A manikin evaluation of five bougies & stylets for hyperangulated videolaryngoscopic intubation

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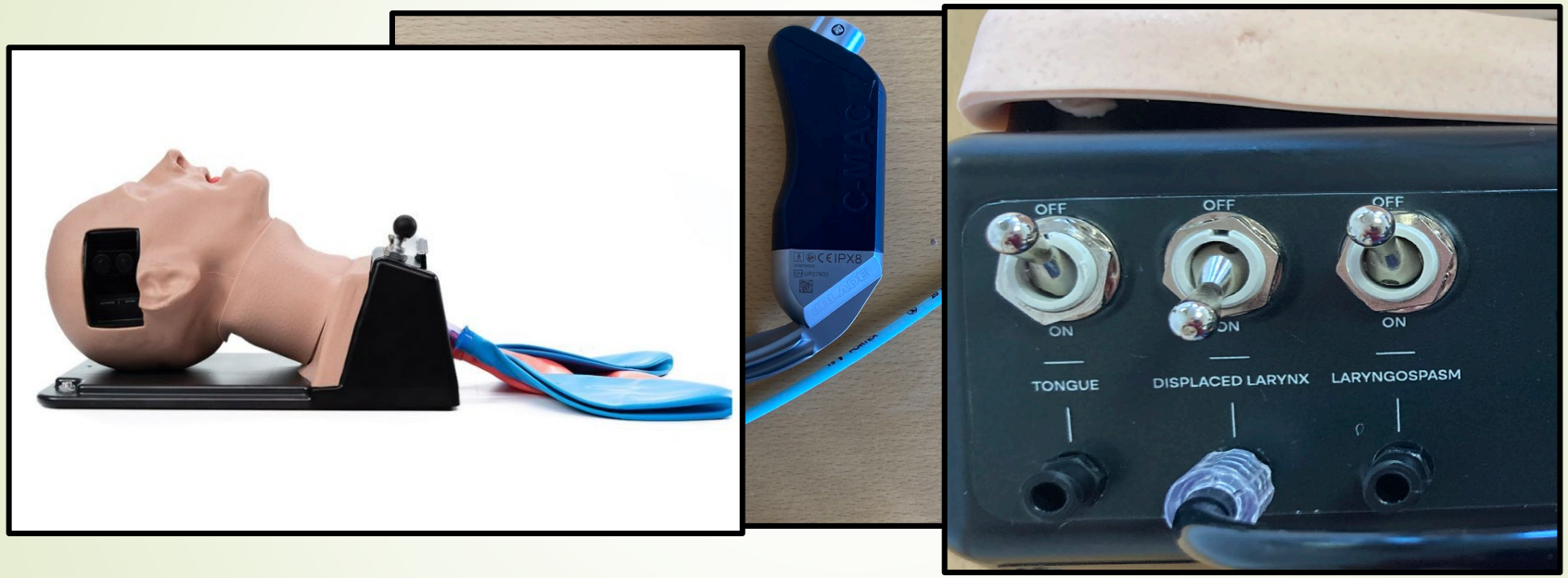
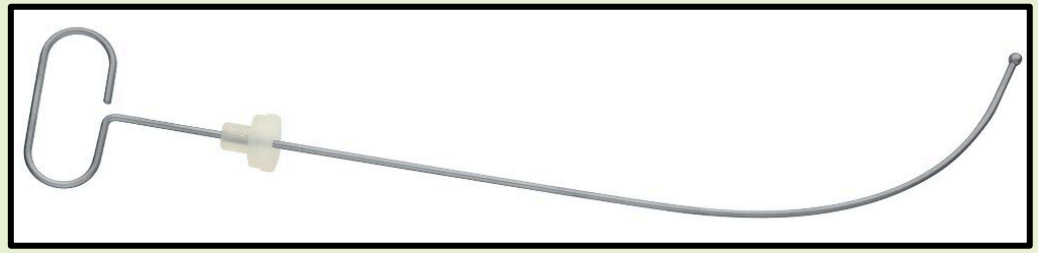
NHS
Royal United Hospitals Bath
NHS Foundation Trust

