries, we then identified all those passages in the journal entries that reflected the theme. Finally, we wrote a general structural description of the phenomenon which took into consideration how the common themes fit together and implicated one another as a whole. In contrast to conventional approaches to phenomenological research, we did not restrict ourselves to general themes found throughout the data. While identifying common themes, we also identified categories of experience that spontaneously emerged from the data and which

served to distinguish in meaningful ways one style of experiencing the phenomena from others.

Results

Common Themes

Stress and anxiety about confronting and dissecting the cadaver

- #8: “My first time in the anatomy lab was very stressful to me.”
- #31: “I’ll have to admit that I am very skittish about the whole dissection of a human body thing.”
- #35: “Before entering the anatomy lab to dissect the cadaver, I expected to be very nervous.”
- #33: “I was a bit apprehensive about walking into the anatomy lab.”
- #22: “I never thought I would mind anatomy lab, I thought I would be able to handle it just fine. But the days leading up to my anatomy lab I started to feel very hesitant. I didn’t know what to expect, what position they exactly would be in and what I would be able to see.”
- #11: “I did have a dream that one of the cadavers had reanimated and was very upset with us for not having asked his permission to study his body...”
- #16: “When I first walked into the cadaver lab, I was a little freaked.”
- #13: “There was a bit of uneasiness just as the initial entrance to the lab occurred...”

- #29: “I didn’t even want to touch the body let alone be near it.”
- #1: “In the days leading up to my first experience with cadavers, I was both excited and nervous.”
- #32: “...I was still a little apprehensive about touching the body.”
- #2: “I think the first time I saw the cadaver I was overly nervous.”
- #18: “Right from the start I was very uneasy about going into a lab with cadavers, and actually having to dissect them.”

Stress and anxiety about the course

- #8: “On top of this, I really didn’t know what I was doing as far as the dissection went. I had read the instructions, but still was not sure what to do. When that lab time was over I just wanted to get as far away from the lab as possible. I told myself that I was not looking forward to doing that again.”
- #23” “I was nervous the first day, not wanting to cut or tear any vital structure.”
- #29: “I would rather study a book or flashcards to learn the material, not dig around with structures that sometimes don’t look like they are supposed to or are mutilated or cut off, and then if I have to go back to a nicely dissected body with clear labels and complete the practical.”

Enjoyment of the course

- #8: “After this dissection I couldn’t wait to get back to the lab again.”
- #35: “Ultimately, I look forward to anatomy lab because I find it very interesting.”

- #6: “My experience in anatomy lab has been very educational and amazing so far.”
- #12: “I love that I can be a part of learning the human body in this manner.”
- #20: These first four weeks of anatomy lab have been a great experience for me.”
- #19: “...it’s quite interesting to be dissecting the whole human body.”
- #21: “And so far it has been a great hand on experience which I am very enthusiastic to work on.”

Curiosity about and interest in the body

- #8: “I found that I was learning so much from the lab times and it was exciting to see what new thing I could learn each week.”
- #31: “The lab was very interesting once I got over the initial fear of being around a dead body.”
- #35: “Ultimately I look forward to anatomy lab because I find it very interesting.”
- #33: “...I look at it as one of the greatest experiences of learning...”
- #26: “The first day was very interesting.”
- #6: “My experience in anatomy lab has been very educational and amazing so far.”
- #12: “There are so many structures and it can be a little overwhelming but fascinating at the same time.”
- #16: “Most people don’t get the chance to see all of this, so it was very, very cool.”

- #20: “I’m interested in working in a surgical field and this was my first time using a scalpel on a human being, so it was a little exciting for me.”
- #1: “I was excited to actually see what a cadaver looked like and to actually see what the insides of a person looked like.”
- #32: “I have always been interested in dissection...”
- #19: “...it’s actually quite interesting to be dissecting the whole human body.”

Sense of awe and amazement about the body of the cadaver

- #22: “I was in awe of what we were doing to this person...”
- #6: “The complexity of the human body amazes...it is amazing how people are so different from each other.”
- #16: “...it was a pretty awesome experience.”
- #20: “I marvel the human body and its complexity.”
- #1: “It is weird that I never met these people while they were alive, yet I know so much more than they have known about their nerves, arteries, veins, or muscles, and they lived in this body for 90 years.”
- #32: “I am constantly in awe of the human body.”
- #19: “It is amazing to see what the structures really look like and are arranged as compared to what we have learned for years through books!”

