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doi:10.1016/j.ajem.2008.01.057

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Laryngoscope blade review

To the Editor,

Airway management remains a vital primary skill for emergency physicians, and through history, many devices and instruments have been used to ease the burden of this crucial technique. Despite advances in medical technology, emergent orotracheal intubation continues to challenge even the most experienced emergency physicians. Intubation carts usually contain the Macintosh and Miller laryngoscope blades, but there are other blades available that physicians may not be aware of or feel comfortable using. The Laryngoscope Blade Review compared the Grandview laryngoscope blade with the traditional Macintosh or Miller blades. The study enrolled 30 emergency medicine residents and attending physicians at 3 emergency departments. The study ran for 8 months with collection of questionnaires that the enrollees completed. This study suggests with the given data that the Grandview laryngoscope blade provides better airway visualization with greater ease of intubation than the Macintosh and Miller blades [1-6].

The Grandview blade is a hybrid blade that has an oral-laryngeal angle of 15 degrees, similar to that of a human. In comparison, the Miller has an oral-laryngeal angle of 0 degree, and the Macintosh has an angle of 30 degrees. The Grandview blade is 80% wider, designed to create better visualization of the vocal cords by allowing the user to completely displace the tongue. Instead of sweeping the tongue to the left as intended with conventional blades, the physician flattens and maintains the tongue, providing a superior line of sight. The Review's purpose was to improve the emergency physician's airway management and provide them an additional tool to use when managing a patient's airway.

The questionnaire (Fig. 1) was designed to compare the blades on 2 factors: ease of visualization and overall ease of intubation that participants graded using a scale of 1 to 5. The participants were also asked to grade the patients' airway using a scale of 1 to 5 to discern the level of difficulty. The study was initiated with data collection from May 1, 2006, to December 31, 2006.

Data

Case	Airway classification (1-5)	First blade used	Second blade used	Ease of visualization, first blade (1-5)	Ease of intubation, first blade (1-5)	Ease of visualization, second blade (1-5)	Ease of intubation, second blade (1-5)
1	2	Grandview		1	1		
2	3	Grandview		3	3		
3	5	Grandview		3	5		
4	1	Grandview		1	1		
5	3	Grandview		2	1		
6	3	Grandview		2	2		
7	2	Grandview		1	1		
8		Grandview	Macintosh	4	4	4	4
9	3	Grandview		1	1		
10	2	Grandview		2	1		
11	5	Grandview		5	4		
12	4	Grandview		3			
13	2	Grandview		1	1		
14	2	Grandview		3	3		
15	2	Grandview		1	1		
16	3	Grandview		1	1		

(*continued*)

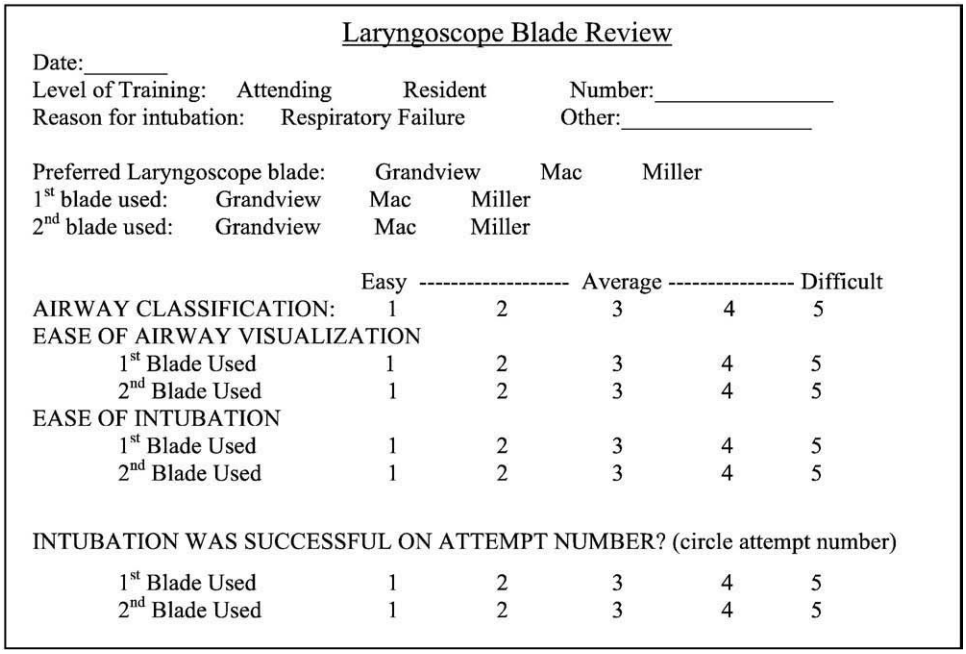
Case	Airway classification (1-5)	First blade used	Second blade used	Ease of visualization, first blade (1-5)	Ease of intubation, first blade (1-5)	Ease of visualization, second blade (1-5)	Ease of intubation, second blade (1-5)
17	4	Grandview		2	2		
18	3	Grandview		1	1		
19	3	Grandview		1	1		
20	4	Miller		4	4		
21	4	Miller		4	4		
22	4	Miller	Grandview	3	5	2	4
23	3	Miller	Grandview	4	5	2	2
24		Miller	Grandview	5	5	2	2
25		Miller	Grandview	4	5	2	2
26	3	Macintosh		2	2		
27	3	Macintosh		1	1		
28	1	Macintosh		4	3		

