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# Gross Anatomy Dissection Videos: Effect on Student Dissection Confidence and Laboratory Examination Scores

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# GROSS ANATOMY DISSECTION VIDEOS: AFFECT ON STUDENT DISSECTION CONFIDENCE AND LABORATORY EXAMINATION SCORES

By

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## ABSTRACT

As medical colleges across the world experience cadaver shortages, faculty shortages, and decreased time allotted to teaching gross anatomy, a need for different teaching modalities has emerged. New ways of teaching are being studied to optimize efficiency and to acquire the same, or better, student outcomes as before the previously mentioned variables became prevalent. This was the stimulus for our research. Dissection videos were made, closely adhering to the dissections performed by Physician Assistant, Physical therapy, and Medical students at the University of Nebraska Medical Center (UNMC). The current Gross Anatomy course at UNMC involves four written examinations covering material discussed in lectures, and four short answer laboratory practicals testing dissections students performed during allotted laboratory hours. The dissection videos were implemented during the last two units of the semester. Student scores from the last two units (when the videos were available) were compared to scores from the first two units (when no videos were available). Reflecting on anonymous surveys completed by students and their examination scores, this study suggests that use of the videos improved examination scores and dissecting, though previous experience with cadavers did play a role. In conclusion, dissection videos may be a viable option for new teaching modalities in the face of less time being devoted to anatomy teaching. Future research is needed to draw a clear conclusion.

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## CHAPTER 1: Introduction

Anatomy has stood the test of time as one of the foundational subjects of medical education. Despite advances in medical technology, Anatomy will always remain a core theme in physician training.

As medicine becomes more complex more training must be devoted to new aspects of the profession. This leads to less time teaching the basic sciences while promoting individual learning amongst students. With less time devoted to teaching basic sciences, such as anatomy, medical educators must come up with new ways to produce equivalent or higher student knowledge outcomes with less contact hours. Therefore, a primary focus of educational research has been devoted to investigating the efficacy of incorporating technologies such as videos, lecture recordings and Internet resources such as YouTube into student learning [1,7,8]. The majority of relevant literature was directed not at replacing current methods of teaching anatomy, but to find what types of modalities best supplemented current anatomy curriculum, producing positive learning outcomes.

In the face of a 'self-learning' environment, students often turn to the Internet as a supplemental source of information in their studies. YouTube is the largest video website, and is the third most visited site behind Google and Facebook. More than 100 million people visit the site daily [1]. To assess the quality of the publicly available anatomy videos dealing with surface anatomy on YouTube, Azer and colleagues performed a comprehensive review of YouTube resources in 2010. Using the keywords "surface anatomy," "anatomy body painting," "living anatomy," "bone landmarks," and "dermatomes," YouTube was scanned for pertinent videos relating to surface anatomy [1]. Each of the videos that were deemed relevant received a score that was dependent on whether or not the videos met a predetermined set of major and minor criteria. Major criteria comprise: (1) content is scientifically correct, (2) images are clear, (3) creator

and/or organization mentioned, (4) topic is clearly presented, and (5) uses living bodies, models, drawings to explain difficult issues. The minor criteria comprise (1) video covers topic identified in the title, (2) designed at the level of undergraduate medical/health science students, (3) sounds are clear and background is free from noises, (4) time to download is reasonable, (5) information about the creator is up-to-date, and (6) educational objectives are stated [1]. If a major criterion was met, it was given two points while only one point was given for a minor criterion that was met. Zeros were assigned to any criteria not met. A video was deemed “educationally useful” if it fulfilled all major criteria and at least three minor criteria. Of the 235 videos screened, 57 were found to have relevant information pertaining to surface anatomy and out of those 57, 15 were found to be ‘educationally useful’ videos, as determined by the criteria previously mentioned. Useful videos had 497,925 views, though there is no way to know what fraction of the total views are from anatomy students. The authors of this paper concluded that YouTube was not an adequate source for learning surface anatomy. However, this study only looked at videos pertaining to surface anatomy, which is a very small facet of gross anatomy as a whole. Even with this limitation, one can still see the volume of people that sought out these surface anatomy videos. More comprehensive research is needed to fully evaluate YouTube as a resource for anatomy information.

Jaffar et al. conducted an experiment in 2012 that assessed students’ perceptions and patterns of usage for YouTube as a learning resource for anatomy, as well as its effectiveness within a problem-based learning curriculum [2]. This study was conducted on 91 second year medical students. In this study, the Human Anatomy Education (HAE) channel was created on YouTube. This channel was created as a way to supplement what the students were learning in the classroom and covered topics such as cadaver dissections, plastinated specimens and sections, plastic models, bones, radiographs,

PowerPoint presentations, histology photomicrographs, and surgical operations, both open and laparoscopic [2]. There was a total of about 4 hours of playing time for all of these videos. The students were then given an anonymous survey and asked to participate in a focus group. Some of the survey questions were framed as Likert-style scales, others were multiple choice questions, and the rest were questions that prompted students to choose between “yes,” “no,” or “unfamiliar.” The results showed that 92% of the students who used the videos agreed/strongly agreed that the channel helped them learn anatomy with 99% overall rating of the channel as very good or excellent [2]. This study shows that students prefer these videos as supplemental learning tools and suggests that video resources may be a viable option for supplementing anatomy curricula. As technologies become more widely available and efficient, teachers must look for ways to incorporate these technologies into the curriculum. However, not all studies support the use of video technology in anatomical instruction.

In 2009, a study was conducted at the Rawalpindi Medical College in Pakistan that showed dissection videos did not improve anatomy examination scores. This study attempted to show the association between implementing dissection videos and students’ performance on examinations in their gross anatomy course. At this public medical college, students enroll immediately after high school. All first and second year students are required to take gross and microscopic anatomy over the course of their first two years. Each class is divided randomly into a Group A and B [10]. During the first portion of the course, one group is tasked with dissecting the upper limb while the other group is to dissect the lower limb. At the end of the six-week session, a term exam is taken. During the second session, the groups switch tasks and eventually take another term exam similar in style to the first. The study involved showing the dissection videos in class, to both groups, during the second term and making the videos available at the college’s

computer laboratory. Videos of dissection of the upper limb were shown to both groups twice during lecture hours. Because of time constraints, videos of the lower limb could not be shown to the class, but students were strongly urged to go to the computer lab to view the videos on their own time.

Scores were also compared to that of the previous two medical classes for a control. The results showed a small but not statistically significant increase in examination scores in the group that watched the videos. A variety of factors could have contributed to the failure to observe a larger increase in exam scores in the group that watched the videos. Since the lower limb videos were not shown in class, half of the students saw relevant videos twice while the other half had to voluntarily go to the computer lab to view relevant videos. Nevertheless, three quarters of the students from both groups reported going to the computer lab to view the videos at least once. This appears to be a major flaw in the execution of this study, as there were likely some students who never saw the relevant video. Though the videos yielded a statistically insignificant increase in examination scores, 50% of the respondents (n=99) claimed that the dissection videos were the best source for learning gross anatomy. Furthermore, 93% of the students wanted regular inclusion of dissection videos into the anatomy curriculum [10]. One could argue multiple reasons why a large increase in exam scores was not seen. First, the design of the course is strange as students are lectured and tested over different material depending on the group they are in. There were also extreme availability issues with these videos as they were only available in the college computer lab during business hours [10]. The execution of this studied was also flawed, as students were only shown upper limb dissection videos in class and, due to time constraints, prompted to view the lower limb videos on their own time. This study claims that dissection videos do not improve anatomy

examination scores. While the results seem to point towards this conclusion, there is not enough reliable evidence to make such a claim.

Studies evaluating video education have also been performed at the level of postgraduate medical education. In 2014 in Dublin, Ireland, a study was done involving the efficacy of audiovisual preconditioning of surgeons and allied health professionals prior to partaking in an upper limb anatomical dissection course. Just as reduced dedicated anatomy hours has become the norm in medical schools, this article cited similar motivations for this type of research in the surgical field. The Halsted model of learning is similar to that of an apprenticeship and can be particularly useful in diverse fields such as plastic surgery. However, time constraints led to a decrease in the learning opportunities that residents and surgical trainees are exposed to in the operating room. The United States has recently introduced the Accreditation Council for Graduate Medical Education 80-h workweek, which has led to a decrease in operation exposure for residents [4]. Coupled with this reduction in hours has been a sevenfold increase in legal claims associated with anatomical errors made between 1995 and 2000 [4]. All of this places an emphasis on surgical educators to come up with new and effective ways to deliver training. This study aimed at assessing whether audiovisual preconditioning is a viable adjunct to learning, specifically evaluated the efficacy of this approach on the acquisition and retention of knowledge over the two-day upper limb dissection course. The goal of this course was to teach applied surgical anatomy of the upper limb with the main goal being an increase in core anatomical knowledge of the participants [4]. Before starting the course, participants completed a questionnaire regarding their experience level, previous attendance at dissection courses, and previous experience as anatomy lecturers. Participants were randomized into a control and intervention group. The intervention and control groups were comprised of a similar makeup that included registrars in orthopedic

surgery, registrars in plastic surgery, junior surgical trainees, and allied health professionals (physiotherapists and occupational therapists) [4]. Prior to practical instruction, the participants (n=35) completed a pre-course multiple-choice questionnaire (MCQ). Following the first MCQ, the intervention group was shown a 6-minute upper limb dissection video with pre-recorded commentary [4]. Following 2 hours of supervised dissection of the brachial plexus and the axilla, both groups completed a second MCQ. At the completion of the course, each group completed a third MCQ. Fifteen percent of the 35 participants had previously attended an upper limb dissection course and one had previous anatomy lecture experience [4]. The post-course MCQ scores for both the control group and the intervention group were significantly higher that the pre-course MCQ scores (Table 1). However, the relative improvement in the intervention group (28% increase) was significantly greater than that in the control group (18%). Subsequent analysis confirmed the intervention group outperformed their counterparts by 12%. 20% of the material assessed in the MCQ was not covered in the video. This was done to reduce the potential that audiovisual preconditioning simple reinforced what was learned during the course [4]. Once again, the intervention group performed significantly better that the control group with a median difference of 10%.

| Figure 1.1 – Median MCQ Scores for Intervention and Control Groups | | |
|---|---|---|
| | **Median Intervention** | **Median Control** |
| Pre-course MCQ | 60% | 60% |
| Post-course MCQ | 88% | 78% |
| Median Difference | 28% | 18% |
| This Figure shows the pre-course and post-course median MCQ scores for both groups and the relative increases between those scores to illustrate which groups saw the largest improvement. All participants experienced an improvement from baseline [5]. | | |

**Figure 1.1 – Score comparison between Control and Intervention Groups**

These findings confirmed that audiovisual preconditioning improved the efficacy of course learning. Participants who underwent audiovisual pre-conditioning significantly outperformed those that did not, with a median difference of 10% noted in post course MCQ scores. The results of the pre course MCQ demonstrate a similar level of baseline

anatomical knowledge between the intervention and control groups. Though this study was executed well and accomplished what it set out to do, there were limitations. The most obvious limitation being the small sample size of highly motivated participants [4]. However, the study cohort was an ideal group that represented the type of professionals who would benefit most from audiovisual preconditioning, as most people looking to increase anatomical knowledge by these means will be very motivated. Similar healthcare professionals, especially in the face of reduced 'hands-on' experience, could benefit from the immediate acquisition of anatomical knowledge lent by this type of study. Surgical and anatomical educators should utilize this learning modality in the future.

It has been well documented that students prefer the utilization of videos as a supplemental tool in learning anatomy [1,3,5,6]. Are these videos efficacious in producing higher examination scores? This important issue is less well researched. One study in 2013 provides some insight into this question. The study aimed to accomplish three research objectives: (1) to describe video usage patterns and frequency within the group with access to the videos; (2) to determine the degree of satisfaction with the video series; (3) to compare the performance on examinations between the experimental groups to that of historical controls [15]. Usage and satisfaction with the videos was determined by administering anonymous and voluntary surveys at the end of the course prior to the final examination. Examination scores of students who had access to the videos (intervention group) were compared to examination scores of historical controls. The entering class of 2011 served as the experimental group who had access to the videos, while the entering class of 2010 was used as the control group. A deidentified data set was provided to the researchers that compared demographics as well as MCAT scores and GPAs. A comparison between the experimental and control group revealed that both groups were demographically and academically very similar. Both groups consisted of 40 students. Of

the 40 students surveyed in the experimental group, 85% responded (n=34). The majority of the respondents viewed the videos from home (79.4%), and for preparation (91.2%), and reinforcement (85.3%) of laboratory material. On average, the respondents viewed the videos 1.55 times/week. The video resources were highly praised by the students as overall satisfaction was rated at a 5 on the Likert scale. The students took two laboratory examination and two lecture examinations. Scores for these examinations were used to determine whether or not the videos had an impact on grades. Student performance was comparable between the two groups with the exception of the average for the final laboratory examination score, which was 4% higher in the experimental group. Though not statistically significant (P=0.3353), the overall final grades for experimental group averaged an 83.59% compared to an 83.01% by the control group. The researchers argue that the increase in the final laboratory examination score may be attributable to the fact that more video material was covered in the second half of the course (9 of the 13 videos pertained to the final laboratory examination). Like all studies, this had several limitations. The most obvious was the small sample size (40 students in the experimental group and 40 students in the control group). Another issue was that individual performance was not linked to video usage, and students who did not watch the video were lumped in with the students who did. It is also unknown if the number of times students viewed the videos increased or decreased as the term progressed. A major focus of this study was the assessment of these video resources as an adjunct to the standard anatomy curriculum. The videos were not intended to replace prosections or any other aspect of the gross anatomy course. Rather, they were to be used as a supplement to a course that that had experienced an 11% decrease in time allocation during the term. It is clear from the results of this study that at the very least, the videos were at least slightly beneficial and, most importantly, that they did not have a negative impact on student outcomes. The future

direction of this particular study is to increase the number of videos so that the entire course content has a relevant video that can be used to reference it. Hopefully, this will result in an increase in examinations across the board rather that just the final laboratory examination.

Faced with a shortage of anatomy educators and a reduction of hours dedicated to anatomy in medical curriculum, it is important to investigate different modalities that can be used to produce high caliber academic and professional outcomes. It is clear that more research needs to be done. This need for new ways of conveying anatomical information, along with a personal interest in dissection, provided the stimulus for this research. The **Hypothesis**: “introducing dissection videos halfway through the anatomy course will increase student examination scores, preparedness for laboratory, and increased confidence/quality in dissections.” This study focused on gathering both qualitative and quantitative data to analyze the effects of the videos on multiple facets of student performance. Rather than comparing examination scores across different classes, students who chose not to view the videos were used as the control group while students who utilized the videos were used as the experimental group.

## CHAPTER 2: Methods

### 2.1: Video Production

After purchasing a donor from the Nebraska Anatomical Board, dissections were carried out at the University of Nebraska-Kearney (UNK), located in Kearney Nebraska. On August 20, 2015 the Human Science Education Complex was opened on the campus of UNK as part of a new partnership with the University of Nebraska Medical Center (UNMC). This building contained a state-of-the-art anatomy lab furnished with a (insert specs here) surgical camera. It was decided that the dissection videos should be

of the highest quality and resolution, lending to the use of this camera in their making. An additional camera, Canon Vixia HF R62 handheld HD camcorder, was also used to film certain aspects of the dissections and to provide additional angles.

