

A Virtual Reality Simulator for Training Veterinary Students to Perform Rectal Palpation of Equine Colic Cases

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Introduction

When a veterinarian is presented with a horse with colic, rectal palpation is part of the diagnostic process. A systematic examination of the abdominal cavity is performed to identify changes in the gastrointestinal tract. However, students have limited opportunities to develop the required skills. Clients are often reluctant to allow trainees to rectal their horses. Additionally, as the examination is internal the student's hand movements are not visible, which makes providing effective instruction difficult. Therefore, a project was undertaken to develop an equine colic simulator using haptic (touch feedback) technology and to evaluate the simulator's potential as a training tool.

Methods

Computer generated virtual models were created to represent the normal abdomen and cases of colic (displacements, dilations and impactions of the intestines). The models were evaluated and improved by sixteen clinicians at an equine veterinary conference. The 'feel' or haptic properties were adjusted dynamically to capture the expert's knowledge. A teaching protocol was developed for use with the simulations based on information gathered during interviews with veterinarians and a focus group with students. An experiment was then conducted to determine the effects of simulator training on skill development. Students who had no previous experience of rectal palpation of horses were randomly allocated to two groups. Eight students were trained with the simulator and eight received a PowerPoint tutorial on equine rectal palpation of equine colic cases. Each student then performed a rectal examination on a physical model of the equine abdomen. The students' ability to perform the examination systematically, to differentiate normal from abnormal and to identify the abnormality present were assessed. In the final part of the project, simulator-based tutorials were introduced into clinical rotations and the use of the simulator was discussed with clinicians at the end of the course.

Results

The input from the sixteen equine clinicians at the beginning of the project resulted in the development of a range of reasonably realistic models. The experiment to assess the simulator as a training tool found significant differences between the groups of students, with simulator-trained students being more systematic in their examination technique and more able to differentiate normal from abnormal. The simulator was then successfully integrated into clinical rotations and benefits identified by clinicians included: being able to direct the examination; giving all students the opportunity to practise; providing a valuable complement to clinical cases. Concerns included: the need to highlight aspects of the real examination not represented in the simulation.

Conclusions

A simulator was developed to address some of the challenges faced when training veterinary students to perform rectal palpation of equine colic cases. The simulator equipped students with useful skills and has a valuable role to practice augmenting clinical training. Haptic technology has the potential to provide safe, accessible and effective training environments for all health professionals and therefore, work is underway to expand the range of simulations to other species and procedures.