How to train a Left Handed Surgeon

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Disclosures

- Intuitive Surgical
- Auris Surgical
- Medtronic

- I am right handed

Background

- Clerkship Director- Surgery
- Have medical students, general surgery and thoracic surgery residents on service

- Observed variation in how left handed senior surgical trainees operate

Background

- LH surgeons are at a disadvantage in surgical training
  - Perceived inferior to RH surgeons by both attendings and self
  - Suggested to be less technically able, more error prone, and less efficient than RH counterparts
  - EXCEPT in “rare” cases (situs inversus)
  - Lack of resources and mentorship for LH surgeons
  - Reason for disadvantage remains unknown

Research efforts

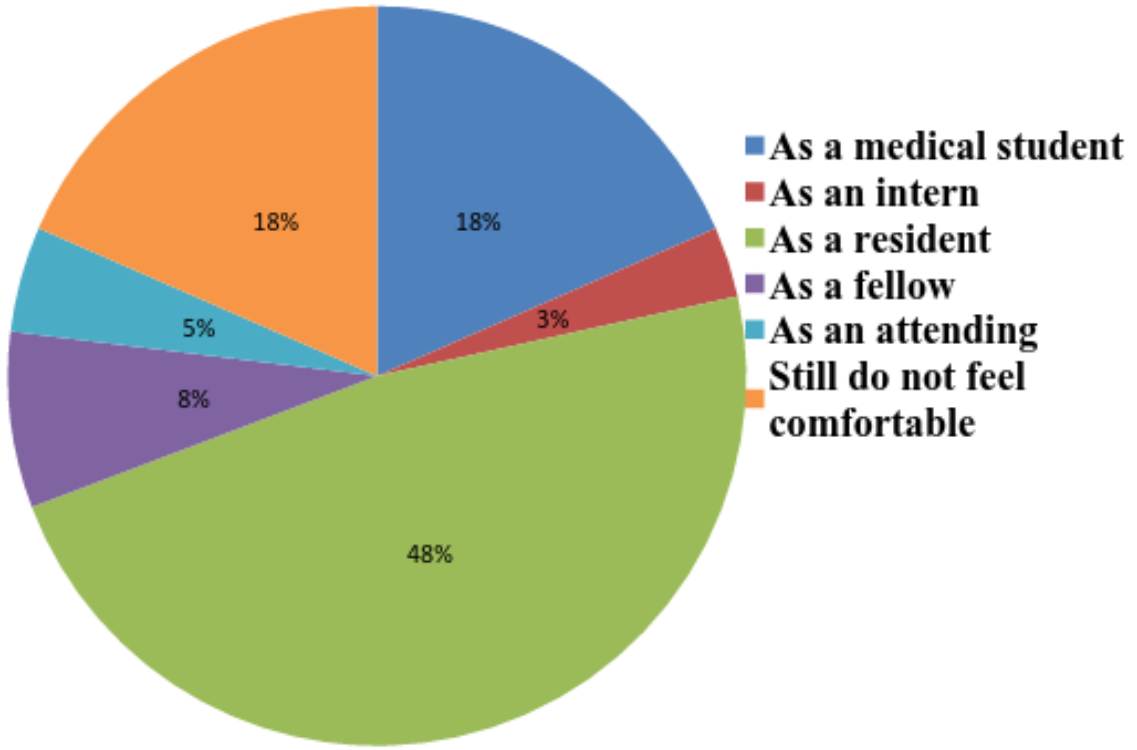
- Understand perspectives from LH learners and their teachers (both RH and LH faculty), surveyed

- Review intern level simulation suturing skills from a single academic center to understand differences in skill set.