Gross anatomy at UNMC is broken down into four units, with one “multiple choice” lecture examination and one “fill in the blank” laboratory practical after each unit. Students were provided with how-to dissection videos for only units 3 and 4. For this reason, in this study, student practical examination scores from units 1 and 2 were used as controls, while the scores from the last two units were used as intervention statistics. The dissections were performed under the direction of the 21st edition of *A Guide to Cadaver Dissection*, the instructional manual used by Physician Assistant, Physical Therapy, Graduate, and Medical students at UNMC. The dissections in this study closely followed the dissector so that the videos would show students structures from similar angles/positions that they themselves would see in lab. Table 2.1 shows all the dissections that were performed and recorded for this study.

| Unit 3: Thorax and Abdomen | Unit 4: Pelvis, Perineum, Lower Limb |
|---|---|
| Pleura and Lungs | Pelvic Cavity |
| Heart | Anterior and Medial Thigh |
| Mediastinum | Gluteal Region and Posterior Thigh |
| Abdominal Wall | Leg |
| Peritoneum | Sole of Foot |
| Abdominal Viscera | |
| Posterior Abdominal Wall | |

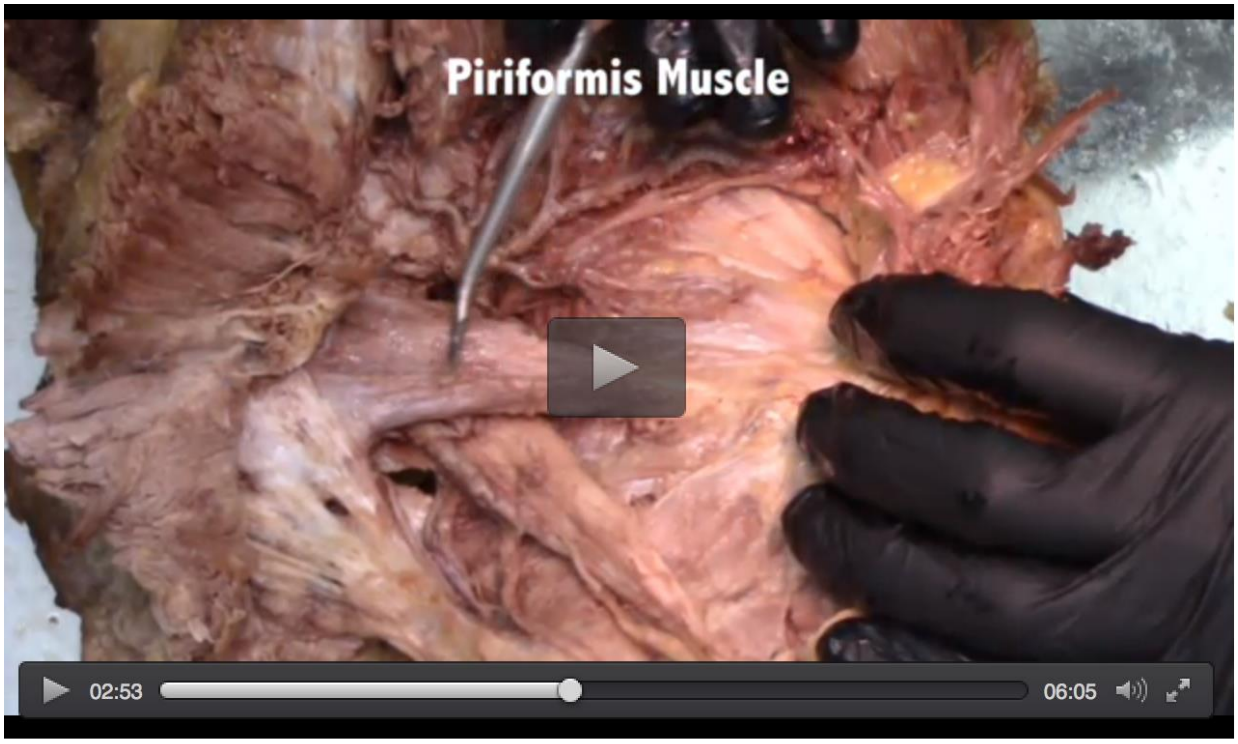
**Table 2.1 – Breakdown of unit 3 and 4 dissections performed for this study.**

| Unit 3 | Unit 4 |
|---|---|
| Inguinal region | Perineum |
| | Hip/Knee Joints |
| | Ankle Joint |

**Table 2.2 – Dissections excluded from study**

Several labs from units 3 and 4 were not included in our video dissections. These labs were demonstration labs, which consisted of prosections performed by faculty members and taught to students in small groups during lab hours. We chose not to do these demonstration dissections because they require excessive tissue removal resulting in the damage of structures relevant to other labs. Table 2.2 displays the labs omitted from this study.

Once the dissections were filmed, they were edited using Adobe Premiere Elements 13™ video editing software. The video were edited using text, arrows, and freeze frames, giving the students time to read the notations and look at the indicated structures before the video progressed. The finished product was in the following format: MPEG-4 movie; dimensions: 1920x1080; Codecs: H.264, AAC; HD color profile. After the videos were finished with the Adobe video editing software, they were uploaded to Etix Media Library™. Students had access to this library via links posted in Blackboard™. A strong effort was made to keep the videos less than ten minutes in duration so as to prevent student attention from wandering when using the videos. If the content required the duration to exceed ten minutes, it was broken down into two separate videos (i.e.: Pelvic Cavity I and Pelvic Cavity II).


Piriformis Muscle
02:53
06:05

### 2.2: Surveys and Evaluation of Videos and Effects

At the same time the videos were being produced, approval from the Institutional Review Board (IRB# 733-15 EX) was acquired and surveys were being developed to better understand student perspective before and after video implementation. The first survey (Appendix C) was administered just before the videos were implemented. This survey was designed to garner background information from the students relative to gross anatomy. These questions were concerned with whether or not they had taken anatomy, if it involved cadavers, whether or not they had previous experience dissecting, etc. The survey continued by asking the student to rate his or her confidence in their dissecting ability on a Likert scale. A similar scale was used to then ask the student how prepared he or she was for lab each day. The remainder of the survey was concerned with how the students prepare for lab and what materials they specifically use to aid in their dissection.

Surveys 2 and 3 (Appendix C) were identical in order to show the progression of change in student confidence and lab preparation. These surveys used a Likert scale to determine student confidence and quality of dissection. The remainder of the surveys used a Likert-type rating system to ask students who utilized the videos to rate how useful the dissection videos were in various aspects with respect to lab (inkling preparation, review, and as a dissection aid).

The students were made aware of the videos through a verbal announcement during lab time and a written announcement posted on Blackboard™ (Appendix A). These announcements not only brought awareness to the project, but also demonstrated to the students how to access the videos and what they would entail. On October 27th, 2015 (shortly after the unit 2 examination and laboratory practical) the first of three anonymous and voluntary surveys (Appendix C) and a consent form (Appendix B) were

distributed to students. The surveys were collected the same day and were deidentified by a third party to protect student confidentiality. In a similar fashion, surveys 2 and 3 were distributed after the third unit examination and before the fourth unit examination, respectively.

## CHAPTER 3: Results

Of the 87 students that completed survey 1 (Appendix C) 61 had previously taken cadaver-based anatomy, whereas 26 had no prior cadaver-based anatomy experience. Though students indicated taking a cadaver-based anatomy course, this does not mean they dissected themselves. It was found that students with prior dissection based anatomy coursework performed significantly better in the current gross anatomy course (P=0.016) than those without such prior cadaver experience. Since prior experience in a dissection based anatomy course was a major determining factor in performance in the current course, all subsequent analyses stratified students based upon this previous experience. Figure 3.1 shows a comparison between the two groups and their overall course grade, which includes lecture and laboratory scores. For Figure 3.1, A=4.0, B=3.0, C=2.0,D=1.0.

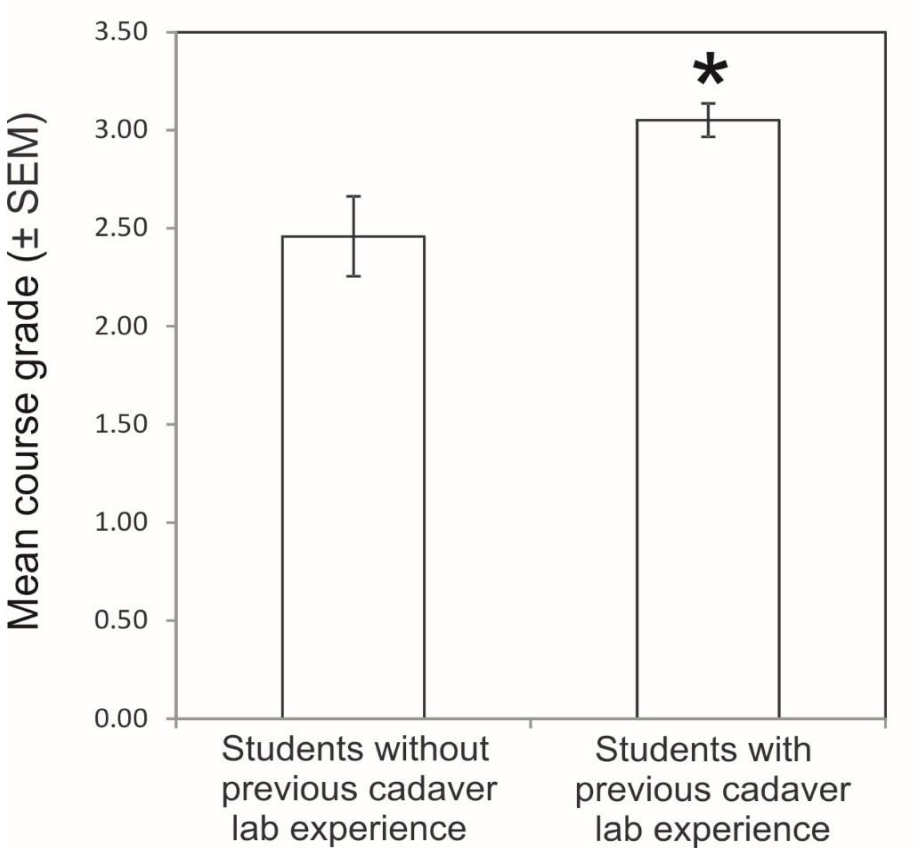



**Figure 3.1, A=4.0, B=3.0, C=2.0,D=1.0. Overall grade comparison for students with and without prior dissection based anatomy course experience**

Figure 3.1 supports the notion the students will perform better in a cadaver-based anatomy curriculum if they have had experience in a similar type of anatomy course. However, this does not necessarily reflect on the influence of the implemented dissection videos on performance since the overall grade (used in the analysis of Figure 3.1) includes both laboratory practical scores and lecture examination scores. Lecture examinations are based on the content presented in lectures by faculty during allotted lecture time. Lecture examinations focus more on the clinical aspect of anatomy in contrast to laboratory practicals, which focus on structure identification. The dissection videos were designed to aid students in dissection and ability to recognize and identify structures as seen in a human cadaver. Therefore, we chose to analyze the impact of the dissection videos specifically on lab practical scores alone, rather than looking at the impact on overall course grades, which also incorporate lecture scores.

Figure 3.2 shows student performance on lab practicals 1 and 2 for students without prior cadaver lab experience and those with prior cadaver lab experience.

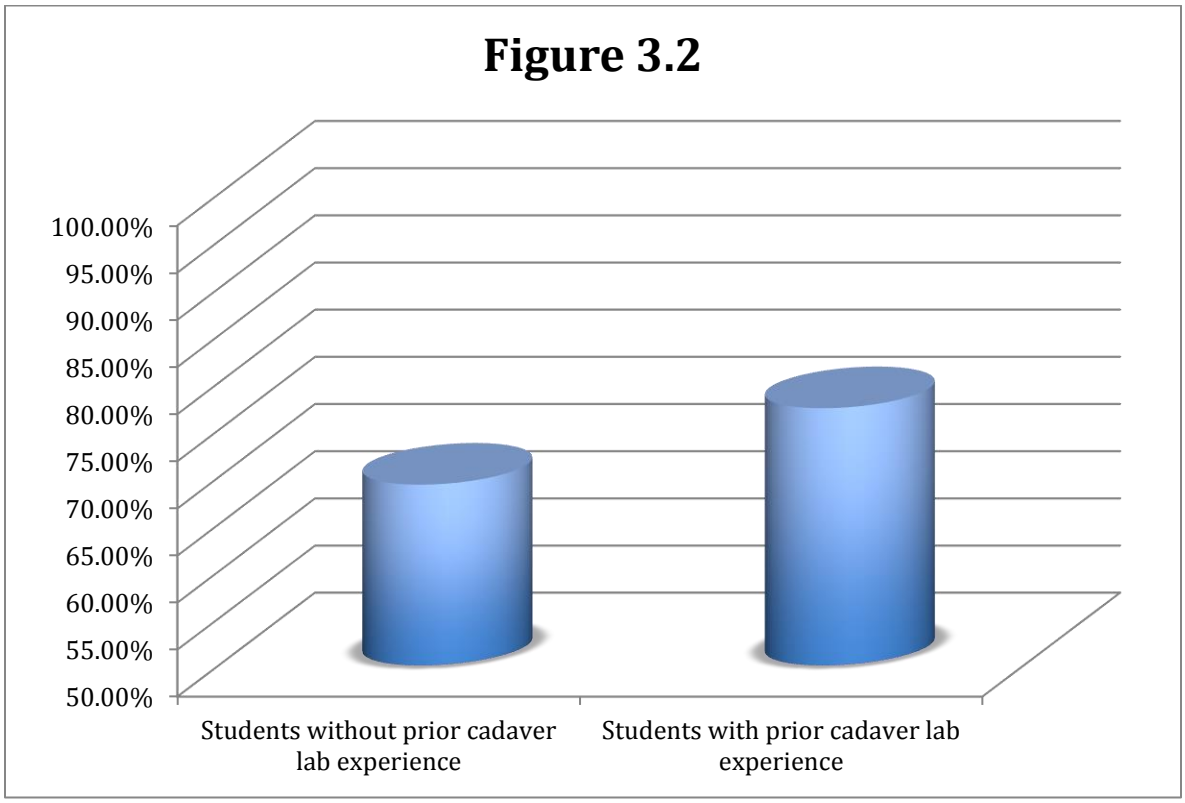



**Figure 3.2 – Comparison of unit 1 & 2 lab practical scores of students without prior cadaver lab experience and students with prior cadaver lab experience.**

The results are consistent with the idea that students who had taken a dissection based anatomy course will perform better in the current anatomy class. The experienced

students scored a 77.3% average between unit 1 and 2 practicals, while students with no prior cadaver experience scored on average 69.2%. These results support Figure 3.1 and provide further rationale to differentiate between students with and without prior cadaver lab experience for further analysis.

One goal of this study was to evaluate the effect of dissection videos on student confidence in their own dissecting skills. Figure 3.3 shows this change in confidence throughout the duration of the course.