Twenty-eight data questionnaires were completed over 8 months of data collection. The data was logged into a database using SPSS 15.0 (SPSS, Chicago, Ill) and analyzed [7-10].

Table 1 shows the descriptive statistics for outlier problems with the data. Table 2 presents the airway classification between residents and attending physicians, revealing minimal difference between the way the 2 groups subjectively classified airways. The overall airway classification by both groups found that the airways evaluated in this study averaged a mean of 2.96 (Table 3). Ideal airway classification should show a mean of 3.0 because the airway was evaluated on a scale of 1 to 5.

First blade used by participants was Grandview (19 times), Macintosh (3 times), and Miller (6 times) (Table 4). Table 5 demonstrates the Grandview to have an overall mean ease of visualization of 2.00 compared with the Macintosh (2.33) and the Miller (4.00). The Grandview produced greater ease of intubation score of 1.89, compared with the Macintosh (2.00) and the Miller (4.67) (Table 6). Table 7 shows preintubation airway rating for the Grandview (2.88), higher than the Macintosh (2.33), which infers that the Grandview performed superior to the Macintosh.

Based on the number of attempts with each blade, certain comparisons were only possible between the Miller and the Grandview. As referenced in Table 8, intubation was successful during all 18 procedures when the Grandview was the first blade used. The average number of intubation attempts using the Grandview blade averaged 1.36 (Table 9). The Miller was used as the first blade 6 times, with a first attempt success rate of only 33%. The Grandview was then used as a rescue blade in the remainder of cases, with a 100% success rate. The Miller averaged 2.00 attempts for a



Laryngoscope Blade Review

Date:_____

Level of Training: Attending Resident Number:_____

Reason for intubation: Respiratory Failure Other:_____

Preferred Laryngoscope blade: Grandview Mac Miller

1st blade used: Grandview Mac Miller

2nd blade used: Grandview Mac Miller

	Easy		Average		Difficult
AIRWAY CLASSIFICATION:	1	2	3	4	5
EASE OF AIRWAY VISUALIZATION					
1st Blade Used	1	2	3	4	5
2nd Blade Used	1	2	3	4	5
EASE OF INTUBATION					
1st Blade Used	1	2	3	4	5
2nd Blade Used	1	2	3	4	5

INTUBATION WAS SUCCESSFUL ON ATTEMPT NUMBER? (circle attempt number)

1st Blade Used	1	2	3	4	5
2nd Blade Used	1	2	3	4	5

Fig. 1 Physician questionnaire.

Table 1 Descriptive statistics

	n	Minimum	Maximum	Mean	SD
Airway classification	25	1.00	5.00	2.9600	1.059 87
No. of attempts necessary for success	20	1.00	3.00	1.5500	0.604 81
Ease of airway visualization, fist blade used	28	1.00	5.00	2.4643	1.373 89
Ease of airway visualization, second blade used	5	2.00	4.00	2.4000	0.894 43
First blade used	28	1.00	3.00	1.5357	0.838 08
Ease of intubation, first blade used	27	1.00	5.00	2.5185	1.626 00
Ease of intubation, second blade used	5	2.00	4.00	2.8000	1.095 45
Preferred blade	28	1.00	3.00	2.0000	0.666 67
Reason for intubation	26	1.00	2.00	1.2692	0.452 34
Second blade used	5	1.00	2.00	1.2000	0.447 21
Intubation was successful on blade number	27	1.00	2.00	1.1481	0.362 01
Level of training	28	1.00	2.00	1.6071	0.497 35
Valid N (listwise)	1				

Table 2 Descriptive statistics

Level of training	Mean	SD	n
Attending	3.1111	1.269 30	9
Resident	2.8750	0.957 43	16
Total	2.9600	1.059 87	25

Dependent variable: airway classification.

