PTAS Project Report (for SMALL PROJECT GRANTS)

Project Title: Using 3d Printing Technology to Create Novel Simulator Models for the Performance of Cerebrospinal Fluid Sampling

Principal Investigator: Megan Madden
School / Department: Royal (Dick) School of Veterinary Studies

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Grant recipients are expected to submit a brief report at the conclusion of their project which outlines briefly the following: nature of work completed; outcomes; benefits to student learning/student experience; dissemination activity (where relevant – actual and planned) and how the activity could inform future work or be transferred to other subject areas in the University. The brief report will be published on the IAD web pages.

Brief Report (maximum 500 words)

We used the funding provided to us through the PTAS Small Project Grant to create a novel canine simulator model for teaching the technique of cerebrospinal fluid sampling at the lumbar subarachnoid space. Cerebrospinal fluid sampling is performed as part of the diagnostic work up of veterinary patients (primarily dogs) with neurological disease. This technique can be technically challenging to learn and requires accurate identification of the anatomical landmarks and familiarity with tactile cues of the procedure. Using 3D-printing technology, we aimed to create an anatomically and aesthetically precise simulator, which would allow repetitive practice of this technique in a safe learning environment. After optimising the design of our simulator and expert validation, we tested the suitability of the simulator against cadavers when teaching final year veterinary students how to perform cerebrospinal fluid sampling at the lumbar subarachnoid space. We found that there was no significant difference in user experience or performance between groups trained on the simulator or the fresh cadaver, with both groups finding the procedure technically challenging. This suggests that the simulator model is a suitable replacement to the use of cadavers when training in this technique. However, the simulator offers the distinct advantage of being more readily available than fresh cadavers, whose availability is limited and unpredictable. The results of this study were published in the Journal of Veterinary and Medical Education (https://doi.org/10.3138/jvme-2021-0159). Methods to reproduce the simulator have been provided within the publication, to allow others to recreate the model for teaching in their own institutions. While this simulator is most likely to benefit post-graduate students (i.e., veterinary specialists in training), it can also be used to provide students with the option to try advanced techniques which may compliment teaching and learning of veterinary neurology during the curriculum. Finally, the simulator could also be used to teach students advanced anaesthetic techniques such as epidural injections. This study demonstrates the diverse applications for 3D-printing technology and interdisciplinary collaboration across the University of Edinburgh. Further collaborations in this area would be welcomed and the project investigator (Megan Madden) can be contacted for further details regarding this project or any future collaborations**.**