



Soiled Airway Tracheal Intubation and the Effectiveness of Decontamination by Paramedics: A randomised controlled manikin study

Richard Pilbery¹ and M. Dawn Teare²

¹Yorkshire Ambulance Service NHS Trust, ²University of Sheffield

Introduction

Vomiting and regurgitation are commonly encountered in out-hospital-cardiac arrest with a reported incidence of 20–30% (Benger et al. 2018, Voss et al. 2014; Simons et al. 2007). This is of concern since patients who have suffered an OHCA are already in extremis. If standard suctioning techniques are not sufficient to maintain a clear airway and provide ventilation, then these patients will die, irrespective of the quality of chest compressions and the timeliness of defibrillation.

Traditional suctioning techniques have been criticised and training in the management of contaminated airways, limited. This has led to the development of a combined suction/laryngoscopy technique to facilitate intubation, known as Suction Assisted Laryngoscopy and Airway Decontamination (SALAD), and the creation of modified airway manikins to allow for the practice of this technique (DuCanto, Serrano, and Thompson 2017).

This study aimed to determine whether a short teaching session of the SALAD technique to paramedics, improved their ability to intubate a contaminated airway. The primary objective was to determine the difference between paramedic first-pass intubation success, before and after SALAD training, in a simulated soiled airway. Secondary objectives were to determine the difference in time taken to achieve first-pass intubation success, before and after SALAD training in a simulated soiled airway, and the effect of multiple intubation attempts on success rates following SALAD training.

Methods

A modified airway manikin, with the oesophagus connected to a reservoir of 'vomit' that was propelled up the oesophagus by a pump, was used to simulate a soiled airway (Figure 1). The intervention consisted of a brief SALAD training session with a demonstration and opportunity to practice. Participants were randomly allocated into two groups: AAB, who made two pre-training intubation attempts and one post-training attempt, and ABB, who made one pre-training and two post-training attempts. **The primary outcome compared the proportion of successful intubations between groups on the second intubation attempt.**