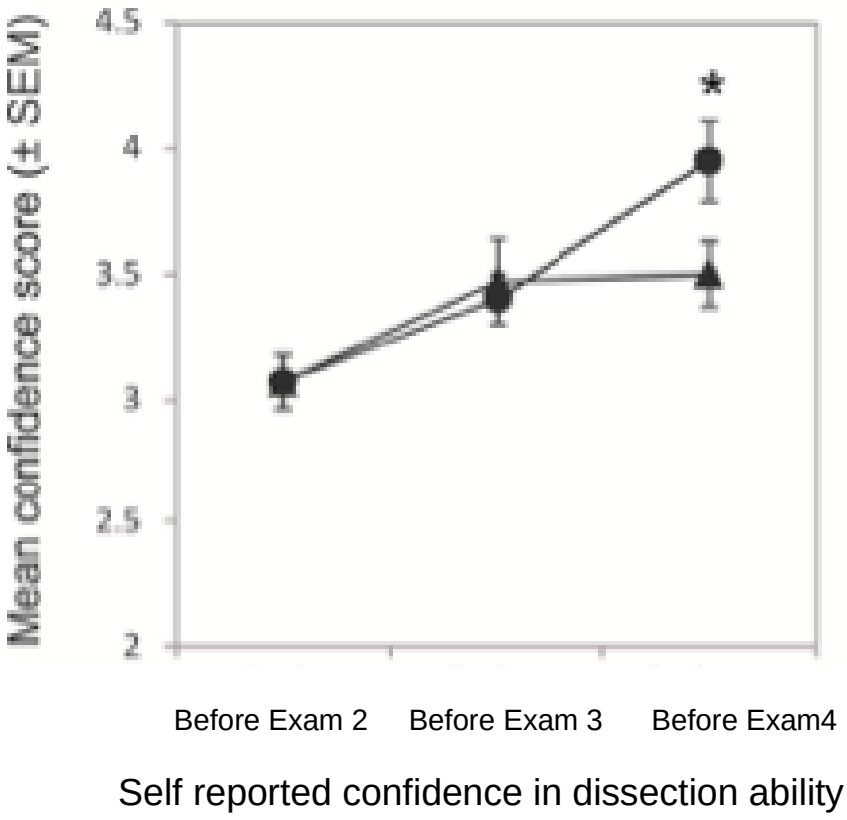



**Figure 3.3 – Change in confidence between students who viewed the dissection videos verses those who did not.**

All of the students incorporated in this analysis have had prior cadaver lab experience and responded to all three surveys (N=48). From that pool, the students were subdivided into two groups: those who reported viewing the dissection videos and those who did

not. 28 students reported viewing the videos (indicated by circles) while 20 reported not utilizing the videos (indicated by triangles). Confidence in dissection increased as time progressed in both groups. However, students who utilized the videos experienced an appreciably larger increase (P=0.035) in dissection confidence than the opposing group prior to the final examination. This analysis supports the argument that dissection videos increase students' confidence in their own dissections. However, there could be a number of contributing factors to this reported increase in confidence such that one cannot definitively conclude that dissection video utilization was the direct cause of increased confidence. The numbers were too small to run a similar analysis on students who did not have prior cadaver lab experience.

A similar analysis was done using laboratory examination scores. Figure 3.4 shows the mean laboratory scores throughout the progression of the semester between students who did utilize the dissection videos and students who did not (all students had previous cadaver lab experience and responded to all three surveys).

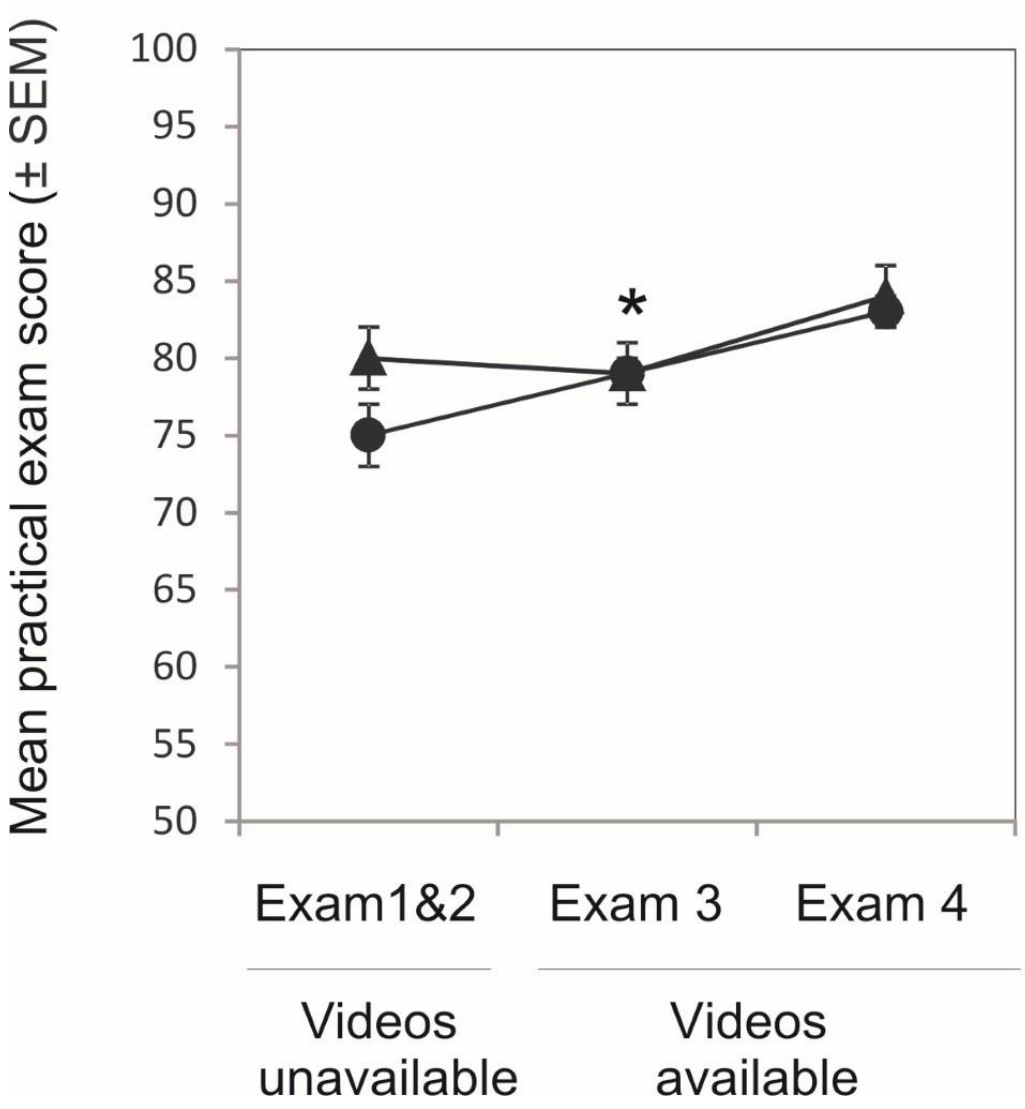



**Figure 3.4 – Comparison of mean practical scores between students who utilized the dissection videos and those who did not.**

The students who did watch the dissection videos are represented with circles, while the students who did not utilize the videos are represented with triangles. Students who chose not to view the dissection videos performed significantly better (P=0.043) on practicums 1 and 2 by earning an average of 80.3%, while their counterparts who later chose to watch the dissection videos averaged a 75.1%. The results from laboratory exam 3 show that students who did utilize the videos increased their scores while the scores of those who did not utilize the videos decreased. Both groups experienced a similar increase in laboratory practical outcomes from unit three to unit four. One interpretation of this data is that the students who chose to not watch the dissection videos were less motivated to utilize supplemental learning material, such as the dissection videos, since they had received higher marks on the first two exams. At the same time, students who performed less well on the first two exams may have been more motivated to incorporate alternative modalities into their studies, thus resulting in the relative decrease and increase in unit three scores, respectively. The change in laboratory scores from unit three to unit four were very similar between the groups. However, since those who chose to watch the dissection videos achieved a lower average between units 1 and 2, the relative increase in laboratory scores was greater for those who chose to incorporate the dissection videos into their studies. To further analyze the potential impact of video usage on practical exam performance, we calculated the change in score from the average between units one and two to unit three for each student. We then used the paired t test to compare the change in exam scores between the two groups (video users and non-users). On exam 3, video users improved their exam performance by, on average 4.3% (from 75.1% to 79.4%). This improvement in exam performance was statistically significant (P=0.013 by paired t-test). By contrast, for video non-users, exam 3 performance actually declined on average by 1.6% (from

80.3 % to 78.6%). Thus, our results are consistent with the hypothesis that dissection video usage improved practical exam performance. However, factors that we cannot control for such as use of other resources, changes in study habits or effort, etc., may have contributed to these results. We cannot definitively conclude that there is a cause-effect relationship between video usage and improved exam performance, though this data does support that assumption.

Though the original purpose of the dissection videos was to provide direction in the gross anatomy laboratory, it was recognized that students might use the videos in other ways to aid in their studies. Therefore, several tables were made to illustrate how students prepared for laboratory and how and when students utilized the dissection videos in a comprehensive manner once they were made available. Table 3.1 displays data collected from survey 1 (Appendix C), when the dissection videos were not available, showing what resources students used to prepare for laboratory and how often they used each resource. Again, the 87 students who took the first survey were subdivided into those with prior cadaver lab experience (N=61) and those without prior cadaver lab experience (N=26).

**Table 3.1** - Student usage of resources used to prepare for gross anatomy lab

| | Percentage of students using each resource type | | | | | |
|---|---|---|---|---|---|---|
| Student experience | Dissector guide | Atlas | Ackland videos | Other online | Other | None |
| Students without previous cadaver lab experience | 96.2% | 75% | 30.8% | 19.2% | 3.8% | 0% |
| Students with previous cadaver lab experience | 93.4% | 60.7% | 39.3% | 8.2% | 4.9% | 4.9% |

Students were divided into groups based upon previous experience in a cadaver based gross anatomy course. Students without such experience (N=26) were analyzed separately from those with such experience (N=61).

We can see from these results that students from both groups preferred the dissector guide and an atlas to prepare for lab. This supports the idea that dissection videos, which are based off of this dissector guide, would be utilized frequently for laboratory preparation. What is surprising is that nearly 5% of students with prior cadaver lab experience reported not preparing for lab at all. One possible reason for this result could be that students with prior cadaver lab experience felt confident and that they didn't need to prepare to be successful in lab. Another possible explanation is that there simply was not time to prepare, as these students are enrolled in very rigorous and demanding programs. However, this is only speculation.

Table 3.2 shows what resources students preferred to use during the allotted laboratory times. Again, the 87 students who completed the first survey were subdivided into those with prior cadaver lab experience (N=61) and those without prior cadaver lab experience (N=26).

Table 3.2 - Student usage of resources during gross anatomy lab

| | Percentage of students using each resource type | | | | |
|---|---|---|---|---|---|
| Student experience | Dissector guide | Text book | Atlas | Teaching assistants | Faculty |
| Students without previous cadaver lab experience | 100% | 23.1% | 80.8% | 92.3% | 100% |
| Students with previous cadaver lab experience | 95.1% | 19.7% | 77.0% | 85.2% | 88.5% |

Students were divided into groups based upon previous experience in a cadaver based gross anatomy course. Students without such experience (N=26) were analyzed separately from those with such experience (N=61).

The dissector guide, atlases, and circulating teaching assistants and faculty members were widely used forms of guidance for students in both groups. Although there was a difference between the two groups when it came to using the faculty members for guidance this difference fell short of statistical significance (P=0.1). All students without prior cadaver lab experience indicated using faculty members during lab. However, only 88.5% of those with past cadaver lab experience reported using faculty members. Again, this could be attributed to an increase in confidence in the experienced group, leading to less “help-seeking” behavior.

The following two tables garnered information on how and when the students used the dissection videos when they were implemented. Table 3.3 shows how and when students used the videos prior to exam three compared to how and when students used the videos prior to the final examination. This was done to see if a pattern of usage evolved amongst the students as the course progressed. This would give insight as to the best application of how-to dissection videos.

Table 3.3 - How and when students used the how to dissection videos

| | When students used videos | | | How students used videos | | |
|---|---|---|---|---|---|---|
| | BBBefore lab | During lab | After lab | For review | As a dissector | As lab exam prep |
| Prior to Exam 3 | 67.9% | 64.3% | 39.3% | 42.9% | 10.7% | 71.4% |
| Prior to Exam 4 | 57.2% | 57.2% | 42.9% | 57.1% | 4.8% | 76.2% |

The table shows that students used the dissection videos primarily before and during laboratory time, and also as preparation for laboratory examinations. Strangely, few students reported using the dissection videos after lab, which was an apparent

contradiction of the fact that more than 70% of the students reported using the videos for laboratory examination preparation. One interpretation of these results is that some students, when filling out the survey, assumed that “after lab” meant reviewing the dissection videos immediately after lab to reinforce retention of structures. However, the investigators of this study intended “after lab” to refer to viewing the dissection videos, at any time after that particular dissection has been performed, for review. Perhaps alternative wording could have prevented these confounding results.

Table 3.4 investigated different student perceptions about the value of the videos in different contexts. The data from surveys 2 and 3 were divided on the table as prior to exam 3 and prior to exam 4, respectively. All of the data represented on the table are from students who reported watching the dissection videos.

Table 3.4 - Student assessment of utility of how to dissection videos

| | When students used videos | | How students used videos | |
|---|---|---|---|---|
| | Prepping for lab | Reviewing material | Understanding material | Guidance during lab |
| Prior to Exam 3 | 3.24 | 3.14 | 3.24 | 3.69 |
| Prior to Exam 4 | 3.47 | 3.40 | 3.38 | 3.48 |

On average, students rated the dissection videos somewhere between 3 (somewhat helpful) and 4 (very helpful) for all applications queried. It was found that in both survey 2 and 3, students felt that the videos were best utilized as guidance during their laboratory dissections. Guiding dissections was one application of the dissection videos by the video producers.

## CHAPTER 4: Discussion

Literature pertaining to the pedagogical use of videos in gross anatomy indicated that more research needed to be done. In addition to the need for more research on this topic, our study was validated by an effort to incorporate more technology into the classroom, both on our campus and nationwide. Several studies had been performed to look at the effects of videos on students' performance in gross anatomy, while others

looked at the perception of instructional anatomical videos from the point of view of the students. Very few projects took into account the multiple effects that the implementation of dissection videos may have. This study made an effort to define the pedagogical purpose of the videos as strictly supplemental, and made an effort to look at multiple facets of the student experience in gross anatomy that may have been influenced by the videos.

Specifically, this study looked at how the implementation of dissection videos affected examination scores, as well as the students' confidence in their own dissection skills. We also assessed how the videos were used, when the videos were used, and the students' perceptions of the videos. Prior to examining the results after implementing the videos, an effort was made to perform a properly controlled study by examining the impact of various "outside" factors or potentially confounding variables that we would need to control for. It was found that previous cadaver lab experience increased student overall performance in gross anatomy. For this reason, students were divided into two groups based upon self-reported previous experience in a cadaver based gross anatomy course for all analyses of the impact of the videos on performance. Unfortunately, the number of students without previous cadaver lab experience who completed the surveys was small, and so, no meaningful statistical analysis could be performed using this group. Therefore, all analyses were performed on the student population that had prior cadaver lab experience. When analyzing confidence, it was shown that all students experienced an increase in confidence in their own dissection skills. However, there was an appreciably larger increase ($P=0.035$) in confidence in the students who decided to utilize the dissection videos. When looking at laboratory examination scores, it was shown that for those who watched the videos, there was an increase from units 1 and 2 to unit 3, while those who elected not to watch the videos actually experienced a

decrease in laboratory examination scores from units 1 and 2 to unit 3. Though both groups experienced a near identical improvement from unit 3 to unit 4 in practical scores, those who utilized the videos saw a larger relative increase in laboratory scores throughout the duration of the course. Though there are certain factors that cannot be controlled for (other resources, study habits, effort, etc.), there seems to be a correlation between increases in confidence and increases in laboratory examination scores in students who chose to watch the videos. These results corroborate our hypothesis that how-to dissection videos would improve students' confidence in their dissections. It is possible that this increase in confidence leads to a more efficient use of lab time and, therefore, higher laboratory examination scores.

According to the data recorded in table 3.4, when asked how helpful the videos were for laboratory preparation, material review, material clarification/understanding, and guidance in laboratory dissections, the students rated the dissection videos somewhere between 3 (somewhat helpful) and 4 (very helpful) for all applications for which the dissection videos were utilized. These numbers support a positive perception of the videos in the eyes of the students. Testimonials collected from the surveys further validate that assumption:

- *"Definitely helped make sense of the directions & speed up the dissecting process."*
- *"I really like the concept of having videos and think they have the potential to be really helpful!"*
- *"Great videos! Very helpful"*
- *"Loved this resource"*

One result of this study, as well as other studies on the use of videos in anatomy courses, was that there did not appear to be any negative consequences of video usage.