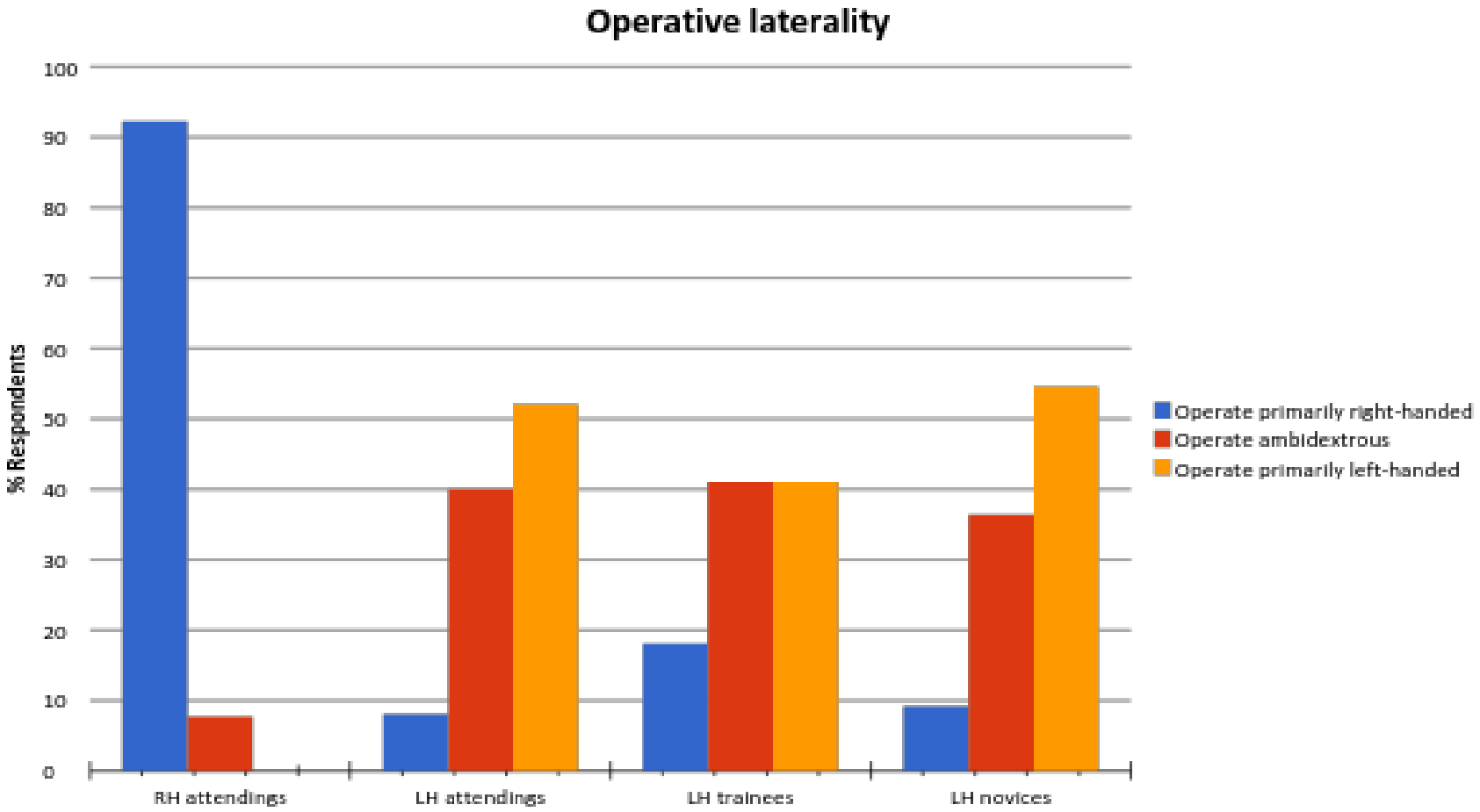
Results

		RH attendings	LH attendings	LH advanced trainees	LH novice trainees
Total (n)		65	26	17	22
Age, years (mean)		48.3	47.5	30.1	27.2
Gender	M	83%	69%	65%	50%
	F	17%	31%	35%	50%
Specialists (%)		63%	77%	41%	27%
Operating laterality (%)					
Dominant		92%	54%	41%	45%
Ambidextrous		8%	38%	41%	45%
Non-dominant		0%	8%	18%	9%

Results- At what level of training did you feel comfortable taking control of your own operative technique?



