



# Evaluation of Flexible Tip Bougie in Simulated Difficult Intubation on Manikin using Video Laryngoscope: Comparison with Portex Single-use and Frova Intubating Introducers



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## INTRODUCTION

Incidence of difficult intubation is around 5% in general population who underwent anaesthesia. According to DAS Difficult Intubation Guidelines 2015, both video laryngoscopes and bougies play major role in difficult airway management. Despite video laryngoscope is now available to improve laryngeal view, this does not warrant a successful intubation.

- A situation of 'I can see the vocal cords but cannot intubate' will be encountered.
- Therefore, it comes the role of bougies in assisting endotracheal placement of tube.

## AIM

General Objective:

- To compare the efficacy of Flexible Tip bougie, Portex single-use and Frova intubating introducers in difficult intubation and explore a better single-use bougie.

Specific Objectives:

- To determine and compare differences in the success rate of intubation
- To determine and compare differences in the intubation time for successful intubation
- To assess and compare differences in the ease-of-use score
- To determine the relationships between experience of work and POGO score, intubation time and ease-of-use score

## METHOD

Design:

- Randomized, cross-over and experimental manikin study

Settings:

- Department of Anaesthesiology and Intensive Care of HTAA, Kuantan and Sultan Ahmad Shah Medical Centre @IIUM, Kuantan

Population:

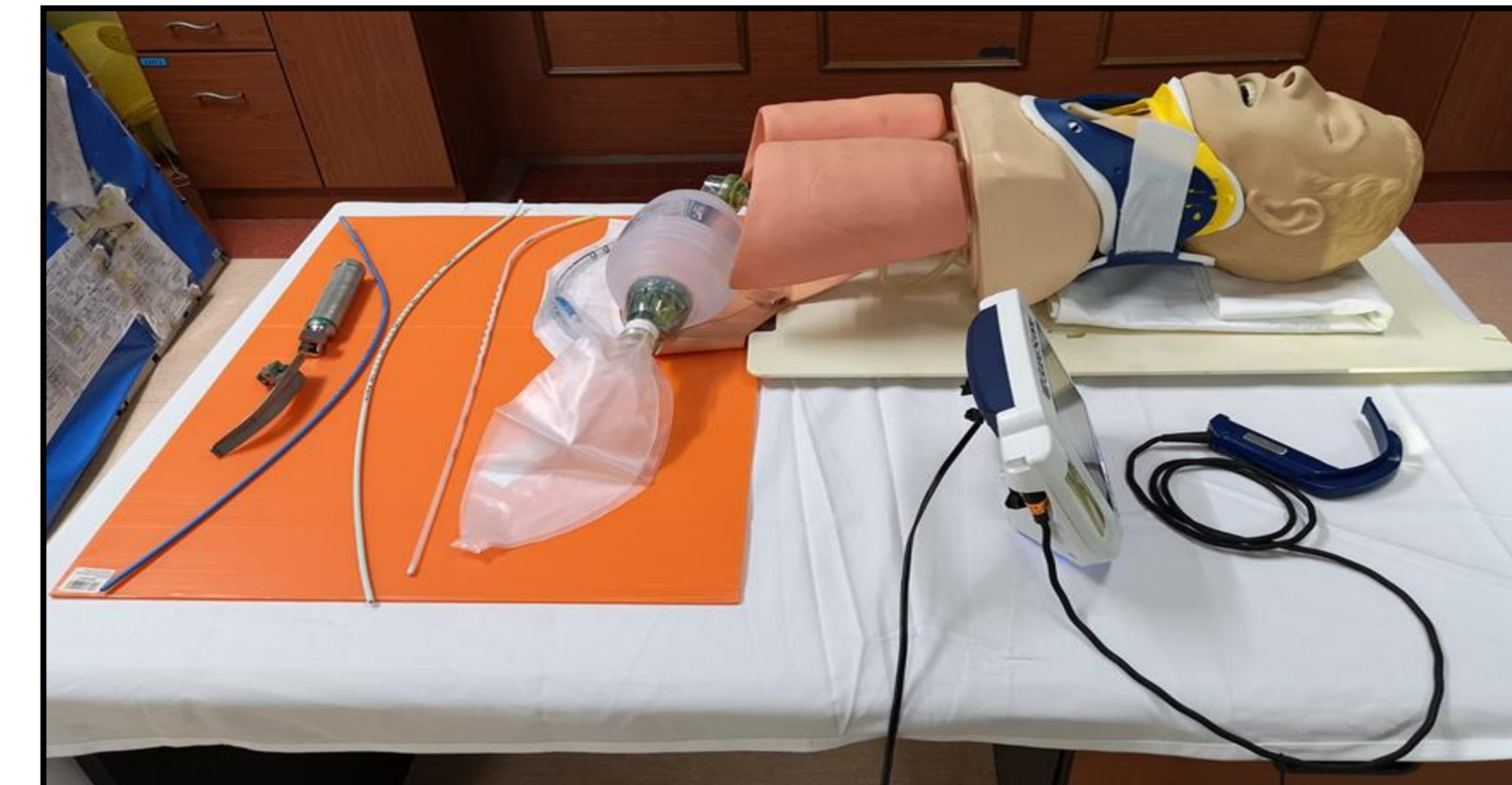
- Medical officers regardless of experience of work

