1-3B Evaluating a digital 3D dissection of the forearm for teaching Anatomy

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Introduction: Understanding the anatomy of the human forearm is challenging for students as it includes 20 muscles organised in several layers. At the University of Aberdeen, students learn Anatomy primarily by using prosections, i.e. cadaveric specimens that have been dissected by trained prosectors. To prepare for classes and facilitate the identification of structures in the prosections, students are encouraged to use labelled diagrams and dissection photos in Anatomy atlases and textbooks (incl. a digital atlas that is accessible via our virtual learning environment). However, as these are 2D images of individual dissection stages, it remains difficult for students to understand the complex, layered arrangements of muscles in the forearm and to distinguish between superficial and deep muscles in the prosections. Therefore, we created and evaluated a new digital 3D learning tool that shows the dissection of the human forearm muscles step-by-step.

Materials & Methods: We created a high-resolution photo-based 3D model of a cadaveric forearm using photogrammetry. We then animated this 3D model, highlighted its muscles and added text labels. To evaluate this learning tool, we handed out questionnaires to 23 undergraduate Anatomy students.

Results & discussion: Students found the 3D model realistic and highly detailed. They indicated that the digital 3D dissection was more helpful than photographic and illustrated anatomy atlases to identify the muscles of the forearm in a cadaveric specimen. In addition, 90% of students agreed they would use the animation outside the Anatomy lab and they would prefer to access it from their personal laptop or PC.

Conclusions: The results of this evaluation indicate that our animated digital 3D model of the forearm facilitates students' learning. Based on the students' suggestions we are planning to make some adjustments to this tool and make it available online to our students via our virtual learning environment.