A concern was that the videos might make students more inclined to neglect other study materials in light of the newly available how-to dissection videos, yielding lower examination scores for students who utilized the videos. It was also a concern that seeing dissections performed on video may make a student feel that his or her dissection skills were inferior, leading to a decrease in confidence throughout the course. Fortunately, this was not the case. Though the results did not always show defined increases in examination scores or confidence, they were never hindering to the students and, therefore, have the potential to benefit them. Though more research must be conducted on this subject, this study adds evidence to support dissection videos as a viable resource to supplement teaching in the gross anatomy laboratory.

## BIBLIOGRAPHY

1. Abdelsattar, Jad M., et al. "Do You See What I See? How We Use Video as an Adjunct to General Surgery Resident Education." *Journal of surgical education* 72.6 (2015): e145-e150.

2. Barry, Denis S., et al. "Anatomy education for the YouTube generation." *Anatomical sciences education* 9.1 (2016): 90-96.

3. Azer, Samy A. "Can “YouTube” help students in learning surface anatomy?." *Surgical and radiologic anatomy* 34.5 (2012): 465-468.

4. Choi- Lundberg, Derek L., et al. "Medical student preferences for self- directed study resources in gross anatomy." *Anatomical sciences education* (2015).

5. Collins, Anne M., et al. "Audiovisual preconditioning enhances the efficacy of an anatomical dissection course: A randomised study." *Journal of Plastic, Reconstructive & Aesthetic Surgery* 68.7 (2015): 1010-1015.

6. Denning, David. "Video in theory and practice: Issues for classroom use and teacher video evaluation." *Victoria: InNATURE productions* (1992).

7. Dong, Chaoyan, and Poh Sun Goh. "Twelve tips for the effective use of videos in medical education." *Medical teacher* 37.2 (2015): 140-145.

8. Doubleday, Alison F., and Sarah J. Wille. "We are what we do: Examining learner- generated content in the anatomy laboratory through the lens of activity theory." *Anatomical sciences education* 7.5 (2014): 361-369.

9. Jaffar, Akram Abood. "YouTube: An emerging tool in anatomy education." *Anatomical sciences education* 5.3 (2012): 158-164.

10. Mahmud, Waqas, et al. "Dissection videos do not improve anatomy examination scores." *Anatomical sciences education* 4.1 (2011): 16-21.

11. Mayfield, Chandler H., Peter T. Ohara, and Patricia S. O'Sullivan. "Perceptions of a mobile technology on learning strategies in the anatomy laboratory." *Anatomical sciences education* 6.2 (2013): 81-89.

12. Mukhopadhyay, Sanjana, Estie Kruger, and Marc Tennant. "YouTube: a new way of supplementing traditional methods in dental education." *Journal of dental education* 78.11 (2014): 1568-1571.

13. Nageswari, K. Sri, et al. "Pedagogical effectiveness of innovative teaching methods initiated at the Department of Physiology, Government Medical College, Chandigarh." *Advances in physiology education* 28.2 (2004): 51-58.
14. Raikos, Athanasios, and Pasan Waidyasekara. "How useful is YouTube in learning heart anatomy?." *Anatomical sciences education* 7.1 (2014): 12-18.

15. Topping, Daniel B. "Gross anatomy videos: Student satisfaction, usage, and effect on student performance in a condensed curriculum." *Anatomical sciences education* 7.4 (2014): 273-279.

16. Wang, RuoLan, Karen Mattick, and Elisabeth Dunne. "Medical students' perceptions of video-linked lectures and video-streaming." *Research in Learning Technology* 18.1 (2010).

# APPENDICES

## Appendix A: Blackboard Announcement

The following is the announcement that was posted to and available on the student Blackboard:

"Karen Gould, PhD from the Department of Genetics, Cell Biology and Anatomy, College of Medicine, and Ryan Splittgerber, PhD, from the College of Allied Health Professions, at the University of Nebraska Medical Center (UNMC) are conducting an educational research study entitled "Evaluation of High-Definition "How-To" Dissection Videos for Gross Anatomy".

Students enrolled in either CBA 571 or GCBA 908/909 Gross Anatomy courses in the fall of 2015 are eligible to participate in this study. Information about this research

project and participation in this study can be found in the document entitled "Consent to Participate in Research_Evaluation of How-To Videos for Gross Anatomy"

Students who elect to participate in the study will have the opportunity to fill out surveys during their mini case lectures. Study participation is optional, and even those who choose not to participate will have access to the instructional videos. The information obtained from the surveys will be used to elicit feedback about dissection videos and how students use them. The surveys are part of the MS thesis research project being conducted by Kevin Selting and Jessica Gamerl. They can be contacted for any more questions. Your feedback is appreciated."

## Appendix B: Consent Form

**Assessment of High-Definition How-To Dissection Videos as Educational Tools in the Gross Anatomy Lab**

The goal of this research is evaluate the benefit of a series of high definition How To dissection videos that will be available to students 24/7 and will provide the students with visual guidance, showing students *how to* perform the dissections. These videos will complement the written instructions and static images in the interactive dissection guide. We hypothesize that these videos will enhance students' preparation for gross anatomy lab sessions, promote efficient and effective use of laboratory time, and improve students' confidence in their dissection skills.

You were selected as a possible participant in this study because you are enrolled in either CBA 571 or GCBA 908/909 Gross Anatomy courses in the fall of 2015. Your

participation in this research study is voluntary.

If you volunteer to participate in this study, you will be asked to do the following:

- Complete 3 brief surveys (after Lab practical 2 and before Lab practical 3 and 4 in fall 2015). Survey questions will focus on if/when/how you used the videos and your perceptions regarding the value of the videos
- Participate in a focus group in which student experiences with the videos will be discussed in more detail and ideas for possible improvements to the videos will be explored.

Completing any portion of one or more of the surveys and/or attending a focus group meeting constitutes implied consent to participate.

Participation to complete the surveys will take a total of about 30 minutes spread out over approximately 8 weeks. Each of the three surveys will require about10 minutes to complete. Surveys will be administered after e Lab practical 2 and before Lab practical 3 and 4 in fall 2015.

Focus group meetings will require an additional 30-45 minutes. Focus groups will be held early in 2016 in interaction rooms in MSC.

Exam grades will be collected for this research to assess the potential impact of the videos of exam performance.

There are no anticipated risks.

You will not directly benefit from your participation in the research. However, the results of the research may benefit future students by providing a rationale to generate and a comprehensive set of instructional how to videos for a larger audience of gross anatomy students.

Any information that is obtained in connection with this study and that can identify you will remain confidential. Confidentiality in the exam scores will be maintained by means of a coding system. Participants will be randomly assigned an ID number and the document containing these assignments will be stored in a locked file cabinet to which only she and Dr. Splittgerber have access. Confidentiality in the surveys will be maintained by means of a coding system. Participants will write their name on the cover sheet only. After participants complete the survey, Dr. Gould will remove the cover sheets and store these in a locked file cabinet to which only she and Dr. Splittgerber have access. Number coded survey pages (no participant names) and number coded exam grades (no participant names) will be analyzed by graduate students Jessica Gamerl and Kevin Selting as part of their thesis research.

A subset of students who complete all of the surveys will be asked to participate in a

focus group. The list of focus group participants will only be known to Dr. Gould, Dr. Splittgerber, Miss Gamerl, and Mr. Selting (and other focus group participants). A list of focus group participants will be stored in a locked file cabinet to which only Dr. Gould and Dr. Splittgerber have access Comments and suggestions regarding the videos that are expressed during the focus group discussions will be written down but will not be attributed to any specific participant.

- You can choose whether you want to be in this study, and you may withdraw your consent and discontinue participation at any time by simply electing not to complete the surveys.
- Whatever decision you make, there will be no penalty to you.
- You may refuse to answer any questions on a survey and still remain in the study.

If you have any questions, comments or concerns about the research, you can talk to the one of the researchers. Please contact: Karen Gould at 402-559-2456 or kagould@unmc.edu or Ryan Splittgerber at 402-559-2712 or ryan.splittgerber@unmc.edu.

## Appendix C: Surveys

### Cover Page

Survey1
Survey ID #___

NAME: _____
[CONFIDENTIALITY STATEMENT AND PARTICIPATION INFORMATION]

1. Have you ever taken an anatomy class prior to this one? Y N

2. If you answered yes to question 1, did that anatomy class involve a cadaver-based lab? Y N

3. If you answered yes to question 1, did you personally dissect the cadaver during the lab? Y N

4. Do you have experience dissecting a cadaver, at all? Y N

5. How would you rate your confidence in your dissecting ability, 1 being the LEAST confident and 5 being the MOST confident:

| Least Confident | Not Very Confident | Somewhat Confident | Very Confident | Most Confident |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

6. In general, how do you prepare for lab each day? Please choose ALL the options that are applicable:

- ☐ Pre-reading the Dissector Guide
- ☐ Looking at an atlas
- ☐ Watching Ackland Anatomy Videos
- ☐ Using an other Online Resource; please specify: _____
- ☐ Other; please specify: _____
- ☐ I don't use any resources to prepare for lab

7. In general, how prepared do you feel for lab each day? ; 1 being NOT AT ALL prepared and 5 being the MOST prepared:

| Not At All Prepared | Not Very Prepared | Somewhat Prepared | Very Prepared | Most Prepared |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

8. What do you use in lab to aid your dissections? Please choose ALL the options that are applicable:

- ☐ The online dissector guide
- ☐ The COA textbook
- ☐ An Atlas
- ☐ The TAs
- ☐ The Faculty

**Cover Page**

Survey2
Survey ID #____

NAME: _____
[CONFIDENTIALITY STATEMENT AND PARTICIPATION INFORMATION]

1. How would you rate your confidence in your dissecting ability; 1 being LEAST confident and 5 being MOST confident:

| Least Confident | Not Very Confident | Somewhat Confident | Very Confident | Most Confident |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

2. How would you rate the quality of your dissections, 1 being LOWEST quality and 5 being HIGHEST quality:

| Lowest Quality | Low Quality | Average Quality | High Quality | Highest Quality |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

3. Have you utilized the instructional dissection videos? Y N

4. If you answered yes to question 3, when did you use the videos? Please select ALL the choices that apply:

- ☐ Before lab
- ☐ During Lab
- ☐ After Lab

5. If you answered yes to question 3, how did you use the videos?

- ☐ As a review
- ☐ As a replacement for the dissector
- ☐ As preparation for lab or a lab practical

6. If you answered yes to question 3, how helpful were the videos for the following categories, 1 being NOT AT ALL helpful and 5 being MOST helpful:

| Category | Not At All Helpful | Not Very Helpful | Somewhat Helpful | Very Helpful | Most Helpful |
|---|---|---|---|---|---|
| Preparing you BEFORE lab | 1 | 2 | 3 | 4 | 5 |
| Reviewing the material | 1 | 2 | 3 | 4 | 5 |
| Understanding the material | 1 | 2 | 3 | 4 | 5 |
| Guiding you DURING lab | 1 | 2 | 3 | 4 | 5 |

7. Do you have any feedback or comments for the videos and how to make them better?

**Cover Page**

Survey3
Survey ID #____

NAME: _____
[CONFIDENTIALITY STATEMENT AND PARTICIPATION INFORMATION]

1. How would you rate your confidence in your dissecting ability; 1 being LEAST confident and 5 being MOST confident:

| Least Confident | Not Very Confident | Somewhat Confident | Very Confident | Most Confident |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

2. How would you rate the quality of your dissections, 1 being LOWEST quality and 5 being HIGHEST quality:

| Lowest Quality | Low Quality | Average Quality | High Quality | Highest Quality |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

3. Have you utilized the instructional dissection videos? Y N

4. If you answered yes to question 3, when did you use the videos? Please select ALL the choices that apply:

- ☐ Before lab
- ☐ During Lab
- ☐ After Lab

5. If you answered yes to question 3, how did you use the videos?

- ☐ As a review
- ☐ As a replacement for the dissector
- ☐ As preparation for lab or a lab practical

6. If you answered yes to question 3, how helpful were the videos for the following categories, 1 being NOT AT ALL helpful and 5 being MOST helpful:

| Category | Not At All Helpful | Not Very Helpful | Somewhat Helpful | Very Helpful | Most Helpful |
|---|---|---|---|---|---|
| Preparing you BEFORE lab | 1 | 2 | 3 | 4 | 5 |
| Reviewing the material | 1 | 2 | 3 | 4 | 5 |
| Understanding the material | 1 | 2 | 3 | 4 | 5 |
| Guiding you DURING lab | 1 | 2 | 3 | 4 | 5 |

7. Do you have any feedback or comments for the videos and how to make them better?

## Appendix D: Traditional course syllabus and course schedule

University of Nebraska Medical Center

**University of Nebraska Medical Center**
**Department of Genetics, Cell Biology and Anatomy**

**Course Title:** Gross Anatomy Lecture/Laboratory

**Course Number:** GCBA 908/909

**Credit Hours:** 908 is 3 credit hours, 909 is 5 credit hours

**Prerequisites:** Permission from the course director

**Semesters offered:** Fall

**Instructor(s)/Faculty:**

| | | | |
|---|---|---|---|
| Sarah Keim Janssen, Ph.D.<br>Course Director<br>Assistant Professor | 559-7833 | WHM, Rm. 2004 | skeim@unmc.edu |
| Gib Willett, P.T., Ph.D.<br>Co-Course Director<br>Associate Professor | 559-6595 | WHM, Rm. 2009 | gwillett@unmc.edu |
| Robert T. Binhammer, Ph.D.<br>Professor | 559-6238 | WHM, Rm. 2008 | rtbinham@unmc.edu |
| Andrew Dudley, Ph.D.<br>Associate Professor | 559-2820 | DRC 2 Rm. 6064 | andrew.dudley@unmc.edu |
| Erin Hoffman, MPAS<br>Assistant Professor<br>PA Education | 559-2928 | BTH, Rm. 4003A | erin.hoffman@unmc.edu |
| Matt Kling, M.S.<br>Graduate Student | | | matthew.kling@unmc.edu |
| Kim Latacha, Ph.D.<br>Assistant Professor | 559- 8341 | WHM, Rm 2005 | klatacha@unmc.edu |
| Carol Lomneth<br>Associate Professor | 559-7279 | WHM, Rm 2002A | clomneth@unmc.edu |
| Alan Richards, M.D.<br>Associate Professor | | | |
| Ethan Schroeder<br>Graduate Student | | | ethan.schroeder@unmc.edu |
| Ryan Splittgerber, Ph.D.<br>Assistant Professor | | HSEC, UNK Rm. 137 | ryan.splittgeber@unmc.edu |
| Syd Clausen<br>Lab Supervisor | 559-7292<br>pg. 888-3571 | WHM, Rm. 2014 | sclausen@unmc.edu |
| Paul Becker<br>Anatomical Board Mortician | 559-6249<br>pg. 888-3965 | WHM, Rm. 2002B | pbecker@unmc.edu |

University of Nebraska Medical Center

**Class Days, Times, Location:**
Monday 3:00-5:00, Tuesday-Friday 2:00-5:00, Wednesday 8:00-8:50

**Course Description:**
Students in the human anatomy course are introduced to the terminology of Anatomy, in particular, and medicine in general. In the Gross Anatomy Laboratory, the human body is studied systematically and the three-dimensional relationships of structures are observed and related to their function. The gross anatomy laboratory is equipped with a computer at each table and access to an Interactive Dissecting Guide online with links to atlas plates to facilitate the learning process. Self-learning while dissecting a cadaver is the basis of the study of gross anatomy. Faculty members will assist in all laboratory sessions and will present some demonstrations. Lectures are limited and will emphasize application of anatomic knowledge to clinical medicine. Gross Anatomy is taught synchronously with Embryology and Neuroanatomy in order to provide students with a broad understanding about the development and configuration of adult anatomy and nervous system structure and function. **Students are responsible for reading the designated material prior to each lecture.**

Throughout the seventeen weeks of the program, particular emphasis is placed on "Living Anatomy" as a corollary to anatomy learned in the dissecting room. Living anatomy is designed to reinforce knowledge obtained in the dissecting room by demonstrating that many structures in the human body may be palpated and/or tested in the living. Although designed as a supplement to Gross Anatomy, many of the tests performed and techniques learned serve as an introduction to the techniques of patient physical examination and diagnosis.

