



Rachel Harris RVN, AFHEA, PGCE

Rachel was a Head Nurse in small animal veterinary practice until 2015 when she was appointed as Senior Teaching Technician at Bristol Vet School and is responsible for leading the clinical skills lab team at Langford. Rachel teaches and assesses clinical skills for BVSc veterinary students and students on the veterinary nursing programme. As part of her role she is involved in developing new practical classes and teaching resources for the Clinical Skills Lab. She delivers a diverse range of practical classes, predominantly based at Langford, but also off site with partner institutions. Rachel is passionate about clinical skills teaching and improving the learning experience for veterinary and veterinary nursing students. In 2016–17 Rachel was awarded a University Teaching and Development Grant and led a study evaluating the use of models in simulation-based teaching. The study has been accepted for publication in the *Journal of Veterinary Medical Education* (2019 in press). In addition, Rachel was recently awarded a Bristol Institution for Learning and Teaching Innovation Grant and is currently leading a study exploring the area of the flipped classroom. In September 2017 Rachel achieved an Associate Fellowship of the Higher Education Academy and in August 2019 she was awarded a Post Graduate Certificate in Education with Oxford Brookes University.
Email: rachel.christopher@bristol.ac.uk

Evaluation of an endotracheal intubation model and practical for training veterinary nursing students

Rachel Harris RVN, AFHEA, PGCE

Clinical Skills Team, Bristol Veterinary School, University of Bristol, Langford House, Bristol, Bs40 5du, UK

Maire O'Reilly RVN

School of Veterinary Medicine, University College Dublin, Dublin 4, Ireland

Sarah Baillie BVSc, MSc, PhD, PFHEA, MRCVS

Bristol Veterinary School, University of Bristol, Langford House, Bristol, Bs40 5du, UK

ABSTRACT: Endotracheal intubation practice, using a modified model dog was introduced to help student veterinary nurses prepare for anaesthetic procedures during clinical work-placements. The model was reviewed by five clinical experts who rated it as reasonably realistic and suitable for teaching and suggested minor improvements. Training was delivered to a cohort of students and their feedback was positive; they found the model helpful and had enjoyed the practical. A focus group and interviews were undertaken with some students after placements; they considered the practical had helped them prepare for and perform the task but requested additional opportunities to use the model.

KEYWORDS: Endotracheal intubation; clinical skills; model; simulation; veterinary nursing

Introduction

For veterinary nurses, the correct placement of an endotracheal (ET) tube is a Day One Skill (Royal College of Veterinary Surgeons, 2016) and all students must be competent by graduation. Traditionally, anaesthesia has been taught in lectures, with students then gaining practical experience with live animals in real clinical situations. However, the technique can be difficult to master and learning on live patients can be stressful (Musk, Collins & Hosgood, 2017). There is a need to develop an alternative way to teach this essential skill and using a model may help prepare students for clinical practice.

Simulation-based education has been shown to be beneficial in training healthcare professionals, enabling students to focus on the acquisition of skills rather than the

risks to patients, facilitating repeated practice and increasing confidence (McGaghie, Issenberg, Cohen, Barsuk & Wayne, 2011). Simulation is also used in veterinary education (Scalese & Issenberg, 2005). Models are not expected to completely replace live animals but rather enhance or act as a precursor (Lumbis, Gregory & Baillie, 2012).

For human anaesthesia training, a life-sized mannequin has been shown to be effective for teaching airway management and intubation (Hesselfeldt, Kristensen, & Rasmussen, 2005). In veterinary medicine, two canine intubation models (high- and low-fidelity) were used for training veterinary students and compared to reading text (Aulmann et al., 2015). Both models were equally effective in student acquisition of skills and significantly better than the text.