Gratitude toward the donor

- #26: “I know that these people donated their bodies so that students can learn anatomy more intimately and I appreciate their generosity.”

- #11: “I am very thankful to the woman that donated her body and her family for allowing us to learn from her.”
- #12: “I forgot to appreciate the generosity of what these people have done.”
- #16: “I tried to give him that sort of respect, because it is extremely respectable that he gratefully gave us his body so that we could learn.”
- #23: “I am very respectful of her, because she gave her body for science to help me out.”
- #32: “I do appreciate that she donated her body to science; that decision must be a difficult one to make.”
- #2: “...I more appreciate that they donated themselves than I feel bad about the fact that they passed away.”
- #18: “...I appreciate that those individual donated themselves so that we as students could learn from them.”

Sadness about the donor’s death when donor was considered to be young

- #11: “I was saddened to learn that our particular cadaver was only 43 at the time of her death and felt like she deserved more time that she was allowed.”
- #12: “We think that she had Down Syndrome but it is still sad for someone to have died that young.”
- #1: “I wondered if this person felt her life was complete before she died, and why she thought to donate her body, when she was only 42 years old when she passed away. Did she know she was going to die soon?”

Dissection in some cases had a surreal quality

- #20: “The situation is also much less personal because the faces of the cadavers are covered. This sort of makes the whole experience surreal.”
- #32: “It is very surreal to spend two hours a week leaning over a body, very similar to yours, and cut it apart.”
- #19: “If I didn’t think about the fact that this person was alive only a few months ago, I would have been fine. But the thoughts that he had been living and well for seventy years or so seemed surreal.”

Participants’ statements implied they felt some guilt about dissecting the cadaver

- Note: Not a single participant explicitly acknowledged feelings of guilt about dissecting the cadaver, but almost every participant found the need to somehow justify the act of dissecting the cadaver. The act of justification implies a need to absolve one’s self of guilt. We identified three kinds of justification: (1) the “full life” justification, (2) the “donation” justification, and (3) the “shell” justification. These three forms of justification are identified (below) as separate, common themes.

Participants sometimes reduced guilt about dissecting the cadaver by thinking the donor had lived a “full life”

- #8: “We learned he was 97 years old and that he died from CHF and atherosclerosis. This was a great comfort to me. I felt relieved by the fact that he had lived a very full life.”

- #12 (aborted “full life” justification): “This week in lab we actually learned the ages and the causes of deaths for the cadavers. The lady my lab is working on died at 43. We think that she had Down Syndrome but it is still sad for someone to have died that young.”
- #2: “We got the information about their ages and stuff and most of them are very old so hopefully they were able to have long fulfilling lived before they passed away.”
- #33: “I know that my cadaver lived a long life.”

Participants sometimes reduced guilt about dissecting the cadaver by interpreting the dissection as the donor’s wishes

- #26: “I know that these people donated their bodies so that students can learn anatomy more intimately and I appreciate their generosity.”
- #22 (aborted “donation” justification): “I was in awe of what we were doing to this person and even though they had donated their life, I couldn’t help but thinking did they really know what was going to happen to them.”
- #11: “I am very thankful to the woman that donated her body and her family for allowing us to learn from her.”
- #16: “...he gratefully gave his body so we could learn.”
- #20: “...willingly donated their bodies...”
- #23: “In the back of my mind she was a human, but then I thought that she donated her body to science and it was ok to cut her.”

- #32: “I do appreciate that she donated her body to science; that decision must be a difficult one to make.”
- #2: “...I more appreciate that they donated themselves...”
- #18: “...I appreciate that those individuals donated themselves so that we as students could learn from them.”

One participant justified his or her guilt by perceiving the cadaver’s body as a mere shell of the person’s former, living self

- #22: “The cadavers seem to be only a shell that was once a person...”

The great majority of participants habituated to the experience of dissecting the cadaver so that, very soon after the initial sessions, they felt less and less stress and anxiety over time

- #8: “As the weeks progressed I got more used to being around the body.”
- #31: “After the first few incisions I was able to get over the fact that there was a dead body in front of me, especially since I could not see her face. The lab was very interesting once I got over the initial fear of being around a dead body.”
- #33: “I was relieved to know that the face and hands would be covered because it makes the process of dissecting a bit more difficult because the face and hands make the cadaver more human like; however, I have since gotten over that.”
- #22: “By the end of the lab I too was helping with the dissection but still very hesitant.”
- #16: “...I’m so glad I could get past all of that and really learn.”

