Basic Surgical Skills Training from the Aspiring Surgeon's Home: A Validation Study

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Introduction:

Surgeons undergo extensive training to master various procedures. Traditionally, the Halsted apprenticeship model, encapsulated in the "see one, do one, teach one" approach, has been fundamental in surgical training. However, recent advancements and changes in surgical education have rendered this traditional model less relevant, signalling a shift towards more modern training methodologies.

The Inovus Medical Basic Surgical Skills (BSS) kit is a pivotal at-home training tool for medical trainees, providing hands-on experience in fundamental surgical techniques such as knot tying, deep tissue suturing, incision making, and various minor surgical procedures (2). It stands out for its convincing skin pads, offering an exceptionally realistic experience for basic surgical skills development. It offers a cost-effective, phone-based robust surgical skills practice and assessment tool

The objective of this pilot study, centred around the Inovus BSS kit (although applicable to any basic surgical skills kit), is to provide a thorough evaluation of this innovative, home-based surgical training tool.

Methodology:

This feasibility study, conducted between August – November 2022, utilises a multi-centre RCT approach. It centres medical students through to core surgical trainees. 13 participants completed an initial series of basic surgical tasks, including suturing and knot-tying techniques. Each skill was measured against three parameters: an objective scoring tool, competition time and self-assessment. Participants were randomly allocated into either the intervention group for at home training, or the control group. Following practice iterations at home, final repeat assessment was conducted to identify improvement

Results:

Five domains were assessed for each suturing task: respect for tissue, motion and efficiency, visuo-spatial, suture quality and time taken. Knot-tying was assessed by quality and time taken. Significance on independent t-test ($p>0.05$) was found across various domains particularly performing complex sutures such as vertical and horizontal mattress. A greater self-confidence in performing knot tying was also reported in those who trained with the tabular base and BSS kit.

Group three, employing the full BSS kit, demonstrated improvements that, while subtler, were nonetheless indicative of the kit's value. Enhancements in specific tasks like Horizontal Suture and Instrument Tie were observed. This underscores the kit's role in refining competencies, even among those who have already attained a certain level of proficiency. The improvements in efficiency and visual-spatial skills among cohort three underline the potential of the Full BSS kit to fine-tune advanced surgical skills.

Analysis of qualitative data produced a significant difference in self assessed skill level post intervention when attempting surgeon's knots, tying at depth and the instrument tie suggesting a positive trial experience.

Conclusion:

This study's findings suggest that remote training using a BSS kit is particularly effective in enhancing complex skill sets in novice trainees. The findings advocate for the integration of such innovative tools into surgical training curricula, especially given their ability to provide high-quality, realistic practice opportunities beyond the confines of the operating theatre or the simulation suite. Future research endeavors should consider increasing the power of the study and stratifying participants by initial skill levels to capture the nuanced effects of such training tools, understand the learning curve, and to tailor educational interventions more precisely.

Acknowledgements:

We are interns/executives within Inovus Medical, which has provided support but not funding for this study. We have sought to avoid over-mentioning products or pushing sales. Our intention is to increase awareness of alternative augmented reality training options to drive surgical training away from the patient's bedside.

We extend gratitude and thanks to SAGES for allowing us to present our findings. Inovus Medical is an eligible company and is an accredited provider for CPD/CME points for surgical training.