Data collection:

- Manikin was used to simulate a Cormack Lehane grade 3A laryngeal view.
- Participants were instructed to perform single intubation attempt with each type of bougies by using GlideScope with GVL 4 blade.
- There were total 6 possible orders of arrangement.
- POGO score obtained by each participant was recorded.
- Site of ETT placement was confirmed by investigator.
- Intubation time and ease-of-use score were recorded.

## RESULTS

Manikin Model of Difficult Intubation with GlideScope



Flexible Tip Bougie



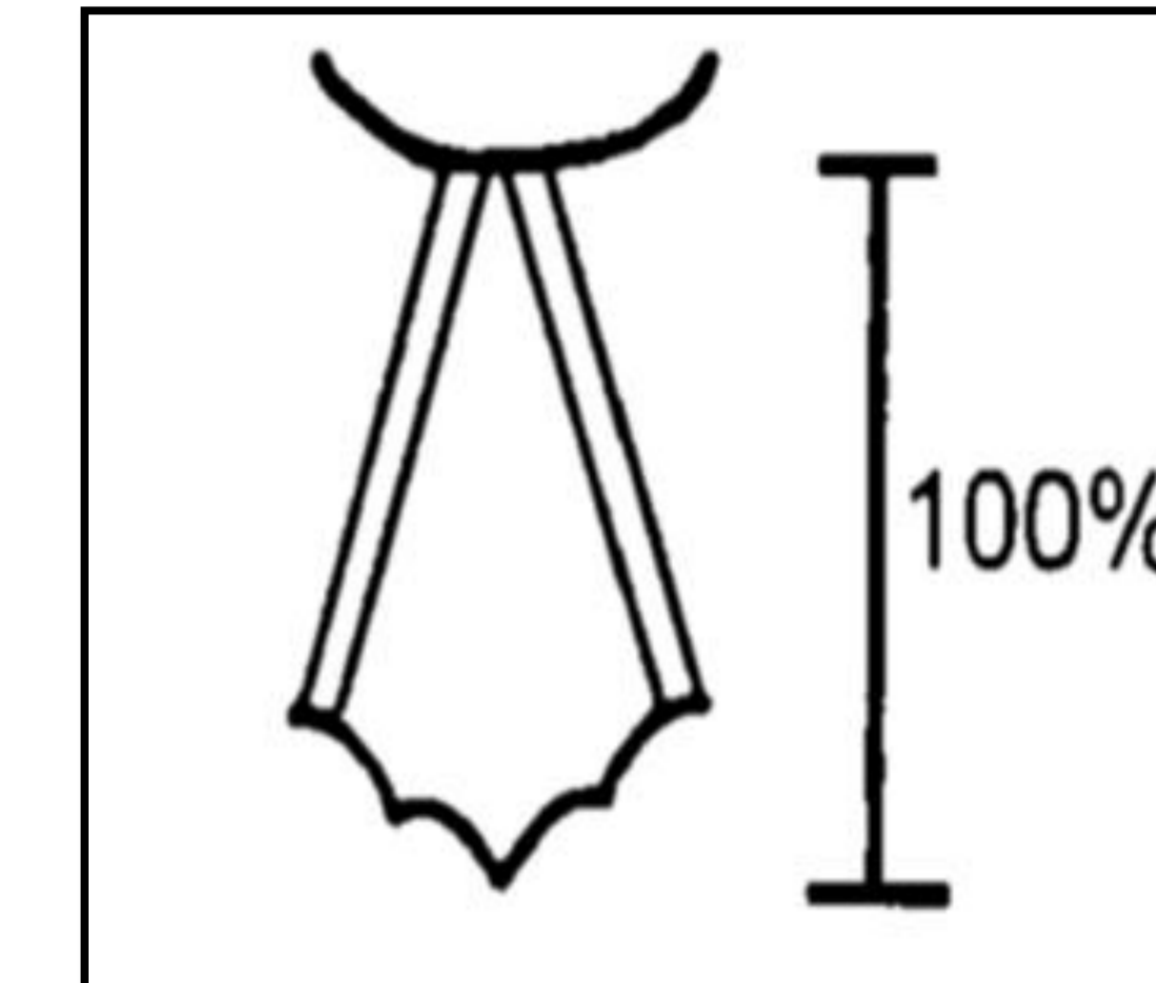
Portex Single-use Introducer



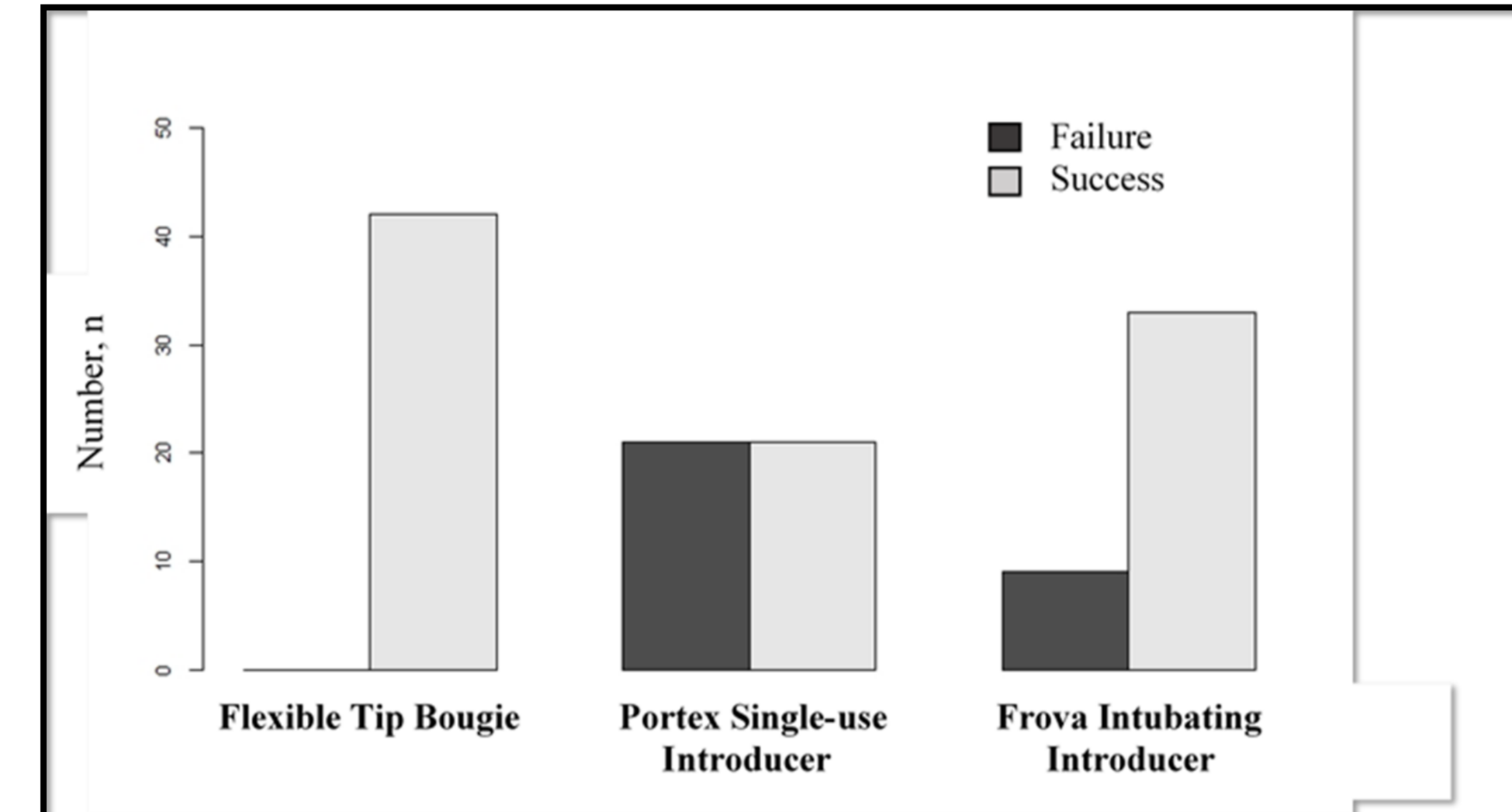
Frova Intubating Introducer



Percentage of Glottic Opening (POGO) Score



Outcomes of Intubation



Intubation Time

Values are median (interquartile range).

	Flexible Tip Bougie	Portex Single-use Introducer	Frova Intubating Introducer	p value
Intubation time, s (IQR)	16.08 (6.13)	19.39 (37.60)	18.25 (18.07)	0.449*

s: seconds; IQR: interquartile range  
