

Surgical Education

The impact of a surgical boot camp on early acquisition of technical and nontechnical skills by novice surgical trainees



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Abstract

BACKGROUND: Acquisition of skills early in surgical training represents a significant challenge at present because of training time constraints. The aim of this study was to investigate if an intensive surgical boot camp was effective in transferring skills at the beginning of a surgical training program.

METHODS: New core surgical trainees (n = 58) took part in a 5-day boot camp. There were pretest and posttest assessments of knowledge, technical skills, and confidence levels. The boot camp used simulation and senior surgical faculty to teach a defined range of technical and nontechnical skills.

RESULTS: The scores for knowledge (53.8% vs 68.4%, $P < .01$), technical skills (35.9% to 60.6% vs 50.6% to 78.2%, $P < .01$), and confidence levels improved significantly during boot camp. Skills improvements were still present a year later.

CONCLUSION: The 5-day surgical boot camp proved to be an effective way to rapidly acquire surgical knowledge and skills while increasing the confidence levels of trainees.

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Traditionally, surgical training was achieved through the apprenticeship model whereby the trainee was taught by direct observation of a senior mentor, followed by practice

under supervision and then repetitions with progressively less supervision and more autonomy.¹ Several factors exist today, which make the apprentice model of training unsustainable. These include restrictions to working hours for surgeons in training, reduced availability of operating time, and increased specialization. The European Working Time Directive stipulates that a doctor may not exceed 48 hours/week working and are entitled to a minimum of 11 hours of uninterrupted rest per day.² A shorter training time of 8 years has been introduced by the Intercollegiate Surgical Curriculum Programme in the United Kingdom and Ireland and this has resulted in at least a 40% reduction in the cumulative hours of training compared with 10 years

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Table 1 Skills taught during the 5-day boot camp skills course

Technical skills	Nontechnical skills
Preoperative gowning	Critical care management
Surgical instrument use	Risk management in surgery
Knot tying	Clinical decision making
Suturing	Industry talk on equipment
Minor procedures	Caring for yourself in surgery: physiotherapy
Abdominal closure	Caring for yourself in surgery: psychology
Bowel anastomosis	Basic emergency medicine skills
Laparoscopic simulation	Nutrition in surgery
Endoscopic simulation	Dealing with common surgical clinical problems

ago.³ Core Surgical Training is the first 2 years of this 8-year program and it includes 6 months in general surgery, 6 months in trauma and orthopedics and 12 months in a surgical specialty. It is intended for doctors who have completed their internship or are in the early years of working as a junior resident in surgery.

Advances in surgical simulation have addressed some of the surgical training needs by allowing surgeons to both learn and practice on virtual reality and physical bench models in a risk-free environment.⁴ The Royal College of Surgeons in Ireland (RCSI) has over the last 10 years embraced training through simulation and offers 5 technical skills and 3 nontechnical skills courses to first year trainees throughout the year. The distribution of these courses, where the trainee's advancement in proficiency and practice of skills is supervised by faculty, is an example of a "distributed practice" method of teaching. This model has been proven to have superior retention rates to "massed practice" where the skills are taught in an intense short period of time.^{5,6}

When trainees start their new surgical career on a training program, there are no transition courses preparing them to become surgical residents. They do not have the appropriate technical or nontechnical skills to immediately take advantage of learning opportunities at work or the confidence in their skills to be assertive within the team.⁷⁻⁹ We hypothesized that the creation of an intensive 5-day surgical boot camp, in the first weeks of their training, would equip the trainees with the appropriate technical and nontechnical skills to "jump start" their careers and take advantage of early training opportunities in the hospital. This concept of a boot camp at the beginning of a new training post is not new and has been shown to be effective with mixed retention rates up to 1 year later.¹⁰⁻¹² However, previous studies offered different content in their courses and the boot camps were of varying length, with small numbers of participants. Our boot camp is the first documented boot camp to be administered nationally on a mandatory basis to newly appointed general surgical trainees. Our study aimed to establish if this boot camp was effective in terms of transferring knowledge, improving technical skills, and increasing confidence levels in technical and nontechnical skills at the end of the 5 days.

The boot camp group in this study went on to participate in the multiple training days during the year (distributed practice); therefore, finally, we wanted to investigate whether their end of the year assessment scores were different to the scores of the previous year's trainees who did not have the additional benefit of the boot camp (massed practice).

Methods

Study design

This was a prospective cohort study with a historical comparison group. The STROBE standardized reporting guidelines were followed to ensure the conduct and reporting of the research.¹³ Ethical approval was obtained from the Research Ethics Committee of RCSI (REC 843) and all participants gave informed consent to participate in the study.

Participants

All 58 trainees commencing core surgical training (CST) in Ireland in July 2013 were enrolled on a 5-day surgical boot camp, which was held at the National Surgical Training Centre at the RCSI. It was mandated that trainees attend all parts of the 5-day course. However, their participation in this study was voluntary.

Intervention

The boot camp consisted of 40 hours of intensive tuition in both technical skills (20 hours over 5 days) and nontechnical skills (20 hours over 5 days) (Table 1). The content of the course was developed by senior surgical educators in RCSI according to learning outcomes aligned with the skills expected for surgical trainees at the end of Year 1 of CST, working from the requirements of the Intercollegiate Surgical Curriculum Programme. The trainees were taught by experienced surgical faculty, with a 1:4 tutor to trainee ratio. They received individual attention with an emphasis on coaching, feedback, and repeated practice.

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