- #13: “I was a bit unsure of what to expect when going into my first lab, but can report at this stage in the game I am unaffected by the presence of a dead body.”
- #23: “Dissecting seems to become easier with each time we have lab.”
- #28: “Since I had seen the back before, it wasn’t that bad afterwards (I just put it out of my mind and didn’t think about it).”
- #18: “Now each time I go in, I look forward to what I’m going to learn and how it’s going to contribute to making me a better athletic trainer, and eventually a PA. The uneasiness I felt was all in my head and the anticipation of having to actually get started. It doesn’t bother me at all now...”

Participants, each in their own way and more or less explicitly, acknowledged the body as a “memorial body”—that is, as a body that serves as a reminder of the donor’s former life

- #8: “My only experiences with dead bodies were from wakes and funerals and I was not really sure how I would react to cutting a person up... Was this man someone’s father, someone’s husband?”
- #31: “The night before our first dissection lab I had a dream about my cadaver still being alive and having all of its clothes on and the only way for me to ‘kill’ it was to crack its back... Also, Dr. Styn told us how old our cadaver was and what she died of... not exactly something I really wanted to know especially since I was uncomfortable, once again, around the cadaver... I was able to forget about the fact that it was someone’s grandmother and begin to dissect again.”
- #35 (denial of memorial body): “Characteristics that we associate with individuals being alive like color, warmth, smiles, and skin are not seen in cadavers.”

- #33: "...the face and hands make the cadaver more human-like."
- #26: "The dissection of the back was easier than the dissection of the back of the head. The bodies' faces, hands, and feet are covered with cloth. I believe this is to take away the personal aspect of actually dissecting a person."
- #22: "I was in awe of what we were doing to this person and even though they had donated their life, I couldn't help but thinking did they really know what was doing to happen to them."
- #11: "I did have a dream that one of the cadavers had reanimated and was very upset with us for not having asked his permission to study his body and that while this was happening Dr. Styn said that this happens sometimes and was going to work on getting us a new cadaver and asked that we put this particular one back in storage."
- #12: "I had a moment where I remembered that these cadavers were once people."
- #16: "I do distinctively remember thinking about our cadaver, and I remember saying to myself, "Wow, this guy was probably walking around not even 6 months ago, and I might have even run into him on the street." I also remember thinking just about my own family, and how this man is someone's father, husband, brother, etc."
- #20: "...there was one thing that freaked me out a bit. My cadaver's hand was clenched in a fist, so when it came time for me to dissect his palm, I had to pull really hard on his fingers trying to loosen them up so that I could extend them. It was very difficult and I kept thinking that I was going to break his fingers, which I really didn't want to do. In the end, I finally got one finger pried open enough to

- make the dissection of the finger. As I was finishing up I pulled on the finger one last time and then it broke. This was a little awkward, but I got over it quickly and was glad that I had been able to do a nice dissection on the palm.”
- #13: “I do appreciate that the people we are dissecting on did have a history and maybe their death was sudden and unexplained...I feel it is only right to treat her with care and refer to her in the more appropriate way.”
 - #23: “In the back of my mind she was a human, but then I thought that she donated her body to science and it was ok to cut her...I am very respectful of her, because she gave her body for science to help me out.”
 - #28: “I was able to put out of my mind that it was a human body...every time I see a person’s back, I don’t want to in vision a cadaver.”
 - #1: “...I wondered how this person died, what this person did in their life, and why they donated their body...After the skin was pulled back on the cadavers, exposing the muscles, the cadaver looked less human-like and I didn’t wonder as much about the actual person’s past life.”
 - #32: “I was afraid that I would be upset seeing her face...that suddenly she would be a dead person and I would be frightened or feel strange touching her body...Instead of feeling uncomfortable, I felt more connected to my cadaver...she was a real person; she was someone who lived, breathed, spoke, laughed, and died.”
 - #19: “If I didn’t think about the fact that this person was alive only a few months ago, I would have been fine.”

- #2: “I try to avoid wondering what kind of people the cadavers were like personality wise. Like one female has nail polish on still and when I saw that I felt a little sad because it made me remember that they were all once alive and emotional and everything.”
- #21: “...the skin was a dark off color (not of dark skin, but like a bruise all over) seemed thicker and more leather like then when a person was alive...”
- #18: “...I appreciate that those individuals donated themselves so that we as students could learn from them.”

