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Foundations EKG I and EKG II: Open-Access Flipped-Classroom Critical EKG Curricula

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Impact/Effectiveness: EAP appointments are nearly complete at one site; zero residents opted-out. Of those surveyed, 100% felt the program should be continued in future years. Ratings for “how likely would you be to attend EAP in the future if needed” were 5.17 +/- 1.68 before and 7.14 +/- 0.99 after the appointment, with a PGY-2+ rating of 4.38 +/- 1.93 (1 = not likely, 9 = very likely). These preliminary results suggest that this intervention may be effective in increasing the likelihood of future EAP use for residents who attend an appointment compared to those who do not. We plan to have additional data from the other participating sites by the 2019 CORD Academic Assembly.

37 Does an Educational Interactive Airway Lab Change Residents Choice of Airway Device and Comfort Level?

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Background: Securing a difficult airway is a critical skill in emergency medicine (EM). Practicing these skills, improving confidence, and knowing backup techniques during residency training are critical.

Educational Objectives: We aimed to assess the impact of an interactive airway lab on resident’s comfort with and choice of different airway devices.

Curricular Design: EM faculty developed a two-part, three-hour interactive course for medical students, EM residents, and pediatric emergency fellows (PEMF) to improve airway management skills. The first part was a 30-minute faculty led discussion on approaching the difficult airway with difficult airway algorithms. The second part included eight hands-on stations employing direct laryngoscopy (DL), video laryngoscopy, laryngeal mask airway (LMA), bougie use, fiberoptic laryngoscopy, retrograde wire-guided intubation, pediatric airway, and cricothyrotomy. Learners circulated in 15-minute intervals to each skills station in small groups learning with various simulation mannequins using the latest equipment under direction of faculty preceptors and equipment vendors. Additional material was provided via social media and online teaching modules. Participants were surveyed before and immediately after the session to assess their primary and back-up airway preferences and comfort with each type of airway device covered in the session.

Impact/Effectiveness: A total of 46 participants took part in this course including 11 MS4, 11 PGY-1, 11 PGY-2, 8 PGY-3, and 5 PEMF. Prior to the course, learners stated their initial airway preference as follows: 20 DL, 20 Glidescope, and one LMA. After the course, 18 chose DL, 23 Glidescope, and one LMA. For rescue airway choice before the course, learners stated 5 DL, 14 Glidescope, and 11 LMA; after the course the choices were 6 DL, 12 Glidescope, and 8 LMA. Overall,

learners reported a significant improvement in comfort for each airway modality after the course. This level and change in comfort level varied with level of training. An interactive airway course improves learners’ confidence and skill with difficult airways, but may not significantly impact their choice of device used. This effect is strongest for junior-level trainees.

Table 1. Mean comfort level with each airway device on VAS (10 point) for participants before and after course.

Airway type	Mean Comfort Level Before Course (95%CI)	Mean Comfort Level After Course (95%CI)
Direct Laryngoscopy	5.2 (4.5-5.9)	7 (6.5-7.5)
Glidescope	5.5 (4.7-6.3)	7.5 (6.9-8.1)
Laryngeal Mask Airway	5.6 (4.8-6.4)	7.3 (6.7-7.9)
C-Mac	3.8 (3.1-4.5)	6.8 (6.3-7.3)
Bougie	3.6 (3.0-4.2)	6.2 (5.7-6.7)
Fiberoptic Assisted Airway	2.7 (2.1-3.3)	5.9 (5.3-6.5)
Cricothyrotomy	1.9 (1.3-2.5)	5.3(4.7-5.9)
Retrograde Wire Intubation	1.5 (1.0-2.0)	5.1(4.4-5.8)
Pediatric Airway/Needle Cric.	3.3 (2.6-4.1)	6.2 (5.6-6.8)

Table 2. Mean comfort level on VAS (10 point) stratified by experience level for different airway devices before and after airway course.

Airway Device	MS4			PGY1			PGY2			PGY3			PEMF		
	Pre	Post	Diff	Pre	Post	Diff	Pre	Post	Diff	Pre	Post	Diff	Pre	Post	Diff
Direct Laryngoscopy	3.1	5.3	2.2	5.4	7.4	2	5.5	6.5	1	6.9	6.9	0	6.2	8	1.8
Glidescope	4.9	7.1	2.2	4.7	7.2	2.5	4.2	6.2	2	5.9	7.3	1.4	8.2	8.5	0.3
Laryngeal Mask Airway	4.2	6.7	2.5	6.7	7.5	0.8	5.1	6.7	1.6	5.2	7.2	2	6.6	7.4	0.8
C-Mac	3.5	6.2	2.7	3.2	6.6	3.4	2.7	6.4	3.7	4.1	6.2	2.1	5.9	8.2	2.3
Bougie	3.5	5.9	2.4	3.1	5.9	2.8	2.7	5.6	2.9	3.5	6	2.5	5.9	6.3	0.4
Fiberoptic Assisted Airway	2.8	5.7	2.9	1.7	5.1	3.4	1.8	5.7	3.9	2.6	5.4	2.8	5	7.4	2.4
Cricothyrotomy	1.6	4.8	3.2	1.1	4.4	3.3	1.9	5.1	3.2	1.8	5.6	3.8	3	5.8	2.8
Retrograde Wire Intubation	1.6	4.7	3.1	0.8	4.1	3.3	1.3	5.2	3.9	1.6	5.4	3.8	2.4	5.4	3
Pediatric Airway/Needle Cric	2.2	5.1	2.9	3.8	5.9	2.1	2.8	6.2	3.4	3	6.2	3.2	5.5	6.4	0.9