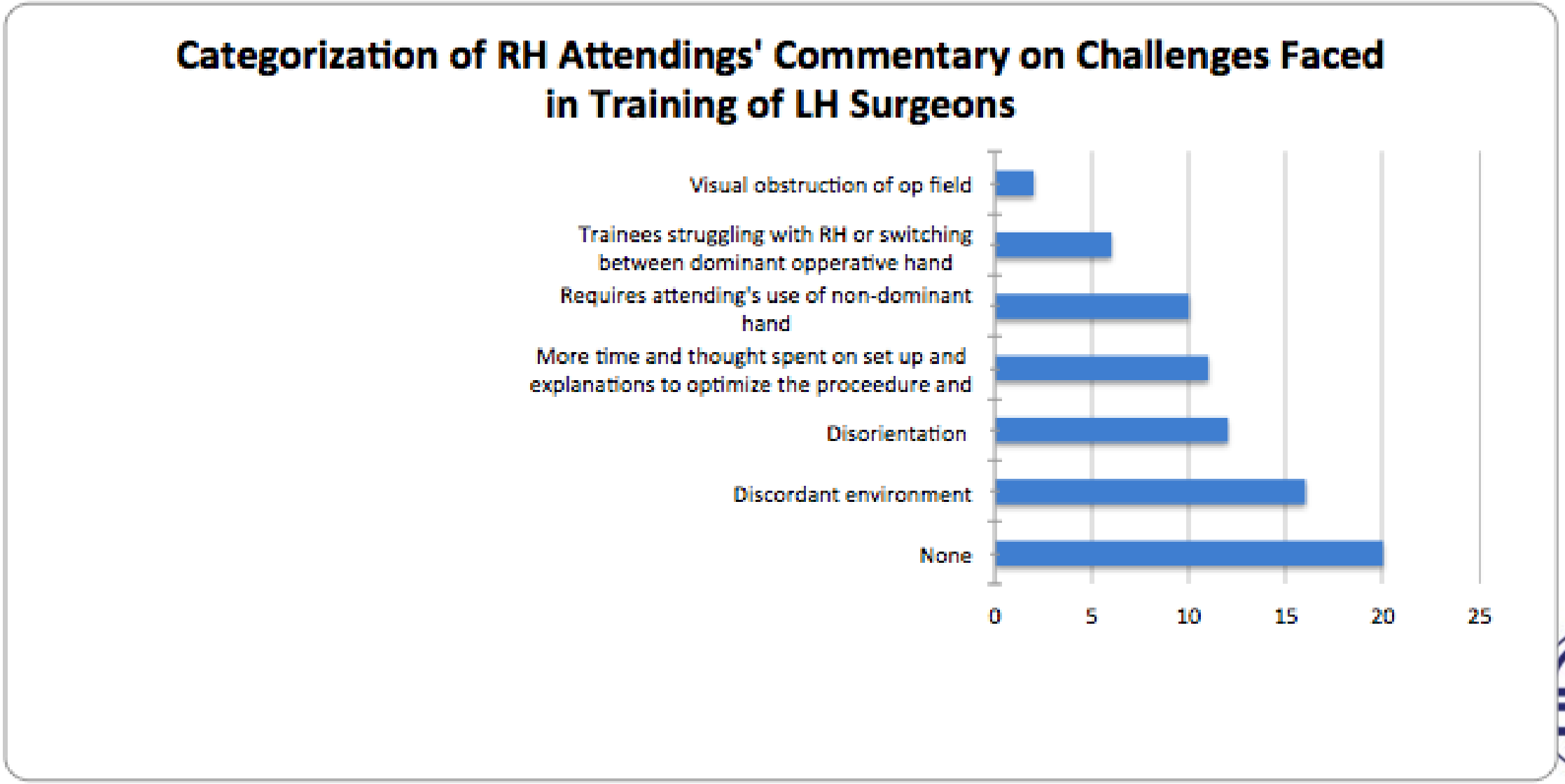
LH surgeons reported a greater degree of ambidexterity, and use of non-dominant hand



