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# THE USE OF VIRTUAL HUMANS TO ASSESS SURGEON COMMUNICATION SKILLS IN A SIMULATED LAPAROTOMY

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- Simulation is increasingly used for team training but time constraints limit the availability of OR personnel to practice these essential communication skills.
- In this study, we examine the use of interactive VHs to simulate OR personnel during a surgical time out and a simulated laparotomy.



- Three interactive VH teammates (anesthesiologist, circulating nurse and surgical technologist) were projected on a 40-inch monitor mounted on a rolling stand.
- Nineteen surgeons (6 faculty and 13 residents) videotaped interacting with VHs while performing a surgical time out and laparotomy on a simulated model.
- Outpatient surgical center (OSC) at the University of Florida – Jacksonville.



## Communication Elements

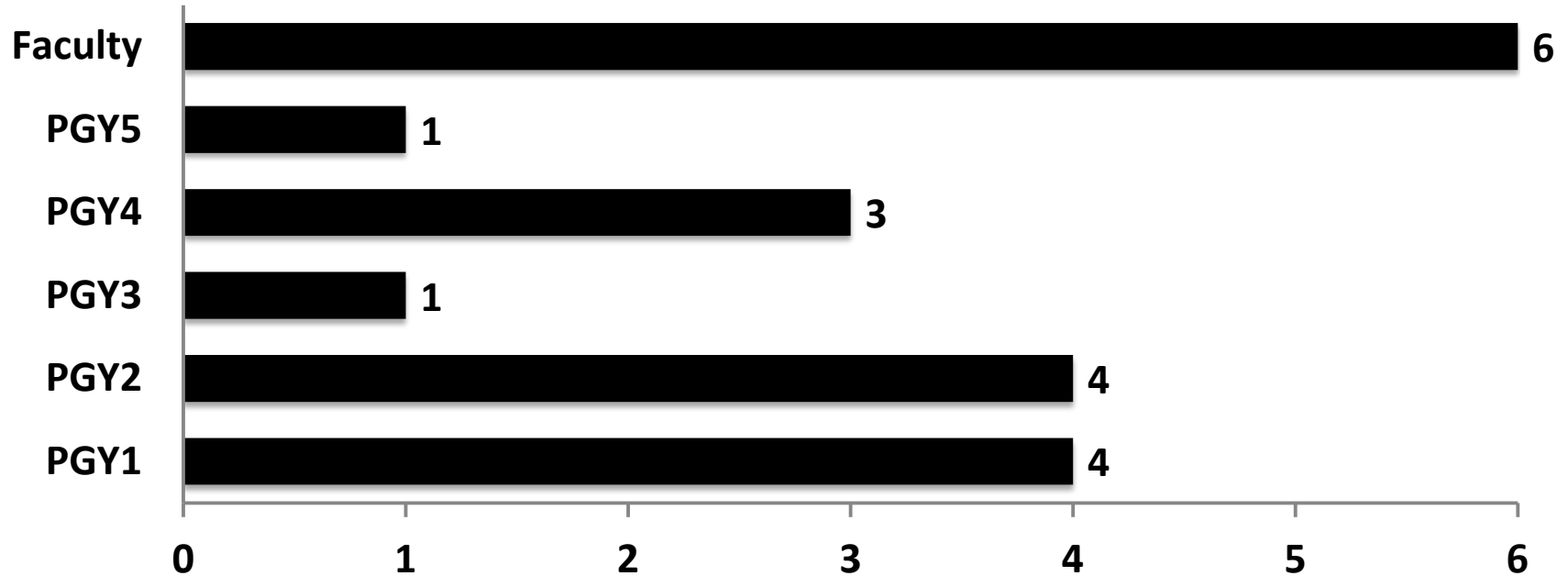
1. Leading a surgical timeout.
  2. Addressing a timeout interruption.
  3. Managing an incorrect sponge count.
- ✓ *Raters (N=5) reviewed videotapes.*

