An Inanimate Colonoscopic Model to Teach Scope Torquing Skills: A Preliminary Report

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Background/Aim

Proficiency in advanced endoscopy requires mastering complex scope mechanics, a process that can be prolonged if training occurs exclusively in the clinical setting[1]. Endoscopic interventions—such as biopsy, snaring, or injection—necessitates precise scope alignment with the pathology at the bottom of the monitor image since instruments passed through the colonoscope's working channel exit at 5-6 o'clock on the monitor. Torque which is applied by the right hand on the scope shaft is most often required to position the pathology at the bottom of the image. Given the limited exposure novice endoscopists receive in clinical training, skill acquisition can be slow. This poster presents an inanimate model designed to teach scope torque, a fundamental skill in both basic and advanced endoscopic procedures, along with preliminary training outcomes.

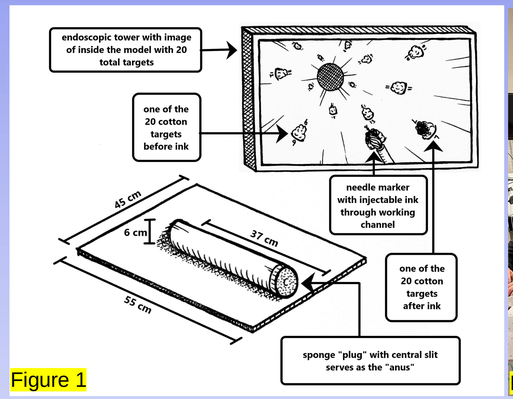


Figure 1

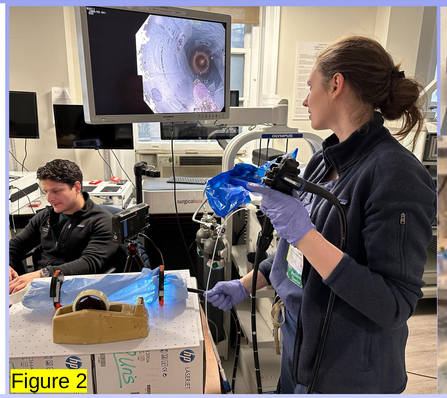
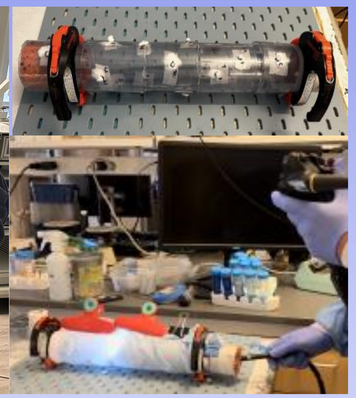


Figure 2



Methods

A hollow plastic tube, 37 cm long with a 3.5 cm inner diameter, serves as the "colon"; the tube has 20 numbered 2 mm holes containing cotton that are dispersed along its length and circumference. A round sponge with a central slit is inserted in one end and serves as the anus (Figure 1). A colonoscope and sclerotherapy catheter (with felt marker tip in its end serves as the pen and the ink is a dilute methylene blue solution) are used. Trainees insert the scope and pass the sclerotherapy catheter "pen" through the instrument channel and out the scope's tip. The trainee touches the targets, in order, with the pen (pen left in extended position between targets). The scope must be repeatedly torqued to accomplish this goal. The time to mark all targets is tracked (single session). Trainees completed between 7 and 11 sessions.

Results

A total of 14 residents did an average of 9.21 sessions each (range, 7 to 11). The number of trainees in each training group was: PGY-1, 1 (7.1%); PGY-2, 4 (28.6%); PGY-3, 2 (14.3%); PGY-4, 2 (14.3%); PGY-6, 2 (14.3%); research MDs, 3 (21.4%)(Figure 3). The mean completion time for the first run was 460 seconds (range, 152-909 seconds). With practice, times decreased and reached a fairly steady baseline (mean of 259 seconds) after an average of 6.6 training sessions. However, the mean completions time further decreased for trainees that did 10 sessions. A steady baseline was not reached in this study. Importantly, the results did not vary significantly with PGY level although the number of trainees per group was quite small.(Table 1).

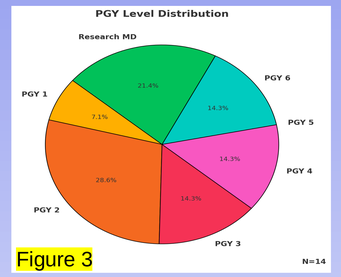


Figure 3

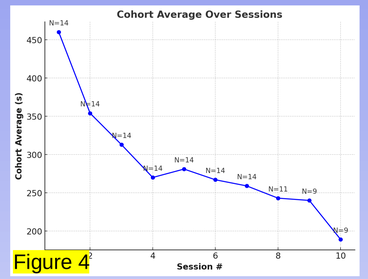


Figure 4

Cohort Training Time Improvement Summary

Session	Average Time (sec)	% Improvement from First Session
1	460.36	0.0
2	353.79	23.15
3	312.79	32.06
4	270.36	41.27
5	280.64	39.04
6	267.29	41.94
7	258.64	43.82
8	242.82	47.25
9	239.78	47.91
10	188.89	58.97

Table 1

Conclusion

This study demonstrates that a focused, high-repetition, non-clinical training model can accelerate the development of scope torque skills in endoscopy trainees. By isolating a fundamental mechanical skill—torquing the colonoscope to align the instrument with the target—this model allows trainees to become proficient efficiently (Table 1). Results show that trainees, regardless of PGY level (Figure 3), reached a stable performance baseline after 6.6 sessions (Figure 4), reducing completion times by 44%. With further training (to 10 sessions) the mean session time decreased by another 50 seconds. Although a final baseline was not reached, these results suggest that deliberate focused practice using an inanimate model can significantly shorten the learning curve, independent of prior clinical experience and PGY level.

While these findings are promising, the broader clinical impact remains to be determined. Future studies should evaluate whether improvements in simulated training translate to enhanced live endoscopic performance. Additionally, expanding this modular approach to other core skills—such as loop reduction, retroflexion, lesion targeting—may further optimize competency-based training. Integrating structured, high-repetition simulation into endoscopy education could improve skill acquisition, potentially shortening clinical training time and enhancing overall procedural proficiency.

References

1. McCarty, T. R., & Aihara, H. (2020). Current state of education and training for endoscopic submucosal dissection: Translating strategy and success to the USA. Digestive Endoscopy, 32(6), 851-860.