Interventions for LH surgeons

	LH Attendings (n=26)	LH Advanced Trainees (n=17)	LH Novice Trainees (n=22)
Modifications to operating procedure			
Switch sides of the table	50%	53%	45%
Modify preparation/positioning of patient	4%	0%	9%
Modify choice of instruments	4%	6%	18%
Change order of steps	0%	0%	5%
*Change technique**	8%	29%	32%
Change port position in laparoscopic/robotic surgery	4%	0%	0%
Change instrumentation in laparoscopic/robotic surgery	0%	12%	5%
Change monitor position on laparoscopic/robotic surgery	4%	0%	9%
Other	12%	6%	0%
Modifications to instrumentation			
Use LH instruments	0%	0%	9%
LH instruments readily available	12%	18%	5%
Laterality mentorship			
*Have been offered mentorship for laterality**	35%	18%	5%
Sought out mentorship for laterality	23%	12%	14%

RH attendings



Conclusions-Survey Work

- Left-handedness is a challenge for surgical teacher and trainee
- LH trainees are at a disadvantage due to barriers in teaching and discordant environment, NOT innate lack of technical ability
- Very few modifications are made by LH learners or teachers to overcome these barriers
- Very few resources available for LH surgeons or their teachers
- Because of this, LH trainees face increased pressure to change operative hand dominance
- Major modification made by LH surgeons is use of non-dominant hand
  - Immediate benefit
  - Long-term disadvantage?
- Opportunity for intervention between medical school and residency

Opportunities for Intervention

Static Factors due to discordant environment

- Predominance of RH surgeons
- Predominance of RH instruments
- Procedures optimized for RH surgeons
- Angles required for specific procedures (i.e. RUQ)

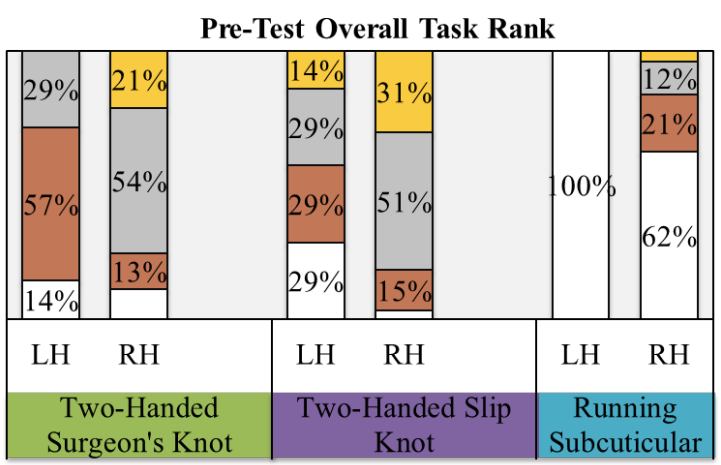
Modifiable Factors due to lack of understanding

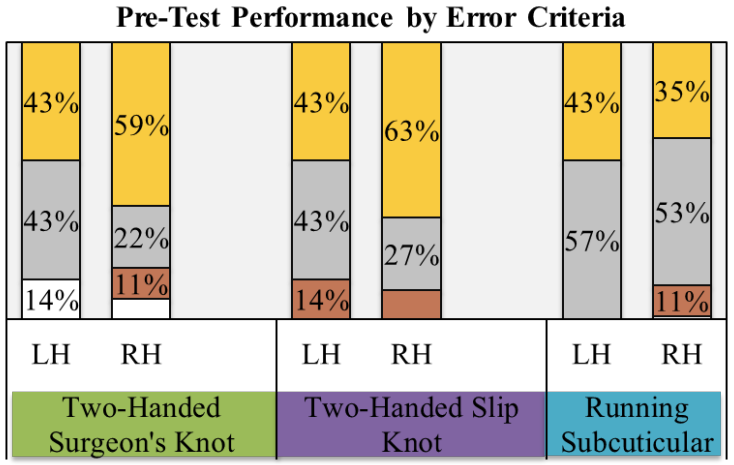
- Difficulty teaching
- Pressure to change handedness
- Lack of mentorship
- Lack of awareness
- Lack of resources