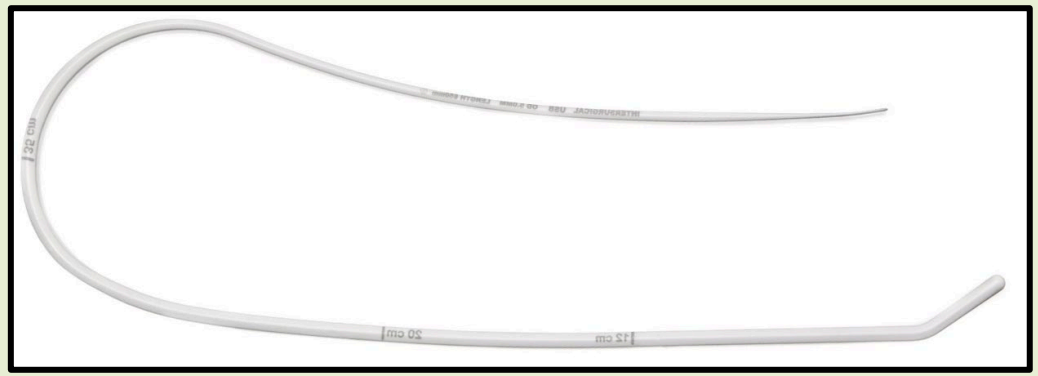
"Videolaryngoscopy improves the view, but tracheal intubation is difficult" [1]



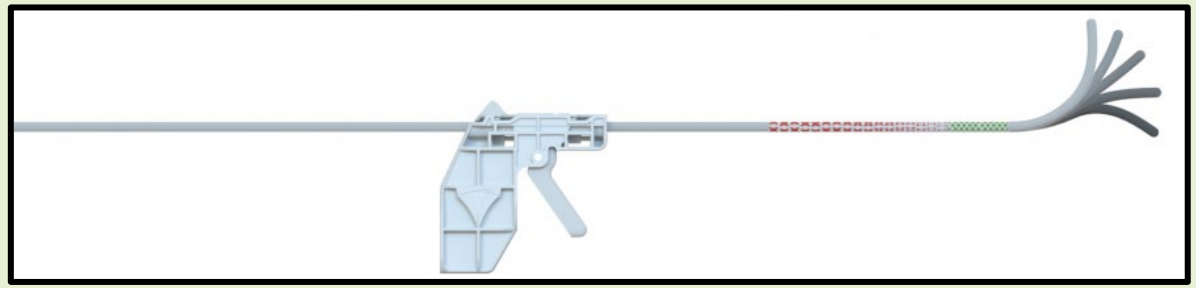
1. Reynolds *et al.* (2020)



Storz C-MAC stylet



Universal Stylet Bougie (USB)