## Psychomotor Elements

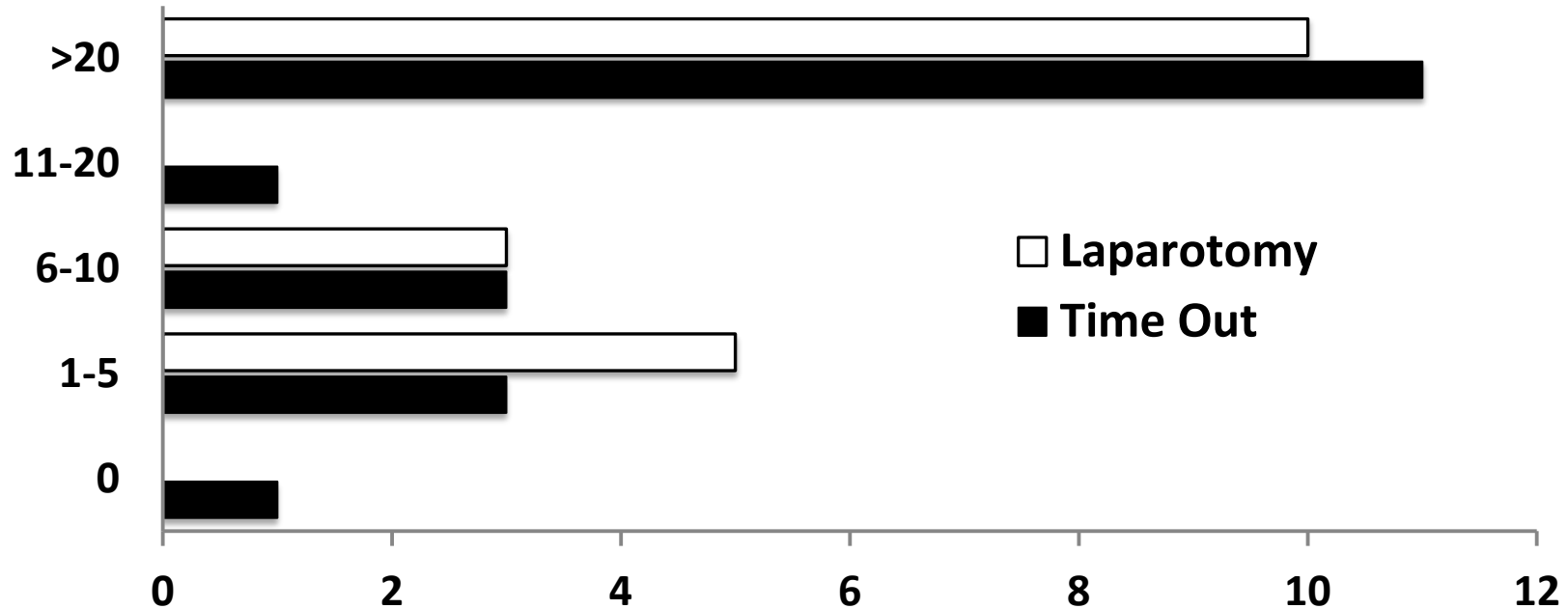
1. Performing a laparotomy.
- ✓ *Raters (N=6) examined simulated laparotomy pads.*



## Participant Level (N=19)



## Participant Experience



## Post Interaction Survey

### *Immersion Level*





## Post Interaction Survey

### *Skill Confidence/Improve*

Skill Confidence	Pre-Interaction	Post-interaction	△
Surgical Time Out	3.25	3.84	0.59
Abdominal Wall Closure	3.70	4.06	0.36

\*Likert scale 1-5 (1=least confident, 5=most confident).