38 Foundations EKG I and EKG II: Open-Access Flipped-Classroom Critical EKG Curricula

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Background: In 2003 Ginde et al. found that 35% of emergency medicine (EM) residencies lack formal electrocardiogram (EKG) curricula and 48% of EM residency directors supported the creation of a national EKG curriculum. No formal national curriculum currently exists, and it is unknown whether residents gain sufficient skill from clinical exposure alone. In 2016 Hartman et al. found only 28% of PGY-1s and 54% of PGY-3/4s passed a validated test of critical EKG interpretation.

Educational Objectives: We sought to evaluate leader and learner perception of learner EKG interpretation skills at the start of EM residency and to assess the value of our flipped-classroom, critical EKG curriculum. Our curriculum provides 1) exposure to critical EKG pattern; 2) a framework for EKG interpretation when gestalt is not sufficient; and 3) implementation guidelines and open-access to any interested residency. Additionally, in response to prior feedback, we sought to create separate curricula, EKG I and II, benchmarked to PGY-1 and PGY-2 level learners respectively.

Curricular Design: The Foundations of Emergency Medicine (FoEM) EKG I and EKG II curricula were launched in 2017. Topics included 15 published critical EKG diagnoses and 33 selected by consensus. Cases include a brief history, EKG(s), a standard interpretation stem, and Free Open Access Medical Education links. Full EKG interpretations and answers to discussion questions were provided to facilitators.

Impact/Effectiveness: EKG I enrollment for the 2017-2018 academic year included 39 residencies and 671 learners, an increase from six residencies and 76 learners in 2016-2017. EKG II enrollment included 24 residencies and 446 learners. In March 2018, program leaders and learners were surveyed, with 74 of 77 sites responding (96%). Leaders were highly satisfied and indicated that content was at an appropriate level for learners. Learners were also highly satisfied and indicated that the curricula improved their ability to interpret EKGs in clinical settings. Only 28% of learners agreed or strongly agreed that “at the beginning of residency, I was prepared to interpret EKGs.” Also, only 14% of leaders agreed or strongly agreed that “at the beginning of residency, compared to their classmates, interns are equally prepared to interpret EKGs.” These preliminary data suggest that an unmet need for standardization and improvement of EKG training exists.

Table 1. Foundations EKG I and EKG II course overview (www.foundationsem.com)

Unit I Summary	Approach to Ischemia: STEMI	Unit VII Summary	Approach to fascicular blocks
1	Anterior/Lateral STEMI	25	Left and right bundle branch blocks
2	Inferior STEMI	26	Left anterior fascicular block
3	Posterior STEMI	27	Left posterior fascicular block
4	STEMI w LBBB/Pacer (Sgarbossa)	28	Bifascicular/"Tri"-fascicular blocks
Unit II Summary	Approach to Ischemia: Ischemia mimics	Unit VIII Summary	Approach to Ischemia: NSTEMIs
5	Benign early repolarization	29	Diffuse STD w aVR elevation
6	LV aneurysm	30	High lateral MI
7	Hyperkalemia	31	DeWinter ST/T complex
8	Pericarditis	32	RV infarct
Unit III Summary	Approach to Syncope	Unit IX Summary	Miscellaneous Ischemic EKGs
9	Brugada	33	PE and acute right heart strain
10	Long QT	34	Cerebral T-waves
11	WPW	35	Wellen's waves
12	HOCM	36	New RBBB & LAFB
Unit IV Summary	Approach to Bradyarrhythmias	Unit X Summary	Potassium Derangement
13	2nd degree AV block type I	37	Hypokalemia
14	2nd degree AV block type II	38	Mild/Moderate hyperkalemia
15	3rd degree AV block	39	Severe hyperkalemia (sine wave)
16	Junctional/Ventricular escape rhythm	40	Bizarre, wide complex bradycardia
Unit V Summary	Approach to Tachyarrhythmias: Narrow Complex	Unit XI Summary	Miscellaneous EKGs
17	SVT	41	SVT w aberrancy/antidromic AVRT
18	Atrial fibrillation with RVR	42	Arrhythmogenic right ventricular cardiomyopathy
19	Atrial flutter with RVR	43	EKG findings in Digoxin toxicity
20	Multifocal atrial tachycardia	44	Accelerated idioventricular rhythm
Unit VI Summary	Approach to Tachyarrhythmias: Wide Complex	Unit XII Summary	Approach to Paced Rhythms
21	VT	45	Normal AV paced rhythm
22	WPW with Atrial Fibrillation	46	Normal V paced rhythm
23	Hyperkalemia	47	Pacemaker Mediated Tachycardia
24	Sodium channel blockade	48	Failure to capture

39 3D Printed, Do-It-Yourself Ultrasound-Guided Femoral Nerve Block Task Trainer

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Background: Emergency physicians are required to be well versed in a wide repertoire of procedures ranging from life-saving resuscitative techniques to pain control and management. Pain management has conventionally been approached via pharmacological means; however, a relatively newer approach involves the use of peripheral nerve blocks. Specifically, for