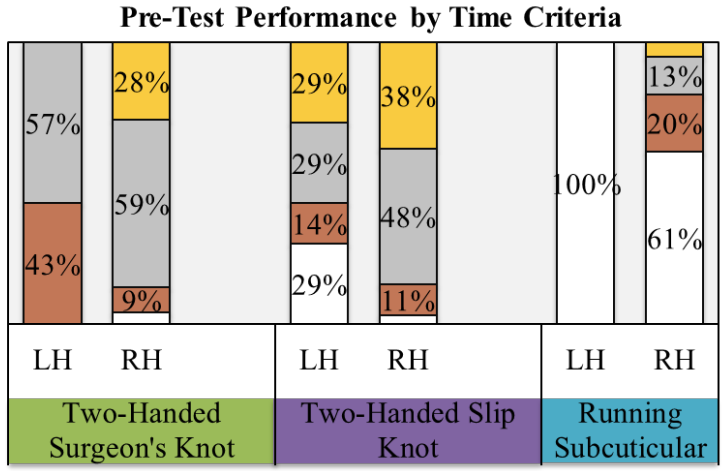
Part 2

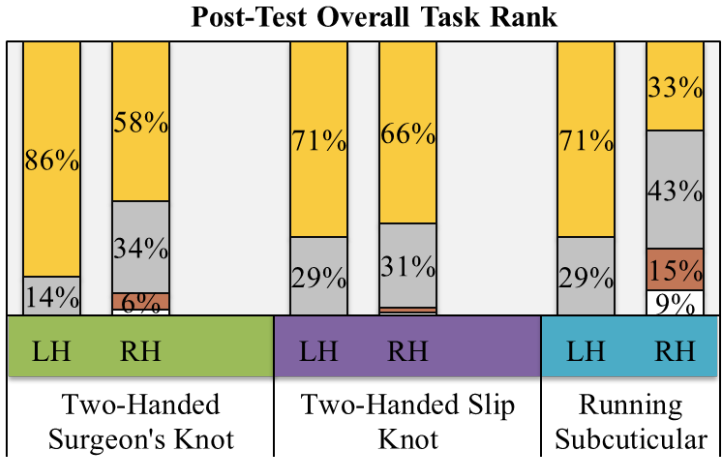
- Retrospective analysis of early operative skills assessments from all surgical interns at our institution from 2011-2015
- Left-handed (LH) & right-handed (RH) assigned by writing handedness; those who performed tasks with non-dominant hand were excluded
- Data from 12-task open skills “pre-test” at start of intern year and identical “post-test” ~6 months later
- Overall rank of Gold (G), Silver (S), Bronze (Br), or Beginner (Be) is assigned for each task
- For a given task rank, both error & time criteria must be met; “Beginner” if fails to meet Bronze criteria
- LH vs. RH performance on pre- and post-tests was compared by time, errors, and task rank
- Within cohort (LH/RH) pre- vs post-test comparison evaluated learning.

Results


Pre-Test Overall Task Rank
29%
57%
14%
21%
54%
13%
14%
29%
29%
29%
31%
51%
15%
100%
12%
21%
62%
LH
RH
LH
RH
LH
RH
Two-Handed Surgeon's Knot
Two-Handed Slip Knot
Running Subcuticular


Pre-Test Performance by Error Criteria
43%
43%
14%
59%
22%
11%
43%
43%
14%
63%
27%
43%
57%
35%
53%
11%
LH
RH
LH
RH
LH
RH
Two-Handed Surgeon's Knot
Two-Handed Slip Knot
Running Subcuticular


