

Assessing the Learning Curve Associated with a Novel Flexible Robot in the Pre-Clinical and Clinical Setting

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Background

- Transoral robotic surgery is limited by rigid instrumentation and line-of-sight visualization
- Non-linear systems specifically designed for the aerodigestive tract are needed
- Ease of use of these new systems in both training and clinical environments are critical in its widespread adoption

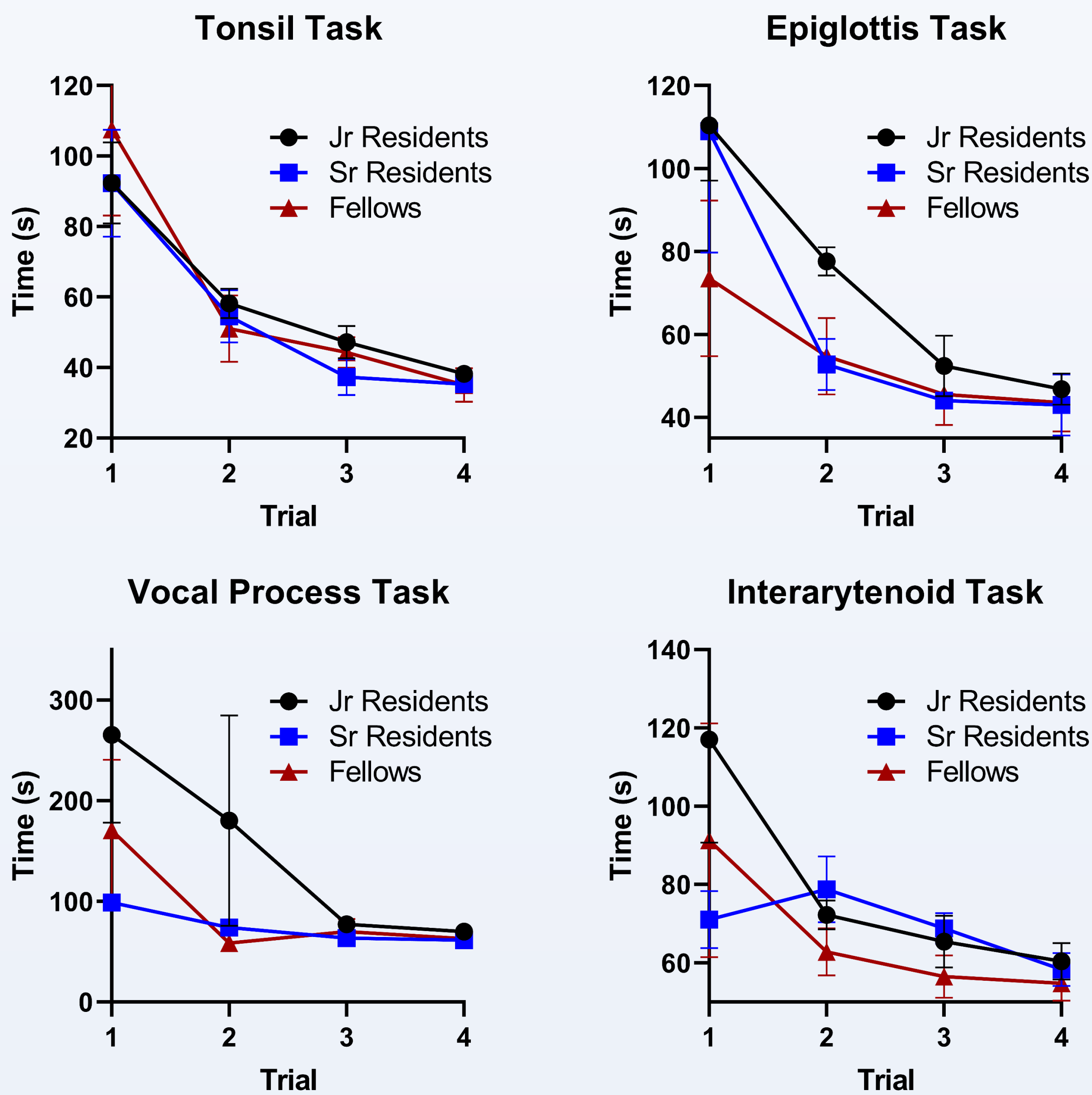


Figure 1. Total time for task completion by training level

Methods

- Residents, fellows, and junior faculty performed tasks on an anatomical airway mannequin using the Medrobotics FLEX™ Robotic System:
 1. expose and incise the tonsil
 2. grasp the epiglottis
 3. palpate the vocal processes
 4. grasp the interarytenoid space
- Subjects performed these tasks again after a 4 month gap to evaluate retention
- Retrospective analysis of one physician's clinic experience with the robot from Sept 2015-2016

Task	1 st trial time, (mean, range) (sec)	4 th trial time (mean, range) (sec)	P value
Tonsil	97 (67-180)	36 (26-48)	<0.001
Epiglottis	99 (36-187)	45 (27-62)	0.001
Vocal Process	185 (60-596)	65 (49-92)	0.01
Interarytenoid	95 (54-221)	58 (43-71)	0.02