**[Please contact presentation authors for removed video.]**



## Communication Elements



Surgical Time Out	Residents N (%)	Faculty N (%)	p Value ( $\alpha=0.05$ )
Initiated	11 (84.6)	5 (83.3)	NS
Interruption Addressed	7 (53.8)	6 (100)	NS
Time Out Resumed	2 (15.4)	4 (66.7)	NS
Time Out Restarted	5 (38.4)	2 (33.3)	NS

## Communication Elements



Response to Incorrect Count	Residents N (%)	Faculty N* (%)	P Value ( $\alpha=0.05$ )
Stopped Operating	7(53.87)	5 (100)	NS
Asked for Recount	7 (53.8)	3 (60.0)	NS
Asked for X-ray	6 (46.1)	2 (40.0)	NS
Searched Abdomen	10 (76.9)	5 (100)	NS

\*One faculty did not receive incorrect count challenge.

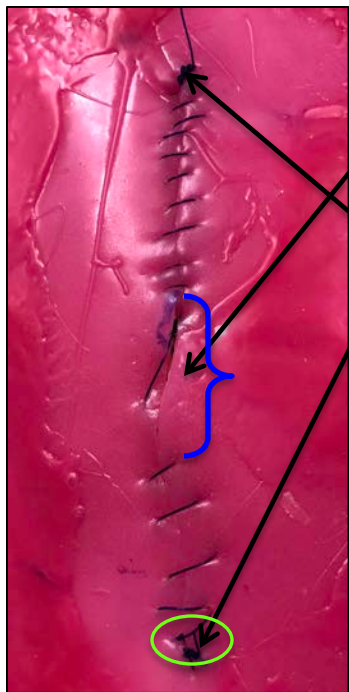
## Psychomotor Elements



Closure Item*	Residents Mean (95% C.I.)	Faculty Mean (95% C.I.)
Bites (Distance/Spacing)	2.61 (1.97, 4.28)	1.97 (1.05, 2.89)
Running Closure (Start/Finish)	1.88 (1.25, 2.51)	1.50 (0.95, 2.01)
Knots (Square/# Throws)	3.51 (2.88, 4.14)	2.89 (1.70, 4.08)
Defects (With Tension)	3.88 (3.22, 4.54)	2.67 (1.42, 3.92)
Overall	11.88 (9.77, 13.99)	9.02 (5.51, 12.53)

\*Likert scale 1-5 (1=worst, 5=best).

### Psychomotor Elements



**LAPAROTOMY CLOSURE RATING FORM**

SAFE OR  
Simulated Activity For Every Operating Room

- Bites are between 5 mm to 10 mm wide with 5 mm to 10 mm advancement.
 

1	2	3	4	5
Bites and advancement are large/small with no consistency	Most bites are between 5-10mm and consistent with regular spacing		All bites are between 5-10mm and consistent with regular spacing	
- Running closure started 1 cm above and below the apices of the fascial incision.
 

1	2	3	4	5
Neither superior/inferior running suture started 1 cm above/below apex	Either superior or inferior running suture started 1 cm above/below apex but not the other		Both superior and inferior running suture started 1 cm above and below apices	
- Knots are square without "air knots" and have an adequate number of throws (6 to 8).
 

1	2	3	4	5
Knots are not square multiple air knots inadequate number of throws	Knots are for the most part square some air knots present most knots have adequate # of throws		Knots are square no air knots all knots adequate number of throws	
- No obvious defects in the incision when placed under tension.
 

1	2	3	4	5
Large defects in the closure when placed under tension	Some (small) defects in the closure when placed under tension		There are no defects in the closure when placed under tension	



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## Participant Comments

*“Phenomenal opportunity to practice surgical and verbal skills as a solo surgeon.”*

*“This was very helpful. I think that having a perfect performance to watch would be great in knowing how to improve.”*

*“It strengthened my ability to communicate with my team in the OR.”*

*“The tissue planes were strange at first, having never operated on simulated humans. Still, once I got the hang of it, I was fine.”*

- We have successfully integrated VHS with a simulated laparotomy model to teach/assess communication/teamwork and psychomotor skills.
- Participant performance demonstrates a need for deliberate practice with feedback in correctly performing a surgical time out and a laparotomy with an incorrect sponge count for surgical residents and faculty.