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Videolaryngoscopy in Trauma

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Direct Laryngoscopy

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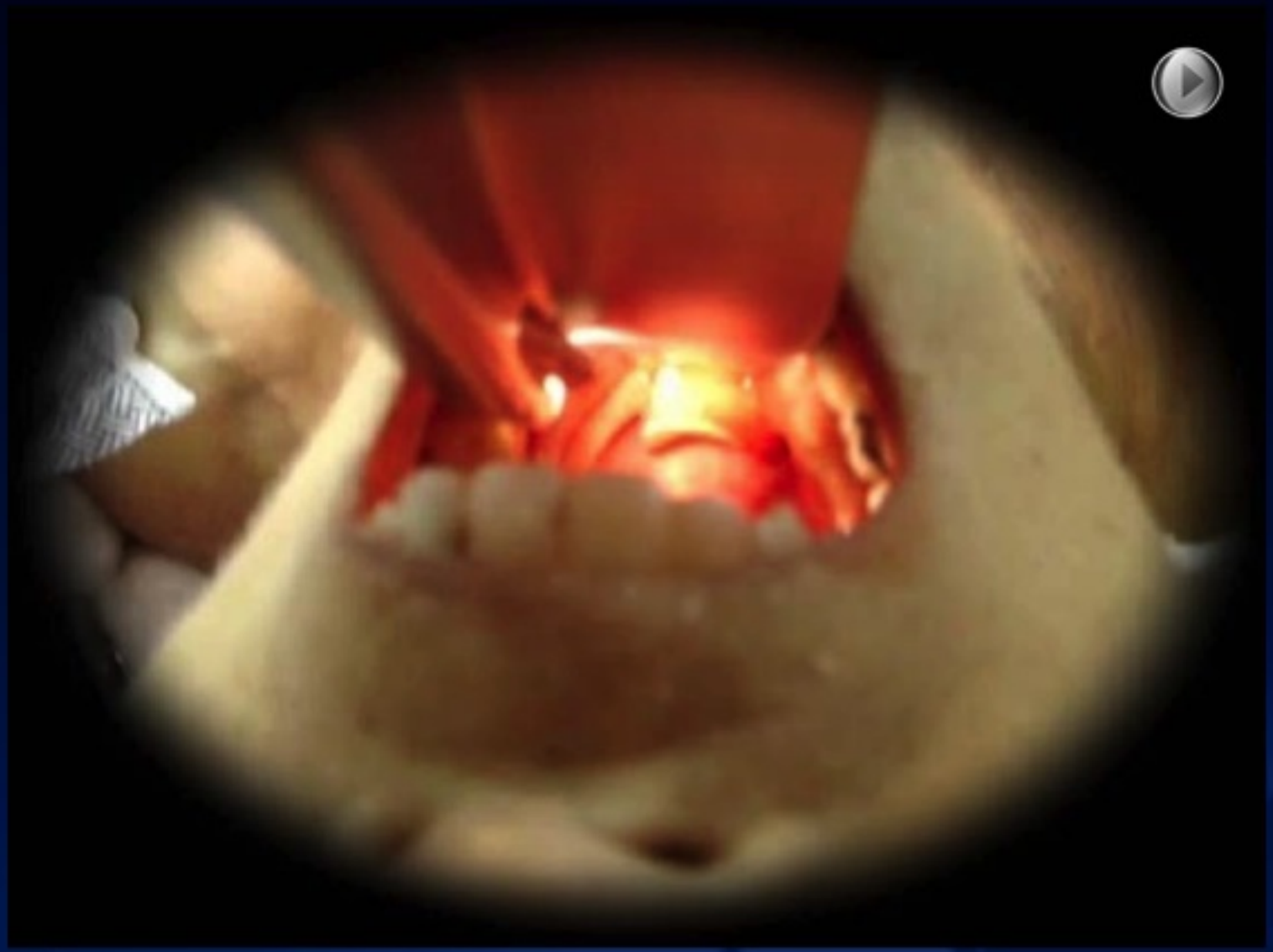
Direct Laryngoscopy



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Direct Laryngoscopy

- Challenging in Trauma patients
  - Need for Rapid intubation
  - Potential for cervical trauma
  - Cervical immobilization
  - Facial fractures
  - Blood or vomitus in the airway

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Direct Laryngoscopy

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YOU WANT WHAT???

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I INTUBATE, THEREFORE I AM


AIRWAY MAN
ROCKS!

