

How transferable is percutaneous tracheostomy training model manufacture and use?

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Introduction

Key elements for training in percutaneous tracheostomy(PCT) were published in Intensive Care Society Standards in 2014. They state that it is key to maximise the use of simulation as a training tool.(1) Intensive care trainees have limited access to high-fidelity PCT procedural simulation as the training models are expensive or animal tissue with its storage requirements, malodour and cultural factors.

We developed a trainer for PCT using ADAMgel (Aqueous Dietary fibre Antifreeze Mix gel) to represent subcutaneous tissue and other inexpensive materials that is high-fidelity, easy to manufacture reusable and recyclable.(2) Ongoing development saw the addition of fiberoptic use (via inexpensive drainscopes) and an intubated polystyrene head. These models are cheap to produce (£3 without and £6 with head) and re-usable, making them ideal for trainees to practice their skills in a controlled, risk-free environment. As there was widespread interest but also a vast over-estimation of manufacturing complexity, we set out to find whether the process of making these models was easily transferable to other hospitals.

Method

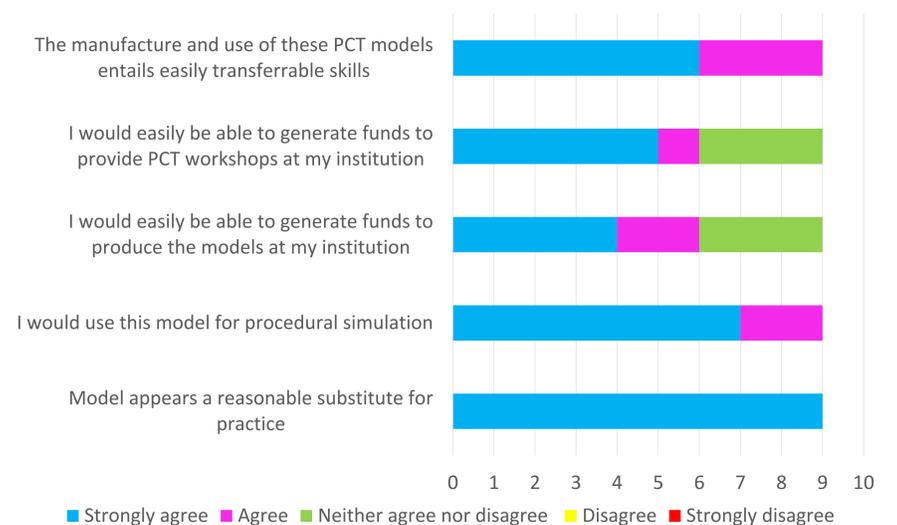
A training day was held at Worthing Hospital to which several anaesthetists with special interest in difficult airways and PCT procedural simulation attended. The technique of preparing and recycling ADAMgel, larynx and trachea manufacture as well as model assembly were demonstrated in a real-time fashion, with ingredient and methodology sheets provided. The attendees also had time to use our existing models to practice the skills and learn how best to use these aids in a teaching environment.



Figure A: workshop to train how to produce ADAMgel.
Figure B: the workshop continues with demonstrations in how to produce life-like material for the cricoid and thyroid cartilage.
Figure C: the finished product. Starting at top left and working clockwise: the thyroid cartilage and cricoid cartilage along with trachea made from anaesthetic machine tubing; cover the trachea with ADAMgel to create life-like soft tissue; cover this with a skin-like material; the finished product attached to a polystyrene head and a ventilation bag to represent the lungs.
Figure D: tutorials taking place in how to perform PCT on the models produced in the workshop.

Results

Feedback using a 5-point Likert scale (median(IQR)[range]) was positive. The clinicians felt that the manikins were a reasonable substitute for practice (5(5-5)[5-5]) and agreed they would use the models for procedural simulation for trainees (5(5-5)[4-5]). The skill set required to manufacture the PCT manikins and use them for training was found to be easily transferrable (5(4-5)[4-5]). The clinicians would be able to generate funding from their institution to produce the manikins (4(3-5)[3-5]) and to get funding to run PCT workshops at their institution (5[3-5][3-5]).



Discussion

We think the skill set required for producing and using these PCT trainers has been shown through our workshop to be easily transferrable. We are in the process of developing a YouTube channel and a website to help encourage and demonstrate how to manufacture all components of the kit. We hope their manufacture will allow increased availability of high fidelity PCT procedural simulation training.

References

1. Bodenham A, Bell D, Bonner S, Branch F, Dawson D, Morgan P, McGrath B, Mackenzie S. ICS Tracheostomy Standards. Intensive Care Society Standards.2014.
2. Ninan S, Willers J, Lawson A, Speers S, Jones E, Uncles D. Development And Evaluation Of A Novel Percutaneous Tracheostomy Placement Simulation Model. DAS Annual Scientific Meeting Abstract Book. 2017. 1: 153