Maire O'Reilly RVN, DipAVN (Surgical)

Maire was a RANA and after working in a variety of VN positions and disciplines has retired from Veterinary Nursing. Recent years were spent working in the Clinical Skills environment in University College Dublin School of Veterinary Medicine and Ross University School of Veterinary Medicine, St Kitts and Nevis. The opportunity to create teaching models and teaching materials was a hugely satisfying experience. Email: maire.oreilly@ucd.ie



Sarah Baillie BVSc, MSc, PhD, PFHEA, MRCVS

Sarah worked in clinical practice for many years before doing a PhD in computer science when she developed and validated virtual reality simulators for training veterinary students. Recently, Sarah led a major curriculum review at Bristol Veterinary School, UK. Sarah is passionate about clinical skills teaching and was responsible for opening the clinical skills lab at Bristol and integrated associated teaching and assessment throughout the curriculum. She has designed many models (low- and high-fidelity) and developed a range of supporting learning resources. She has a diverse portfolio of educational research including clinical skills and simulation as well as work-based learning, business skills, evidence-based veterinary medicine (EBVM), case-based learning, mental wellbeing and employability. Sarah is now an Emeritus Professor with the University of Bristol and is fortunate to be able to dedicate more time to veterinary education research and collaborations around the world. Email: sarah.baillie@bristol.ac.uk

Whilst there has been an increase in simulation research within veterinary education, the focus has been primarily with veterinary students and not student veterinary nurses (SVNs). Models have been created for veterinary nursing training for example, Deamer's (2014) model for performing intermittent positive pressure ventilation. However, the validity of models and SVNs' experiences using them have not been evaluated. Therefore, this study aimed to determine whether the inclusion of a practical using an intubation model would help SVNs prepare for anaesthetic procedures in the clinical workplace.

Methods

An intubation practical using a model was introduced for second year SVNs in the autumn term (2018) prior to their first work-placements. The practical and its impact on student learning were evaluated in three stages: assessing the realism of the model, gathering feedback on the practical and evaluating the subsequent student experiences in the workplace. Ethical approval was obtained for the study. All participants were provided with an information sheet and a consent form to sign prior to involvement in the study.

Model validation

A model (Figure 1) was designed (by MO) using an Ikea soft toy dog, scavenging tube (for the trachea), bicycle inner tube (oesophagus), balloons (lungs) and dressing materials cut to shape (tongue, epiglottis and larynx) and sewn into the pharyngeal area. The model represented a medium-sized, long-nosed breed as this would be the ideal type selected for teaching students to perform their first intubation.

Clinical experts were invited to practise intubating the model and provide feedback via an online questionnaire. Likert scales were used to evaluate the level of realism

(look and feel) and free text questions asked for comments about good and bad points of the model and its suitability for teaching students.

Student practical and questionnaire

During the practical students worked in pairs and one of two tutors demonstrated how to use the equipment and perform the technique on the model. Students then practised the skill under the supervision of a tutor, one student focused on restraining the patient and the other on intubation. Whilst waiting for their intubation training, students were set anaesthesia related, self-directed tasks based on material covered in lectures. Immediately after the practical, students were asked to provide feedback by 'opting-in' to the study, signing a consent form and completing a short paper questionnaire. The questionnaire used both Likert scales and free text questions, asking about student's prior intubation experience and views on the practical and model.

Focus group and interviews

Students who went on work-placements shortly after the practical were invited to attend a focus group at the beginning of the spring-term to discuss their experiences in a clinical setting. Students who attended work-placements at the end of the academic year were invited to participate in an interview. A standardised set of questions was prepared to guide the discussion and explore students' experiences when on work-placements, opportunities to practise intubation and any issues encountered. Students' planning and preparation for performing intubation were discussed as well as suggestions about any additional help that should be provided. The discussions were recorded using an encrypted Dictaphone, transcribed and stored on a secure server. Two of the authors (RH & SB) analysed the data to identify major themes, which were discussed until a consensus was reached.

Results

Model validation

Five clinical experts evaluated the model, two veterinary nurse and three veterinary surgeons. Responses to the Likert scale questions about the level of realism (look and feel) are shown in Figure 2. In the free text comments, all participants mentioned that the pharyngeal area looked realistic with minor improvements suggested around the appearance of the soft palate. Particularly realistic aspects of the model included holding the tongue and passing the tube through the epiglottis into the



▲ Figure 1. Model developed for teaching intubation.