Participants readily distinguished between parts of the surface body that were experienced to be more personal or impersonal.

- #31: “After the first few incisions I was able to get over the fact that there was a dead body in front of me, especially since I could not see the face...Since were still working on the back, this lab session was a piece of cake...Today in lab we had to turn our cadavers onto their backs. I was not cool with this. Today’s lab was to start dissecting their necks. I was OK until I saw the cadaver’s lips...anything that makes this cadaver ‘personal’ to me makes me upset.”
- #35: “This past week we dissected the anterior neck and when the face was exposed, I still felt very comfortable...because the cadavers lack human characteristics.”
- #26: “The dissection of the back was easier than the dissection of the back of the head. The bodies’ faces, hands, and feet are covered with cloth. I believe this is to

take away the personal aspect of actually dissecting a person. Last Tuesday, I was a little taken back when I saw the mouth agape.”

- #20: “...there was one thing that freaked me out a bit. My cadaver’s hand was clenched in a fist, so when it came time for me to dissect his palm, I had to pull really hard on his fingers trying to loosen them up so that I could extend them. It was very difficult and I kept thinking that I was going to break his fingers, which I really didn’t want to do. In the end, I finally got one finger pried open enough to make the dissection of the finger. As I was finishing up I pulled on the finger one last time and then it broke. This was a little awkward, but I got over it quickly and was glad that I had been able to do a nice dissection on the palm.”
- #13: “...at this stage I am unaffected by the presence of a dead body. I think it has to do with the fact that I haven’t seen the face and/or personality behind the person.”
- #23: “Since we did the back first it felt like I was dissecting something else. When we flipped the cadaver around and I uncovered the face, it was a little weird, because I then put some sort of identification with this person. I didn’t like seeing how the nose and the mouth were flattened because she had been on her stomach.”
- #28: “Since I had seen the back before, it wasn’t that bad afterwards...This week, however, the cadaver was actually lying face up, and we started to dissect the neck muscles. This extremely disturbed me because we had to cut toward the ears, which was too human for me. The first two weeks I was able to pretend it wasn’t

a human that I was cutting into, but this week the ears made it impossible for me to put my mind somewhere else, so to speak.”

- #1: “One of the creepiest experiences I’ve had with the cadavers so far is when we were learning the muscles that move the hand. One specific muscle, if we pulled on the tendon, it moved the pinky finger. It was just weird seeing this hand of a cadaver, which actually looked very human like except very pale, move its pinky finger.”
- #32: “This week, we began the dissection of the neck. I spent the evening before lab worrying about seeing the face of my cadaver....Suddently, I was looking at her face. I think all of the air left my lungs for a split second, but I quickly recovered. Instead of feeling uncomfortable, I felt more connected to my cadaver...she was a real person; she was someone who lived, breathed, spoke, laughed, and died.”
- #2: “He wasn’t just a body to learn from when you saw the face too. I think when we get to the part where we dissect the face and stuff that might be a little sad because up until now we’ve just been focusing on the body and haven’t really looked at the faces. Looking at the face will probably make it a little more personal.”

Participants identified the surface body as being more personal than the recessive, interior body under the skin.

- #22: “After our first dissection I knew what to expect plus the bodies were being further and further cut open and more layers of muscle being removed. This

helped to make the person less human looking and seem more like a learning experience.”

- #1: “After the skin was pulled back on the cadavers, exposing the muscles, the cadaver looked less human-like and I didn’t wonder as much about the actual person’s past life.”

In many cases, participants said they did not have much opportunity to reflect on their emotions about the experience of dissecting the cadaver, because they had to remain focused on the educational goals of the class, which required that they see the body mechanically and impersonally.

- #11: “Otherwise my brain has been filled with thoughts of muscle origins, innervations, actions and vascularity.”
- #12: “Sometimes when I am caught up in the vigorous learning process, I forget to appreciate the generosity of what these people have done.”
- #16: “I think it subsided so quickly because there was really no time to think about it. We jumped right into learning and looking around, and it felt pretty mechanical and business-like.”
- #20: “...I got over it quickly and was glad that I had been able to do a nice dissection on the palm.”
- #13: “I can say that I am usually all about business when I get in the lab and when I went into it the first day that is exactly how I treated it.”
- #28: “...I was able to put out of my mind that it was a human body and just focus on the task at hand.”

