Development of an Interactive iBook for Canine Musculoskeletal Anatomy Dissection
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Abstract
In recent years, many veterinary anatomy students have demonstrated difficulty when translating written dissection instructions into action when utilizing traditional dissection resources. That said, contemporary learners are often particularly familiar and adept at utilizing technology to learn new skills. In an effort to meet these needs, Lincoln Memorial University - College of Veterinary Medicine (LMU-CVM) hopes to capitalize on the preferences and skill sets of modern students to address student concerns and observed deficiencies with traditional resources. Accordingly, interactive educational resources, specifically downloadable, non-web-based modules, have been created to reinforce students' training. These modules are being created as eBooks, developed for the Apple iBooks platform (iBooks). The eBooks can be downloaded onto various Apple products such as tablets, phones, and laptops, allowing users to select a device of their choosing and further increase their access to instructional materials. The eBooks have been developed to include videos and interactive components, in addition to text. They will function like an application, or app, providing easy-to-use features and include tools for veterinary instructors who require grading and screen-sharing features in the classroom and laboratory. Users will be able to customize their interface in order to suit their study preferences and facilitate multiple avenues for learning. As an initial step toward our ultimate goal, we are developing an eBook for canine musculoskeletal dissection, and we hypothesize that students will benefit from the use of this eBook and will demonstrate a preference for electronic media to supplement and guide their learning.

Background
• With the rise in virtual anatomy and other anatomical software programs in veterinary medicine, there are now a variety of resources available to anatomy students beyond textbooks and cadaveric dissection, resources which offer numerous illustrations, narrated videos, and labeled images of near-perfect projections. Still, traditional dissection remains a valuable component of anatomical education.
• Citing frustration with existing resources and difficulty translating content within medical illustrations or images of meticulous dissections to their own specimens, students have asked for a resource that more closely corresponds to what they are seeing throughout the dissection process, particularly one that offers a variety of multimedia content.

Methods
• Dissection of canine forelimb and hindlimb musculoskeletal structures was performed with multiple-angle video recording and numerous, progressive photographs taken throughout the dissection process (e.g., when structures are initially encountered, during removal of fat & fascia, once isolated, and after transection/reflexion).
• The articulated canine skeleton, individual articulated skeletal components, and individual bones of the limbs were photographed in multiple, standardized views (e.g. cranial, caudal, lateral, medial, etc.).
• Musculoskeletal dissection and skeletal photographs were edited to include color overlays indicating specific structures utilizing Photoshop CC 2018 by Adobe Systems (San Jose, CA).
• Video recordings of the canine musculoskeletal dissection were edited using Camtasia 3 by TechSmith (Okemos, MI) and iMovie 10.1.9 by Apple ( Cupertino, CA) to create isolated clips that feature content filmed at the optimal viewing angle at any given time and correspond to individual components of the dissection.
• Edited image and video materials were organized by individual muscles, muscle groups, and other relevant components of the dissection process and are being programmed into an interactive, multimedia canine musculoskeletal anatomy iBook using iBooks Author to include toggled labels, descriptions, overlays, and instructional commentary as well as opportunities for students to customize their experience by adding notes or dictations.

Future Directions
• The initial component of this resource (musculoskeletal dissection of the canine forelimb) will be made available to all students in the upcoming Veterinary Anatomy I course to be used in conjunction with existing course materials and laboratory sessions on a voluntary basis.
• Students will be surveyed at the completion of individual laboratory sessions using audience response devices to gather data on the usage and utility of the resource in clarifying instructions to facilitate the dissection process. Students will also be surveyed at the completion of the study (after the musculoskeletal examination in the course) to provide feedback on design, ease of use, and overall perceptions of the resource.
• Instructors will independently assess student group dissection quality following each laboratory session against a dissection quality rubric.
• Ultimately, we plan to utilize the feedback provided by student and instructor feedback to expand this resource to supplement additional components of the veterinary anatomy course and create additional resources to supplement the curriculum as a whole.

References

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