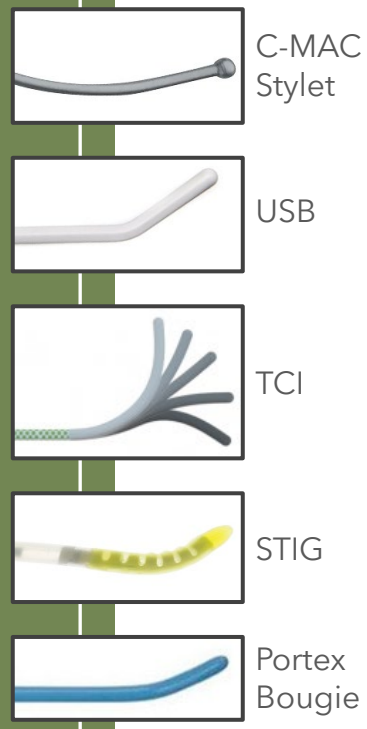


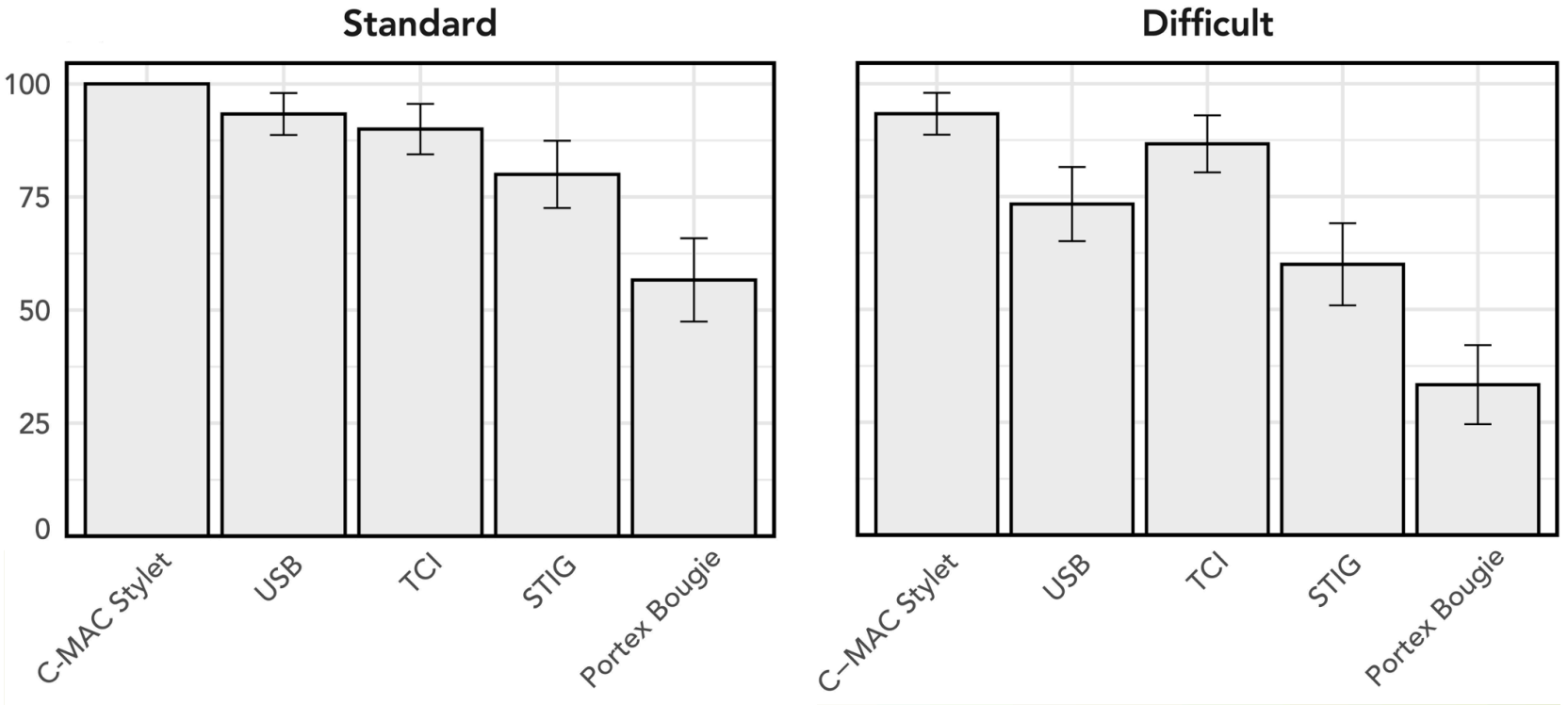
Runnels Total Control Introducer (TCI)

Steerable Tracheal Intubation Guide (STIG)