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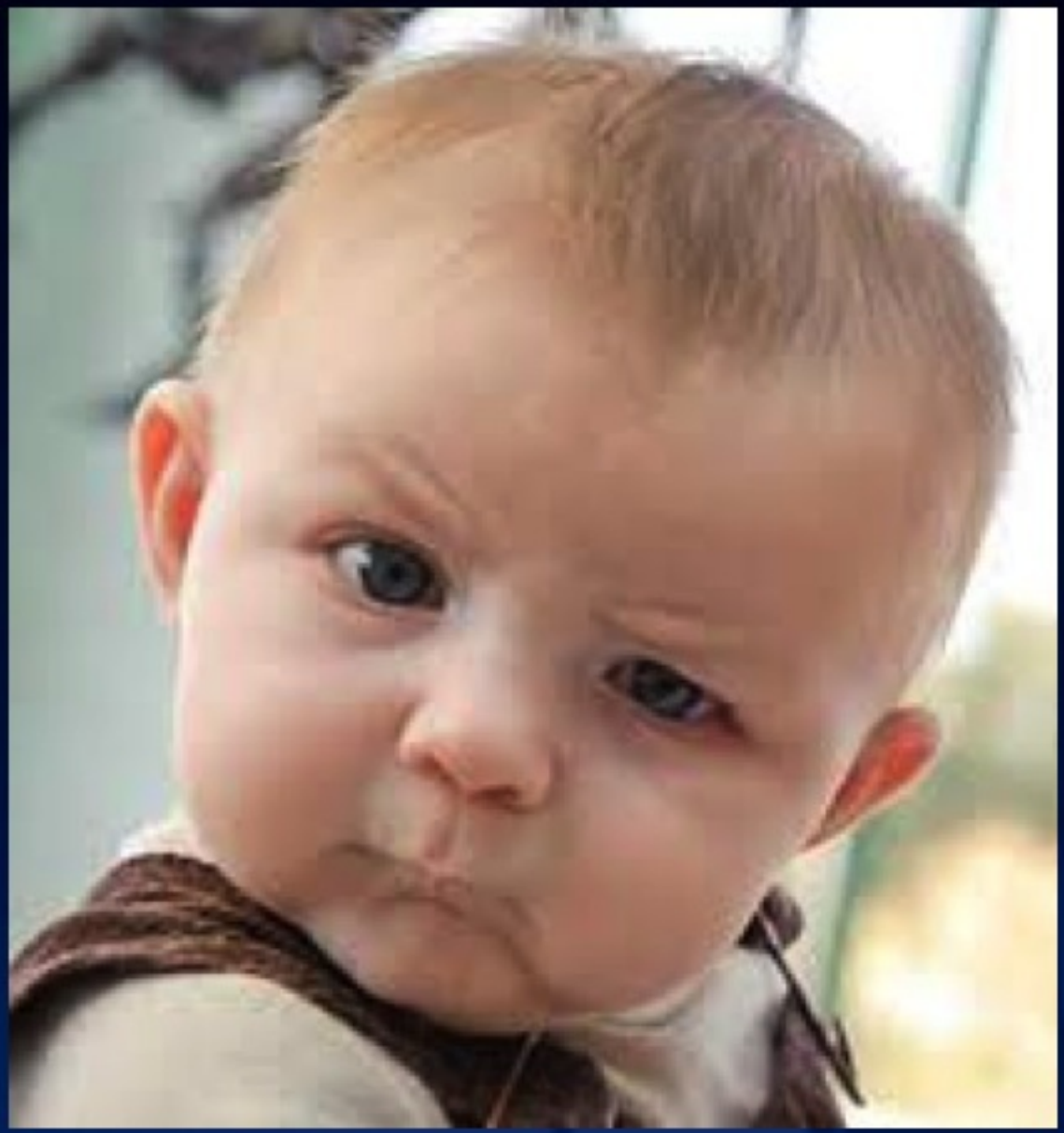

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Original Contributions

TRACHEAL INTUBATION IN THE EMERGENCY DEPARTMENT: A COMPARISON OF GLIDESCOPE® VIDEO LARYNGOSCOPY TO DIRECT LARYNGOSCOPY IN 822 INTUBATIONS

John C. Sakles, MD, Jarrod M. Mosier, MD, Stephen Chiu, BA, and Samuel M. Keim, MD, MS

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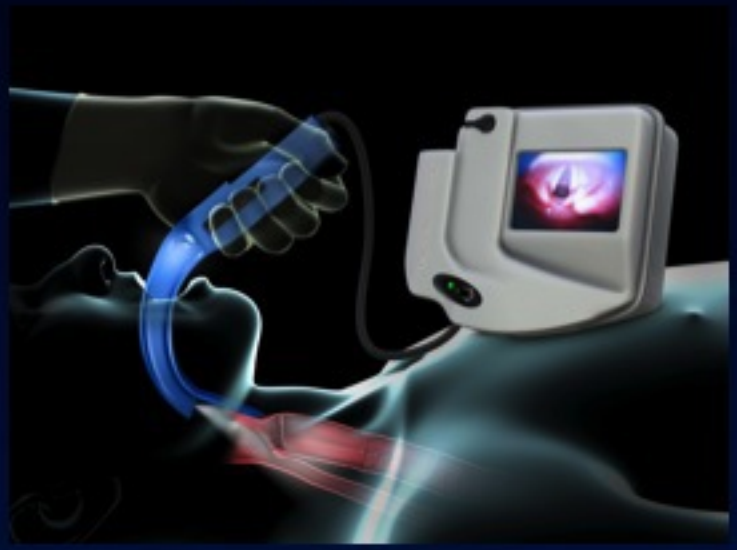
Video laryngoscopy

- Magnification of larynx
- Improves laryngeal view
- Less cervical motion
- Multiple simultaneous viewers



Rai, MR et al *Anaesthesia*. 2005
Serocki G, et al *Eur J Anaesthesiol* . 2010

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A Comparison Of Direct Laryngoscopy To Videolaryngoscopy For Trauma Patients In The ED

Michailidou M, Mosier JM, Friese RS, Rhee P, Sakles J, O' Keeffe T

Methods

- Prospectively observational study
  - –All trauma patients
  - –Jan 1 2008 to June 2011
  - –Type of devices
    - Attending preference
- Successful intubation
  - –First attempt

Methods

Airway CQI Form

___/___/___
Date

Attending: _____
Resident: _____

Age: _____

Sex: ☐ M ☐ F

☐ Trauma ----> Mechanism _____
Trauma Dx _____
☐ Medical ----> Diagnosis _____

Was there a failed intubation attempt *PREHOSPITAL*? ☐ No ☐ Yes

IF *YES*, then: ☐ BVM ☐ Combitube ☐ LMA ☐ Cric ☐ Esophageal Intubation

---

Reason for Intubation:
- ☐ Respiratory Failure
- ☐ Airway Protection
- ☐ Patient Control
- ☐ Cardiac Arrest
- ☐ Hypoxia

Method Used:
- ☐ RSI
- ☐ Oral (Sedation Only)
- ☐ Oral (NO Meds)
- ☐ Nasal

Drugs Used:
- ☐ Succinylcholine
- ☐ Rocuronium
- ☐ Etomidate ☐ Ketamine
- ☐ Atropine ☐ Lidocaine
- ☐ Other _____

Reason for Initial Device Selection (Check ONE):
☐ Standard Device ☐ Difficult Airway Suspected ☐ Educational Purposes

---

Difficult Airway Predictors (check ALL that Apply):
- ☐ Blood in Airway
- ☐ Vomit in Airway
- ☐ Cervical Immobility
- ☐ Facial/Neck Trauma
- ☐ Airway Edema
- ☐ Small Mandible
- ☐ Obesity
- ☐ Large Tongue
- ☐ Short Neck
- ☐ Other _____
- ☐ **NONE**

Intubation Attempts *See other side for device codes*
***If more than 3 attempts, please attach an additional airway form**

