DOES MORE YEARS IN TRAINING EQUAL TO MORE ADVANCED SKILLS? TRENDS IN THE OPERATIVE PERFORMANCE OF SURGICAL RESIDENTS DURING ADVANCED LAPAROSCOPIC TRAINING COURSE

Diaa Soliman, MD; Mazin Abdalgadir, MD; Chiu-Hsieh Hsu, PhD; Michelle Chang, MD; Iman Ghaderi, MD

University of Arizona, Department of Surgery, Tucson, Arizona
Central Michigan University, College of Medicine, Saginaw, Michigan

Introduction

- **Surgical residents** are expected to improve their **operative skills** during training.
- It is unclear whether this **improvement** applies equally to **basic** and **advanced** procedures.
- **Objective:**

➢ **Examine** the **trend** in **operative performance** of general surgery residents during an advanced **laparoscopic course** in a live **porcine lab.**

➢ Compare **faculty assessments** with **residents' self-assessments.**

Methods

Participants: Senior general surgery residents (PGY 3 to 5).

Procedures Performed:
Nissen fundoplication
Low anterior colon resection (LAR)
Splenectomy

Setting: Procedures performed in anesthetized pigs during an advanced laparoscopic course.

Assessment Tools: Validated instruments used to evaluate operative performance.

Statistical Analysis:
Linear mixed-effects model
Assessed score trends by resident level
Compared faculty assessments with residents' self-assessments

Results

Table 1: Analysis of operating performance during laparoscopic splenectomy by training level and evaluator (faculty vs. self)

	F: Estimate	Lower 95% CI	Upper 95% CI	p-value	S: Estimate	Lower 95% CI	Upper 95% CI	p-value
PGY 4 vs. 3	0.12	-0.18	0.41	0.7715	0.28	-0.01	0.57	0.0668
PGY 5 vs. 4	0.51	0.16	0.85	0.0011	0.44	0.1	0.78	0.0056
Trend	**0.29**	**0.12**	**0.45**	**2e-04**	**0.35**	**0.18**	**0.51**	**0.0001**
Trend: S vs. F	0.06	-0.13	0.26	0.7397				

Table 2: Analysis of operating performance during laparoscopic low anterior colon resection by training level and evaluator (faculty vs. self)

	F: Estimate	Lower 95% CI	Upper 95% CI	p-value	S: Estimate	Lower 95% CI	Upper 95% CI	p-value
PGY 4 vs. 3	0.2	-0.16	0.57	0.5102	0.15	-0.21	0.51	0.7503
PGY 5 vs. 4	0.29	-0.12	0.7	0.269	0.32	-0.1	0.73	0.2045
Trend	**0.24**	**0.04**	**0.44**	**0.014**	**0.22**	**0.02**	**0.43**	**0.0273**
Trend: S vs. F	-0.02	-0.27	0.23	0.9856				

Table 3: Analysis of operating performance during laparoscopic Nissen Fundoplication by training level and evaluator (faculty vs. self)

	F: Estimate	Lower 95% CI	Upper 95% CI	p-value	S: Estimate	Lower 95% CI	Upper 95% CI	p-value
PGY 4 vs. 3	0.19	-0.16	0.54	0.5295	0.08	-0.27	0.42	0.9651
PGY 5 vs. 4	0.04	-0.29	0.38	0.9959	0.22	-0.12	0.55	0.3521
Trend	**0.12**	**-0.07**	**0.3**	**0.2916**	**0.15**	**-0.03**	**0.33**	**0.1375**
Trend: S vs. F	0.03	-0.2	0.26	0.9434				

Discussion

Surgical skill progression is often assumed to be **linear**, but this may not apply equally to **advanced procedures.**

Skill Progression: Residents excel in core procedures but **lag** in advanced cases like **Nissen fundoplication,** despite **increasing performance skills in low-complexity** cases.

Challenges: Limited exposure to **complex cases** and **reliance** on **clinical volume** alone **hinder proficiency** in **advanced procedures.**

Self-Assessment: Residents overestimate their **skills** compared to **faculty**, highlighting the need for **targeted feedback.**

Conclusion

The **progression** of **surgical skills** during residency is **not uniform** across all procedures, with **advanced cases lagging** behind core procedures.

Intentional, structured training focused on **advanced procedures** is essential to bridge this gap.

Competency-based training and **simulation-based learning** may be prioritized to ensure residents achieve proficiency across the full spectrum of surgical practice.

These **insights** can guide the **development** of **updated curricula** and **training programs**, ensuring graduates are well-prepared for the diverse complexities of general surgery practice.