

# Core surgical field camps: a new deanery-based model for enhancing advanced skills in core surgical trainees through simulation

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## Abstract

Hands-on wet lab simulation training is a vital part of modern surgical training. Since 2010, surgical 'boot camps' have been run by many UK deaneries to teach core surgical trainees basic entry level skills. Training in advanced skills often requires attendance at national fee-paying courses. In the Wessex Deanery, multiple, free of charge, core surgical 'field camps' were developed to provide more advanced level teaching in the particular specialty preference of each core surgical trainee. After the COVID-19 pandemic, national hands-on courses will be challenging to provide and deanery-based advanced skills training may be the way forward for craft-based specialties. The experiences over 2 years of delivering the Wessex core surgical field camps are shared, giving a guide and advice for other trainers on how to run a field camp.

**Key words:** Boot camp; Core surgical training; Field camp; Simulation; Surgical skills; Wessex

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## Introduction

Surgical 'boot camps' in the UK originated in Scotland in 2010 as a hands-on intensive simulation workshop for core surgical trainees at the start of their training to create a level playing field of basic skills (Walker et al, 2020). The boot camp has been shown to be an effective way to acquire surgical knowledge and skills while increasing the confidence levels of trainees (Fernandez et al, 2012; Heskin et al, 2015). Since then, boot camps have been organised in other deaneries, including the authors' own Wessex Deanery. They were loosely styled on the original military meaning of boot camp as imparting the initial basic skills needed by an early recruit. In the Wessex Deanery, like many other deaneries, a monthly regional teaching programme is organised, which includes wet lab and simulation training, but it can be challenging to ensure that core surgical trainees are receiving adequate teaching in their chosen specialty to prepare them for higher surgical training. Acquisition of the necessary skills in early surgical training is a significant challenge, and simulation-based education has become a critical way to fulfil training requirements (Fernandez et al, 2012; Bamford et al, 2016, 2018). It has a vital role to play in the development of surgical technical skills and confidence in a risk-free environment, enabling better use of valuable clinical operative exposure (Aggarwal et al, 2010; Choy and Okrainec, 2010; Nagendran et al, 2013).

The authors recognised a need for a more intensive simulation workshop and, taking inspiration again from military training, a core surgical 'field camp' was developed. In this, core surgical trainees were stretched further than their basic skills and were given the training and tools needed to hone their craft in the 'field'. Specifically, multiple parallel hands-on workshops were developed, which were tailored to the specific specialty preferences of the core surgical trainees in the region, partnering with surgical equipment providers and wet lab specialist providers, to provide three independent 2-day practical workshops in the specialties of general surgery, orthopaedics and plastic surgery. This model was used over a 2-year period with excellent feedback and progression from trainees. In light of the COVID-19 pandemic, national hands-on courses will be challenging to facilitate, yet core surgical trainees must not be denied the opportunity to acquire the surgical skills necessary to permit progression in training. The authors consider it likely that deanery-based regional

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training will become feasible before national or international courses resume, and believe that these courses can be run while adhering to government guidelines on social distancing. The authors therefore share their experiences and give guidance to show the excellent value that deanery-based field camps can provide in surgical training to facilitate trainers elsewhere in establishing them.

### Field camp aims and objectives

1. Provide speciality-specific hands-on operative simulation training for core surgical trainees as opposed to generic basic MRCS (Membership of the Royal College of Surgeons) level training
2. Showcase the operative skills desirable for the end of core surgical training or junior registrar level (CT2–ST4), to stretch core surgical trainees and provide them with the initial experience needed to be able to confidently carry out similar tasks under supervision in theatre, if given the opportunity
3. Improve the morale and motivation of core surgical trainees by giving training at the level and quality of that given to junior registrars, to show what core surgical trainees are working towards in pursuit of an ST3 training number
4. Reduce the high cost to trainees incurred by the traditional route of gaining these skills through nationally run courses, often costing upwards of £800 per course.

### Setup and guide for trainers

Core surgical field camps were established for the three largest specialty preferences within the cohort of Wessex Deanery trainees – general surgery, orthopaedics and plastic surgery. The general surgery camp also catered for vascular and urology trainees, both with specific skill stations and given the transferable skills of general surgery. Similarly, ear nose and throat and maxillofacial trainees attended the plastic surgery camp, given the transferable skills in those disciplines. Each field camp consisted of 15 hours of intensive tuition and hands-on practice (excluding breaks) over the course of 2 days. The content of the course was developed and delivered by specialty-specific consultant and registrars (Table 1).

The level taught was that which would be expected of junior registrars, therefore pushing the core trainees beyond the basics and giving them a ‘flying start’ into specialty training. Technical skills were initially demonstrated by faculty or pre-recorded video and taught using wet lab porcine models, laparoscopic simulators, saw bones and orthopaedic equipment, as appropriate. Individual skills were taught in small groups of 3–4 trainees, with trainees rotating around skill stations every 90–120 minutes. Where equipment allowed, for example with laparoscopic trainers, trainees were able to train in pairs for the entire day with a series of tasks to achieve. The specific tasks and equipment used for each specialty-specific field camp are shown in Figure 1a–d.