Attempt #1	**Attempt #2**	**Attempt #3**
Intubator: _____	**Intubator:** _____	**Intubator:** _____
Device: _____	**Device:** _____	**Device:** _____
Type/Size: _____	**Type/Size:** _____	**Type/Size:** _____
Outcome (Check ONE)	**Outcome** (Check ONE)	**Outcome** (Check ONE)
☐ **SUCCESS!**	☐ **SUCCESS!**	☐ **SUCCESS!**
If Failed Attempt:	*If Failed Attempt:*	*If Failed Attempt:*
☐ Esophageal Intubation	☐ Esophageal Intubation	☐ Esophageal Intubation
☐ Can't See Cords	☐ Can't See Cords	☐ Can't See Cords
☐ Can't Direct Tube	☐ Can't Direct Tube	☐ Can't Direct Tube
☐ Equipment Failure	☐ Equipment Failure	☐ Equipment Failure
Complication(s) (ALL that apply)	**Complication(s)** (ALL that apply)	**Complication(s)** (ALL that apply)
☐ **NONE**	☐ **NONE**	☐ **NONE**
☐ Desaturation	☐ Desaturation	☐ Desaturation
☐ Mainstem	☐ Mainstem	☐ Mainstem
☐ Hypotension	☐ Hypotension	☐ Hypotension
☐ Aspiration	☐ Aspiration	☐ Aspiration
☐ Airway/Dental Trauma	☐ Airway/Dental Trauma	☐ Airway/Dental Trauma
☐ Other _____	☐ Other _____	☐ Other _____

Starting Sat: _____% (PRIOR to intubation)
Lowest Sat: _____% (DURING intubation)

Grade of Laryngoscopic View

DL View (Att #): _____ _____ _____ _____
VL View (Att #): _____ _____ _____ _____

Stylet Used: ☐ Standard ☐ Saturn ☐ None **Bougie Used?** ☐ Yes ☐ No

GVL Direct/CMAC Questions Only: ☐ Used as DL ☐ DL to VL Switch ☐ Used as VL ☐ VL to DL Switch

---

Clarity of Optical View
(Videoscopes, Fiberoptics, and Optically-Assisted Devices)
Please label each attempt

Lens Contamination
- ☐ **None**
- ☐ **Mild** (Contaminated, cords easily visible)
- ☐ **Moderate** (Moderate Contamination, cords still visible)
- ☐ **Severe** (Contaminated, cords NOT visible)

Other Questions:
Video Recorded? ☐ Y ☐ N

Please provide any important comments regarding the intubation:

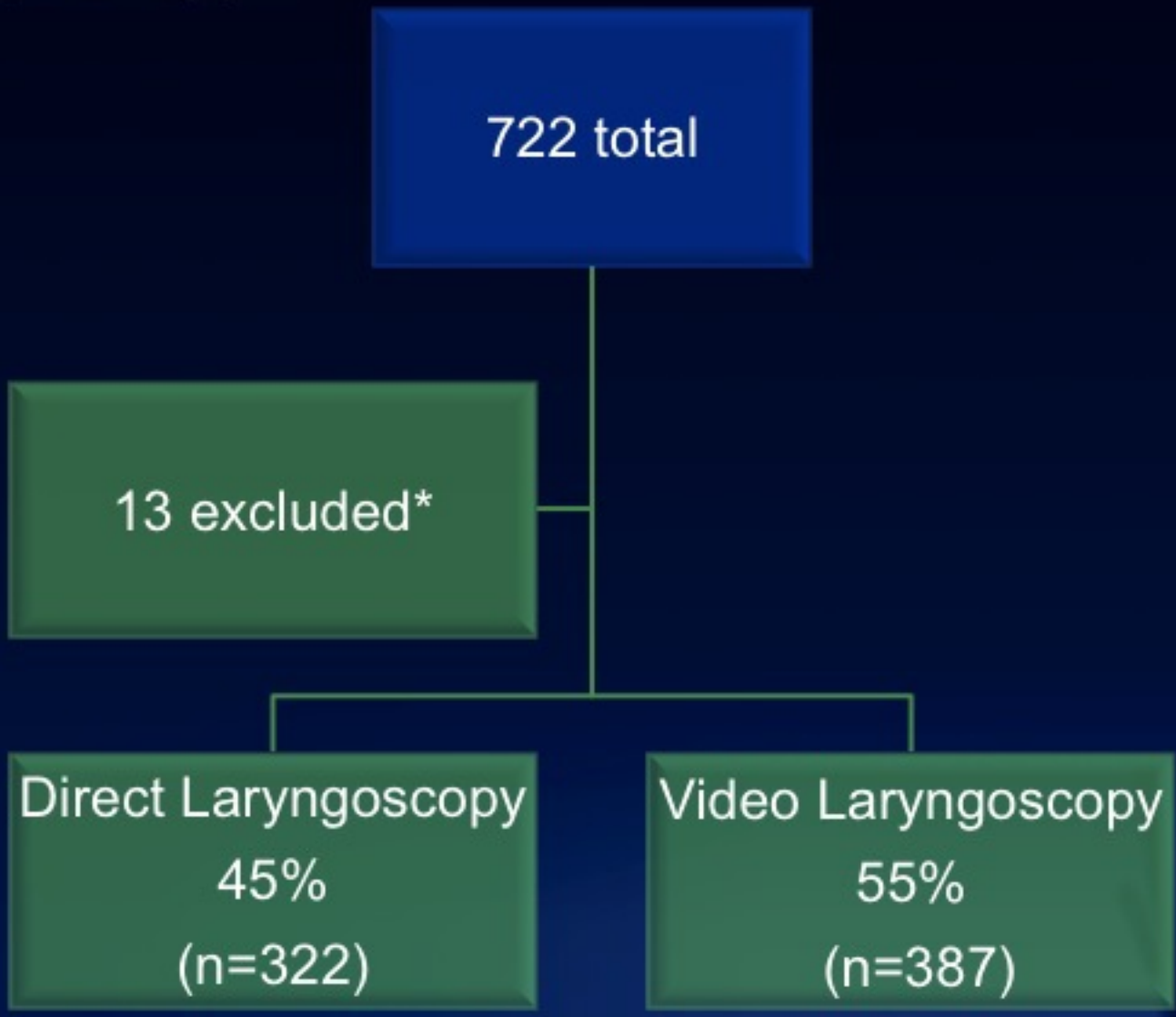
_____
_____
_____
_____
_____
_____

See Other Side

See Other Side

Methods

- Data collection sheet CQI
  - Indications for use of each device
  - Difficult airway predictors
  - Intubation outcome
  - Reason for failure
  - Grade of laryngoscopic view
  - Level of intubator