Portex single use bougie

First pass success

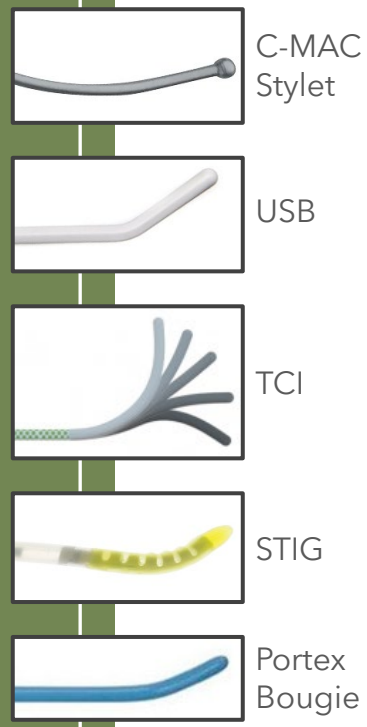


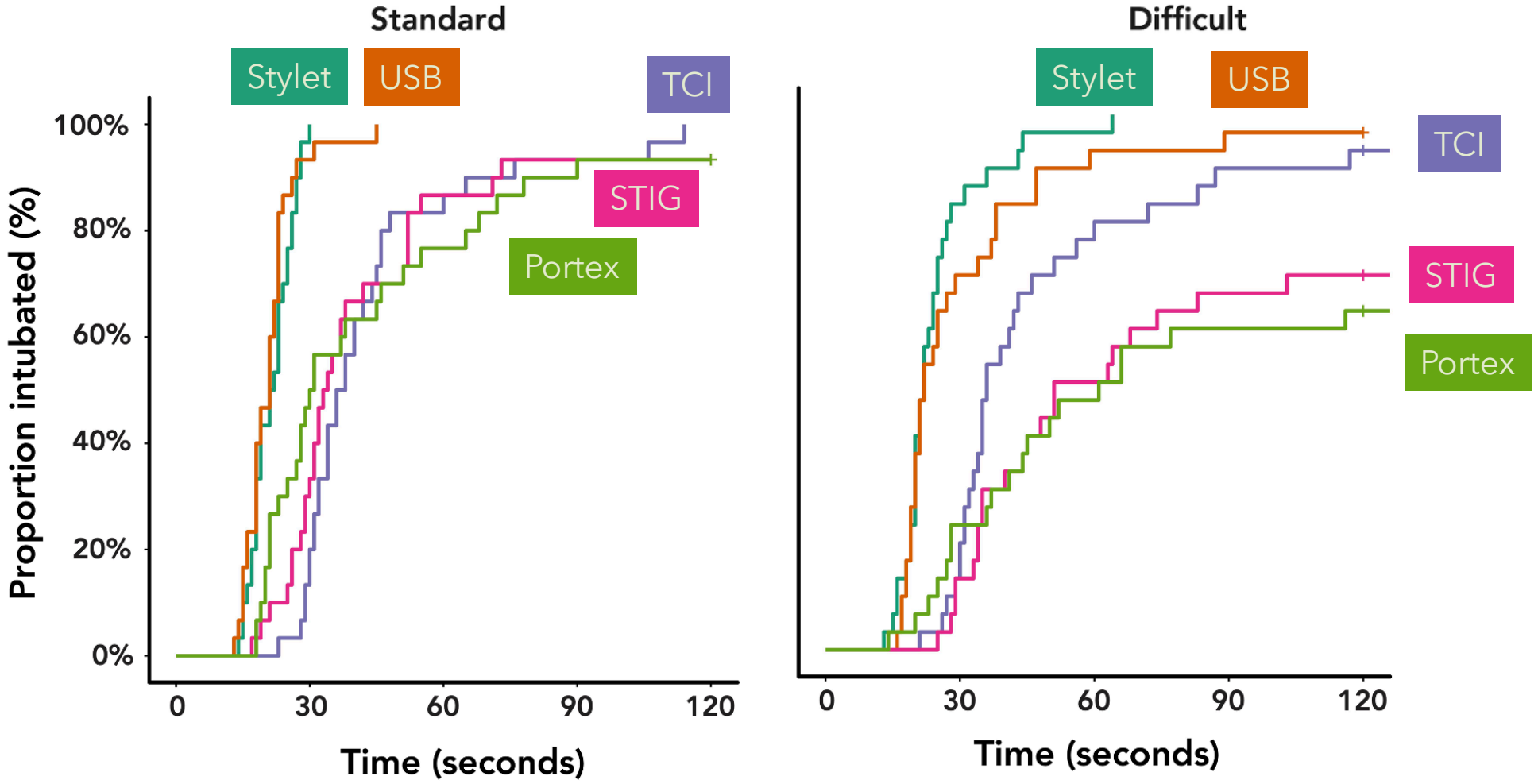


Test of statistical significance:

