Simulating Paediatric Adenotonsillectomy: validation of an ovine animal model as a simulation tool

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INTRODUCTION
A systematic reviews of surgical simulation has established the efficacy of simulation as a training tool, as well as the potential for transfer of skills to the operative setting1. However, presently there are very few tonsillectomy simulation models, with only tonsil tie simulators and virtual reality models described in the literature2,3.

AIMS
• To explore the feasibility of performing adenotonsillectomy in an ovine model
• Establishing whether an ex-vivo ovine model can be validated as a simulation training tool

METHODOLOGY
Literature review identified anatomical organisation of adenoid and tonsillar tissue in various commercially available animal models4. The ovine model possessed palatine, adenoid and lingual tonsils, was readily commercially available, and was equivalent in size to the paediatric patient being simulated. Availability, cost and fidelity of current tonsillectomy and adenotonsillectomy models was also determined, allowing comparison to the lamb model.

Feasibility of adenotonsillectomy in the fresh-frozen lamb model was assessed with both cold steel and coblation techniques. Eleven ENT trainees performed adenotonsillectomy on the lamb model, completing a 5-point Likert scale questionnaire assessing face validity (how realistic the model was), global content validity (how effective the model was in teaching global surgical skills), and task-specific content validity (how realistic the model was for teaching adenotonsillectomy operative steps). A median score of ≥4 was used as the validation threshold.

RESULTS

FEASIBILITY OF Ovine ADENOIDECTOMY
During adenoidectomy in the lamb, nasal catheter retraction did not provide sufficient exposure. In order to gain access to the adenoidal tissue the soft palate had to be excised by performing a uvulopalatopharyngoplasty (UPPP) (E). Adenoidectomy was performed by oral retrograde dissection. Lamb adenoid tissue is similar in tissue texture and appearance, allowing sufficient procedure realism (F).

Graphs demonstrating face, global content and task-specific content validation scores. Median scores are represented by the solid bars, calculated from analysis of the 11 ENT trainees undertaking the procedures. Maximum and minimum scores are represented using the error bars. A validation threshold has been set at a score of 4, represented by the dotted red line.

DISCUSSION
• The ex-vivo ovine model is a commercially available, low-cost simulation model
• Adenotonsillectomy is feasible in the ovine model using cold steel and coblation techniques.
• The model provides high fidelity simulation of tonsil dissection, knot-tying at depth and adenoidectomy
• Validation thresholds were achieved with respect to face, global content and task-specific validity in all domains except for obtaining access to the oropharynx and nasopharynx.
• Overall the ovine model has therefore been validated as a low-cost, high-fidelity model for simulation of paediatric adenotonsillectomy

REFERENCES