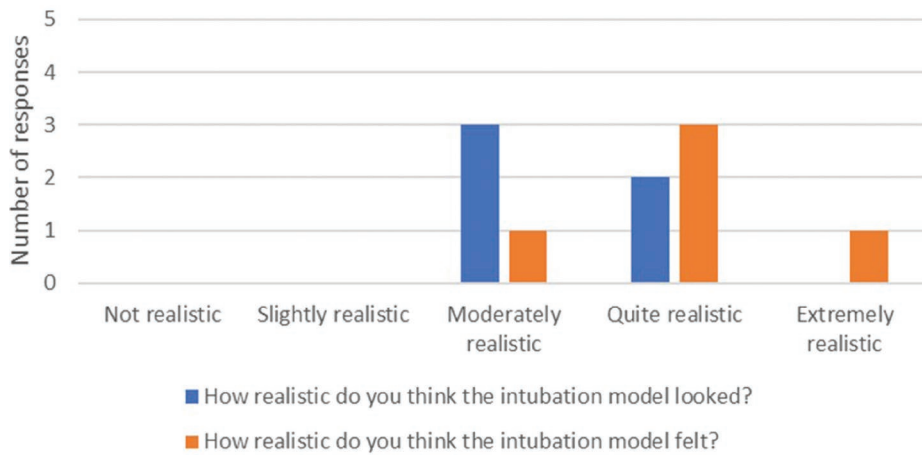


Figure 2. Clinical expert responses (n = 5) to Likert scale questions evaluating the model's look and feel.

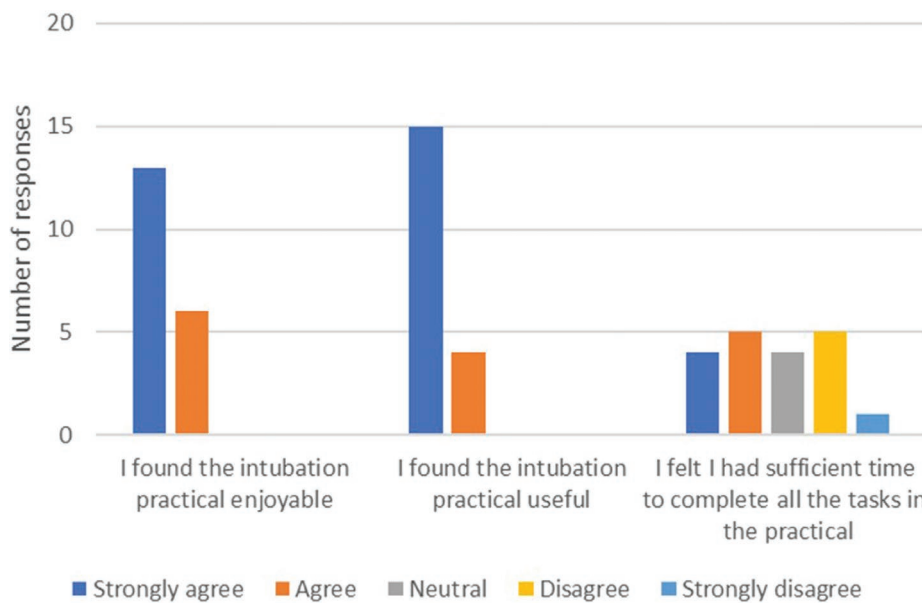


Figure 3. Student responses (n = 19) to Likert scale questions evaluating the practical class.