Time is reported only for successful intubation.  
\*Friedman test

Relationships between Experience of Work and POGO Score, Intubation Time and Ease-of-use Score

Values are number.

		Correlation coefficient, r	p value
Experience of work	Percentage of glottic opening score	0.069	0.662 <sup>a</sup>
	Intubation time	-0.159 <sup>b</sup>	0.123 <sup>b</sup>
	Ease-of-use score	0.002	0.985 <sup>a</sup>

\*rs, Spearman's rank-order correlation coefficient  
<sup>a</sup> Pearson's product-moment correlation  
<sup>b</sup> Spearman's rank-order correlation

Success Rate of Intubation

Values are proportion (%).

	Flexible Tip Bougie	Portex Single-use Introducer	Frova Intubating Introducer	p value	Adjusted p values for Between-device Differences
Success	42/42	21/42	33/42	< 0.001 <sup>a</sup>	A vs. B: < 0.001 <sup>b</sup>
Rate of Intubation	(100%)	(50%)	(78.6%)		A vs. C: = 0.003 <sup>b</sup> B vs. C: = 0.002 <sup>b</sup>

<sup>a</sup>Cochran's Q test  
<sup>b</sup>Pairwise McNemar test (post-hoc analysis)

Ease-of-use Score

Values are mean (standard deviation).

	Flexible Tip Bougie (A)	Portex Single-use Introducer (B)	Frova Intubating Introducer (C)	p value	p values for Pairwise Comparisons*
Ease-of-use Score, (SD)	16.67 (21.86)	69.64 (32.45)	50.59 (29.98)	< 0.001 <sup>a</sup>	A vs. B: < 0.001 <sup>b</sup> A vs. C: < 0.001 <sup>b</sup> B vs. C: = 0.008 <sup>b</sup>

SD: standard deviation; Ease-of-use score: 0 being "very easy" to 100 being "very difficult"  
\*Adjustment for multiple comparisons: Bonferroni  
<sup>a</sup> Repeated measures Analysis of Variance (ANOVA) with sphericity assumed  
<sup>b</sup> Paired t-test (post-hoc analysis)

## CONCLUSIONS

In this simulation study, **Flexible Tip bougie:**

- More efficient in achieving successful endotracheal intubation
- Easier to use

Type of bougie does not have significant effect on intubation time.

Experience of work is not significantly related to the POGO score, intubation time and ease-of-use score.

## ACKNOWLEDGEMENTS

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