McGrath MAC versus Macintosh for perioperative endotracheal intubation: A re-analysis of a recent Cochrane review

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Introduction

- Cochrane evidence demonstrates that video laryngoscopy (VL) is better than direct laryngoscopy (DL) for successful tracheal intubation.¹
- Multiple devices are available, meaning that identifying a particular device based on available • evidence can be challenging.
- We reassessed the Cochrane meta-analysis to specifically compare McGrath MAC (Figure 1) versus Macintosh DL.

Methods

- We reviewed the randomized controlled trials (RCTs) included in the Cochrane review, selecting only RCTs that used McGrath MAC VL compared with Macintosh DL in perioperative care.
- Outcomes assessed were:
 - First-pass success (FPS)
 - Failed intubation
 - Esophageal intubation
 - Dental injury
 - Hypoxemia
- Meta-analysis was performed using RevMan 5.4.²
- Failed and esophageal intubations are rare events and were therefore assessed using the Peto odds ratio (OR).³
- The risk ratio (RR) was used for FPS and we present it alongside the original result from the Cochrane review where all Macintosh-style VL devices were grouped together.¹



Figure 1. McGrath MAC Next Generation video laryngoscope

with Macintosh

Outcome

A. Firs

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Total (95 Total ever Heteroa Test for overa

B. Failed intubation for McGrath MAC vs. Macintosh

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Anandraia 202 Bakshi 2019 Cakir 2019 Kaur 2020 Kido 2015 Ruetzler 2020 Shippey 2013 Yoo 2018

Total (95% CI) Total events :

C. Esophageal intubation for McGrath MAC vs. Macintosh

Colak 2019 Ing 2017 Thion 2018 Yoo 2018

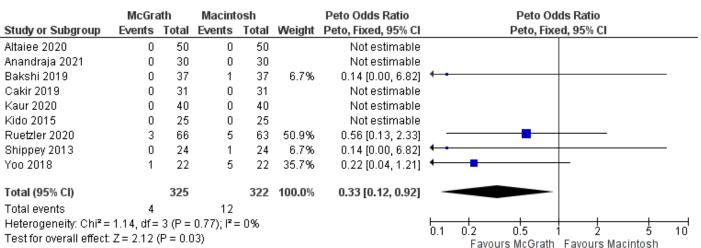
Total (95% CI) Total events

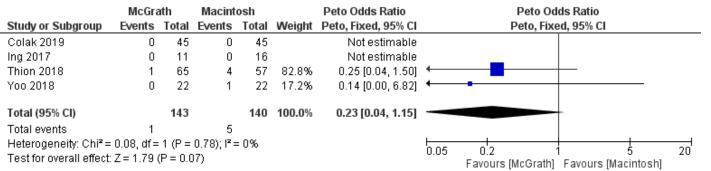
Figure 2. Meta-analysis outcomes including studies comparing McGrath MAC VL with Macintosh DL for (A) first-pass success, (B) failed intubation, and (C) esophageal intubations. The diamonds in each forest plot represent the total estimate where the mid points are the averages and the extremities indicate the confidence intervals.

 Table 1. Re-analysis of Cochrane review comparing only McGrath MAC

Outcome	Re-analysis RR or OR [95% CI]	Cochrane review* RR [95% CI]					
First pass success, RR	1.07 [1.01, 1.15]	1.05 [1.02, 1.09]					
Failed intubation, OR	0.33 [0.12, 0.92]	Not reported as OR					
Esophageal intubation, OR	0.23 [0.04, 1.15]	Not reported as OR					
*Hansel 2022 ¹ ; OR, Petos odds ratio; RR, risk ratio.							

rst-pass success for McGrath MAC vs. Macintosh								
	McGra	ath	Macint	osh		Risk Ratio	Risk Ratio	
r Subgroup	Events	Total	Events	Total	Weight	M-H, Random, 95% Cl	M-H, Random, 95% Cl	
2020	50	50	50	50	14.0%	1.00 [0.96, 1.04]	+	
018	35	40	34	40	7.0%	1.03 [0.86, 1.23]	_ + _	
2019	36	37	35	37	11.2%	1.03 [0.94, 1.13]	+	
020	31	31	30	31	11.5%	1.03 [0.95, 1.13]	+	
2019	44	45	41	45	10.8%	1.07 [0.97, 1.19]	+	
7	9	11	15	16	3.4%	0.87 [0.64, 1.19]		
)20	39	40	35	40	9.3%	1.11 [0.98, 1.27]		
)15	24	25	16	25	3.4%	1.50 [1.11, 2.03]		
2017	1019	1084	896	1087	14.2%	1.14 [1.11, 1.18]	•	
r 2020	61	66	56	63	10.2%	1.04 [0.93, 1.16]		
y 2013	24	24	18	24	4.9%	1.32 [1.04, 1.68]		
95% CI)		1453		1458	100.0%	1.07 [1.01, 1.15]	◆	
/ents	1372		1226					
geneity: Tau ² = 0.01; Chi ² = 53.73, df = 10 (P < 0.00001); l ² = 81% r overall effect: Z = 2.20 (P = 0.03)								
overall ellect.	2.201	(F – 0.0	5)				Favours Macintosh Favours McGrath	





Results

- McGrath series 3 or 5, and one was retracted.
- Figure 2A).
- (Table 1, Figure 2B & C).
- To put this into context a hospital with:

Conclusion

- common.
- analysis would be useful.

References

- undergoing tracheal intubation. The Cochrane database of systematic reviews, 4(4), CD011136.
- online-learning/core-software/revman/.
- Collaboration, version 5.1.0, Chapter 9.4.4.2.

Disclosures

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Compared with the 21 studies originally included in the Cochrane review, we excluded seven of these RCTs because two used a mix of VLs, two were not for perioperative care, two used

We included 14 RCTs with 3,137 patients (1,570 using McGrath MAC).

FPS was significantly improved using McGrath MAC in comparison to Macintosh (RR 1.07, 95% CI 1.01 - 1.15) and the RR was similar to that reported in the Cochrane review (Table 1,

In addition, the use of McGrath MAC led to a **significant reduction in failed intubations** (OR 0.33, 95% CI 0.12 - 0.92) and a non-significant reduction in oesophageal intubations

• ...an FPS of 85% with Macintosh, could expect FPS to increase to 91%.

• ...a failed intubation rate of 3% with Macintosh, could expect this to drop to 1%.

There were insufficient data to report results on dental trauma or hypoxemia.

In a leave-one-out analysis, results were not substantially impacted by any one study.

In keeping with the findings of the 2022 Cochrane review, in perioperative care, **FPS is** higher with McGrath MAC in comparison to Macintosh DL and failed intubation is less

To determine the clinical significance, real-world data, a larger RCT, or a network meta-

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US and SS are employees and RS is the owner of Core Scientific, who received consultancy fees for this research. AM is a consustant anaesthetist in Edinburgh and has received honoraria from medtronic for lectures on videolaryngoscopy.