Table 3 Descriptive statistics

	n	Minimum	Maximum	Mean	SD
Airway classification	25	1.00	5.00	2.9600	1.059 87
Valid N (listwise)	25				

Table 4 Between-subjects factors

First blade used	Value label	n
1.00	Grandview	19
2.00	Mac	3
3.00	Miller	6

Table 5 Descriptive statistics

First blade used	Mean	SD	n
Grandview	2.0000	1.201 85	19
Macintosh	2.3333	1.527 53	3
Miller	4.0000	0.632 46	6
Total	2.4643	1.373 89	28

Dependent variable: ease of airway visualization (first blade used).

Table 6 Descriptive statistics

First blade used	Mean	SD	n
Grandview	1.8889	1.323 49	18
Macintosh	2.0000	1.000 00	3
Miller	4.6667	0.516 40	6
Total	2.5185	1.626 00	27

Dependent variable: ease of intubation (first blade used).

Table 7 Descriptive statistics

First blade used	Mean	SD	n
Grandview	2.8889	1.078 61	18
Macintosh	2.3333	1.154 70	3
Miller	3.7500	0.500 00	4
Total	2.9600	1.059 87	25

Dependent variable: airway classification.

Table 8 First blade used* intubation was successful on blade number (cross tabulation)

First blade used	Intubation was successful on blade number		Total
	First blade	Second blade	
Grandview	18	0	18
Macintosh	3	0	3
Miller	2	4	6
Total	23	4	27

Table 9 Descriptive statistics

First blade used	Mean	SD	n
Grandview	1.3571	0.633 32	14
Miller	2.0000	0.000 00	6
Total	1.5500	0.604 81	20

Dependent variable: number of attempts necessary for success.

Table 10 First blade used

First blade used	Mean	SE	95% CI	
			Lower bound	Upper bound
Grandview	1.357	0.144	1.055	1.659
Miller	2.000	0.220	1.538	2.462

Dependent variable: number of attempts necessary for success.

successful procedure. As evidenced in Table 10, we can say with 95% confidence that the Grandview allows for a statistically significant reduction in number of attempts necessary for success compared with the Miller.

Ideally physicians would be able to compare multiple blades and visualizations on the same patient, thus making anatomical variances obsolete. This is neither practical nor ethical when dealing with emergent endotracheal intubation. In only 5 of 28 cases were we able to collect data that incorporated multiple attempts with more than 1 blade on the same patient, so analysis of data collected about second blade used was limited to draw valid conclusions [11,12].

The limited number of completed data questionnaires made it difficult to draw absolute conclusions when comparing 3 different blades. Although general trends and comparisons can be followed, a higher volume of data would be necessary to improve validity.

The study successfully introduced and evaluated the Grandview laryngoscope blade compared with traditional Macintosh and Miller blades in emergent endotracheal intubation. With the given data, this study did show that the Grandview blade provides improved airway visualization and improved ease of intubation than the Macintosh and the Miller blades.

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doi:10.1016/j.ajem.2008.02.028

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Ultrasound-assisted localization for lumbar puncture in the ED

To the Editor,

We read with great interest the article by Ferre et al [1] regarding the use of ultrasound by emergency physicians for identifying the anatomical landmarks of lumbar puncture. In this study, 76 patients enrolled were more obese with a mean body mass index of 31.4 (95% confidence interval, 29.1-33.6). Despite nearly half (47%) of the subjects having difficult- or impossible-to-palpate landmarks, ultrasound is very sensitive in identifying the spinous process (100%, 76/76 subjects) and ligamentum flavum (97.4%, 74/76) by using curved array from midline approach. Although the identification rates of dural matter and epidural space by ultrasound are much lower, 85.5% (65/76) and 77.6% (59/76), respectively, we found that simply identifying the spinous process and ligamentum flavum through bedside ultrasonography had been sufficient enough for successfully obtaining cerebrospinal fluid (CSF). This finding is rather interesting. We hereby present a case of a 25-year-old male patient with a body mass index of 34 (a body weight of 100 kg and a height of 1.7 m) who underwent an uneventful lumbar puncture using ultrasound-assisted landmarks localization.

This patient was presented to the emergency department with 1-day history of fever, conscious alteration, and nuchal rigidity suggestive of meningitis. Antibiotics were given before performing spinal tapping on this obese patient.

The patient's body surface landmarks, such as the lumbar spinous processes, were difficult to palpate even after being