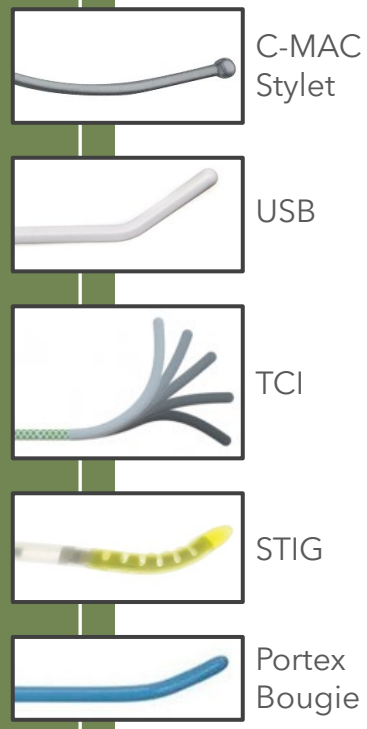
C-MAC stylet, USB and TCI
better than
Portex Bougie

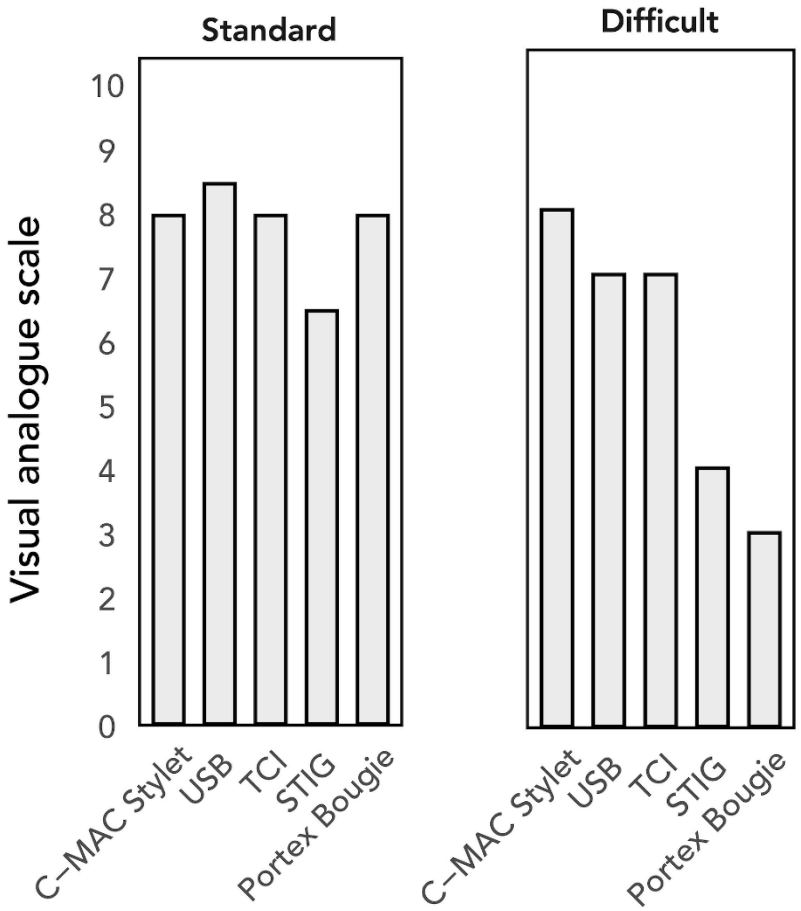
Time to intubation





Ease of intubation





Test of statistical significance:

C-MAC Stylet, USB & TCI

better than

STIG & Portex Bougie

Conclusions and discussion

- Stylets > Dynamic Bougies > Static Bougie
- First use of AirSim Difficult Airway in a trial
- Overall first pass success rate 69% in the difficult airway
- Contrary to findings of Eum *et al*. (2024)
- Performance differences increased in difficult airway
- Should you use a static bougie as your first line adjunct with a hyperangulated blade?

References, acknowledgements and declarations

- Limbs & Things Ltd, Bristol loaned the use of an AirSim Difficult Airway manikin (Trucorp, County Armagh, Ireland)
- Airway adjuncts were donated free of charge by manufacturers
- Our department has received further equipment for evaluation in the past

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Table 2: Performance characteristics of intubation adjuncts.