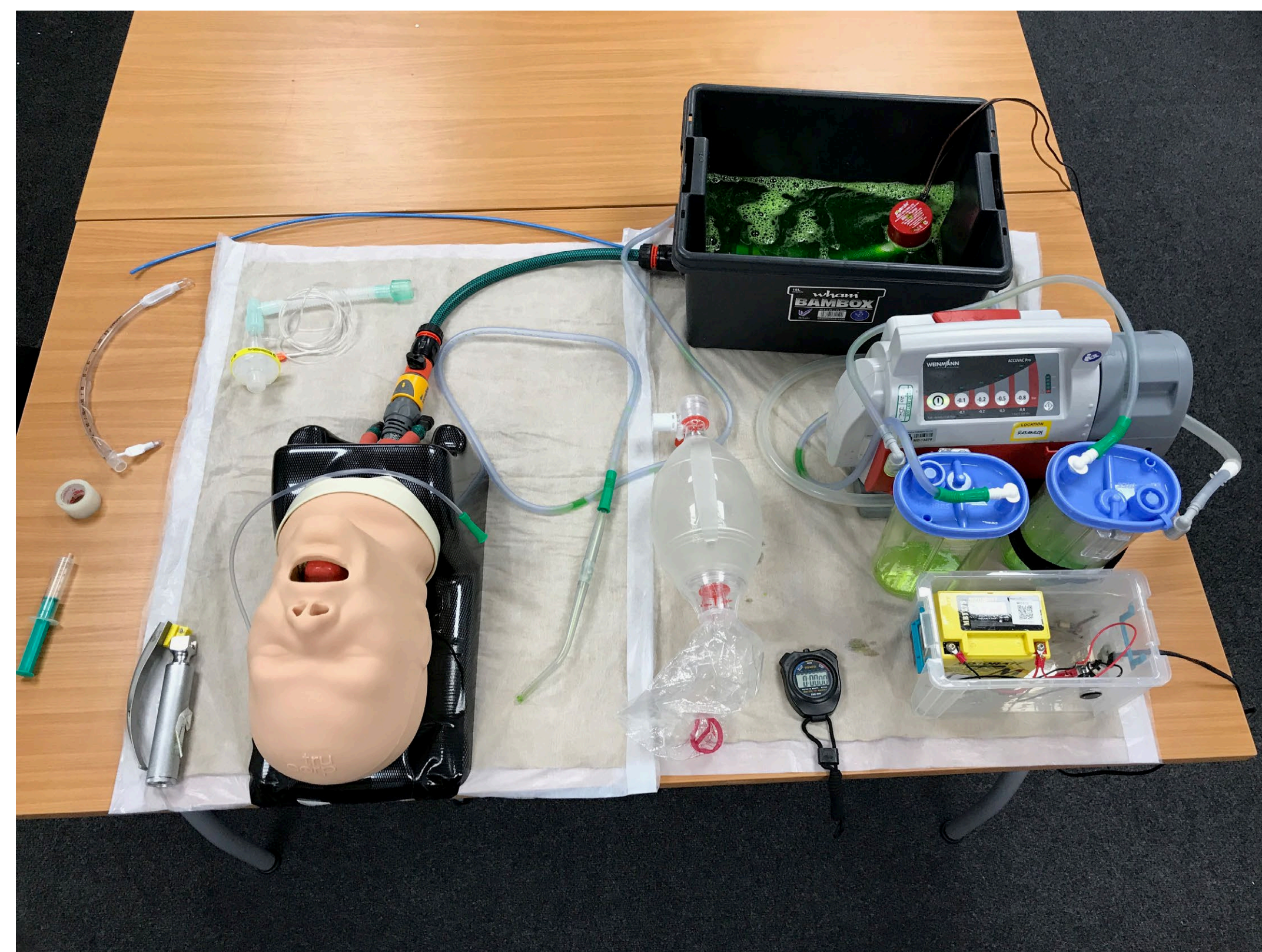


Figure 1: SALAD manikin setup used for the study

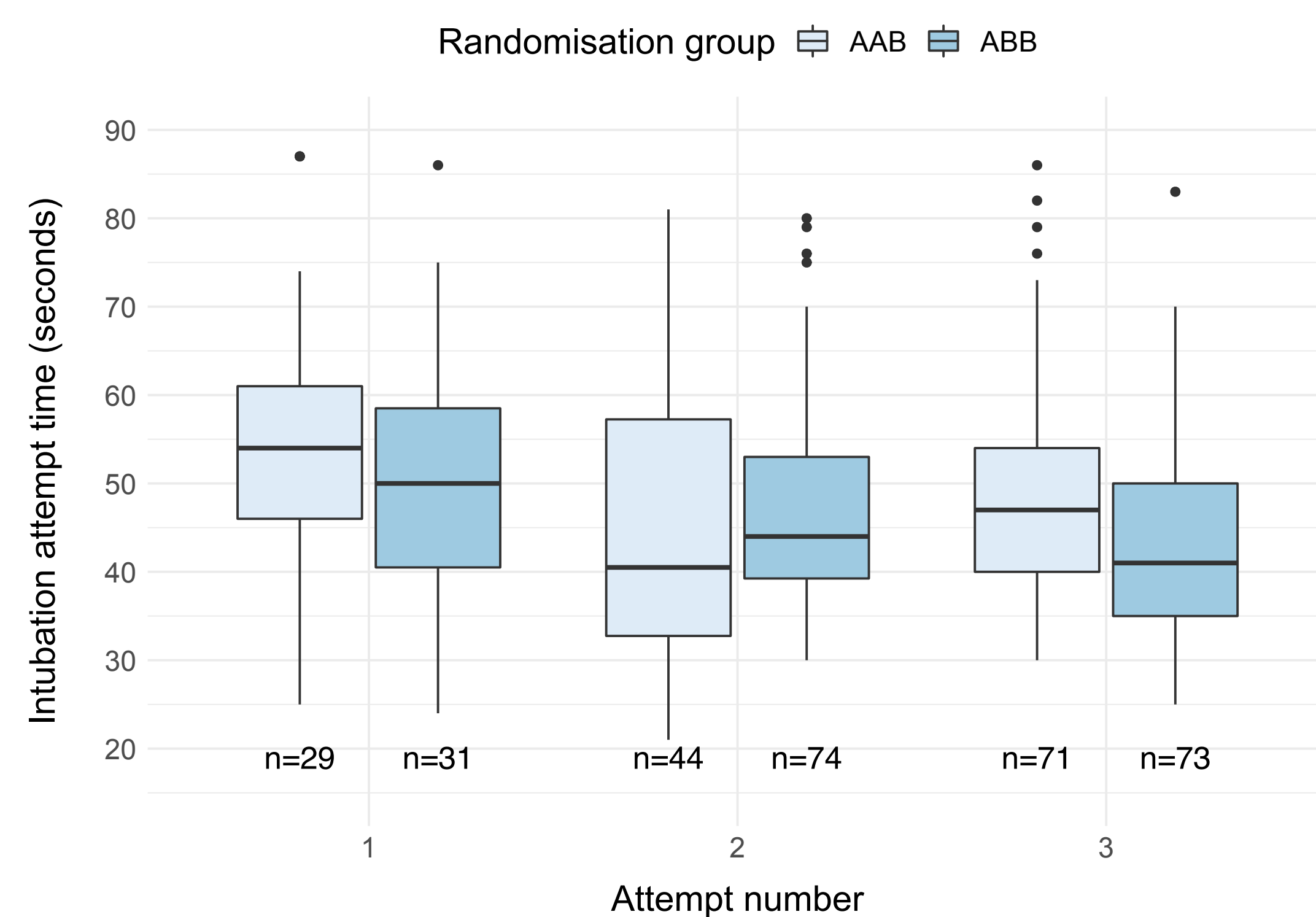


Figure 2: Successful intubation attempt times, stratified by randomisation sequence and attempt number. Note: N=82 for each group (AAB/ABB) and attempt.