* 7 fiberoptic
2 no device
1 TrachLight,
1 primary
1 cricothyroidotomy
2 tube exchanger

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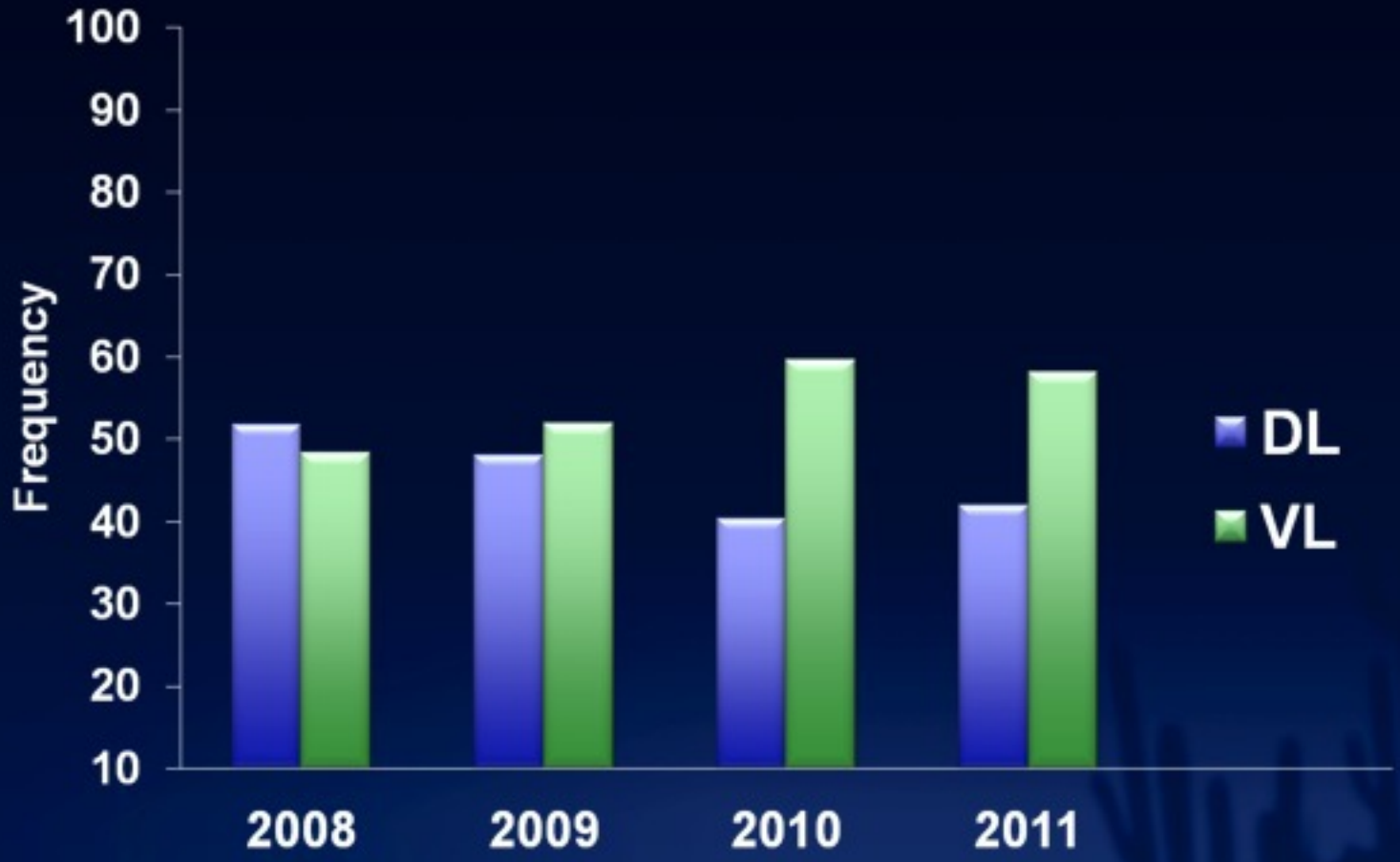
Increasing VL use over time



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Demographics/Clinical Data

	DL (n=332)	VL (n=387)	p-value
Age	37 ± 22	39 ± 19	0.21
Gender (% male)	75	77	0.45
Blunt mechanism (%)	81	83	0.46
SBP < 90 mmHg	**9.9**	**15.8**	***0.02***
ISS	**21 ± 15**	**24 ± 15**	***0.02***
Head AIS	3.7 ± 1.3	3.8 ± 1.2	0.39
Face AIS	1.8 ± 0.8	2 ± 0.9	0.15
DAP (n)	**1.6 ± 1.5**	**2.1 ± 1.4**	***<0.001***
Median PGY level	2	2	*N/A*

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First Attempt Success Rates

	n	DL (%)	VL(%)	P value
All patients	709	83	88	***0.05***
Blunt trauma	582	82	88	**0.08**
C-spine immobilization	483	80	87	***0.05***
≥ 5 DAPs	31	54	89	***0.04***

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Intubation failure

Intubation failure (%)	DL N=85	VL N=87
Inability to visualize cords	64.7	46
Failure to direct ETT tube	18.8	37.9
Esophageal intubation	10.6	6.9
Equipment failure	2.4	4.6

Independent predictors of initial intubation failure

Odds ratio (95% CI)

	DL	VL
Blood in airway	NS	4.4 (2.0-9.9)
Small mandible	5.6 (1.4-22)	7.5 (2.0-29)

Summary

- VL was overall more successful than DL
- VL was more successful in difficult airways
- Clear indications exist for and against VL

