Comparison between Glidescope® Groove and standard videolaryngoscope: a mannequin study in novice providers

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Disclosure

No conflicts of interest
Background
Endotracheal intubation

Critically Ill Patients

High risk of complications

High risk of difficult airway

Multiple intubations required

Novice Providers

Endotracheal Intubation

Elective OR

Low risk of complications

Intensive Care Med 2008; 34(10): 1835-42
Direct laryngoscopy

Macintosh Direct Laryngoscope

X-ray image of Direct Laryngoscope
Videolaryngoscopy

Glidescope® Videolaryngoscope

Improved Glottic View

Camera View of Intubation using the GlideScope Videolaryngoscope
Problem #1: Steering
Problem #2: Intubation axis

Direct laryngoscopy

Videolaryngoscopy
Glidescope® Groove

- Digital Video camera
- Blade shape of videolaryngoscope

Central Channel
- Endotracheal tube sits in the channel during intubation
Compared to the standard videolaryngoscope, would novice providers intubate an airway mannequin faster with the Glidescope® Groove?
Objectives

- Primary objective:
  - Times-to-intubate

- Secondary objective:
  - Glottic view (Cormack-Lehane grade)
  - Number of intubation attempts
  - Participants’ perspectives on devices’ ease of use
Methods
Participant Criteria

- Population: 2\textsuperscript{nd}-4\textsuperscript{th} year medical students (University of British Columbia)

- Exclusion criteria:
  
  *Participants must NOT have:*
  
  - Performed >10 clinical intubations in last 3 months
  - Have received any mannequin intubation training using a videolaryngoscopy in the past 3 months
Study Procedure

Instructional video
Practice with all devices
Timed Trials: DL (2x)
Timed Trials: GVL, GG (random order; 2x)
Questionnaire (Subjective assessment)
Results
Participant Demographics

- Recruited 34 medical students
- Level of education
  - Year 2: 27 / 34 (79%)
  - Year 3: 3 / 34 (9%)
  - Year 4: 4 / 34 (12%)
- 16 / 34 (47%) female
Intubation times

<table>
<thead>
<tr>
<th>Method</th>
<th>Median</th>
<th>IQR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct Laryngoscope</td>
<td>17.4 s</td>
<td>13.2 ~ 22.1 s</td>
</tr>
<tr>
<td>Glidescope Videolaryngoscope</td>
<td>17.7 s</td>
<td>14.9 ~ 21.0 s</td>
</tr>
<tr>
<td>Glidescope Groove</td>
<td>21.7 s</td>
<td>15.4 ~ 37.0 s</td>
</tr>
</tbody>
</table>

P = 0.45
## Glottic views

<table>
<thead>
<tr>
<th>Glottic views</th>
<th>CL Grade</th>
<th>Direct Laryngoscope</th>
<th>Glidescope® videolaryngoscope</th>
<th>Glidescope® Groove</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>25 / 34 (74%)</td>
<td>32 / 34 (94%)</td>
<td>34 / 34 (100%)</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>9 / 34 (26%)</td>
<td>2 / 34 (6%)</td>
<td>0</td>
</tr>
</tbody>
</table>

*P-values:*
- \( P=0.01 \)
- \( P=0.11 \)
- \( P=1.0 \)
Intubation attempts

Participants (34)

Intubation Attempts

P=0.38

P<0.001

P<0.001
“Considering the Glidescope Groove and the original Glidescope, please answer the following...”

Blade insertion

Obtaining Glottic View

Bringing ETT to glottis

Passing ETT through glottis

Overall Ease of Use

Very Hard   Hard   Neutral   Easy   Very Easy

ETT = Endotracheal tube
“Overall, which device is easier to use, the Glidescope Groove or the original Glidescope?”
Conclusions
Conclusions

- Direct laryngoscope, Glidescope® videolaryngoscope and Glidescope® Groove had similar intubation times in novice providers.

- Glidescope® Groove required more intubation attempts when compared to direct and videolaryngoscopy, despite excellent glottic views.

- Participants found the Glidescope® Groove to be harder to use compared to the standard videolaryngoscope.
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- Ms. Winnie Yung
Questions

(and hopefully answers)
Glidescope® Groove

• Similar to standard videolaryngoscope:
  • digital video camera
  • light-emitting diodes

Central Channel: endotracheal tube sits in the channel during intubation

• Blade tip: epiglottis guard pushes the epiglottis anteriorly and away from channel
Glidescope® Groove

**Intubation set-up:**
a hand grips both the endotracheal tube and the handle of the device at the same time
Intubation axis: direct laryngoscopy
Videolaryngoscopy

Improved Glottic View

Increased Intubation success

Extensive training not required

Can J Anaesth 2012; 59(1): 41-52
Anesthesiology 2009; 110(1): 32-7
Can J Anaesth 2012; Epub ahead of print
Statistical Analysis

- Intubation times: Friedman’s test
- Paired data: McNemar’s test
- Subjective Assessment: Wilcoxin Signed Ranks Test
Airway Mannequin

- Anatomically correct
- Reliable alternative to real human airway
- Standard to test new devices in mannequins before trying it in patients (ethical)
Why medical students?

- No or minimal experience with laryngoscopy and videolaryngoscopy
  - Need >47 attempts to acquire competency with direct laryngoscopy

- 2nd, 3rd, 4th year medical students: have basic knowledge of airway anatomy
  - May be easier to understand how laryngoscopy works

Anesthesiology 2003; 98(10):23-7
Complications

- Severe complications: 24% of intubated critically ill patients

- Multiple intubation attempts: 3x risk of cardiopulmonary complications

- Types of complications: hypoxemia, aspiration, bradycardia, cardiac arrest