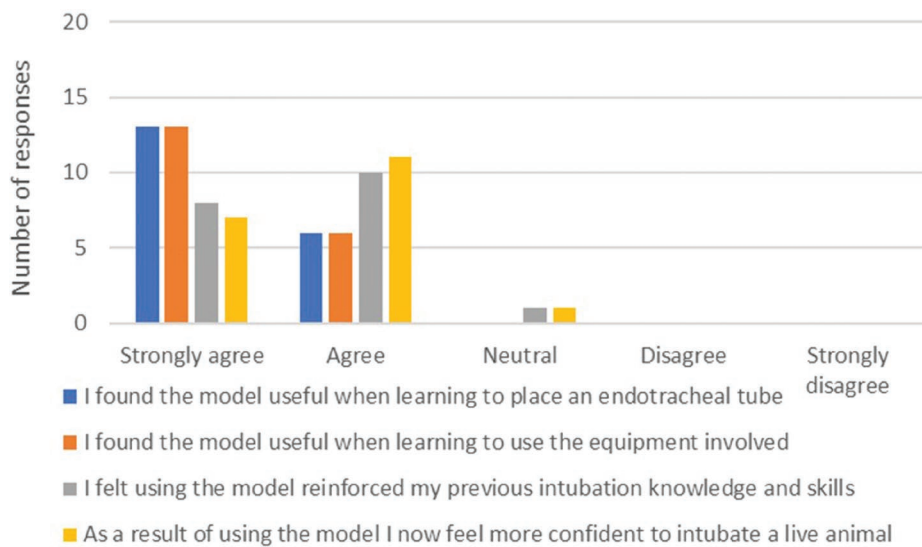


Figure 4. Student responses (n = 19) to Likert scale questions evaluating the model.

trachea for example “the force and movement required to intubate it were very similar to that of a live patient.” However, the lack of jaw tone was noted as being unrealistic. Another suggested adding teeth would be

an improvement. The model design was considered simpler than “the real thing” but this was “a positive” as it made the task clearer. Several mentioned that the model would enable students to take as much time

as needed compared to the live patient where it is “often rapid and overwhelming for the novice.” All agreed that the model would be suitable for teaching SVN prior to intubating their first live patient.

Student questionnaire

Twenty-one students attended the practical and nineteen completed the questionnaire. Two students had intubated one live animal, the rest had never performed intubation. Responses to the Likert scale questions evaluating the practical class and the model are shown in Figures 3 and 4. In the free text comments, two major themes emerged around the model's good points; being able to perform the technique before a live animal was valuable “a safe way to practise” and being able to visualise the pharyngeal area. Some students mentioned the good quality of the teaching. Few bad points were identified however, some noted that the model was too “floppy.” Suggested improvements to the practical included having images of live animals being intubated and additional models i.e., different sized dogs and other species. When asked for any further comments, two themes emerged – a positive theme around students finding the practical both useful and helpful and a negative theme about needing more time.

Focus group and interviews

Three students attended a focus group and two participated in individual interviews. Most themes that emerged were similar. Although students had opportunities to practise intubation while on placements, a theme emerged around barriers including feeling scared, time constraints and suitability of the patient. However, when asked about their preparation for performing intubation, students consistently commented that the model and practical had been helpful in increasing their confidence, knowing the steps “it helped with muscle memory” and the value of having practised “I felt I'm comfortable doing it [intubation]... compared to i.v. catheter which was all new.” Suggested improvements included wanting more time to practise with the model. Once the skill had been mastered, having access to models representing more difficult cases would also be useful.

Discussion

Overall the expert evaluation deemed the model to be realistic, with a few minor adaptations, and suitable for teaching endotracheal intubation. Interestingly, the comments about the potential benefits of the model's simple design were consistent with Aulmann et al.'s work (2015) which suggested that choosing a simple model,

consisting of only the essential anatomical structures, helped to minimise distractions and therefore, aid learning.

Student feedback from the questionnaire, focus group and interviews indicated that the practical had been useful and enjoyable. However, a recurring theme related to needing more time in the practical. Time constraints and stressors in the workplace were also mentioned which was similar to the observations of Musk et al. (2017) that performing anaesthesia techniques on live animals is stressful for learners. In comparison, the opportunity to practise with the model was considered beneficial, provided a safe environment and increased students' knowledge, skill and confidence.