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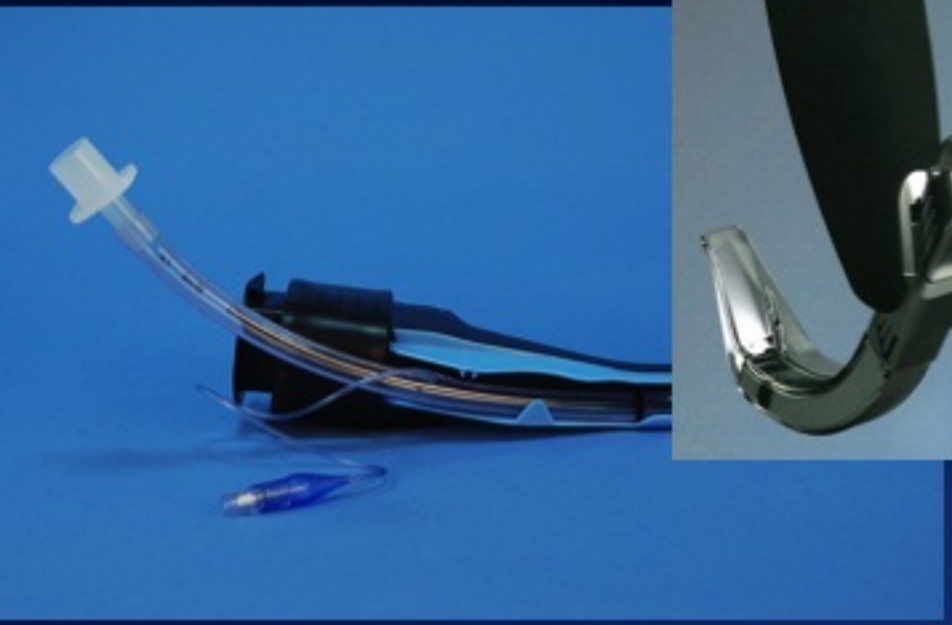
Video laryngoscopes



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Video laryngoscopes

CMAC

Glidescope (GVL)

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The CMAC Videolaryngoscope is Superior To The Glidescope For The Intubation Of Trauma Patients

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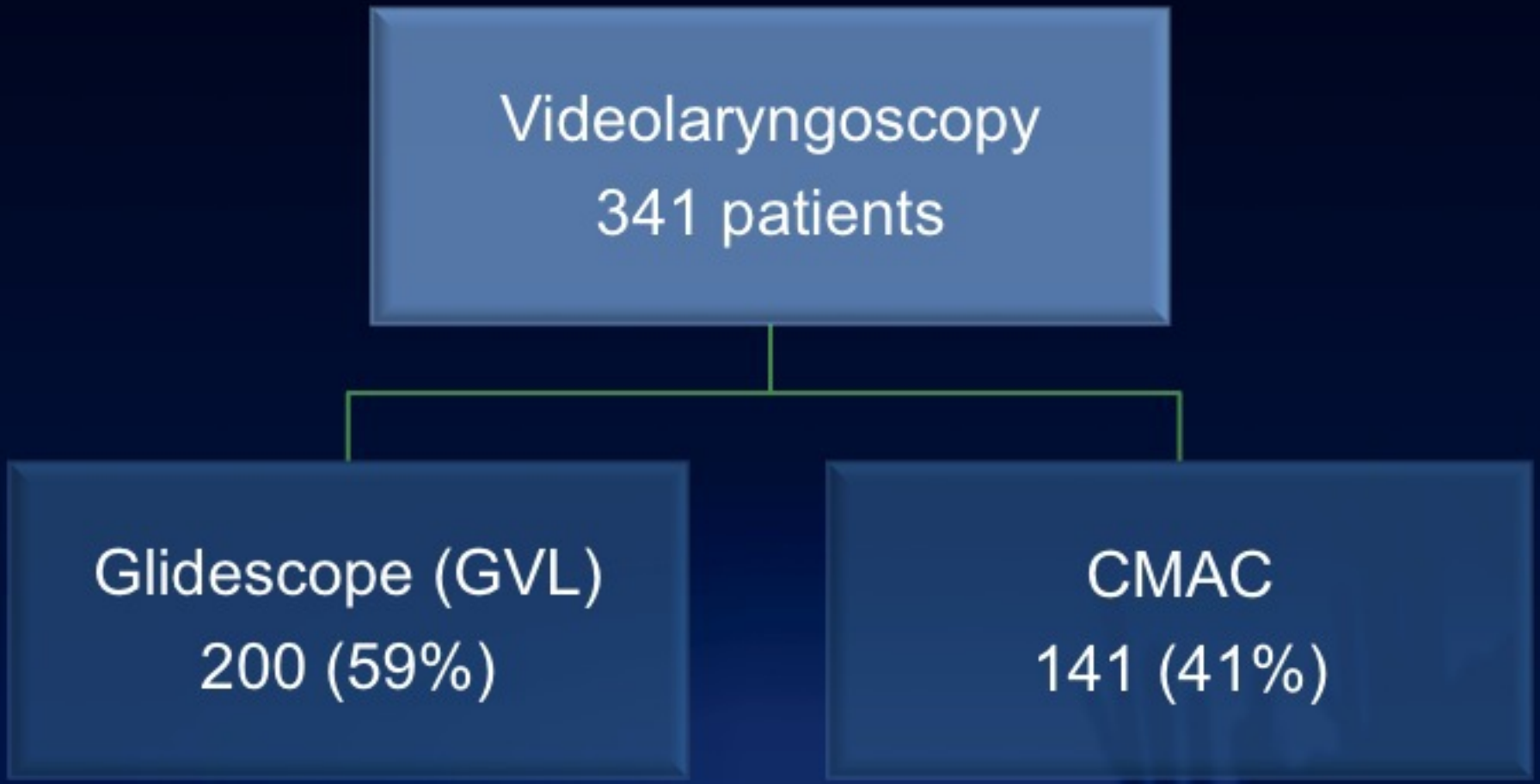
Results



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Success rates

	N	CMAC (%)	GVL (%)	DL (%)	P value
All patients	580	94.3%	87.0%	84.1%	**0.01**
Blunt trauma	470	95.3%	87.0%	84.0%	**0.02**
C-spine immobilization	386	95.5%	86.8%	82.6%	**0.02**
Success at 2nd attempt	97	86.7%	65.5%	44.7%	**0.002**
Esophageal Intubation	22	2.8%	5.0%	3.0%	**NS**

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Results

Intubation failure (%)	CMAC N=141	GVL N=200	DL N=239	P value
Inability to visualize cords	14%	9%	16%	0.09
Failure to direct ETT tube	7%	11%	2.5%	0.002
Esophageal intubation	2.1%	2.5%	4.2%	0.45
Equipment failure	1.4%	0.5%	0.8%	0.66

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Glidescope

- Glidescope did not outperform DL
  - (87% vs. 84%, p=0.4)