Throughout the program, appropriate clinical correlations are emphasized to form the foundation of clinical practice. In selected cases, pathological processes are examined and related to the anatomical information presented in the course. Students are encouraged to critically think and seek an anatomical solution to clinical problems where one exists.

Students are provided with a wide variety of learning materials that can be found on Blackboard. Independent study is both encouraged and necessary. Students are provided ample opportunities to reinforce, amplify and employ their classroom experiences.

**Course Goals:**
On completion of the course, the student shall be able to:

1. Describe and identify the essential features of normal human anatomy at the tissue, organ, and system level.

2. Demonstrate with an acceptable degree of manual dexterity on the normal (living) subject: the position, extent, and functional integrity of organs and systems.

3. Interpret the position and extent of normal structures in radiographs, contrast studies, air studies, angiograms, echograms, cross sections, computerized tomography (CT) scans, magnetic resonance images (MRI), and osteology material.

4. Describe the embryological development of organs and organ systems and apply this knowledge to explain the underlying defects in major congenital malformations.

5. Describe the neuroanatomical organization of the nervous system and apply this knowledge to explain the underlying issues in neurological diseases and damage.

6. Explain the anatomical basis of clinical procedures and pathological processes, and formulate an anatomical solution to clinical problems where one exists.

**Textbook/Materials:**

Required:

1. Clinically Oriented Anatomy, 7th Ed.
   K. Moore, A. Dalley, A. Agur
   Lippencott Williams & Wilkins

2. The Developing Human: Clinically Oriented Embryology, 10th Ed.
   K. Moore, T. Persaud, M. Torchia
   Saunders/Elsevier

3. Neuroscience Fundamentals for Rehabilitation, 4th Ed.
   L. Lundy-Ekman
   Elsevier

Recommended:

4. Netter's Atlas of Human Anatomy, 6th Ed.
   Netter
   Saunders

Suggested:

5. Atlas of Anatomy, 2nd Ed.
   A. Gilroy, B. MacPherson, L. Ross
   Thieme

Reference Text:

6. Gray's Anatomy, 37th British Edition
   R. Warwick and P. Williams
   Saunders

**Student Expectations:**

Students in this course are expected to:

1. Demonstrate professionalism by:
   a. Accepting responsibility for your own actions.
   b. Applying time management skills in order to juggle classes, volume of information, and life.
   c. Being punctual to all lectures and lab sessions.
   d. Coming to class/lab prepared and ready to engage.
   e. Treating the donors with sensitivity and respect.
   f. Cleaning up classrooms and lab stations before leaving.
2. Demonstrate professional behavior, that is consistent with your profession, during interactions with others by:
   a. Creating and maintaining a productive working relationship with peers, instructors, clinicians, donors, and administrators.
   b. Treating others with respect and dignity.

   c. Accepting constructive criticism and feedback without defensiveness.
   d. Working through conflicts in a constructive way.
   e. Assuming responsibility for your choices and actions.
   f. Abiding by the laboratory rules pertaining to confidentiality and respect for the donors.
   g. Completing administrative requirements such as course evaluations and peer reviews.
3. Practice and apply the skills necessary to become a life-long learner by:
   a. Independently studying anatomy, embryology and neuroanatomy. Not all information will be handed to you.
   b. Applying knowledge to clinical problems to determine a solution.
   c. Seeking additional information from validated and reliable sources and self-directing your learning.
   d. Critically thinking and asking questions.
   e. Critically reflecting on strengths and weaknesses and developing a corrective plan to address weaknesses.
4. Accept responsibility for understanding the course requirements.

**Religious Holidays:**
Religious holidays are an excused absence, but not beyond the day for the holiday itself. Students should make their requests known at the beginning of the semester and arrangements must be made with Dr. Keim for missed work.

**ADA Accommodations:**
It is the policy of the University of Nebraska Medical Center to provide flexible and individualized accommodation to students with documented disabilities. To receive reasonable accommodations, students must complete a Request for Services application and provide documentation to the Services for Students with Disabilities Office. Information is available at the Counseling and Student Development Center website at www.unmc.edu/stucouns/ You may contact Kelly Swoboda, Coordinator of Services for Students with Disabilities at 402-559-7276 or kelly.swoboda@unmc.edu. The office is located in Bennett Hall, 6001 within the Counseling and Student Development Center. Meetings are by appointment. Adequate time for processing, up to four weeks, is recommended.

**Grade Requirements:**
Student performance in this course is evaluated in several different ways. Knowledge and understanding of anatomy, neuroanatomy, and embryology will be assessed in written and practical examinations. Questions will consist of multiple choice, short answer, specimen-identification and oral questions of anatomic structures, images (photographs, X-ray, CT, MRI and cross sections), bones, etc. Examinations will occur at four points after completion of major segments of gross anatomy.

Cheating or other academic misconduct (see UNMC Student Handbook) on an examination will automatically result in a grade of zero for that examination and may result in failure of the course.

| **Performance Criteria** | | Approximate Pts. |
|---|---|---|
| Written Examinations (weight of exam varies based on amount of material covered in each section) | | |
| Gross & Living - 4 exams x avg. 50 questions/exam | = | 200 pts. |
| Short Answers - 4 exams x avg. 20 questions/exam | = | 80 pts. |
| Neuroanatomy - 4 exams x avg. 20 questions/exam | = | 80 pts. |
| Embryology - 4 exams x avg. 20 questions/exam | = | 80 pts. |
| Practical Examinations (weight of exam varies based on amount of material covered in each section) | | |
| Gross - 4 exams x avg. 50 stations/exam | = | 200 pts. |
| Living - 4 exams x 4 stations/exam x 5 points | = | 80 pts. |
| Reflection Writing | | |
| Self-assessment after 1st exam | = | 5 pts. |
| Self-assessment after 2nd exam | = | 5 pts. |
| Peer Evaluation of Lab Group | = | Pass/Fail |
| Peer Evaluation before 1st exam | = | 5 pts. |
| Peer Evaluation before 2nd exam | = | 5 pts. |
| Peer Evaluation before 3rd exam | = | 5 pts. |
| Approximate Total Average | = | 745 pts. |

**Grading System:**
The grading scale used is listed below. Please check with your program's Student Handbook to determine what letter grade qualifies as a passing grade. Grades in the examinations will be recorded in a central record as raw scores as outlined above. Percentage values will be derived at intervals and at the end of the course for the final grading of students. This grading scale illustrates the minimum letter grade associated with a particular percentage score. Each student will have reasonable access to his or her own record on Blackboard.

| **Grading Scale:** | | | | |
|---|---|---|---|---|
| | A+ | = 94.00-100.00 | B- | = 75.00-77.99 |
| | A | = 88.00-93.99 | C+ | = 72.00-74.99 |
| | A- | = 85.00-87.99 | C | = 68.00-71.99 |
| | B+ | = 82.00-84.99 | C- | = 65.00-67.99 |
| | B | = 78.00-81.99 | D | = 60.00 - 64.99 |
| | | | F | = Less than 60 |

**Course and Faculty Evaluations**
Students are required to complete and submit the course and faculty evaluations by the assigned due date. Failure to do so will result in a final grade of Incomplete, which will be submitted to Academic Services.

**Written Examinations**
There will be four written examinations during the seventeen weeks. Students are required to assemble in the designated rooms 15 minutes prior to the announced examination with sharpened number 2 pencils. Books, handbags, electronic devices, **cell phones** or other extraneous materials will not be allowed in the examination room and must be left outside of the exam room. Bathroom breaks will NOT be allowed (except for emergency situations). The examinations, which will test knowledge of gross anatomy, living anatomy, neuroanatomy, and embryology, will employ a variety of formats. There will be multiple choice

questions of the single best answer type, diagrams, fill in the blanks, and short answers essays. The answers to questions may be derived from multiple sources of information, e.g., lectures, laboratory, textbooks, etc. Questions will be distributed appropriately over the materials and **up to 10% of the questions may cover material tested previously**. A faculty member or administrator will be present to proctor these examinations.

**Laboratory Practical Examination**

There will be four Gross Anatomy Practical Examinations, which will include oral testing stations for Living Anatomy. Students will assemble 15 minutes prior to the announced time of the examination. Final instructions will be given at this time. Students should place a name tag with their name written legibly on their upper hip or thigh. Students should also collect a clip board with an answer sheet and make sure they have suitable writing instruments.

Structures will be identified on the donors by flags or pins. Structures will also be identified on bones, radiographs, CTs, MRIs, and on cross-sections. There will be four Living Anatomy stations for student partners with oral questions related to Living Anatomy. For this section, students will have one minute to demonstrate a test, locate bony prominences, palpate nerves, etc. on their partner.

The Gross Laboratory will be closed at an appropriate time to allow instructors time to set up the examination. Students will be allowed 60 seconds at each station during the exam. A buzzer will sound and each student will proceed to the next station. They must also halt at all the rest stops provided. There will be no talking during the examination, and touching the anatomical structures is strictly prohibited. Incorrect spelling will result in a deduction of ½ point.

Questions will be distributed appropriately over the materials (questions included will cover gross anatomy, embryology, neuroanatomy and living anatomy) and **up to 10% of the questions may cover material tested previously**.

**Reflective Writing**

There will be two assigned reflective writing exercises. The goal of these writing assignments are to encourage self-reflection and self-evaluation to determine your individual weaknesses and strengths, and how to improve the weaknesses. The purpose of the writing assignments is to: 1) reflect on your study habits and techniques, and self-evaluate what worked and did not work for you as an individual, 2) develop a solution or plan to help you to succeed in anatomy, and 3) develop better writing skills. These assignments will be assigned after the 1st and 2nd exams, after the test scores have been posted. The writing assignments will be worth 5 points each and will be evaluated according to the rubric on page 7. A passing grade will contribute 5 points to the anatomy grade, a marginal will contribute 2.5 points to the anatomy grade and a failing grade will contribute 0 points to the anatomy grade. Failure to turn the assignment in on the scheduled day and time will result in a failing grade for that assignment.

**Peer Evaluation of Lab Group**

There will be three assigned peer evaluations, where students will assess the professional behaviors of themselves and members of their lab group. Evaluations will be anonymous and will be graded as PASS/FAIL. The peer evaluations are found on blackboard and will be completed prior to exams 1, 2 and 3. Categories being assessed are listed on page 8 and a scale of 1-5 will be used (5 being the highest possible and 1 being the lowest possible). For scores of 1-2, students will need to describe the behavior of the individual with specific examples and the context of the situation the problem occurred in. Evaluations will be anonymous. **All evaluations must be completed by the due date and time or the student will receive a failing grade.**

**Reflection Rubric**

| | Fail | Marginal | Pass | |
|---|---|---|---|---|
| | 1 | 2 | 3 | Marks |
| Content | • Creates no understanding of the student's opinion<br>• Does not reflect on the situation/ assignment<br>• No evaluation of the issues or suggested improvements<br>• **Total of 3 possible points** | • Creates a limited understanding of the student's opinion<br>• Has limited reflection on the situation/ assignment<br>• Some evaluation of the issue(s), but no suggested improvements<br>• **Total of 6 possible points** | • Creates a clear understanding of the student's opinion/experiences<br>• Fully reflects on the situation/ assignment<br>• Fully evaluates the issue(s) and suggests improvements<br>• **Total of 9 possible points** | |
| Organization | • Did not include an introduction, body or conclusion<br>• Is organized into three or less sentences<br>• **Total of 2 possible points** | • Structure of an introduction, body and conclusion is incomplete<br>• Is organized into one paragraph<br>• **Total of 4 possible points** | • Structure includes an effective introduction, body and conclusion<br>• Is organized into two paragraphs<br>• **Total of 6 possible points** | |
| Accountability | • Turned assignment in late<br>• **Failure of assignment** | | • Turned assignment in on time<br>• **Total of 3 possible points** | |
| Conventions | • Errors in grammar, usage, punctuation and spelling throughout distract the reader<br>• **Total of 1 possible point** | • Errors in grammar, usage, punctuation and spelling may distract the reader<br>• **Total of 2 possible points** | • Grammar, usage, spelling and punctuation are correct<br>• **Total of 3 possible points** | |

Grading for each reflective writing assignment:

| | |
|---|---|
| PASS: 16-21 points | Will receive 5 points toward the anatomy grade. |
| MARGINAL: 15-11 points | Will receive 2.5 points toward the anatomy grade. |
| FAIL: 10-0 points | Will receive 0 points toward the anatomy grade. |

**Criteria for Peer Evaluations**

**Punctuality and Attendance:** Is always on time to lab. Always comes to lab.

Lowest 1 2 3 4 5 Highest

**Communication skills:** Interacts comfortably with others. Encourages interaction through effective language skills, uses appropriate terminology/language, and has a receptive attitude.

Lowest 1 2 3 4 5 Highest

**Personal Health:** Exhibits grooming, dress, and hygiene commensurate with responsibilities.

Lowest 1 2 3 4 5 Highest

**Honesty and Integrity:** Demonstrates integrity in all situations. Is not deceitful to peers/faculty and does not show poor discretion.

Lowest 1 2 3 4 5 Highest

**Respect:** Treats all people/donors with courtesy both publicly and privately.

Lowest 1 2 3 4 5 Highest

**Accountability:** Participates routinely in dissection. Comes to lab prepared to do the current dissection. Is knowledge about the information, and aids in learning the information.

Lowest 1 2 3 4 5 Highest

**Cooperativeness**: Did the group member work well with others?

Lowest 1 2 3 4 5 Highest

**Dependability and Reliability**: Did he/she help make group decisions? Was he/she able to stay on task? Did he/she help others to review and learn the anatomy? Did this group member complete his or her "fair share" of activity? Did they help in brainstorming, presenting, and/or recording any information?

Lowest 1 2 3 4 5 Highest

**Gross Anatomy Laboratory Rules**

1. Access to the Gross Lab is restricted. To gain access to the gross lab or the locker rooms, use your ID card and pass it near the electronic lock. Access is available 24/7. The gross lab is a restricted area. Doors must remain closed at all times. Do not prop the doors open.

2. Only students, residents and faculty who are currently enrolled in a course are allowed in the gross anatomy lab. NO VISITORS are allowed without permission from the lab director. You must have your UNMC ID badge to enter the gross lab.

3. The bodies in the Gross Anatomy Laboratory are donors to Medical Science. They are the remains of persons who are making a substantial contribution to your professional education and the welfare of humanity. They are deserving of your respect. The dignity of the dead MUST be maintained at all times. Unauthorized photography in the dissecting laboratory is forbidden and can result in dismissal from your program of study. Visitors are not permitted in the laboratory at any time, except with special permission of the Course Director and/or Chairman of the Department.

4. Anatomical material may not be removed from the laboratory. Video or photographs (whether digital or film) are not allowed in the lab. Violation of this rule may lead to dismissal.

5. Material from each dissection which is no longer required should be placed in the container below your table. Do not mix tissue from one table with another. The table should be kept neat and clean at all times. This is not only good laboratory procedure; it may also minimize injuries suffered on contact with instruments lying on the table. While every attempt is made to ensure that the bodies are completely embalmed, occasionally, incomplete fixation of the brain, thorax or abdomen does occur. If you have any reason to suspect that a portion of your cadaver may not be completely fixed (fluidity, odor), please contact a laboratory instructor immediately.

6. Gloves should be removed before exiting the lab. Used gloves and waste paper are to be place in the waste containers near the sinks.

