A Comparison of Novice, Resident, and Attending Orthopaedic Surgeon Outcomes on Six Fundamentals of Arthroscopic Surgery Training (FAST) Workstation Tasks

Peters T. Otlans, MD, MPH1, Taylor Buuck, BS1, Adam Rosencrans, BS1, Douglas Zaruta, MD2, Ryan Koehler, MD, MS3, Adam Schumaier, MD4, Jaron P. Sullivan, MD3, Brian Grawe, MD4, Gregg T. Nicandri, MD2, and Jacqueline M. Brady, MD1

1Oregon Health & Science University, Portland, Oregon; 2University of Rochester, Rochester, New York; 3Vanderbilt University, Nashville, Tennessee; 4University of Cincinnati, Cincinnati, Ohio
Peters Otlans, MD, MPH

I have no financial conflicts to disclose.
A Comparison of Novice, Resident, and Attending Orthopaedic Surgeon Outcomes on Six Fundamentals of Arthroscopic Surgery Training (FAST) Workstation Tasks

Peters T. Otlans, MD, MPH¹, Taylor Buuck, BS², Adam Rosencrans, BS², Douglas Zaruta, MD², Ryan Koehler, MD, MS³, Adam Schumaier, MD⁴, Jaron P. Sullivan, MD⁵, Brian Grawe, MD⁴, Gregg T. Nicandi, MD⁵, and Jacqueline M. Brady, MD¹

¹Oregon Health & Science University, Portland, Oregon; ²University of Rochester, Rochester, New York; ³Vanderbilt University, Nashville, Tennessee; ⁴University of Cincinnati, Cincinnati, Ohio

Introduction

- The FAST Program offers a arthroscopic skills workstation and curriculum designed for surgeons in training to acquire and improve arthroscopic surgical skills.

- More expert surgeons would be expected to take less time to complete procedures while committing fewer errors.

- The purpose of this study was to compare medical students, orthopaedic trainees, and attending surgeons to demonstrate that time to completion, number of errors, and successfully tied knots is associated with level of training in arthroscopy.

Methods

- 115 subjects enrolled:
  - 78 orthopaedic residents and 17 medical students were enrolled at three orthopaedic training sites.
  - 20 attending arthroscopic surgeons consisted of instructors at two Arthroscopy Association of North America Resident Arthroscopy Courses.

- Each participant completed 6 modules in random order.
  - For each module, except knot tying which involved tying five knots, the participant completed the task twice, once with each hand in random order.
  - For biting, maze, probing, ring transfer, and suture passage, time to completion and errors were recorded.
  - Number of successful knots was recorded for knot tying.

- Four groups were compared: medical students, junior residents (post-graduate year 1 through 3), senior residents (post-graduate year 4 and 5) and attendings.

- Data for each trial was averaged and significance was set at p < 0.05.

Results

- BITING: Mean time to completion for biting was significantly slower for medical students compared to other groups (158 vs 101-122 seconds).

- Attending surgeons made significantly fewer errors than the junior resident and medical student groups (0.1 vs 1.4-2.0 errors, respectively).

- MAZE: For maze completion time, senior and junior residents performed similarly (129-156 s) while medical students were significantly slower (207 s) and attendings were significantly faster (72 s).

- Error rates were similar for all groups.

- PROBING: For probing completion time, senior and junior residents performed similarly (156-165 s) while medical students were significantly slower (214 s) and attendings were significantly faster (96 s).

- Error rates were similar for all groups.

- RING: For ring transfer, all groups were significantly different and attendings were fastest, followed by seniors, juniors, and students (140, 221, 297, 428 s).

- Attendings made significantly fewer errors, and other groups performed similarly (0.9 vs 1.9-2.6 errors).

- SUTURE: For suture passage, attendings were significantly faster than all groups (203 s), and senior residents (410 s) were significantly faster than juniors and students (711, 772 s), who performed similarly.

- With regard to passage errors, attendings committed significantly fewer and other groups performed similarly (0.2 vs 1.5-1.7 errors).

- KNOT: For number of successfully tied knots, there was no difference between attendings and seniors (3.8 and 2.9 knots), attendings were better than juniors (2.6 knots), and the medical student group was significantly worse than all others (1.4 knots).

Conclusion

- When comparing medical students, senior residents, and attending orthopaedic surgeons on six FAST modules, there are measurable differences in time to completion, errors, and successfully tied knots.

- In all circumstances, when significantly better performance was observed, it occurred in the more senior group.

- The FAST program can serve as a valuable tool in detecting objective changes as orthopaedic surgeons progress in their training and may help develop clinically applicable arthroscopic skills.
References