- Differences in Glidescope performance
  - Ranger 100% (N=11)
  - Standard GVL 86.9% (N=148)
  - Cobalt GVL 50% (N=14)

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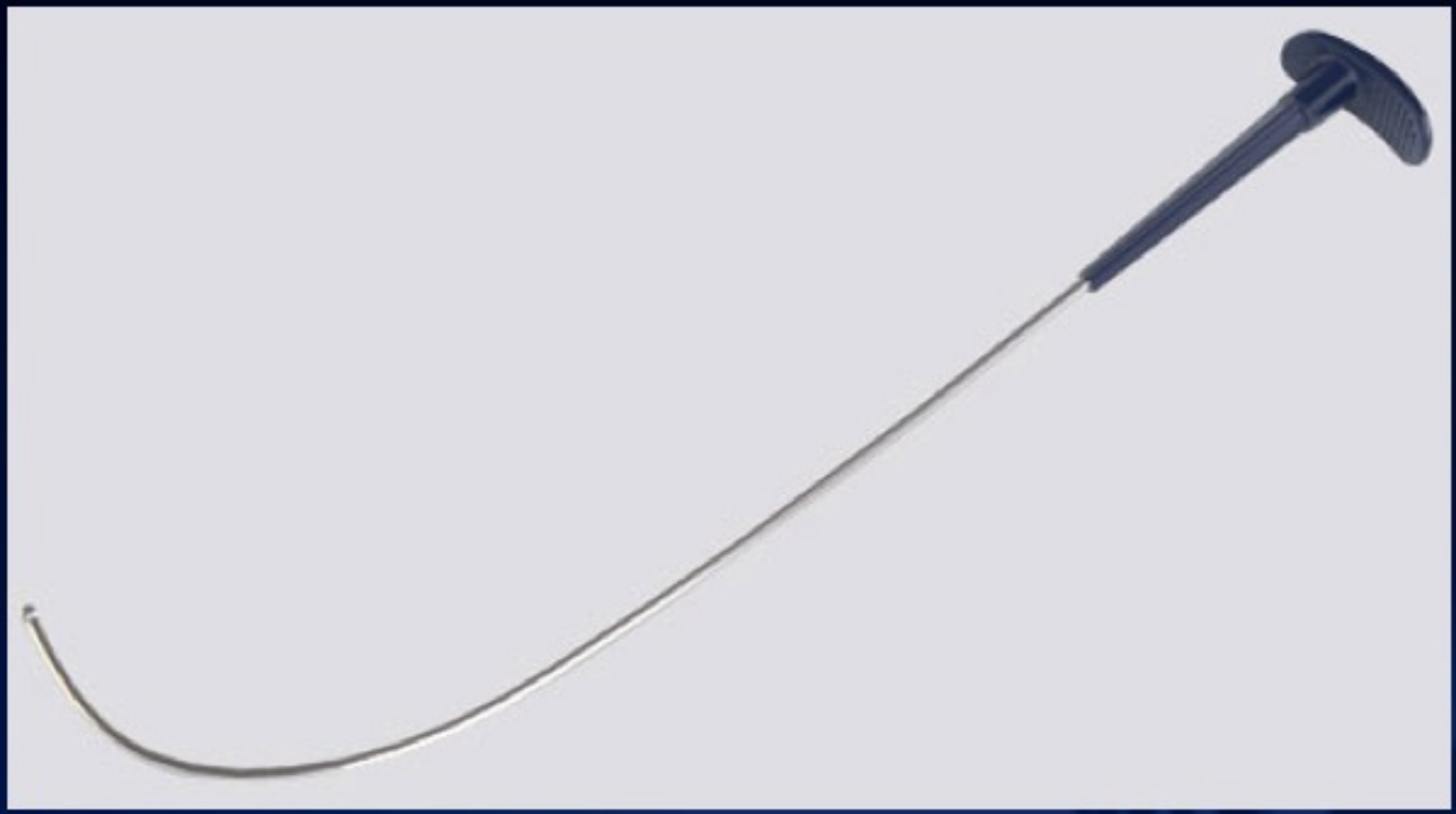
Stylet



Mosier *et al. Critical Care* 2013, **17**:R237
http://ccforum.com/content/17/5/R237

Table 3 First attempt and ultimate success rates by level of training

Training level	First attempt success - DL	First attempt success - VL	*P*-value	Ultimate success- DL	Ultimate success- VL	*P*-value
Residents (PGY 1 to 3)	59% (16/27)	73% (72/98)	0.16	93% (25/27)	97% (95/98)	0.29
Fellows/Attendings (PGY 4+)	62% (18/29)	82% (112/136)	0.02	93% (26/28)	99% (134/136)	0.03

Table 3: Compares the first attempt and ultimate success rates between VL and DL by residents and fellows/attendings. DL, direct laryngoscope/laryngoscopy; PGY, post-graduate year; VL, video laryngoscope/laryngoscopy.

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Summary

- VL was more successful than DL
  - especially in difficult airways
- The type of VL appears to be a factor
  - CMAC - higher success rate than GVL