7. Smoking, eating and drinking are not allowed in the laboratory for reasons of hygiene and OSHA regulations.

8. Students are strongly advised to wear suitable protective clothing in the Gross Laboratory. Lab coats (buttoned-up), aprons, or scrub suits are expected to be worn to protect skin and clothing. Sandals and open-toed shoes are prohibited in the laboratory. Protective safety glasses are recommended, especially when cutting through bone. We recommend they be laundered at least every week. We recommend that if you must visit the cafeteria, do so either before the Gross Lab or afterwards and not while you are wearing laboratory suits. Severely soiled scrubs should be placed in the laundry basket; do not wear dirty scrubs out of the lab.

9. Each student is responsible for his own books and equipment. Every year, many books and personal items are lost. There is little we can do after the event, so please avoid the problem. Personal belongings (backpacks, purses, etc.) should be placed in the locker room area only and not near the front entrance. Use your locker whenever possible. Also, do be careful with scalpels and chisels. A first-aid kit is available.

10. Used scalpel blades are to be placed in the sharps containers or removed at the blade removal stations mounted on the wall. Wash and dry the dissection tools after each class and put them away before leaving. Never leave your dissecting tools in the trays with the donors; place them in their box and under your table.

11. You alone are responsible for keeping the body on which you will be working in the best possible condition for the duration of the course. Keep the body moist, but not excessively wet. Please report, without delay, to an instructor, the mortician or Gross Laboratory Technician, any evidence of mold growth or tissue decomposition. Keep on reporting it until the problem is dealt with. At the conclusion of each laboratory period, moisten the body with fluid provided and replace the cover. Remember, your

laboratory examination will be based on the material in the Gross Laboratory. It is undoubtedly in your own best interests to keep this material in the best possible condition.

12. The Gross Anatomy Instructional Staff expects you to produce a dissection which displays the anatomy of the region in a clear, clean and complete manner. The human body is the best possible learning device and we therefore expect you to dissect in a fashion which will be a credit to yourself and the donor who has contributed so generously to your medical education. You will dissect under the supervision of an assigned faculty member who will also conduct small group discussion over the dissections.

13. Articulated skeletons are to be handled with extreme care. Bones (bone boxes) are to be studied away from the dissecting tables at designated areas.

14. Bone Boxes: In order to facilitate your study of Gross Anatomy, bone boxes and skulls will be distributed on a group basis (one per table). These materials will be available in the gross anatomy laboratory, but under no circumstances can the material be removed from the gross anatomy laboratory.

15. Memorial Service: A memorial service is held each year to commemorate those persons who performed one last service to mankind by donating their bodies to the Medical Center. This service will be held in the Truhlsen Campus Event Center in April; we would sincerely appreciate it if you would join us in saying 'thank you' to those who have donated themselves to assist with your education.

16. Deeded Body Program: The bodies to be employed in the Gross Anatomy Laboratory were donated to the Medical School for use in this and other courses under the provisions of the Uniform Anatomical Gift Act. This procedure is colloquially referred to as the "Deeded Body Program". Information on this program is available upon request from the Office of the Department of Genetics, Cell Biology and Anatomy in WHM 2030, Nebraska Anatomical Board in WHM 2002, or Dr. Lomneth.

**Transmission of Disease to Dissector**

The embalming process used with donor bodies reduces the possibility of transmission of most infectious agents to the dissector. Phenol is cidal to all known infectious organisms including HIV and TB. Prions, (mutated proteins which replicate and cause rapidly progressive dementia) on the other hand, are not inactivated by embalming solutions. Diseases caused by prions (Jacob-Creutzfeldt, mad-cow, wasting disease in elk and deer) are rare (world-wide incidence of Jacob-Creutzfeldt disease is less than 1 in a million) and the likelihood of a cadaver in the gross lab with prion disease is very small. As an additional precaution, the State Anatomical Board of Nebraska is screening donors for rapidly progressive dementia and excluding from the gross lab any donor with a rapidly developing neurological disease. Screening donors is in accordance with the recommendation of the World Health Organization and is intended as a way of minimizing possible exposure.

To our knowledge, there is no modern recorded instance of infectious disease transmission to any health professional student from a cadaveric source. We have minimized risk to the students through our screening and embalming procedures. Thus, we believe the risk of exposure of students to infectious agents is minimal. Since it is not possible to guarantee that there is no risk, it is essential that adequate precautions be taken. Students should presume a “potential risk” and observe “Universal Precautions” in the gross anatomy laboratory. Gloves and scrub suits or lab coats should be worn at all times in handling tissues; cuts and abrasions should be washed thoroughly; no food or drink should be consumed in the gross anatomy laboratory; and protection for the eyes, nose and mouth should accompany use of the autopsy saw.

**Self-study Resources**

1. Osteology
   A complete set of human bones are available and numbered for each dissection table in plastic containers in the lower cabinets. A human skull is also available for each. None of these specimens are to be removed from this room. They are very fragile and should be handled carefully with clean hands. Any lost items are subject to replacement costs. In the case of the human skulls this can range up to $800.

2. Radiographs (X-Rays, CTs and MRIs)
   The radiographs used for the laboratory demonstrations are available in PowerPoint presentations in Blackboard. Students are responsible for the content contained in the X-rays, cross sections, CTs and MRIs.

3. Blackboard
   a. Test bank of Sample Questions
   A bank of multiple-choice questions for each of the exam units is available through Blackboard.

   b. Acland Anatomy
   A series of dissections can be viewed along with identification of individual muscles. This site is host on the library's main page and can be found at http://www.aclandanatomy.com/

   c. Living Anatomy
   Recordings are made of the demonstrations in Living Anatomy sessions and are posted on Blackboard shortly after the session is completed.

4. Refreshments
   Students are **NOT** permitted to bring food or drinks into the Gross Anatomy Laboratory at any time. Students are permitted to bring drinks and/or snacks into designated "clean" rooms only. Students are requested not to stand coffee, soft drinks, etc. on the computers and other hardware, and to put all debris in the trash cans provided. If the rooms are not maintained in satisfactory condition, they will be closed to all students except during examinations. Before leaving the Gross Laboratory, students should always wash their hands thoroughly to remove grease, etc. This is particularly important before using the sensitive equipment in this room. These rooms are shared by a large number of students and everyone's cooperation is requested to keep the rooms clean and the equipment in working order.

5. Hours Open for the Gross Anatomy Laboratory - 24 hours a day, seven days a week.
   Students should have their photo IDs with them at all times since Security has been asked to verify students identify after normal laboratory hours.

**ACADEMIC INTEGRITY AND PROFESSIONAL CONDUCT**

The University of Nebraska Medical Center has established a policy on academic integrity and professional conduct. This policy may be found in the UNMC Student Handbook. All students are expected to adhere scrupulously to this policy. Cheating, academic misconduct, fabrication, and plagiarism are viewed as serious matters and will lead to disciplinary action as described in the UNMC Student Handbook under Procedural rules Relating to Student Discipline. Additional materials related to Responsible Conduct in Research can be found in the UNMC Student Handbook.
Selected sections from the UNMC Student Handbook follow:

**CHEATING:** A general definition of cheating is the use or attempted use of unauthorized materials or information for an academic exercise. Examples of cheating include but are not limited to:

1. using unauthorized materials such as books, notes, calculators or other aids during an examination or other academic exercises;
2. receiving unauthorized assistance from another person during an exam or exercise such as copying answers, receiving answer signals, conversation or having another person take an examination for you;
3. providing assistance to another person during an exam or exercise, such as allowing your answers to be copied, signaling answers or taking an exam for someone else;
4. obtaining answers and/or other information without authorization from someone who has previously taken an examination;
5. including all or a portion of previous work for another assignment without authorization.
6. appropriating another person's ideas, processes, result, or words without giving appropriate credit, i.e. an appropriate attribution or citation (plagiarism). For example, a student who quotes verbatim the results of a previous student's work in a required term paper, but fails to credit the individual through citation. The work is recent and thus cannot be considered common knowledge.

**ACADEMIC MISCONDUCT:** Academic misconduct is defined as the falsification of official documents and/or obtaining records, examinations or documents without authorization. Several examples of academic misconduct are:

1. the unauthorized acquisition of all or part of an unadministered test;
2. selling or otherwise distributing all or part of an unadministered test;
3. changing an answer or grade on an examination without authorization;
4. falsification of information on an official university document such as a grade report, transcript, an instructor's
5. grade book or evaluation file or being an accessory to an act of such falsification;
6. forging the signature of an authorizing official on documents such as letters of permission, petitions, drop/add,
7. transcripts, and/or other official documents;
8. unauthorized entry into a building, office, file or computer data base to view, alter or acquire documents.

**Research misconduct** has been defined by the Federal DHHS Office of Research Integrity (ORI) and UNMC subscribes to this definition: **"Research misconduct is defined as fabrication, falsification, or plagiarism in proposing, performing, or reviewing research, or in reporting research results." Research misconduct does not include honest error or differences of opinion. It is important that every student understand the meaning of fabrication, falsification, and plagiarism.**
**Fabrication** is making up data or results and recording or reporting them. Some examples are:

1. indicating a laboratory experiment had been repeated numerous times or
2. done in a controlled environment when it had not, thus leading to an invented or uncorroborated conclusion.

**Falsification** is manipulating research materials, equipment, or processes, or changing or omitting data or results such that the research or academic performance is not accurately represented in the research or academic records.
Some examples are:

1. altering an original source document, misquoting or misrepresenting a source to support a point of view or hypothesis;
2. Using computer software to change research images so they show something different than the original data.

**Plagiarism** is the appropriation of another person's ideas, processes, results, or words without giving appropriate credit, i.e. an appropriate attribution or citation. An example is:

1. In the methods section of a thesis, a graduate student describes a procedure used in research for the thesis. The procedure was developed by a fellow graduate student in the laboratory of their major professor; however, neither the student who developed this procedure nor the major professor was given credit in the thesis. This implies that the author had himself developed the procedure.
2. In the background section of a thesis, a graduate student quotes verbatim the results of a previous investigator's work but fails to credit the individual through citation. The work is recent and thus cannot be considered common knowledge.

# FALL SEMESTER 2015 (Core 1)
## Medical & PA/PT Students

| Week 1: August 24 - 29 | | | | | | |
|---|---|---|---|---|---|---|
| **Time** | **Monday August 24** | **Tuesday August 25** | **Wednesday August 26** | **Thursday August 27** | **Friday August 28** | **Saturday August 29** |
| 8:00 | C1–GROSS 1<br>**Course/Lab Intro**<br>Lomneth, Willett WH | C1–LAB 2<br>**Superficial Muscles of the Back and Scapular Region** | C1–EMBRYO 1<br>**Fertilization**<br>Dudley MSC | C1–LAB 4<br>**Pectoral and Axillary Region (continued)** | C1–LAB 5<br>**Arm, Cubital Fossa, Anterior Forearm** | |
| 9:00 | C1–GROSS 2<br>**Geriatrics**<br>Staff WH | | C1–LAB 3<br>**Breast, Pectoral and Axillary Region** | **DEMO:**<br>**Back and Vertebral Canal** | Staff GL | |
| 10:00 | C1–LAB 1<br>**Geriatrics** | Staff GL | | Staff GL | C1–LIVING 1<br>**Back**<br>Willett MSC | |
| 11:00 | Staff GL | C1–GROSS 3<br>**Axilla**<br>Willett MSC | Staff GL | C1–EMBRYO 2<br>**Gastrulation**<br>Dudley MSC | C1–LIVING 2<br>**Scapular and Pectoral Regions Axilla and Arm**<br>Latacha MSC | |
| 12:00 | | **Prosection Back and Vertebral Canal**<br>**before Thurs.** | PAPT–NEURO 2<br>**Cell Biology of Nervous System**<br>8:00 am<br>Keim DRC1002 | | | |
| 1:00 | | | | | | |
| 2:00 | | PAPT–GROSS 1<br>**Introduction & Shoulder**<br>Keim/Willett MSC | PAPT–EMBRYO 1<br>**Fertilization**<br>Keim MSC | PAPT–GROSS 3<br>**Axilla**<br>Willett MSC | PAPT–LAB 4<br>**DEMO: Back and Vertebral Canal** | |
| 3:00 | PAPT–LAB 1<br>**Introduction**<br>**Back and Scapular Region** | PAPT–LAB 2<br>**Back and Scapular Region** | PAPT–GROSS 2<br>**Back and Vertebral Column**<br>Splittgerber MSC | PAPT–LAB 3<br>**Pectoral Region** | | |
| 4:00 | Keim GL | Staff GL | PAPT–NEURO 1<br>**Spinal Cord and Peripheral Nerves**<br>Keim MSC | Staff GL | Staff GL | |

# FALL SEMESTER 2015 (Core 1)
## Medical & PA/PT Students

| Week 2: August 31–September 5 | | | | | | |
|---|---|---|---|---|---|---|
| **Time** | **Monday August 31** | **Tuesday September 1** | **Wednesday September 2** | **Thursday September 3** | **Friday September 4** | **Saturday September 5** |
| 8:00 | C1–LAB 6<br>**Anterior Forearm, Palm of Hand**<br>Staff GL | C1–LAB 7<br>**Hand (continued)**<br>Staff GL | C1–LAB 8<br>**Posterior Forearm and Hand**<br>**DEMO: Joints**<br>Staff GL | C1–EMBRYO 4<br>**Placenta and Fetal Membranes**<br>Keim MSC | C1–LAB 9<br>**Review in Lab**<br>Staff GL | C1<br>**EXAM 1 & LAB PRACTICAL** |
| 9:00 | | | | | | |
| 10:00 | C1–EMBRYO 3<br>**Back and Upper Limb**<br>Dudley MSC | C1–LIVING 3<br>**Anterior Forearm and Hand**<br>**Exam Arrangements/ Expectations**<br>Latacha MSC | C1–LIVING 4<br>**Forearm and Hand Structures and Joints**<br>Willett MSC | C1–MINICASES 1<br>**Back and Upper Limbs**<br>Staff SGR | PAPT–GROSS 5<br>**Intro to X-Ray**<br>10:00am<br>Splittgerber MSC | **Upper Limb**<br>Staff GL |
| 11:00 | C1–GROSS 4<br>**Back Pain**<br>Willett MSC | | C1–GROSS 5<br>**Nerve Lesions**<br>Latacha 1010 | | | |
| 12:00 | **Gross Conference**<br>Staff WHM 2000 | | | | | |
| 1:00 | | | | | | |
| 2:00 | | PAPT–LIVING 1<br>**Back**<br>Willett MSC | PAPT–GROSS 4<br>**Forearm & Hand**<br>Keim MSC | PAPT–EMBRYO 4<br>**Back and Upper Limb**<br>Dudley MSC | PAPT–LIVING 2<br>**Shoulder & Arm**<br>Willett MSC | |
| 3:00 | PAPT–EMBRYO 2<br>**Gastrulation**<br>Keim MSC | PAPT–LAB 5<br>**Axilla** | PAPT–LAB 6<br>**Axilla Arm** | PAPT–LAB 7<br>**Arm and Anterior Forearm** | PAPT–EMBRYO 5<br>**Placenta and Fetal Membrane II**<br>Keim MSC | |
| 4:00 | PAPT–EMBRYO 3<br>**Placenta and Fetal Membrane I**<br>Keim MSC | Staff GL | Staff GL | Staff GL | | |