Pre-Test Performance by Time Criteria
57%
43%
28%
59%
9%
29%
29%
14%
29%
38%
48%
11%
100%
13%
20%
61%
LH
RH
LH
RH
LH
RH
Two-Handed Surgeon's Knot
Two-Handed Slip Knot
Running Subcuticular


Post-Test Overall Task Rank
86%
14%
58%
34%
6%
71%
29%
66%
31%
71%
29%
33%
43%
15%
9%
LH
RH
LH
RH
LH
RH
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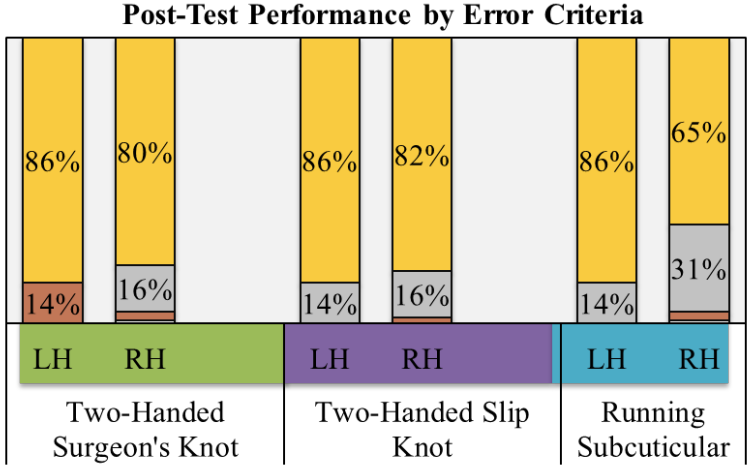
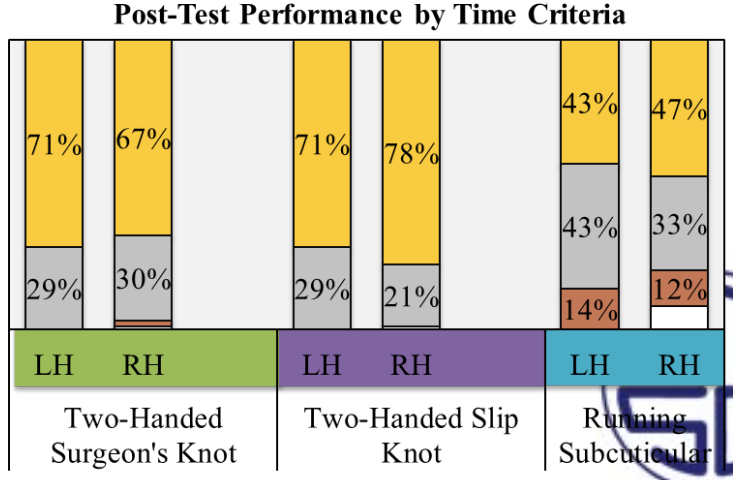

Post-Test Performance by Error Criteria
86%
14%
80%
16%
86%
14%
82%
16%
86%
14%
65%
31%
LH
RH
LH
RH
LH
RH
Two-Handed Surgeon's Knot
Two-Handed Slip Knot
Running Subcuticular


Post-Test Performance by Time Criteria
71%
29%
67%
30%
71%
29%
78%
21%
43%
43%
14%
47%
33%
12%
LH
RH
LH
RH
LH
RH
Two-Handed Surgeon's Knot
Two-Handed Slip Knot
Running Subcuticular

Conclusions

- Initially, LH interns performed worse than RH interns on two-handed knot tying under tension and running subcuticular suturing.
    - LH interns were slower, but not more error prone.
- With practice, LH interns improved to perform equal to or better than RH interns.
- Further study is needed to understand the reason for these technical differences.

Thanks to

- Maia Anderson-PGY 4 General Surgery Resident (LH)
- Erica Carballo-PGY 4 OB Gyn Resident (LH)
- David Hughes-Endocrine Surgery (RH)
- Gurjit Sandhu-PhD Educator (RH)