	Storz C-MAC® Stylet (N = 60)	Universal Stylet Bougie™ (N = 60)	Total Control Introducer™ (N = 60)	Steerable Tracheal Intubation Guide (N = 60)	Portex® Single Use Bougie (N = 60)
First attempt success, (n (%) [95% CI])	58 (97) [0.92-1.00]	50 (83) [0.74-0.93]	53 (88) [0.80-0.97]	42 (70) [0.58-0.82]	27 (45) [0.32-0.58]
Standard	30 (100) [1]	28 (93) [0.84-1.00]	27 (90) [0.79-1.00]	24 (80) [0.65-0.95]	17 (57) [0.38-0.76]
Difficult	28 (93) [0.84-1.00]	22 (73) [0.56-0.90]	26 (87) [0.74-0.99]	18 (60) [0.41-0.79]	10 (33) [0.15-0.51]
Success within 120 seconds	60 (100) [1]	59 (98) [0.95-1.00]	58 (97) [0.92-1.00]	49 (82) [0.72-0.92]	47 (78) [0.68-0.89]
Standard	30 (100) [1]	30 (100) [1]	30 (100) [1]	28 (93) [0.84-1.00]	28 (93) [0.84-1.00]
Difficult	30 (100) [1]	29 (97) [0.90-1.00]	28 (93) [0.84-1.00]	21 (70) [0.53-0.87]	19 (63) [0.46-0.81]
Time to intubation excluding time to view, (s; median (IQR) [range])	22 (19-25) [13-64]	21 (18-25) [13-89]	36 (31-46) [21-130]	35 (29-52) [17-140]	34 (25-53) [14-174]
Standard	22 (18-25) [14-30]	21 (18-23) [13-45]	37 (31-46) [23-114]	33 (29-44) [17-73]	30 (21-47) [18-90]
Difficult	22 (20-26) [13-64]	22 (19-34) [16-89]	36 (31-51) [21-130]	45 (34-64) [25-140]	43 (28-62) [14-174]
Ease of intubation, median (IQR) [range]	8 (7-9) [3-10]	8 (6.75-9) [1-10]	7 (6-8) [1-10]	6 (3-7) [1-10]	5.5 (2-8.25) [1-10]
Standard	8 (8-9) [5-10]	8.5 (8-9) [3-10]	8 (6-8.75) [4-10]	6.5 (5-7.75) [1-10]	8 (3.5-9) [1-10]
Difficult	8 (6.25-9) [3-10]	7 (3-8) [1-10]	7 (5-8) [1-9]	4 (1-6.75) [1-10]	3 (1-6.75) [1-10]
Ease of railroading, median (IQR) [range]	-	-	8 (5-9) [1-10]	6 (3.25-8) [1-10]	8 (5.75-9) [2-10]
Standard	-	-	9 (6.25-9.75) [3-10]	7 (5-9) [1-10]	9 (7.75-10) [2-10]
Difficult	-	-	8 (5-9) [1-10]	4 (3-7) [1-10]	6.5 (4.75-8.25) [3-10]
Force used, median (IQR) [range]	6 (3-7) [1-10]	5 (3-7) [1-10]	5 (3-7) [1-10]	6.5 (4-8) [1-10]	6 (3.25-8) [1-10]
Standard	5 (2.25-6.75) [1-9]	4.5 (3-6) [1-9]	4 (3-6.75) [1-9]	5 (4-7) [1-9]	4 (3-6) [1-9]
Difficult	6 (5-7.75) [2-10]	7 (4-8) [2-10]	6 (4.25-7.75) [1-10]	7 (5.25-8) [1-10]	7 (4-9) [2-10]

CI, confidence interval; IQR, interquartile range

Table 1: Baseline characteristics of intubators

	Intubators (N = 30)
Grade, n (%)	
Core trainee	7 (23)
Senior trainee or equivalent	9 (30)
Consultant	11 (37)
Staff Grade, Associate Specialist and Specialty Doctors	3 (10)
Previous experience with C-MAC D-Blade, n (%)	
10-20	11 (37)
20-50	13 (43)
50-100	5 (17)
>100	1 (3)

Definition of an intubation attempt

We defined one attempt at intubation as beginning when a laryngoscope, intubation adjunct or tracheal tube entered the oropharynx, and ending when one of those devices was removed from the oropharynx.