Table 1. Statistical analysis comparing the task completion times between the first and fourth trials

Results

Mannequin Learning Trials

- 13 participants in initial round of study and 8 participants 4 months later
- Junior residents slower in most tasks initially but reached similar levels of efficiency and retained skills after a 4 month break

Clinical Experience of FLEX™ Robotic System

- Analyzing cases of similar complexity and pathology demonstrates clear decreases in overall operative times

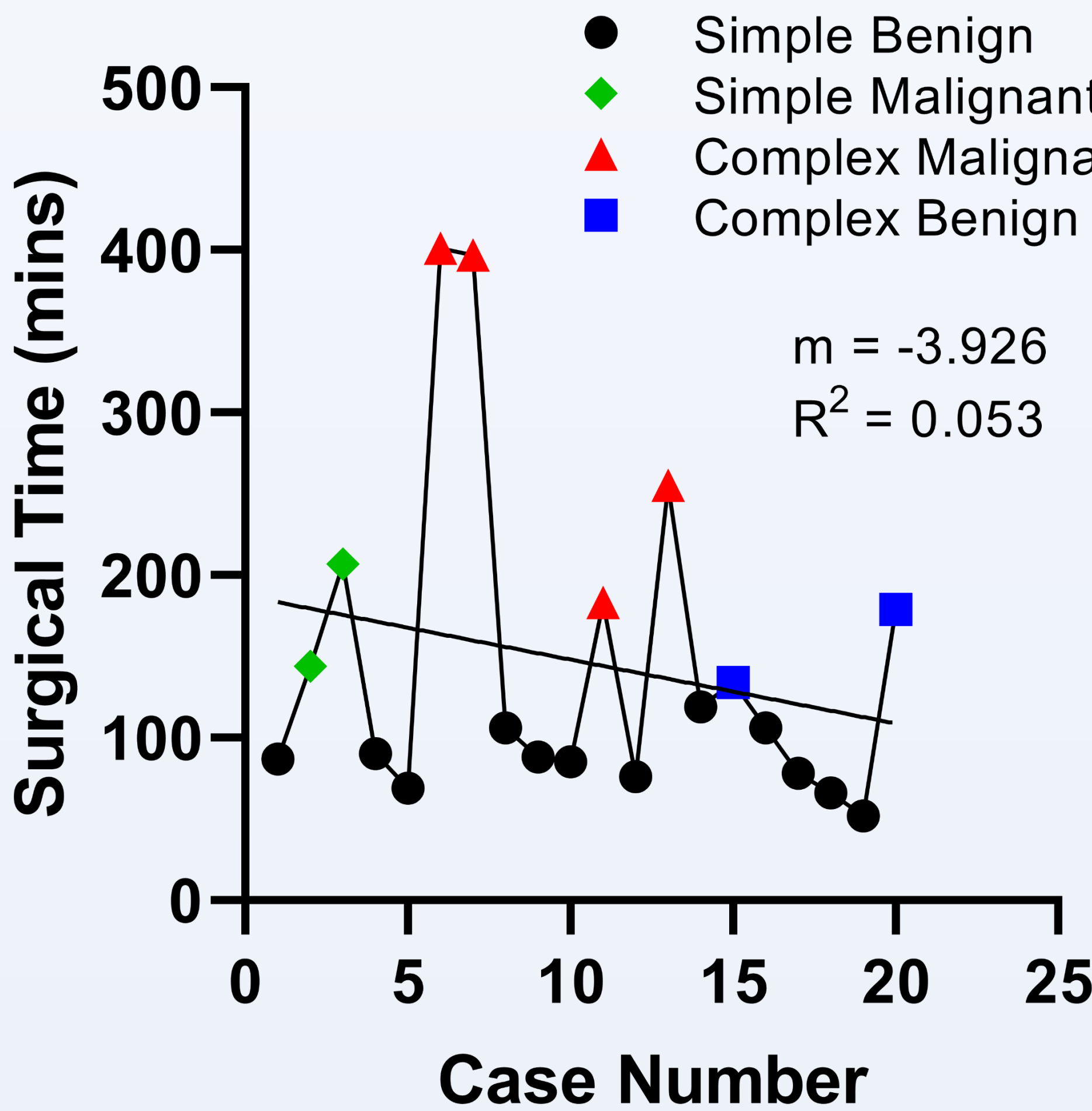


Figure 2. OR times for the first 20 surgical cases using the FLEX™ Robot.



Figure 3. The MedRobotics FLEX™ System with airway mannequin head secured to the table.

Conclusion

Users quickly gained proficiency with the FLEX™ Robotic System in a training environment, and these skills are retained after several months. This learning could translate to the clinical setting if a proper training regimen is developed. The Medrobotics FLEX™ Robotic System shows promise as a surgical tool in head and neck surgery in this study.

References

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