LEARNING ANATOMY THROUGH LAPAROSCOPY

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Purpose
The purpose of this project was to create a laboratory experience and independent learning module (ILM) that reinforced first year medical students’ knowledge of abdominal anatomy using laparoscopic dissection and views as new tools for learning the information.

Background
A strong foundation in gross anatomy is essential for all physicians, regardless of specialty, to permit the accurate execution of physical exams and translation of findings into clinical diagnoses. Currently, the school of medicine anatomy curriculum relies on open dissection of human cadavers to teach students functional relationships of abdominal structures. Contextual learning contributes to retention of understanding, but the context of open dissection on embalmed tissue during the Essential Core is dissimilar from the actual application of anatomical knowledge on living patients during clerkships. Furthermore, studies suggest that laparoscopy is an effective supplement to an anatomy curriculum; using laparoscopy reinforces spatial perception of visceral relationships, and enhances students’ perceived understanding of anatomy.

Methods
We searched PubMed and CurrMIT to find similar curricula that have been tested at other institutions. Little literature exists on the subject, thus we relied on the expert opinion of surgical faculty for project development. We collaborated with UCSF surgeons to: construct an ILM that guides students through a laparoscopic procedure, reviewing key gastrointestinal anatomy throughout; to edit and narrate video footage of a surgery for students to better understand how to orient themselves within the abdominal cavity and identify structures under the limited viewing window of a laparoscopic camera; and to design a systematic laboratory experience that offers students hands-on manipulation of organs within an unembalmed cadaver using laparoscopic tools. We also observed multiple laparoscopic surgeries to identify potential challenges that may arise in using this as a teaching medium for first year medical students. Finally, we designed the elective laboratory experience to occur on a Saturday during the Metabolism and Nutrition block, accommodating a total of 72 learners. Students will rotate through three stations: one hour to develop skills on laparoscopic box trainers; one hour to apply those skills in a laparoscopic exploration and dissection of the abdominal cavity; and 30 minutes to debrief, reviewing the dissection under the guidance of a surgical resident.

Evaluation Plan
We have designed a survey assessment tool for distribution to surgery and ob/gyn clerkship educators (directors, attending, and residents) to measure using a visual analog scale how confident they are that students entering into clinical rotations can demonstrate abdominal anatomy understanding in identified areas. This survey will be administered to ascertain the competency of the class of 2014 and class of 2015 cohorts of MS3 learners who will not
participate in the laparoscopic educational lab, and who will serve as a control group. We will also distribute the survey the following year to examine the class of 2016 cohort. We will track involvement in the lab and use of the ILM to correlate assessments with the later performance of project participants and nonparticipants. In addition, students in all cohorts will be asked to assess their self-perceived ability to demonstrate understanding of abdominal anatomy. To evaluate the usefulness of the lab in reinforcing knowledge, we will administer a pre- and post-lab exam using laparoscopic images, using voluntary non-participants as a control.

**Dissemination**
The ILM and narrated video will be made available to students on the CLE website.

**Reflective Critique**
Feedback solicited during Curriculum Ambassador consultation sessions helped to structure the project. Going forward, the surgeons on the advisory team will be asked to provide expert opinion about the accuracy and relevance of the ILM teaching clinical anatomy. Selected current MS2 learners will review the ILM and provide feedback on its usability and usefulness as a learning resource. A subset of MS2 learners will provide feedback after participating in a practice run of the lab in October.