- #2: “I guess I just sorta forget about that in lab because I’m so focused on trying to learn everything.”
- #21: “But after the first hour, I realized that this class is more about gross anatomy, hence the name. The location of structures, where they are found in contrast to other structures in the body, etc....And so far it has been a great hands on experience...”

Some of the participants noted the highly unpleasant smell of the cadavers.

- #31: “When we first walked into the room the immediate smell of formaldehyde filled my nostrils, made me want to run back out into the hall.”
- #33: “I knew that the smell would be the most overwhelming part.”
- #6: “Today...was the first time my breath was actually taken away by the smell and sight of decomposed tissue and how the skin fails to thrive when it is not being supplied by blood. One body in particular that I am referring to is very nauseating after standing around it for too long.”
- #16: “The only thing that got to me while dissecting was the smell.”
- #19: “The other thing that is tough to handle some times is the smell in the laboratory. Personally, the smell of formaldehyde is manageable at first. It appears as though the smells increase in intensity throughout your time in the lab (although I’m positive it doesn’t). By the end of the period, I am definitely ready to leave that atmosphere and get a breath of fresh air!”

Many participants noted the educational value of the experience

- #31: “The area and structures that we dissected the first time had turned to a brownish color where as before they were a nice red color...like you see in text-books. It is definitely one thing to look at a muscle in a text book and see its size and shape and then its another thing to actually dissect that muscle and the regions around it to REALLY see what it’s all about.”
- #33: “As the weeks went on I realized that my cadaver was the best learning tool that I could have for my anatomy studies.”
- #26: “I look forward to following labs so I can view muscle, tissue, and bone so I can have a better sense of what is located beneath the surface of the skin.”
- #6: “I find that I learn more in the lab when being exposed to the cadaver then most of the learning in the classroom.”
- #12: “I love that I can be a part of learning the human body in this manner.”
- #16: “”...I loved being able to find and identify structures that we were learning about in textbooks. It makes things so much clearer when you can actually get your hands on them.”
- #20: “I feel like I did a great job and really learned a lot about the structures of the arm and hand I was dissecting. The hands on dissection really help you learn your anatomy!”
- #23: “Overall though, dissecting a human is a great experience because I can get a good appreciation for where all the structures in my body are. I learn more in lab where the structures are, than I do in class, and reading the information in the books.”

- #1: "...allowing me to better understand how the human body works, and to appreciate the little differences that make each of the cadavers unique."
- #32: "Looking at the cadaver, I see muscles I have on my own body; I know what these muscles do because I can flex or extend it on my own body as I am dissecting."
- #19: "It's amazing to see what the structures really look like and are arranged as compared to what we have learned for years through books!"
- #21: "...it has been a great hands on experience..."
- #18: "...it was evident how much this class would reinforce the way that anatomy works and how it's situated. Now each time I go in, I look forward to what I'm going to learn and how it's going to contribute to making me a better athletic trainer, and eventually a PA."

General Structural Description

Students in gross anatomy felt stress and anxiety about confronting and dissecting a cadaver, in addition to pressures related to the gross anatomy course. Students expressed a wide range of emotions, both positive and negative. Initially, however, students primarily felt anxiety as a result of apprehension about what they were about to do, which was essentially to cut into the flesh of a dead human body. Over time, the students became increasingly habituated to the cadaver's presence and, consequently, were more capable of feelings such as a sense of awe and amazement about the process of dissecting a human being. They were also increasingly curious about the unique structure of the

body and how the cadaver's body reflects but diverges from the textbook models of the body. In that spirit, in many cases they came to enjoy the lab and some even anticipated it eagerly. Participants who moved past the initial apprehension and anxiety were also increasingly prepared to feel sadness about the donor's death, especially when the donor was found to have been at a young age at the time of death. Recognition of the donor's death also in many cases gave rise to feelings of gratitude for the donor's gift of his or her body to the student's education.