A major element in being able to deliver this high quality simulation training was the provision of wet lab specimens and surgical equipment. These wet lab specimens, purchased from Medmeat Ltd, were both far cheaper and more realistic than equivalent synthetic models. Medmeat Ltd were able to supply bowel, stomachs, oesophagus, tendons, vessels, ureters, skin and muscle, making a whole range of skill stations possible. Twinned with this was the free provision by surgical equipment manufacturers of a wide range of supplies and devices. For the general surgery and plastic surgery field camps, Ethicon provided a large range of sutures, stapling devices and reloads, and energy devices. For the orthopaedic field camp, Strkyer provided ‘saw bones’ (realistic models of bones made from plastic and foam) as well as their complete kits, drills and clamps.

The field camps were provided to trainees free of charge. Consumable surgical equipment was provided free of charge from industry sponsors. The costs for venues, catering and reusable surgical equipment, such as the laparoscopic simulators and surgical instruments, were met from the Wessex Deanery core surgical budget. In the first year of the field camps (2019), the total cost for the three field camps was £3670, broken down as £2084 for general surgery, £1002 for plastic surgery and £584 for orthopaedics. Within these total costs, wet

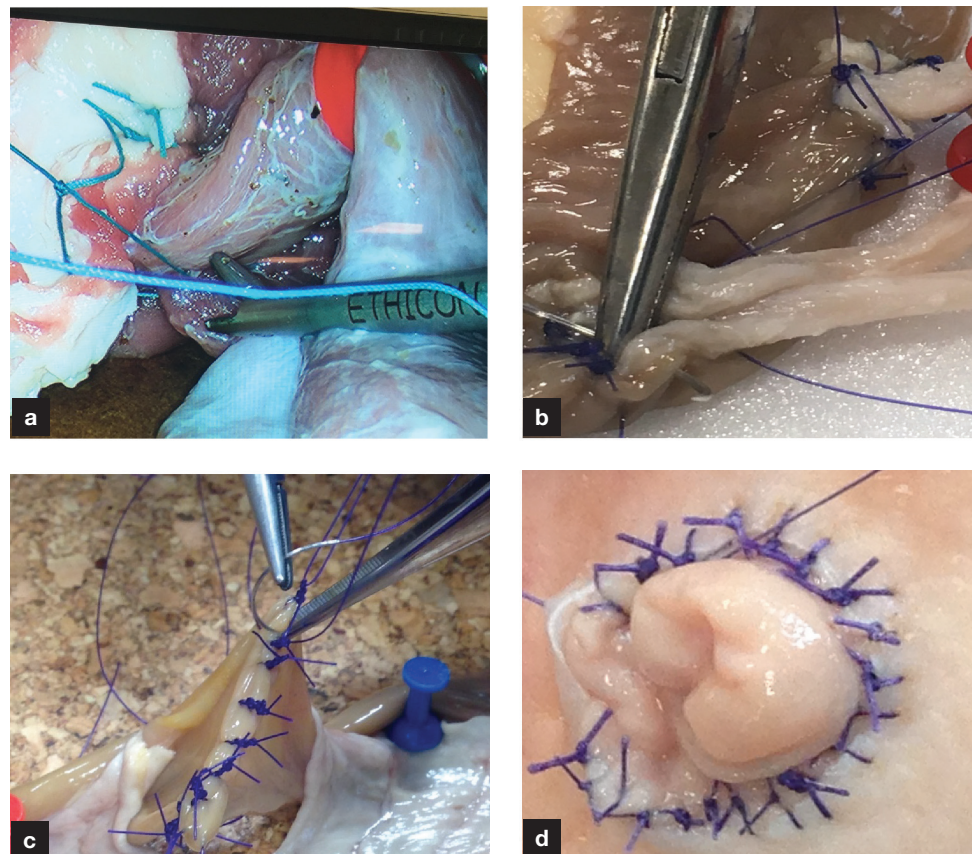
**Table 1. Specific skill stations and equipment for each field camp**