# FALL SEMESTER 2015 (Core 1)
## Medical & PA/PT Students

| Week 3: September 7 - 12 | | | | | | |
|---|---|---|---|---|---|---|
| **Time** | **Monday September 7** | **Tuesday September 8** | **Wednesday September 9** | **Thursday September 10** | **Friday September 11** | **Saturday September 12** |
| 8:00 | **LABOR DAY HOLIDAY** | C1–GROSS 6<br>**Skull Demo and Breakout Session**<br>Latacha 1010 | C1–GROSS 8<br>**Autonomics I Head and Neck**<br>Lomneth MSC | C1–EMBRYO 5<br>**Face**<br>Keim MSC | C1–GROSS 9<br>**Eye**<br>Latacha MSC | |
| 9:00 | | C1–GROSS 7<br>**Meninges**<br>Keim MSC | C1–LAB 11<br>**Cranial Cavity Meninges, Brain Removal** | C1–LIVING 5<br>**Scalp and Face**<br>Latacha 1010 | C1–EMBRYO 6<br>**Eye**<br>Dudley MSC | |
| 10:00 | | C1–LAB 10<br>**Scalp and Face** | | C1–LAB 12<br>**Orbit** | C1–LAB 13<br>**Orbit (continued)** | |
| 11:00 | | Staff GL | Staff GL | Staff GL | Staff GL | |
| 12:00 | | **Gross Conference**<br>Staff WHM 2000 | PAPT–GROSS 6<br>**Integration**<br>8:00 am<br>Keim MSC 1010 | | | |
| 1:00 | LABOR DAY | **Prosection Removal of Brain**<br>Staff | | | | |
| 2:00 | | PAPT–LAB 8 | PAPT–GROSS 7<br>**Nerve Lesions**<br>Latacha MSC | PAPT–LAB 9 | PAPT–LIVING 4<br>**Hand and Post. Forearm**<br>Willett MSC | |
| 3:00 | | **Hand and Posterior Forearm**<br>**Radiology** | PAPT–LIVING 3<br>**Ant. Forearm and Hand**<br>Willett MSC | **DEMO: Joints** | PAPT–MINICASES<br>**Upper Limb and Back** | |
| 4:00 | | Staff GL | PAPT–GROSS 8<br>**Joints**<br>Binhammer MSC | Staff GL | Staff SGR | |

# FALL SEMESTER 2015 (Core 1)
## Medical & PA/PT Students

| Week 4: September 14 - 19 | | | | | | |
|---|---|---|---|---|---|---|
| **Time** | **Monday September 14** | **Tuesday September 15** | **Wednesday September 16** | **Thursday September 17** | **Friday September 18** | **Saturday September 19** |
| 8:00 | C1–GROSS 10<br>**Ear**<br>Lomneth MSC | C1–LAB 14<br>**Posterior Triangle of Neck** | C1–EMBRYO 8<br>**Ear**<br>Dudley MSC | C1–GROSS 11<br>**Nasal Cavity**<br>Keim MSC | C1–EMBRYO 9<br>**Pharyngeal Arches**<br>Dudley MSC | |
| 9:00 | C1–LIVING 6<br>**Eye and Ear**<br>Latacha MSC | **DEMO: Ear** | C1–LAB 15<br>**Anterior Triangle of Neck** | C1–LAB 16<br>**Infratemporal Fossa** | C1–LAB 17<br>**External Pharynx and Nasal Cavity** | |
| 10:00 | C1–LIVING 7<br>**Cranial NS Testing**<br>Latacha MSC | Staff GL | **Procedural Activity** | **CLINICAL DEMO: Central Line** | **DEMO: Pterygopalatine Fossa** | |
| 11:00 | C1–EMBRYO 7<br>**Cranial NS**<br>Keim MSC | C1–CLINICAL<br>**Clinical Correlation**<br>Staff 1010 | Staff GL | Staff GL | Staff GL | |
| 12:00 | **Gross Conference**<br>Staff WHM 2000 | | PAPT–NEURO 3<br>**Cranial Cavity, CSF and Vessels**<br>8:00 am<br>Keim DRC1002 | **Prosection Retropharyngeal Space** | | |
| 1:00 | | | | | | |
| 2:00 | | PAPT–EXAM 1<br>**WRITTEN EXAM 1** | | PAPT–GROSS 9<br>**Face**<br>Willett MSC | PAPT–EMBRYO 6<br>**Face**<br>Keim MSC | |
| 3:00 | PAPT–LAB 10<br>**REVIEW IN LAB** | Keim MSC 3002 | PAPT - EXAM 1<br>**PRACTICAL EXAM 1** | PAPT–LAB 11<br>**Face I** | PAPT–LAB 12<br>**Face II** | |
| 4:00 | Staff GL | | Staff GL | Staff GL | Staff GL | |

# FALL SEMESTER 2015 (Core 1)
## Medical & PA/PT Students

| Week 5: September 21 - 26 | | | | | | |
|---|---|---|---|---|---|---|
| **Time** | **Monday September 21** | **Tuesday September 22** | **Wednesday September 23** | **Thursday September 24** | **Friday September 25** | **Saturday September 26** |
| 8:00 | C1–LAB 18<br>**Pharynx and Palate**<br>Staff GL | C1–LAB 19<br>**Oral Cavity**<br>Staff GL | C1–LIVING 8<br>**Triangles**<br>Binhammer MSC | C1–LIVING 9<br>**TMJ Joint**<br>**Oral Cavity**<br>Binhammer MSC | C1<br>**EXAM 2**<br>**&**<br>**LAB PRACTICAL**<br>**Head & Neck**<br>Staff GL | |
| 9:00 | | | C1–EMBRYO 10<br>**Mouth and Tongue**<br>**Pituitary**<br>Keim MSC | C1–MINICASES 2<br>**Head and Neck** | | |
| 10:00 | | C1–GROSS 13<br>**Larynx**<br>Richards MSC | C1–LAB 20<br>**Review in Lab** | Staff SGR | | |
| 11:00 | C1–GROSS 12<br>**Autonomics II**<br>Lomneth MSC | C1–CLINICAL<br>**Clinical Correlation**<br>Staff 1010 | **DEMO: Larynx**<br>Staff GL | C1–CLINICAL<br>**Clinical Correlation**<br>Sewell 1010 | | |
| 12:00 | **Gross Conference**<br>Staff WHM 2000 | | PAPT–NEURO 5<br>**Brainstem and Cerebral Cortex**<br>8:00 am<br>Keim DRC1002 | | | |
| 1:00 | | | | | | |
| 2:00 | | PAPT–NEURO 4<br>**Cranial Nerves**<br>Splittgerber MSC | PAPT–GROSS 12<br>**Skull**<br>Binhammer GL | PAPT–GROSS 13<br>**Eye and Eye Movement**<br>Splittgerber MSC | PAPT–GROSS 14<br>**Ear**<br>Keim MSC | |
| 3:00 | PAPT–LIVING 5<br>**Scalp and Face**<br>Binhammer MSC | PAPT–EMBRYO 7<br>**Spinal Cord & Cranial Nerves**<br>Keim MSC | PAPT–LAB 13<br>**Brain Removal** | PAPT–EMBRYO 8<br>**Eye**<br>Keim MSC | PAPT–LAB 14<br>**Orbit I** | |
| 4:00 | PAPT–GROSS 10<br>**Meninges**<br>Keim MSC | PAPT–GROSS 11<br>**Autonomics I**<br>Willett MSC | Staff GL | | Staff GL | |

# FALL SEMESTER 2015 (Core 1)
## Medical & PA/PT Students

| Week 6: September 28–October 3 | | | | | | |
|---|---|---|---|---|---|---|
| **Time** | **Monday September 28** | **Tuesday September 29** | **Wednesday September 30** | **Thursday October 1** | **Friday October 2** | **Saturday October 3** |
| 8:00 | C1–GROSS 14<br>**Pleura & Lungs**<br>Richards MSC | C1–GROSS 15<br>**Heart**<br>Latacha MSC | C1–LIVING 10<br>**Thoracic Wall**<br>Latacha MSC | C1–LAB 24<br>**Mediastinum**<br>Staff GL | C1–EMBRYO 12<br>**Heart I**<br>Keim MSC | |
| 9:00 | C1–EMBRYO 11<br>**Pleura and Lungs**<br>Keim MSC | C1–LAB 22<br>**External Heart**<br>**CLINICAL DEMO: Airway and Chest Tube**<br>**Emergency Med Faculty**<br>Staff GL | C1–GROSS 16<br>**Heart Sounds**<br>Latacha MSC | | C1–EMBRYO 13<br>**Circulation/Heart II**<br>Keim MSC | |
| 10:00 | C1–LAB 21<br>**Thoracic Wall, Pleura & Lungs**<br>Staff GL | C1–LAB 23<br>**External Heart (cont.)**<br>**Internal Heart**<br>Staff GL | | C1–LIVING 11<br>**Heart and Great Vessels**<br>Binhammer MSC | C1–GROSS 17<br>**Autonomic Thorax**<br>Latacha MSC | |
| 11:00 | | | | | C1–PBL 1<br>Staff SGR | |
| 12:00 | **Gross Conference**<br>Staff WHM 2000 | | PAPT–NEURO 6<br>**Auditory, Vestib and Vision**<br>8:00 am<br>Splittgerber DRC1002 | | **Prosection Inguinal Canal**<br>Staff GL | |
| 1:00 | | | | | | |
| 2:00 | | PAPT–EMBRYO 9<br>**Ear**<br>Dudley MSC | PAPT–GROSS 15<br>**Triangles**<br>Splittgerber MSC | PAPT–GROSS 16<br>**Radiology**<br>Keim GL | PAPT–LIVING 7<br>**Triangles**<br>Richards MSC | |
| 3:00 | PAPT–LIVING 6<br>**Cranial Nerves** | PAPT–LAB 15<br>**Orbit II** | PAPT–LAB 16<br>**Triangles I** | PAPT–LAB 17<br>**Triangles II** | PAPT–LAB 18<br>**Triangles III** | |
| 4:00 | Hoffman MSC | Staff GL | Staff GL | Staff GL | Staff GL | |

# FALL SEMESTER 2015 (Core 1)
## Medical & PA/PT Students

| Week 1: August 24 - 29 | | | | | | |
|---|---|---|---|---|---|---|
| **Time** | **Monday August 24** | **Tuesday August 25** | **Wednesday August 26** | **Thursday August 27** | **Friday August 28** | **Saturday August 29** |
| 8:00 | C1–GROSS 1<br>**Course/Lab Intro**<br>Lomneth, Willett WH | C1–LAB 2<br>**Superficial Muscles of the Back and Scapular Region**<br>Staff GL | C1–EMBRYO 1<br>**Fertilization**<br>Dudley MSC | C1–LAB 4<br>**Pectoral and Axillary Region (continued)**<br>**DEMO:**<br>**Back and Vertebral Canal**<br>Staff GL | C1–LAB 5<br>**Arm, Cubital Fossa, Anterior Forearm**<br>Staff GL | |
| 9:00 | C1–GROSS 2<br>**Geriatrics**<br>Staff WH | | C1–LAB 3<br>**Breast, Pectoral and Axillary Region**<br>Staff GL | | | |
| 10:00 | C1–LAB 1<br>**Geriatrics**<br>Staff GL | | | | C1–LIVING 1<br>**Back**<br>Willett MSC | |
| 11:00 | | C1–GROSS 3<br>**Axilla**<br>Willett MSC | | C1–EMBRYO 2<br>**Gastrulation**<br>Dudley MSC | C1–LIVING 2<br>**Scapular and Pectoral Regions Axilla and Arm**<br>Latacha MSC | |
| 12:00 | | **Prosection Back and Vertebral Canal**<br>**before Thurs.** | PAPT–NEURO 2<br>**Cell Biology of Nervous System**<br>8:00 am<br>Keim DRC1002 | | | |
| 1:00 | | | | | | |
| 2:00 | | PAPT–GROSS 1<br>**Introduction & Shoulder**<br>Keim/Willett MSC | PAPT–EMBRYO 1<br>**Fertilization**<br>Keim MSC | PAPT–GROSS 3<br>**Axilla**<br>Willett MSC | PAPT–LAB 4<br>**DEMO: Back and Vertebral Canal** | |
| 3:00 | PAPT–LAB 1<br>**Introduction**<br>**Back and Scapular Region** | PAPT–LAB 2<br>**Back and Scapular Region** | PAPT–GROSS 2<br>**Back and Vertebral Column**<br>Splittgerber MSC | PAPT–LAB 3<br>**Pectoral Region** | | |
| 4:00 | Keim GL | Staff GL | PAPT–NEURO 1<br>**Spinal Cord and Peripheral Nerves**<br>Keim MSC | Staff GL | Staff GL | |

# FALL SEMESTER 2015 (Core 1)
## Medical & PA/PT Students

| Week 8: October 12 - 17 | | | | | | |
|---|---|---|---|---|---|---|
| **Time** | **Monday October 12** | **Tuesday October 13** | **Wednesday October 14** | **Thursday October 15** | **Friday October 16** | **Saturday October 17** |
| 8:00 | C1–LAB 29<br>**Abd. Viscera (cont)** | C1–LIVING 14<br>**Alimentary Canal Spleen/Kidney**<br>Richards MSC | C1–LAB 30<br>**Posterior Abdominal Wall and Diaphragm** | C1–MINICASES 3<br>**Thorax & Abdomen** | C1<br>**EXAM 3 & LAB PRACTICAL** | |
| 9:00 | **CLINICAL DEMO: Grant** | C1–CLINICAL<br>**Thorax, Abd. Lymph**<br>Staff 1010 | | Staff SGR | | |
| 10:00 | Staff GL | C1–PBL<br>**Case 1 Session 3** | | C1–LAB 31<br>**Review in Lab** | **Thorax and Abdomen** | |
| 11:00 | C1–EMBRYO 16<br>**Fetal Circulation**<br>Keim MSC | Staff SGR | Staff GL | Staff GL | Staff GL | |
| 12:00 | **Gross Conference**<br>Staff WHM 2000 | | PAPT–NEURO 8<br>**Neuro Integration**<br>8:00 am<br>Keim MSC 1010 | | EXAM SET UP 12:30 | |
| 1:00 | | | | | | |
| 2:00 | | PAPT–GROSS 21<br>**Larynx**<br>Binhammer MSC | PAPT–MINICASES<br>**Head and Neck** | | PAPT–LAB 23<br>**Review** | |
| 3:00 | PAPT–EMBRYO 10<br>**Mouth and Tongue**<br>Keim MSC | PAPT–LAB 22<br>**DEMO: Larynx** | Staff SGR | PAPT–GROSS 22<br>**Integration** | Staff GL | |
| 4:00 | PAPT–EMBRYO 11<br>**Pharyngeal Arches**<br>Keim MSC | Staff GL | | Keim MSC 1010 | | |

# FALL SEMESTER 2015 (Core 1)
## Medical & PA/PT Students

**Week 9: October 19 - 24**

| Time | Monday October 19 | Tuesday October 20 | Wednesday October 21 | Thursday October 22 | Friday October 23 | Saturday October 24 |
|---|---|---|---|---|---|---|
| 8:00 | C1–GROSS 22<br>**Pelvis and Perineum**<br>Lomneth MSC | C1–EMBRYO 17<br>**Genitourinary**<br>Keim MSC | C1–EMBRYO 18<br>**Genitalia**<br>Keim MSC | C1–GROSS 24<br>**Hip and Thigh**<br>Willett MSC | C1–LIVING 15<br>**Anterior and Medial Thigh**<br>Willett MSC | |
| 9:00 | C1–LAB 32<br>**Pelvic Cavity and Viscera**<br>Staff GL | C1–GROSS 23<br>**Autonomics of Pelvis**<br>Lomneth MSC | C1–LAB 34<br>**Anterior and Medial Thigh**<br>**DEMO: Perineum**<br>Staff GL | C1–LAB 35<br>**Gluteal Region and Posterior Thigh**<br>Staff GL | C1–GROSS 25<br>**Knee**<br>Willett MSC | |
| 10:00 | | C1–LAB 33<br>**Pelvic Cavity and Viscera (continued)**<br>Staff GL | | | C1–PBL<br>**Case 2–Session I**<br>Staff SGR | |
| 11:00 | | | | | C1–CLINICAL<br>**Clinical Correlation**<br>Staff 1010 | |
| 12:00 | **Gross Conference**<br>Staff WHM 2000 | | PAPT–NEURO 9<br>**Somatosensory Tracts I**<br>8:00 am<br>Splittgerber DRC1002 | | | |
| 1:00 | | | | | | |
| 2:00 | | PAPT–EXAM 2<br>**WRITTEN EXAM 2**<br>Keim MSC 3002 | PAPT–GROSS 23<br>**Pleura and Lungs**<br>Richards MSC | PAPT–LIVING 9<br>**Thoracic Wall**<br>**Respiratory System**<br>Keim/Hoffman MSC | PAPT–GROSS 24<br>**Heart**<br>Latacha MSC | |
| 3:00 | PAPT–EXAM 2<br>**PRACTICAL EXAM 2** | | PAPT–EMBRYO 12<br>**Pleura and Lungs**<br>Keim MSC | PAPT–LAB 25<br>**Pleura and Lungs** | PAPT–LAB 26<br>**Heart** | |
| 4:00 | Staff GL | | PAPT–LAB 24<br>**Thoracic Wall**<br>Staff GL | Staff GL | Staff GL | |