In conclusion, a reasonably realistic intubation model was created and used to deliver effective teaching to a cohort of SVNs. However, participants recognised that additional training using the model could better prepare them for work-placements

and therefore a longer practical and more opportunities to practise are being considered. The findings of this project and utilisation of the model have potential to contribute not only to veterinary nursing but clinical skills training more widely across the veterinary sector.

Acknowledgments

We would like to thank the staff and students at Bristol Veterinary School who participated in this study.

Disclosure statement

The authors have no conflicts of interest.

References

- Aulmann, M., März, M., Burgener, I. A., Alef, M., Otto, S., & Mülling, C. K. W. (2015). Development and evaluation of two canine low-fidelity simulation models. *Journal of Veterinary Medical Education*, 42(2), 151–160. doi:10.3138/jvme.1114-114R
- Deamer, C. (2014). How to create your own IPPV dog and other training aid tips. *Veterinary Nursing Journal*, 29(6), 218–219. doi:10.1111/vnj.12153

Hessfeldt, M., Kristensen, S., & Rasmussen, L. S. (2005). Evaluation of the airway of the SimMan™ full-scale patient simulator. *ACTA Anaesthesiologica Scandinavica*, 49(9), 1339–1345. doi:10.1111/j.1399-6576.2005.00856.x

Lumbis, R. H. H., Gregory, S. P. P., & Baillie, S. (2012). Evaluation of a dental model for training veterinary students. *Journal of Veterinary Medical Education*, 39(2), 128–135. doi:10.3138/jvme.1011.108R

McGaghie, W. C., Issenberg, B., Cohen, E. R., Barsuk, J. H., & Wayne, D. B. (2011). Does simulation-based medical education with deliberate practice yield better results than traditional clinical education? A meta-analytic comparative review of the evidence. *Academic Medicine*, 86(6), 706–711. doi:10.1097/ACM.0b013e318217e119

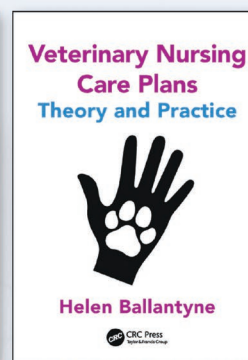
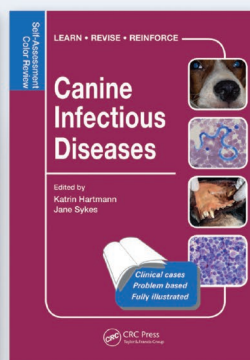
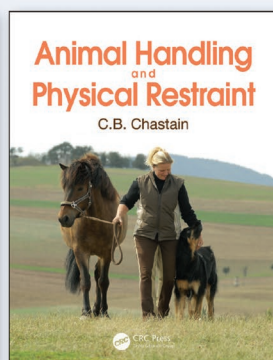
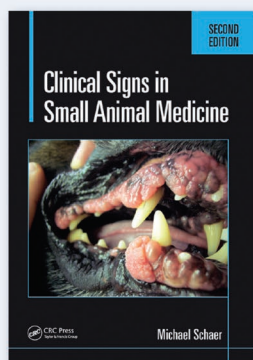
Musk, G. C. C., Collins, T., & Hosgood, G. (2017). Teaching veterinary anaesthesia: A survey-based evaluation of two high-fidelity models and live-animal experience for undergraduate veterinary students. *Journal of Veterinary Medical Education*, 44(4), 590–602. doi:10.3138/jvme.0216-043R1

Royal College of Veterinary Surgeons. (2016). *RCVS day one skills for veterinary nurses*. Retrieved from <https://www.rcvs.org.uk/document-library/rcvs-day-one-skills-for-veterinary-nurses/>

Scalese, R. J., & Issenberg, S. B. (2005). Effective use of simulations for the teaching and acquisition of veterinary professional and clinical skills. *Journal of Veterinary Medical Education*, 32(4), 461–467. doi:10.3138/jvme.32.4.461

Exclusive 20% Discount

on all CRC Press books for VNJ readers



Simply visit www.crcpress.com and enter code **VNJ18** when ordering to claim your 20% DISCOUNT, plus free shipping!

