Proficiency-based Standard Setting for Fundamental Endoscopic Tasks

Payton M. Miller MD, Maya Hunt MD, Noosha D. Deravi MD, Katie J. Stanton-Maxey MD, Dimitrios Stefanidis MD PhD, E. Matthew Ritter MD MHPE
Indiana University School of Medicine

Introduction

- Simulation-based elective in Minimally Invasive Surgery (MIS) developed for MS4's pursuing surgery
- Mastery-learning curriculum of laparoscopic, robotic surgery, & endoscopic training
- 5 virtual reality (VR) endoscopic tasks from GI Mentor selected based on relevance to the Fundamentals of Endoscopic Surgery (FES) manual skills exam
  - Endoscopic Navigation (Task 2)
  - Loop Reduction (Task 10)
  - Retroflexion (First Module for Gastroscopy, Case 8)
  - Mucosal Evaluation Advanced II (Task 5),
  - Advanced Targeting with a Tool (Task 9)
- No current proficiency standards for these GI Mentor tasks

Objective

To establish expert-derived proficiency-based standards for 5 GI Mentor tasks

Methods

- Gastrointestinal & surgical endoscopists recruited
- Each participant performed 2 consecutive repetitions of each task
- Performance assessed by the GI Mentor Express automatic scoring algorithm
- Mean time to completion & task-specific metrics recorded for each repetition
- Proficiency standards were established at 2 standard deviations below expert performance

Table 1. Mean performance among experts and subsequently set proficiency standards for each GI Mentor Task

FES Task	Navigation		Loop Reduction		Retroflexion			Mucosal Evaluation			Tool Targeting	
GI Mentor Task	**Fundamentals Task 2: Endoscopic Navigation**		**Fundamentals Task 10: Loop Reduction**		**First Module for Gastroscopy – Case 8**			**Fundamentals Task 5: Mucosal Evaluation – Advanced II**			**Fundamentals Task 9: Advanced Targeting (with a Tool)**	
	Total Time (min:sec)	% Target Acquired	Total Time (min:sec)	% Reduction Success	Total Time (min:sec)	% Clear View	Time to Duodenum (sec)	Total Time (min:sec)	% Target Acquired	% Time Scope Tip Mid Lumen	Total Time (min:sec)	% Target Acquired
Mean (SD)	5:50 (0:33)	100 (0)	2:57 (1:36)	71.4 (15)	2:38 (1:07)	99.9 (0.4)	26.1 (6.7)	5:01 (0:55)	97.5 (3.8)	81 (0.09)	5:44 (1:15)	100 (0)
Proficiency Target	[ ] time ≤ 6:55 & [ ] 100% of targets acquired		[ ] time ≤ 6:09 & [ ] reduction success rate ≥ 41% & [ ] cecum reached		[ ] time ≤ 4:52 & [ ] score 100% & [ ] "Achieve Proficiency" acquired			[ ] time ≤ 6:52 & [ ] 90% of targets acquired & [ ] scope tip mid-lumen for ≥ 62% of time			[ ] time ≤ 8:14 & [ ] 100% of targets acquired	
Repetitions	[ ] 2 consecutive repetitions + [ ] 5 nonconsecutive repetitions											

Results

- Participants:
  - 2 MIS surgeons and 2 gastroenterologists; 1 MIS surgeon with prior VR simulation platform experience
- Minimum proficiency metrics generated (Table 1)
- All participants w/ 100% of target acquisition in:
  - Endoscopic Navigation
  - Advanced Targeting with a Tool
- Loop Reduction performance was most variable:
  - completion time (0:42 – 6:08)
  - reduction attempts (3 – 31)
  - reduction success rates (45.2% -- 100%)

Discussion

- A proficiency-based endoscopic training curriculum was developed for 5 GI Mentor tasks
- These proficiency standards will guide simulation practice for students enrolled in the MIS Elective and residents on endoscopy rotations
- Validation studies evaluating trainee FES manual skills performance will be conducted in the future

References

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