Development of an Open Knot-Tying Curriculum: We Assumed They Already Knew!

Nizamuddin Shaikh, Vicky Yeh, Rafael de Azevedo, Talal Dahab, Michael Traynor Jr, Anne Kamphausen, Mohamed Baloul, Mariela Rivera, David Farley
Department of Surgery
Mayo Clinic, Rochester, MN

**Results**

- **Average time to tie a pair of knots** was 34 seconds in the control cohort and 36 seconds in the intervention cohort.
- **Leak rate** was 41.5% (27/65) in the control cohort, compared to a leak rate of 33% (22/65) in the intervention cohort.
- **Accuracy** was 52% (34/65) in the control cohort, compared to 63% (41/65) in the intervention group.
- 100% knots were squared in both cohorts.

**Objectives**

- Develop a 90-minute open knot-tying curriculum for surgical residents aimed at:
  - improving resident technique
  - refocusing resident thought processes to prioritize secure knots rather than speed.

**Material**

- Simulated blood vessels (balloons filled with fake blood)
- FAST knot tester
- Dowel
- Ligature
- Foam
- Pencils
- 20 lb nylon fishing line

**Backgrounds**

Institutional study in 2018 showed 72% knots leaked.
Attributed to poor technique and prioritizing speed over secure knot-tying.

**Method**

**The knot-tying curriculum:**
- Two handed
- Right single hand
- Left single hand

**Basics of knots:**
- Square knot
- Half-hitched knot
- Slip knot

Knot-tying proficiency was compared between two intern cohorts:

- **Control (2018):** No exposure to a curriculum
- **Intervention (2019):** Participated in a 90-minute knot-tying curriculum

**Assessment**

- Time
- Square
- Accuracy
- Leak

**Conclusion**

A focused 90-minute knot tying curriculum improved knot-tying skills in surgical interns and reduced leakage.

© 2017 Mayo Foundation for Medical Education and Research