While participants were explicit about their feelings of anxiety, awe, curiosity, enjoyment, sadness and gratitude, not a single participant explicitly mentioned feelings of guilt or shame about the dissection of the cadaver. Nevertheless, a closer examination of the data revealed a pervasive theme of implicit guilt among the participant's narratives. In particular, guilt was implied by the way that most participants made a point to justify the fact that they were essentially mutilating the body of a person who was formally alive. The act of justification requires a motive to provide an explanation that one's actions are in fact just and right; and that motive must necessarily include the presumption that one's actions could be taken as unjust or wrong and hence in need of justification. The justification therefore serves as a means to absolve the self from implicit guilt, attributed to the self by the self or by imagined others. By providing various forms of justification for dissection, therefore, our participants reveal the taboo nature of the act of human dissection. In other words, their forestructure of understanding includes the background assumption that violation of a corpse is in most contexts wrong and can only be made right in extraordinary circumstances that require explanation to rectify or to make right

that violation of the body, if not for the person than at least for the survivors of the deceased who mourn the loss of their loved one.

For the participants, medical education by itself did not appear to justify the violation of the body in the gross anatomy course. This observation was testified to by the additional justifications put forth by the student participants. Participants used one or more of three types of justification: (1) the “full life” justification; (2) the “donation” justification; and/or (3) the “shell” justification. The “full life” justification was an appeal to the age of the donor as an indication of having lived a full life. The implication here is that the donor’s body could be rightfully probed because the death of the person was timely and appropriate. The “donation” justification appealed to the idea that dissection of the body was rectified by the fact that the donor him- or herself had given consent to the dissection. And, finally, the “shell” justification was an appeal to the quasi-metaphysical assertion that the body is now a “shell” of the former person, presumably a former home for an immaterial soul which has now in death been released to an after-life, so that violation of the body by dissection is therefore not a violation of the deceased person.

What prompts the perception that the act of human dissection may be a violation of the deceased person? One explanation is that the participants must grapple with the ambiguity of the body as simultaneously the memorial body of a former life and a cadaver to be used as a tool for learning. The participants are persistently reminded by the body that this carcass had not so long ago been animated by a living, breathing, motivated person who was a parent, sibling, friend to living persons who still survive him or her. When the body is revealed as a memorial body, the participants describe the body

as more “personal” rather than “impersonal”—the body takes on an identity that demands a narrative of a past life and perhaps even a present and future after-life. This personal face of the cadaver as a memorial body is revealed most explicitly through the face and hands of the body, and the personal face of the body appears to be restricted to the surface body of skin and sensory organs. As the skin of the cadaver is peeled away and as the course moves deeper within the cadaver to examine the viscera, bone, and nerves, the memorial body quickly fades from the foreground of the students’ awareness. Their attention, instead, becomes focused on the task at hand, which is to succeed at learning to identify the correct terms and functions for the flesh at hand. Occasionally, the putrid smell of rotting flesh or formaldehyde brings the student back to a more explicit recognition of how the body also stands for human mortality and the death that awaits us all. But most of the time, the students found themselves too busy and preoccupied with learning the machinery of the body that there was little time for depthful reflection on the human and spiritual significance of their encounter with death.

With few exceptions, the students noted the educational value of this experience. Working with an actual human body rather than pictures in text books enabled the students to appreciate the uniqueness of each body and its peculiar irregularities, which are missed when learning from models in books. Implicitly, the students also acknowledge through their narratives that, in their emotional encounter with the cadaver and through their grappling with the ambiguities of the body’s status, they are also socialized into a particular medical way of constituting the body’s and death’s significance. This particular way of coping with death is through the intellectualizing of death: filling up the existential nothingness of death with Latin terms for body parts and

their mechanical relationships to one another. The challenge for the student is to find a way to reconcile this new way of understanding death without losing their more intimate connection to the body as a memorial of a past life or without defensively avoiding the recognition that the deceased body can also be taken up as emblem for our ultimate fate and the fate of all those we love.

Styles of Coping with the Memorial Body

Our analysis identified four styles of coping with the memorial body of the cadaver: (1) denial of the memorial body, (2) foreclosure of the memorial body through disgust, (3) non-integrated acknowledgement of the memorial body, and (4) integrated acknowledgement of the memorial body.

Three of the participants wrote narratives about their experience in gross anatomy which can be interpreted as a denial of the memorial body. By “denial,” we are referring to a way of perceiving the body that simply did not at any time explicitly acknowledge the body as that of a person who once lived. The body instead was entirely constituted as a learning tool which functioned solely for the illustration of human anatomy. For example, participant #35 wrote:

Before entering the anatomy lab to dissect the cadaver, I expected to be very nervous. Surprisingly, I ended up not being very nervous. I was completely comfortable with the situation and ended up feeling more curious than anxious. I realized I was much more excited about the process than afraid of it. If I spoke about dissecting the cadaver, I would often tell people that my biggest fear was when I would have to see the face. Once again, this turned out to be also wrong.