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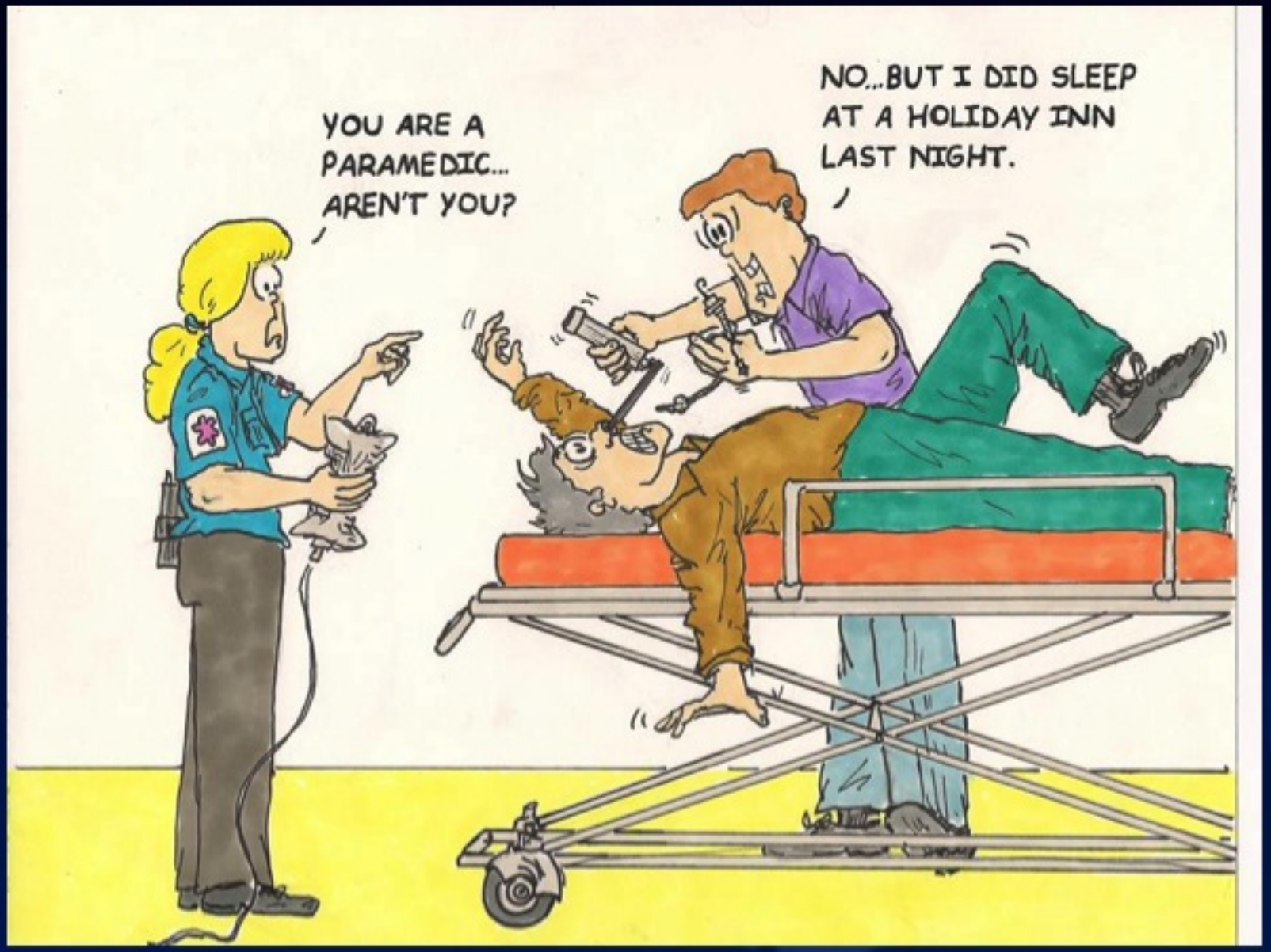
End of story?



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Limitations

- Not randomized
- Operator bias
- Small numbers of CMAC intubations
- Single institution

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But what about training?

- Not everywhere will have a videolaryngoscope
- Expensive
- They can malfunction
- Trainees need to know how to use DL
- Most of the studies are on manikins

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ORIGINAL ARTICLE

Effect of video laryngoscopy on trauma patient survival: A randomized controlled trial

Dale J. Yeatts, MD, Richard P. Dutton, MD, MBA, Peter F. Hu, MS, Yu-Wei W. Chang, MS, Clayton H. Brown, PhD, Hegang Chen, PhD, Thomas E. Grissom, MD, Joseph A. Kufera, MA, *and* **Thomas M. Scalea, MD,** *Baltimore, Maryland*