# FALL SEMESTER 2015 (Core 1)
## Medical & PA/PT Students

| Week 10: October 27–31 | | | | | | |
|---|---|---|---|---|---|---|
| **Time** | **Monday October 26** | **Tuesday October 27** | **Wednesday October 28** | **Thursday October 29** | **Friday October 30** | **Saturday October 31** |
| 8:00 | CI–LIVING 16<br>**Gluteal Region Posterior Thigh**<br>Willett MSC | C1–GROSS 26<br>**Ankle and Foot**<br>Willett MSC | C1–LIVING 16<br>**Leg and Knee**<br>Willett MSC | C1–LIVING 17<br>**Foot and Ankle**<br>Willett MSC | C1–MINICASES 4<br>**Pelvis Perineum Lower Limb**<br>Staff SGR | C1 - EXAM 4<br>**EXAM & LAB PRACTICAL**<br>**Pelvis Perineum Lower Limb**<br>Staff GL |
| 9:00 | C1–LAB 36<br>**Leg and Dorsum of the Foot**<br>**DEMO: Joints of Hip and Knee**<br>Staff GL | C1–EMBRYO 19<br>**Fetal Growth**<br>Keim MSC<br>C1–PBL<br>**Case 2 Session 2**<br>Staff SGR | C1–LAB 37<br>**Sole of Foot and Ankle**<br>**DEMO: Joints of Ankle and Foot**<br>Staff GL | C1–GROSS 27<br>**Nerve Lesions**<br>Lomneth MSC<br>C1–GROSS 28<br>**Gait**<br>Willett MSC<br>C1–LAB 38<br>**Review in Lab**<br>Staff GL | | |
| 10:00 | | | | | C1–PBL<br>**Case 2 Session 3**<br>Staff SGR | |
| 11:00 | | | | | | |
| 12:00 | **Gross Conference**<br>Staff WHM 2000 | | PAPT–NEURO 10<br>**Somatosensory Tracts II**<br>8:00 am<br>Splittgerber DRC1002 | | | |
| 1:00 | **PROSECTION**<br>**Sole of the Foot**<br>Staff GL | | | | | |
| 2:00 | | PAPT–GROSS 25<br>**Heart Sounds**<br>Latacha MSC | PAPT–LIVING 10<br>**Heart and Great vessels**<br>Keim MSC | PAPT–LAB 28<br>Preview Lecture<br>Online | PAPT–GROSS 27<br>**Ant. Abdomen, Inguinal Canal & Hernias** | |
| 3:00 | PAPT–EMBRYO 13<br>**Heart I**<br>Keim MSC | PAPT–GROSS 26<br>**Autonomics Thorax**<br>Binhammer MSC | PAPT–LAB 27<br>**Heart II** | **Mediastinum** | Richards MSC | |
| 4:00 | PAPT–EMBRYO 14<br>**Heart II**<br>Keim MSC | PAPT–EMBRYO 15<br>**Fetal Circulation**<br>Keim MSC | Staff GL | **Radiology**<br>Staff GL | | |

# FALL SEMESTER 2015 (Core 1)
## Medical & PA/PT Students

| Week 11: November 2 - 7 | | | | | | |
|---|---|---|---|---|---|---|
| **Time** | **Monday November 2** | **Tuesday November 3** | **Wednesday November 4** | **Thursday November 5** | **Friday November 6** | **Saturday November 7** |
| 8:00 | C2–CELL **Intro** Chaney MSC | C2–CELL **Membranes** Joshi MSC | | | | |
| 8:30 | C2–CELL **Cell Structure** Joshi MSC | | | | | |
| 9:00 | | | | | | |
| 10:00 | | | | C2–LAB 1 **Cells** Staff | | |
| 11:00 | C2–PBL Staff SGR | | | | | |
| 12:00 | | | PAPT–NEURO 11 **Motor Tracts I** ↑ 8:00 am ↑ Keim DRC1002 | | | |
| 1:00 | | | | | | |
| 2:00 | | PAPT–LAB 29 **DEMO: Inguinal Canal** Staff GL | PAPT–GROSS 28 **Peritoneum** Keim MSC | PAPT–GROSS 29 **Ab. Blood Vessels & Auto** Richards MSC | PAPT–LIVING 11 **Abdominal Wall** Richards MSC | |
| 3:00 | PAPT–EMBRYO 16 **GI Tract I** Keim MSC | **Anterior Abdominal Wall** | PAPT–LAB 30 **Peritoneum** Staff GL | PAPT–LAB 31 **Abdominal Viscera I** Staff GL | PAPT–LAB 32 **Abdominal Viscera II** Staff GL | |
| 4:00 | PAPT–EMBRYO 17 **GI Tract II** Keim MSC | | | | | |

# FALL SEMESTER 2015 (Core 1)
## Medical & PA/PT Students

| Week 12: November 9 - 14 | | | | | | |
|---|---|---|---|---|---|---|
| **Time** | **Monday November 9** | **Tuesday November 10** | **Wednesday November 11** | **Thursday November 12** | **Friday November 13** | **Saturday November 14** |
| 8:00 | C2–CELL<br>**Epithelium and Glands**<br>Lomneth MSC | | | | | |
| 9:00 | C2–CELL<br>**Skin**<br>Lomneth MSC | | | | | |
| 10:00 | C2–PBL | | | C2–LAB 2<br>**Epithelium Glands/Skin** | | |
| 11:00 | Staff SGR | | | Staff WH 3020 | | |
| 12:00 | | | PAPT–NEURO 12<br>**Motor Tracts II**<br>8:00 am<br>Keim DRC1002 | | | |
| 1:00 | | | | | | |
| 2:00 | | PAPT–LAB 33<br>**Abdominal Viscera III**<br>**DEMO: Surgery**<br>Staff GL | PAPT–GROSS 31<br>**Posterior Abdominal Wall**<br>Keim MSC | PAPT–LIVING 13<br>**Abdominal Viscera**<br>Richards MSC | PAPT–MINICASES<br>**Thorax and Abdomen**<br>Staff SGR | |
| 3:00 | PAPT–LIVING 12<br>**Abdomen, Planes and Viscera**<br>Binhammer MSC | | PAPT–LAB 34<br>**Posterior Abdominal Wall I**<br>**Radiology**<br>Staff GL | PAPT–LAB 35<br>**Posterior Abdominal Wall II**<br>Staff GL | | |
| 4:00 | PAPT–GROSS 30<br>**Referred Pain**<br>Richards MSC | | | | PAPT–LAB 36<br>**REVIEW IN LAB**<br>Staff GL | |

# FALL SEMESTER 2015 (Core 1)
## Medical & PA/PT Students

| Week 13: November 16–21 | | | | | | |
|---|---|---|---|---|---|---|
| **Time** | **Monday November 16** | **Tuesday November 17** | **Wednesday November 18** | **Thursday November 19** | **Friday November 20** | **Saturday November 21** |
| 8:00 | C2–CELL<br>**Cells and Connective Tissue I**<br>Elzie MSC | C2–CELL<br>**Cytoskeleton**<br>Elzie MSC | | | | |
| 9:00 | C2–CELL<br>**Cells and Connective Tissue II**<br>Elzie MSC | | | | | C2–EXAM 1<br>**Lectures 1-42** |
| 10:00 | C2–PBL | | C2–CELL<br>**Meiosis and Mitosis**<br>Joshi MSC | C2–LAB 3<br>**Connective Tissue** | **EXAM 1**<br>**REVIEW** | |
| 11:00 | Staff SGR | | C2–CELL<br>**Control of Cell Division**<br>Joshi MSC | Staff WH 3020 | Staff MSC | MSC |
| 12:00 | | | PAPT–NEURO 13<br>**Cerebellum**<br>8:00 am<br>Keim DRC1002 | | | |
| 1:00 | | | | | | |
| 2:00 | | PAPT–EXAM 3<br>**WRITTEN EXAM 3** | PAPT–EXAM 3<br>**PRACTICAL EXAM 3** | PAPT–GROSS 33<br>**Pelvis**<br>Keim MSC | PAPT–LAB 37<br>**DEMO:** | |
| 3:00 | PAPT–GROSS 32<br>**Integration** | Keim MSC 3002 | Staff GL | PAPT–GROSS 34<br>**Perineum**<br>Lomneth MSC | **Pelvis and Perineum** | |
| 4:00 | Keim 1010 | | | | **Pelvis Cavity I**<br>Staff GL | |

# FALL SEMESTER 2015 (Core 1)
## Medical & PA/PT Students

| Week 14: November 23 - 28 | | | | | | |
|---|---|---|---|---|---|---|
| **Time** | **Monday November 23** | **Tuesday November 24** | **Wednesday November 25** | **Thursday November 26** | **Friday November 27** | **Saturday November 28** |
| 8:00 | C2–CELL<br>**Muscle I**<br>Elzie MSC | | | **THANKSGIVING** | | |
| 9:00 | C2–CELL<br>**Muscle II**<br>Elzie MSC | | | | | |
| 10:00 | | C2–LAB 4<br>**Muscle** | C2–CELL<br>**Cartilage and Bone I**<br>Dudley MSC | | | |
| 11:00 | | Staff WH 3020 | C2–CELL<br>**Cartilage and Bone II**<br>Dudley MSC | | | |
| 12:00 | | Cellular Focus Group #1 (by invitation)<br>UT 4122 | | | | |
| 1:00 | | | **THANKSGIVING** | | | |
| 2:00 | | PAPT–GROSS 35<br>**Autonomics Abdomen/Pelvis**<br>Lomneth MSC | | | | |
| 3:00 | PAPT–EMBRYO 18<br>**Urinary System I**<br>Keim MSC | PAPT–LAB 38<br>**Pelvis Cavity II** | | | | |
| 4:00 | PAPT–EMBRYO 19<br>**Genitalia**<br>Keim MSC | Staff GL | | | | |

# FALL SEMESTER 2015 (Core 1)
## Medical & PA/PT Students

| Week 15–November 30 - December 5 | | | | | | |
|---|---|---|---|---|---|---|
| **Time** | **Monday November 30** | **Tuesday December 1** | **Wednesday December 2** | **Thursday December 3** | **Friday December 4** | **Saturday December 5** |
| 8:00 | | | | C2–CELL<br>**Hematopoesis**<br>Joshi MSC | | |
| 9:00 | | | | C2–CELL<br>**Blood Cells**<br>Joshi MSC | | |
| 10:00 | | | C2–CELL<br>**Cartilage and Bone I**<br>Todd MSC | C2–LAB 5<br>**Cartilage & Bone** | | |
| 11:00 | C2–PBL<br>Staff SGR | **EXAM I REVIEW** | C2–CELL<br>**Cartilage and Bone II**<br>Todd MSC | Staff WH 3020 | | |
| 12:00 | **Exam Review #1**<br>**WH Amp** | | PAPT–NEURO 14<br>**Basal Ganglia**<br>8:00 am<br>Keim DRC1002 | | | |
| 1:00 | | | | | | |
| 2:00 | | PAPT–GROSS 37<br>**Gluteal Region And Thigh**<br>Keim MSC | PAPT–LIVING 14<br>**Anterior and Medial Thigh**<br>Willett MSC | PAPT–LAB 40 | PAPT–LIVING 15<br>**Gluteal Region**<br>Willett MSC | |
| 3:00 | PAPT–GROSS 36<br>**Hip and Lower Limb Lymphatics**<br>Splittgerber MSC | PAPT–LAB 39<br>**Anterior and Medial Thigh** | PAPT–GROSS 38<br>**Integration**<br>Pelvis & Perineum | **Hip and Gluteal Region**<br>**Radiology** | PAPT–GROSS 39<br>**Knee**<br>Willett MSC | |
| 4:00 | PAPT–EMBRYO 20<br>**Fetal Growth**<br>Keim MSC | Staff GL | Keim MSC 1010 | Staff GL | PAPT–GROSS 40<br>**Ankle and Foot**<br>Willett MSC | |

# FALL SEMESTER 2015 (Core 1)
## Medical & PA/PT Students

| Week 16: December 7 - 12 | | | | | | |
|---|---|---|---|---|---|---|
| **Time** | **Monday December 7** | **Tuesday December 8** | **Wednesday December 9** | **Thursday December 10** | **Friday December 11** | **Saturday December 12** |
| 8:00 | | | | C2–CELL<br>**Lymphoid Tissue I**<br>Joshi MSC | C2–CELL<br>**Lymphoid Tissue II**<br>Joshi MSC | |
| 9:00 | | | | C2–CELL<br>**Cell Motility**<br>Joshi MSC | C2–CELL<br>**Lymphoid Tissue III**<br>Joshi MSC | |
| 10:00 | C2–PBL | | | C2–LAB 6<br>**Blood** | C2–CELL<br>**Acquired Immunity I**<br>Lu MSC | |
| 11:00 | Staff SGR | C2–CELL<br>**Innate Immunit**<br>Lu MSC | | Staff WH 3020 | C2–CELL<br>**Acquired Immunity II**<br>Lu MSC | |
| 12:00 | | | | | | |
| 1:00 | | | | | | |
| 2:00 | | PAPT–LAB 42 | PAPT–LIVING 16<br>**Knee and Leg**<br>Willett MSC | PAPT–LAB 43 | PAPT–LIVING 17<br>**Foot and Ankle**<br>Willett MSC | |
| 3:00 | PAPT–LAB 41<br>**Knee and Leg** | **DEMO: Hip and Knee** | PAPT–GROSS 41<br>**Nerve Lesions**<br>Keim MSC | **DEMO: Ankle**<br>**Foot I** | PAPT–LAB 44<br>**Foot II** | |
| 4:00 | Staff GL | **Leg**<br>Staff GL | PAPT–GROSS 42<br>**Gait**<br>Binhammer MSC | Staff GL | **Radiology**<br>Staff GL | |

# FALL SEMESTER 2015 (Core 1)
## Medical & PA/PT Students

| Week 17: December 14 - 19 | | | | | | |
|---|---|---|---|---|---|---|
| **Time** | **Monday December 14** | **Tuesday December 15** | **Wednesday December 16** | **Thursday December 17** | **Friday December 18** | **Saturday December 19** |
| 8:00 | | | | | | |
| 9:00 | | | | C2–REVIEW | | |
| 10:00 | C2–PBL | | C2–LAB 7 | **Exam 2 REVIEW** | | |
| 11:00 | Staff Com Sm. Grp Rms. | | **Lymphoid Tissue** Staff WH 3020 | MSC | **EXAM 2 At 1:00 p.m.** | |
| 12:00 | | | | PAPT–EXAM 4 **PRACTICAL EXAM 4** 9-11 am Staff GL | | |
| 1:00 | | | PAPT–LAB 45 **REVIEW** | PAPT–EXAM 4 **WRITTEN EXAM 4** | | |
| 2:00 | | PAPT-MINICASES **Lower Limb** | Staff GL | Keim DRC 1002 | | |
| 3:00 | PAPT–GROSS 43 **Integration** | Staff SGR | | | | |
| 4:00 | Keim MSC 1010 | | | | | |