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Student-led learning: a new teaching paradigm for surgical skills

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Abstract

BACKGROUND: Competency-based education and simulation are being used more frequently in surgical skills curricula. We explored a novel student-led learning paradigm, which allows trainees to become more active participants in the learning process while maintaining expert guidance and supervision.

METHODS: Twelve first-year orthopedic residents were randomized to either a student-led (SL) or a traditional instructor-led group during an intensive, month-long, laboratory-based technical skills training course. A rigorous qualitative-description approach was used for analysis.

RESULTS: Four prominent themes emerged: instructional style, feedback, peer and instructor collaboration, and self-efficacy. Compared with the instructor-led group, there was more peer assistance, feedback, collaboration, and hands-on and active learning observed in the SL group.

CONCLUSIONS: The flexible and socially rich nature of the SL learning environment may aid in development of both technical and nontechnical skills early in residency and ultimately privilege later clinical learning.

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Recent challenges have led surgical educators to question the ability of traditional, apprenticeship-based training methods to adequately prepare surgical trainees for independent practice.[1] Restrictions on residents' work hours have resulted in fewer opportunities for teaching and learning in the clinical setting.[2] This is especially true given the ever increasing number and complexity of surgical procedures that residents must learn. Recent studies have revealed that surgical residents may not be getting sufficient exposure to essential procedures before completing their training.[3]

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Surgical educators are seeking new approaches to training residents. Two prominent trends are emerging. The first is a transition toward competency-based education (CBE), which aims to prepare physicians to graduate with demonstrated competencies and de-emphasize time-based training while assuring greater accountability, flexibility, and learner centeredness.[4] A number of competency frameworks have been developed, with each built on the notion that trainees must demonstrate proficiency on key predefined outcomes before being authorized to continue to the next stage of their training, eventually leading to certification for independent practice.[5–8]

The second trend is an increasing use of simulation-based teaching sessions to supplement and enhance traditional clinical learning. Recent years have seen an exponential increase in the number of high- and low-fidelity simulators and bench models, which can be used to teach and perfect medical and surgical techniques in a low-risk, stress-free environment before they are applied to the high-stakes clinical setting.[9,10] One important variable that has been examined with regard to simulation training is the role of independent learning paradigms, such as student self-guided learning, which are becoming increasingly popular in residency programs, especially because of the augmented ease of access to simulation laboratories.[11] Although some studies have reported that self-guided or self-regulated learning can provide effective learning environments for trainees, researchers warn that some level of supervision should be maintained and that complete learner autonomy should not necessarily be the ultimate goal of medical and surgical education.[12] The amount of time and influence a teaching clinician provides to learners still needs to be determined. Additionally, these studies have exclusively examined the acquisition of technical skills; yet, little is known about how self-guided learning may affect the acquisition and use of nontechnical skills.

Our team from the University of Toronto recently developed a novel training paradigm entitled student-led learning (SLL). SLL is a new term, coined to set this approach apart from many buzzwords that permeate through the literature, such as self-guided, self-regulated, and student-driven models of learning, many of which have been interpreted differently by various groups.[11,13] Although the primary tenets of SLL are not new, this approach is a carefully selected combination of key aspects of a variety of teaching strategies, systematically implemented into a cohesive program. SLL stresses the importance of trainees' autonomous control over the learning process[13,14]; yet, unlike self-directed and self-regulated learning, which are generally unsupervised,[11] central to the SLL paradigm is that an educator is always present to provide assistance as required and to guide students through the learning process. Appropriate guidance by content experts is critical, especially in the earliest, formative stages of skill acquisition.[15] SLL emphasizes the role of the educator as a facilitator who promotes deliberate, student-led exploration and practice, providing guidance and an educational framework when necessary.[14] Furthermore, trainees who learn under an SLL paradigm are encouraged to work together in small groups, which contrasts with the independent nature of the instructor-directed, self-guided learner.[11]

Our initial exploration of the SLL paradigm examined its ability to enhance the acquisition of technical surgical skills.[16] Learning technical skills is an iterative process, during which trainees must analyze the skill, break it down into its components, define goals, and then create strategies to reach these goals.[15] Creating an internal representation of what optimal performance should be for each component allows trainees to compare their actual performance against this representation and continue to solicit additional feedback with each attempt at the skill to improve their performance.[15,17] SLL offers trainees an environment in which they are free to explore and develop their own internal representations for skill acquisition rather than working from templates that are provided through lectures and demonstrations.[16] The SLL approach also encourages trainees to practice at their own pace and repeat skills as they deem necessary. Skills are reinforced through cooperative learning, whereas trainees become the primary support for their peers, with the instructor available for assistance as required.

We have previously shown that an SLL paradigm is an extremely effective approach for enhancing the acquisition of technical surgical skills.[16] In our previous study, SLL was examined in the context of an intensive, technical surgical skills training course at the University of Toronto, known as the Toronto Orthopaedic Boot Camp (TOBC).[16,18,19] First-year orthopedic residents who were taught under the SLL paradigm performed significantly better on a series of targeted skills examinations than their peers who were taught using traditional, instructor-led methods.[16] Although the implementation of SLL has clear benefits for technical skills acquisition, there is more to being a competent surgeon than simply being an excellent technician. Training programs must also develop methods for teaching nontechnical skills, such as communication, collaboration, teamwork, and leadership skills.[20] Nontechnical skills are difficult to quantify, and there is growing concern that a focus on the achievement of measurable technical competencies may be overshadowing a variety of other nontechnical skills, which are essential to the success of the profession.[20,21]

Based on the SLL paradigm design and its success in technical skill acquisition, we believe it may be more useful than a traditional, instructor-led framework for developing surgical trainees' nontechnical skills. Current laboratory-based surgical training courses may be overemphasizing technical skills and overlooking the importance of development of nontechnical skills.[21] A primary aim of the SLL approach is to allow trainees to take more control over the learning process, perhaps promoting a more cooperative, social, and active learning environment, which may improve problem-solving and leadership abilities.[22,23]

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