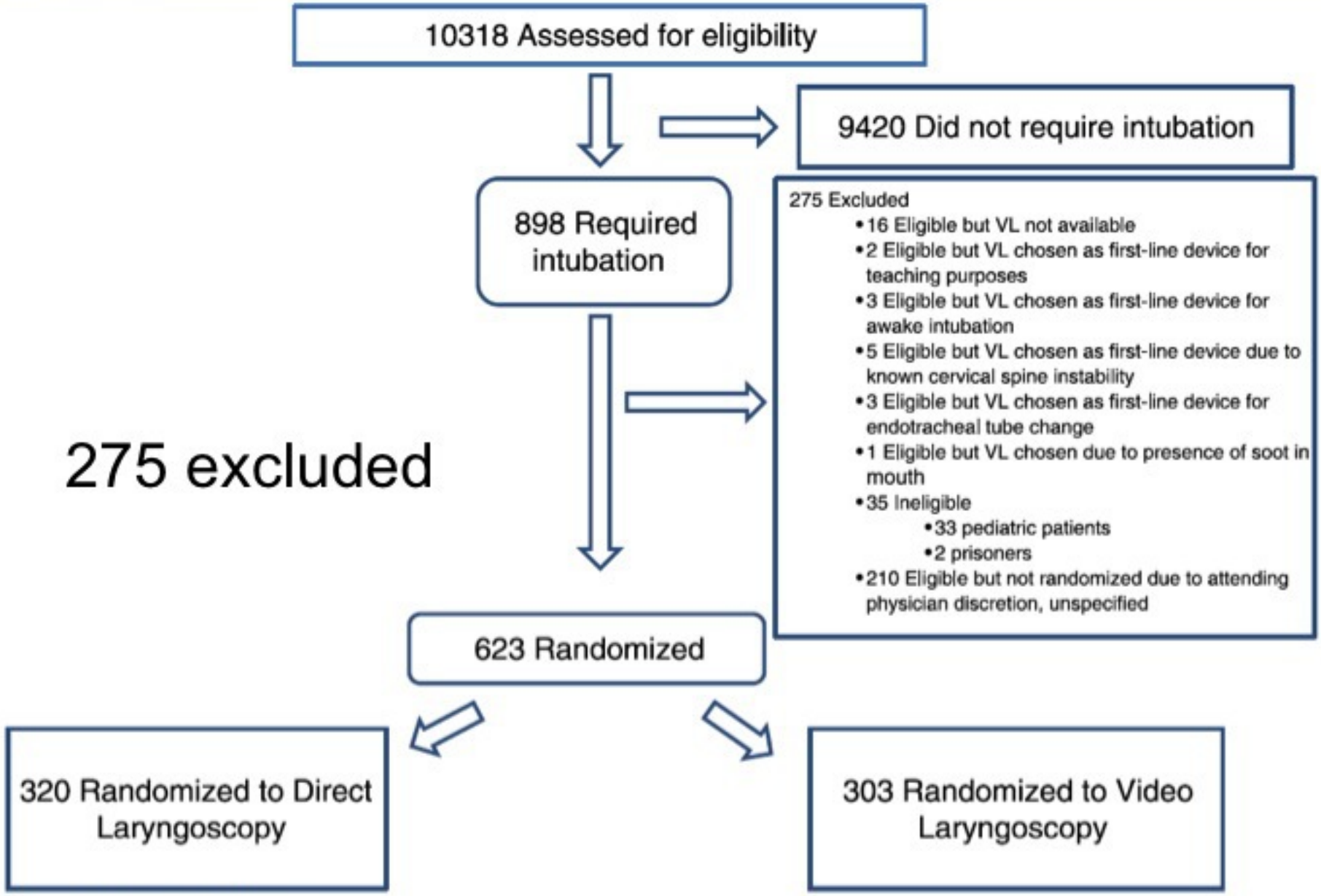


Figure 2. Patient flow diagram.

TABLE 2. First-Pass Success Rate for Intubation by Experience Level and Specialty

	First-Pass Success, %	n
Specialty		
Anesthesia	68.6	51
Critical care medicine	82.6	86
Emergency medicine	83.6	323
Surgery	66.7	3
Experience level		
PGY 2	83.3	270
PGY 3	77.6	49
PGY 4	84.1	44
PGY 5	100.0	20
PGY 6	74.1	27
Attending	66.7	18
Certified registered nurse anesthetist	85.7	7
Student registered nurse anesthetist	73.9	23

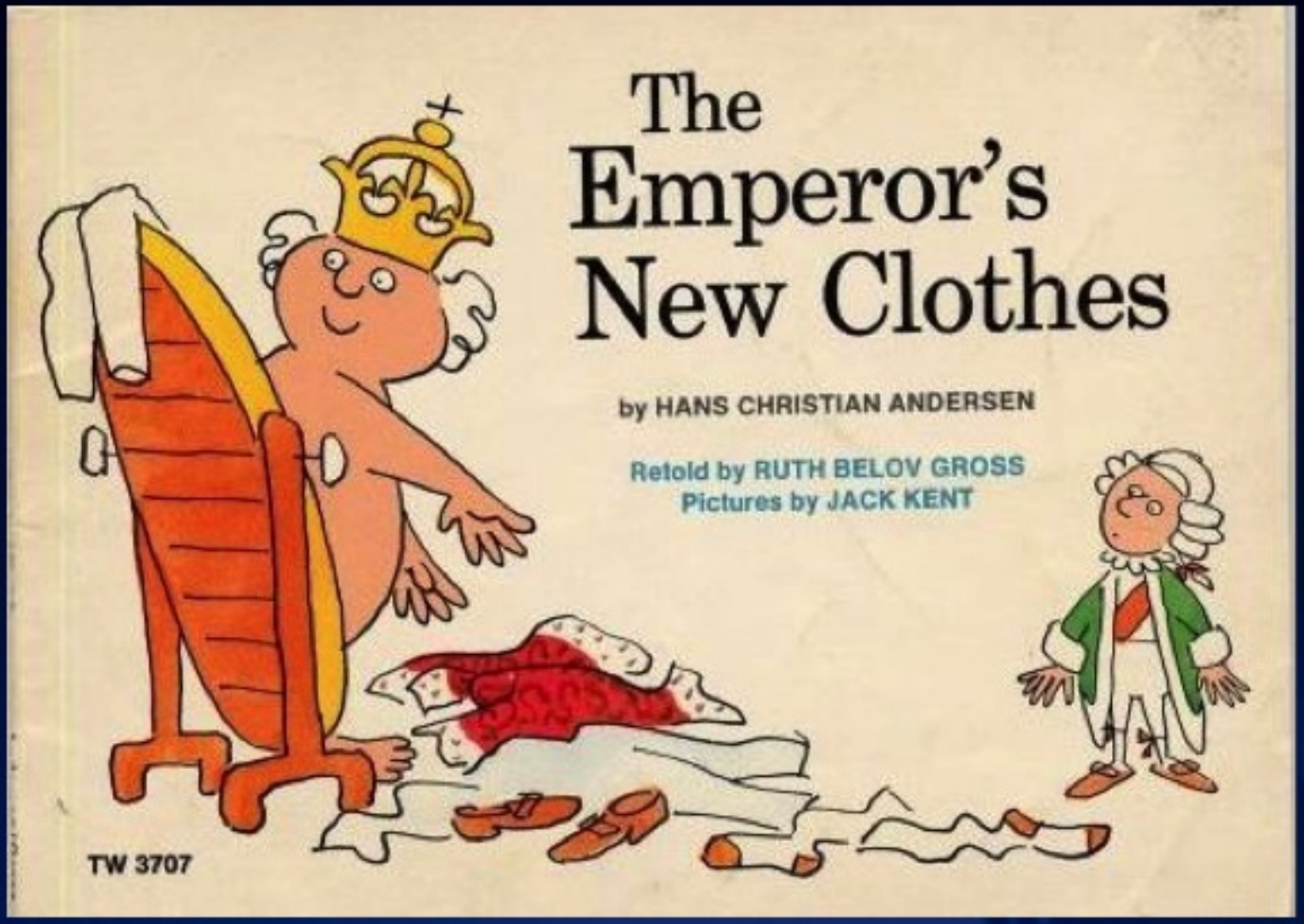
Results

- No difference in survival
- VL had longer intubation times
- No differences in first-pass success
- Head injury patient subgroup
  - Greater incidence of hypoxia
  - Higher mortality

No meaningful differences between the two groups were found in the first-pass success rates (81% for DL and 80% for GVL, $p = 0.46$).

Of the 336 patients for whom Mallampati scores were recorded, 178 were randomized to intubation with the DL and 158 were randomized to intubation with the GlideScope.

. Among patients with anticipated "difficult" airways, there was no difference between cohorts regarding number of intubation attempts or intubation attempt duration.


The Emperor's New Clothes
by HANS CHRISTIAN ANDERSEN
Retold by RUTH BELOV GROSS
Pictures by JACK KENT
TW 3707

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Take home messages

- VL is useful in SPECIFIC situations
- Better for the infrequent intubator
- Will likely become standard of care

- BUT
  - Be familiar with and practice with DL

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A final word about job security

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Questions?