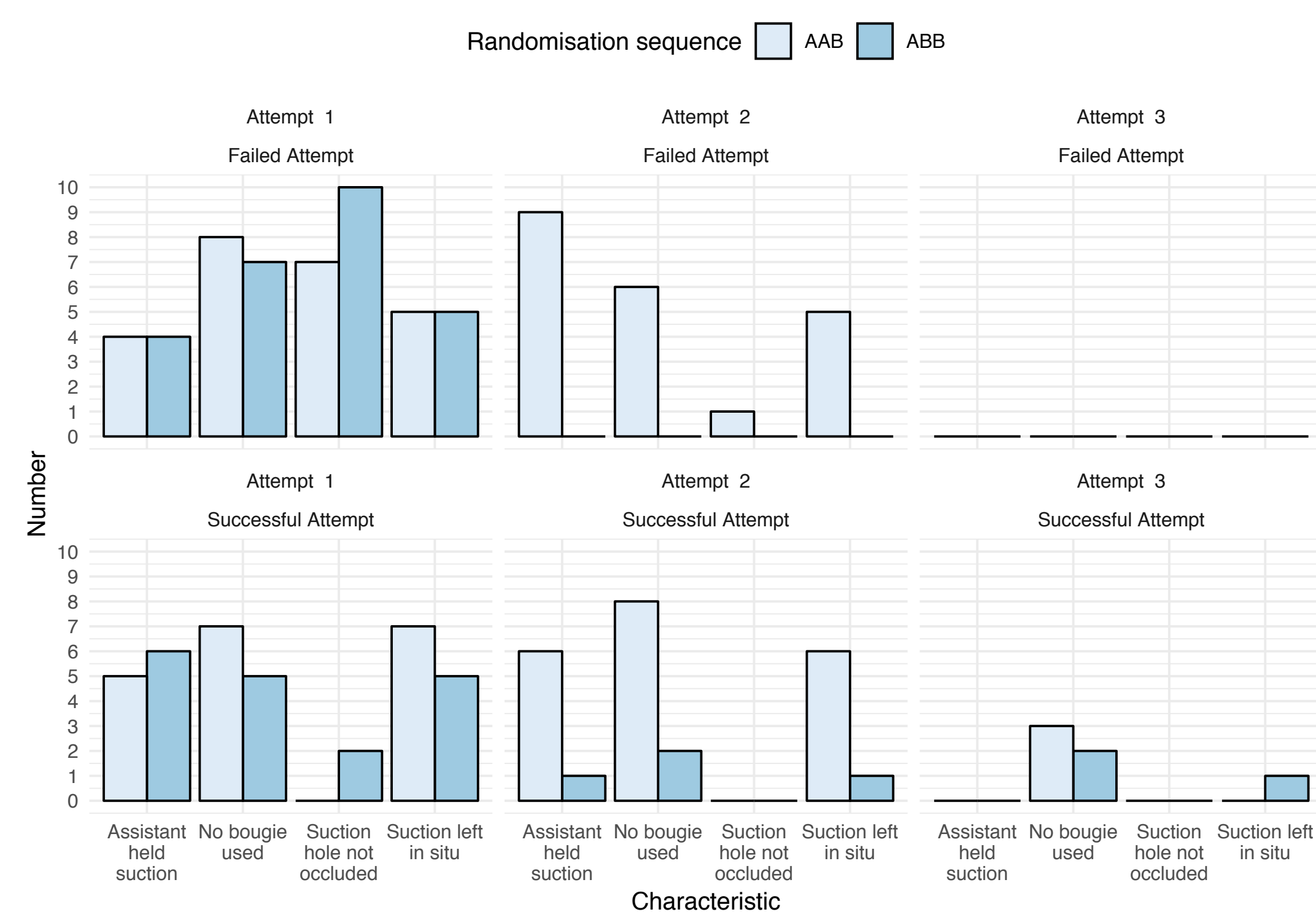


Figure 3: Bar chart showing techniques and omissions during intubation attempts, stratified by randomisation group, attempt number and intubation outcome

Results

In this manikin study, following a brief SALAD training session, more paramedics were able to intubate a soiled airway on their first attempt compared to those without SALAD training (90.2% vs 53.7%, difference of 36.6%, 95% CI 24–49.1%, p<0.001, Figure 2).

The mean difference in time taken to perform a successful intubation between groups was statistically significant for attempts 1 and 2 (mean difference 11.71 seconds, 95% CI 1.95–21.47 seconds, p=0.02), but not attempts 1 and 3 (mean difference -2.52 seconds, 95% CI -11.64–6.61 seconds, p=0.58). However, these results are likely to be confounded by the use of tracheal suction, which only occurred in the post-training attempts, and added additional time to the intubation attempts.

There was no statistically significant difference in success rates on the third attempt between AAB and ABB (89.0% vs 86.6%, difference 2.4%, 95%CI 7.6–12.4%, p=0.63), suggesting that paramedics were able to successfully utilise the SALAD technique despite limited opportunity for practice.

A number of techniques and omissions were observed during intubation attempts (Figure 3). This included asking the assistant to hold the suction catheter in the mouth (n=35), which was arguably the only appropriate intervention to perform out of all those seen. In addition, there were also instances where participants did not use a bougie (n=48, of which 21 were successful attempts, and 27 unsuccessful), forgot to occlude the suction vent hole on the catheter when attempting to clear the airway themselves (n=35), or who left the suction catheter in the mouth but did not occlude the suction vent hole, resulting in ineffective suction (n=20).

Conclusion

In this manikin study, following a brief training session, paramedics were able to intubate a soiled airway on their first attempt, significantly more often when using the SALAD technique.

Contact



Richard Pilbery
 email:
 r.pilbery@nhs.net
 tel:
 +44 7463 734 823



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Study website



<https://satiated.netlify.com>

For references and more information, visit the study website using the URL or QR code.