This past week we dissected the anterior neck and when the face was exposed, I still felt very comfortable. Ultimately, I look forward to anatomy lab because I find it very interesting. My own personal explanation for this lack of nervousness is because the cadavers lack human characteristics. I am not saying this in a disrespectful manner; in fact I think Dr. Styn is excellent about the appropriate manner we should behave in anatomy lab. Characteristics that we associate with individuals being alive like color, warmth, smiles and skin are not seen in cadavers. In a strange but respectful manner, these individuals are cold, somewhat misshaped and have abnormal colors. These characteristics are normal for something that has been deceased and embalmed. But before going into the lab, I think people forgot this and expected to see a recently deceased individual with no embalming procedures taken. For me personally, I would say that I ultimately was not nervous, because the cadavers do not possess traits that many individuals associate with life. Thus far, those are my conclusions in the first few anatomy labs. Good luck with the research!

One participant also denied the memorial body, but in such a way that distinguished her from the above group. Rather than constituting the body solely as a learning tool, this student constituted the body as a something offensive and disgusting. Through the mood of disgust and revulsion, the student could neither approach the body as memorial body nor manage it as a learning tool. Both interpretive frames in her case were completely overwhelmed by her intense aversion to the donor's cadaver. In her journal, this participant writes:

The first few weeks in the cadaver lab have been okay, but it's not really my thing. When I first saw the bodies I was really grossed out but I could handle it. I just didn't do much dissecting. The guy at my cadaver (in my group) took the class before at UB, so he knew what he was doing and dived right in, so I just stepped back and watched (pretty grossed out). I didn't even want to touch the body let alone be near it, and I think it's so crazy how people can enjoy digging around it and doing the dissections so much. I don't look forward going to lab (think god I only have it for a couple hours once a week), but I deal with it. I would rather study a book or flash cards to learn the material, not dig around with structures that sometimes don't look like they are supposed to or are mutilated or cut off, and then if I have to go back to a nicely dissected body with clear labels and complete the practical. The first couple labs I've been really passive and just basically watch the other people dissect, but I don't learn well at all that way. So the last lab I had I used the atlas of human anatomy and the lists for lab (of the structures I need to know), and I sat down next to the table with my group but I studied the book and got 100% more out of the lab than before. If I can I will try to utilize my time that way in lab.

A third group of 15 participants—by far the majority of the students, comprising 71% of the volunteers—did acknowledge and describe the cadaver as a memorial body.

However, they were not able to integrate their experience of the memorial body with the experience of the cadaver as a learning tool. They fought however vainly to maintain

their dissecting activity without recognition of the memorial body, and yet the memorial body continued to appear. With each appearance of the memorial body, these participants found themselves returning to their initial stress and anxiety before once again regaining their composure. As one participant wrote:

Today in lab we had to turn our cadavers over onto their backs. I was not cool with this. Today's lab was to start dissecting their necks. I was OK until I saw the cadavers lips...anything that makes this cadaver "personal" to me makes me upset. Also, Dr. Styn told us how old our cadaver was and what she died of...not exactly something I really wanted to know especially since I was uncomfortable, once again, around the cadaver. I also forgot to wear my glasses for lab so the formaldehyde was irritating my eyes and I had to leave the room a couple of times to help air them out. Probably won't be doing that again. Since we kept the cloth that covers her face on I really didn't get a good look of the face and after I calmed down I was able to forget about the fact that it was someone's grandmother and begin to dissect again. Hopefully, we can keep the cloths on a little while longer.

The last group of participants were few in number—comprised of two students—who managed to integrate their experience of the memorial body with the experience of the cadaver as a learning tool. In each case, the students described being present to the dissection process in such a way that they could appreciate the body as a means for learning anatomy without forgetting the more personal dimension of the body as a person

with his or her own life story. One of these participants was especially eloquent in her description of the experience:

It is very surreal to spend two hours a week leaning over a body, very similar to yours, and cut it apart. The muscles are so easy to see! When we would dissect smaller animals in labs before this one, it was always very difficult to identify structures. Also, it was harder to remember where muscles were and what they did because we, as humans, have no need for the small muscles a cat has. Looking at the cadaver, I see muscles I have on my own body. I know what these muscles do because I can flex or extend it on my own body as I am dissecting. This week, we began the dissection of the neck. I spent the evening before lab worrying about seeing the face of my cadaver. A friend of mine assured me that if I viewed the cadaver as a real person, as someone who graciously gave herself to us so that we could learn more about the human body, looking at her face would be easier. I was afraid that I would be upset seeing her face....that suddenly she would be a dead person and I would be frightened or free strange touching her body. I worried about this straight up until the moment the face was exposed. My partner lifted the shroud quickly; I didn't have a chance to think about what I was going to see (it was like ripping off a band-aid). Suddenly, I was looking at her face. I think all of the air left my lungs for a split second, but I quickly recovered. Instead of feeling uncomfortable, I felt more connected to my cadaver. I do appreciate that she donated her body to science: that decision must be a difficult one to make. Seeing her face made her more real to me---she was no longer just a back

or an arm or a pelvis—she was a real person; she was someone who lived, breathed, spoke, laughed, and died. Styn finally received the cause of death notes from UB. Our cadaver is a 52 year old woman who died of a heart attack on June 23, 2006. This cadaver, as strange as it sounds, has become a new friend. I don't think I will ever forget what her face looks like. For the first time since we started dissecting, my partner(s) and I spoke to her...we asked her questions, like "why are your back muscles so huge?" or "Why in the world is your neck so covered in adipose?" We've bonded with our cadaver. It's not weird. It's not scary. It's not disgusting. Dissecting, so far, has been exciting, enlightening, amazing, and surprising. So far, I am enjoying this experience.

Discussion

The findings of our analysis validate prior research on the educational value of cadaver dissection. The students who participated in this study clearly reaped the benefits of work with their cadaver, which could be replaced with a virtual cadaver without losing something essential about the experience. Students gained an awareness of the uniqueness of each body through the surprising discovery of the irregularities in the bodies of the cadaver. But more importantly, students underwent an emotional experience that demanded from them a confrontation with death and mortality by which they were challenged to mature into young medical professionals. The stressful experience served as something like a rite of passage, in which success almost assured that the student would become socialized into the medical subculture and its peculiar style of coping with death and dying. However, our findings also suggest that medical education has not yet

taken full advantage of this opportunity. Currently, gross anatomy education has not traditionally included pedagogy on socio-emotional issues surrounding death and dying, but our study suggests that students are ripe for it and would likely benefit greatly from the experience. They are already thinking about these issues, but not always successfully. They could use more guidance and assistance in the process of coming to a healthy, adaptive integration of their emotions and knowledge about death.

As we expected, it was quite useful to conceptualize the cadaver as having an ambiguous status, which lends itself to multiple meanings. The anatomical body of the cadaver served as a means to an end of the student's learning, whereas the memorial body demanded respect for the deceased person as an end in him- or herself. The body of the cadaver could also, understandably, give rise to feelings of revulsion and disgust, even to the point of foreclosing the student's ability to enter into the learning process of the course in a productive manner. Students who were able to integrate these experiences of the body in one form or another seemed to express at the same time a level of emotional maturity that was both rare and worthy of esteem. Future research should continue the process of identifying various meanings of the body, but especially how the constitution of the body may be a reflection of individual differences. Those individual differences should also be examined for their predictive power in forecasting the student's functioning as a medical professional.

Our work together has led us to recommend and implement changes in the curriculum of the Physician's Assistant department at Daemen College. The Physician Assistant program is now considering a requirement that all students in gross anatomy write journal entries over the duration of the course. Further research may identify

Further research may identify whether there are in fact pedagogical and therapeutic benefits of this process. In addition, when those same students, two years later, are required to take a course on socio-emotional interviewing, the students may be provided with their original journals from gross anatomy. These journals might serve as a learning tool that will facilitate the student's appreciation for their own style of coping with the emotional dimensions of the medical profession, with the aim of guiding the students to more effective means of adapting to the pressures and unique stresses of the medical world. Again, future research may identify the pedagogical and therapeutic benefits of this new curriculum.

The results of this study, and also our recommendations for medical education, should be interpreted with caution. Our participants were limited to undergraduate students in specific medical fields, and their experience may not generalize to other populations of students in medical school. Furthermore, the qualitative nature of our study, while especially useful for theory-building and the generation of new hypotheses about student experiences with cadavers, has its limitations, including relatively poor internal validity. In future research, correlational and experimental testing of our tentative conclusions may lend further support to our conclusions, or challenge them in ways that will enhance our understanding of this unique learning experience.

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