	<b>General surgery</b>	<b>Orthopaedics</b>	<b>Plastic surgery</b>
<b>Day 1 skills</b>	End-to-end sewn small bowel anastomosis Side-to-side stapled small bowel anastomosis Side-to-side two layer sewn gastrojejunostomy Side-to-end stapled oesophagojejunostomy (with anvil) Loop, end and double barrelled stomas Wallace and Bricker Uretero-ileal anastomosis (2020 course) Aortic–Dacron graft anastomosis and vein patch (2019 course)	Dynamic hip screw Hemiarthroplasty Gamma nail Associated lectures on fracture management principles	Tendon repair using porcine and synthetic silicone tendons Microvascular arterial and venous anastomoses Case-based discussions on management of plastic surgery cases with associated practicals
<b>Day 2 skills</b>	Laparoscopic suturing using hiatus hernia model Use of laparoscopic energy devices Use of laparoscopic staplers Laparoscopic gastrojejunostomy using stapler, suturing and energy device skills	Plastering techniques for upper and lower limb injuries Ankle lag screw with neutralisation plates, and compression plating techniques	Full-thickness skin grafts Simple flaps, for example rhomboid, z-plasty, bilobed, hatchet
<b>Equipment used</b>	Porcine or bovine small bowel Porcine stomach with oesophagus Porcine skin or muscle for stoma model and hiatus hernia model Porcine ureters Porcine aorta and femoral vessels Ethicon nTLC 90 staplers Ethicon Harmonic device Ethicon laparoscopic stapler 3/0 PDS and 2/0 Ethibond sutures	Femoral saw bones Clamps to hold saw bones Drills Dynamic hip screw kit Gamma nail kit Hemiarthroplasty kit Small fragment set Plaster of Paris	Microvascular suturing sets Synthetic tendons made from sanitary silicone Porcine tendons Porcine splenic artery (smallest calibre artery available – approx. 3mm)

lab specimens for the general surgery camp cost £580 and £110 for plastic surgery. The free provision by Stryker of saw bones as the simulated material for orthopaedics considerably lowered the cost of that camp. In addition, the use of laparoscopic simulators in the general surgery camp increased venue costs compared to the other camps. In 2020, refinements in all camps led to a reduction in costs of approximately 20%. Across the three camps, the average cost to the deanery per trainee per year was £101.94, based on the 72 trainees that attended the camps over the 2 years in which they have so far been organised. This compares very favourably to the £600–£800+ per person costs of nationally organised courses delivering comparable content.

All faculty provided their time without charge and were able to obtain study leave from their trusts. In addition, a basic faculty dinner was provided as part of the costs for each camp. Averaged across the 2 years that the field camps have been organised, the overall trainee to faculty ratio has been 3:1. Specifically, the general surgery, plastic surgery and orthopaedic camps have had trainee to faculty ratios of 3.25:1, 4.5:1 and 2:1. Faculty were recruited via Deanery-wide e-mails to the relevant specialties and, perhaps more importantly, by word of mouth recruitment of consultants and registrars known to excel in teaching. All faculty were a minimum of ST3 level and most were senior registrars (ST7/8) or consultants. The consultant to registrar ratio was 1:2.5.

Contact details for industry representatives and wet lab specimen providers are given in the acknowledgements as well as contact details for the authors who would be happy to advise any trainers interested in setting up a similar field camp.



**Figure 1.** a. Laparoscopic suturing on porcine hiatus hernia model. b. Wallace uretero-ileal anastomosis for ileal conduit urinary diversion. c. End-to-end sewn small bowel anastomosis using porcine model. d. Double-barrelled stoma using porcine small bowel and colon.

### Trainee satisfaction results

A total of 72 core surgical trainees have attended over the 2 years (2019 and 2020) that the field camps have been held – 39 in general surgery, 24 in orthopaedics and 9 in plastic surgery. Qualitative feedback was collected via Google Forms at the end of each day. Consideration was given to quantitatively assessing pre-course performance of a set task compared to performance on the same task after the course; however, given the number of skills to be taught, it was felt this quantitative assessment would detract from the actual learning time for trainees, especially given the task for quantitative assessment would have to be already widely known by trainees.

Feedback from the field camp was highly positive. All trainees either strongly agreed (80.3%) or agreed (19.7%) that the field camp was highly relevant to their training. Furthermore, all trainees either strongly agreed (64.3%) or agreed (35.7%) that their knowledge had improved as a result of the field camp days. All faculty were individually rated either excellent (70.1%) or good (29.9%) by all trainees. Free-text feedback was highly positive (Figure 2).

‘All excellent – a brilliant 2 days. Really useful, should definitely run again’  
 ‘I enjoyed all the sessions and definitely improved my operative skills.’  
 ‘Very useful to have so much hands-on training in a simulated manner’  
 ‘Hands on experience that we normally would not have gotten’  
 ‘Very useful to practise using saw bones and kit, especially before ST3 interviews’

**Figure 2.** Trainee free-text feedback.

## Conclusion and thoughts for the future

The introduction of core surgical field camps in the Wessex Deanery allowed core surgical trainees to obtain more advanced practical skills in their chosen field and receive feedback and mentorship from the consultants and registrars. All the field camps had excellent feedback and the timing of the teaching days in March allowed trainees to practice ST3 relevant skills in preparation for their upcoming interviews.

As the UK moves past the first peak of the COVID-19 pandemic, trainers nationally will be thinking about how training can be delivered in this new COVID-19 period. While undoubtedly some medical training can be moved online, trainees in craft-based surgical specialties will struggle without hands-on training. Relying entirely on 'in the job' training for trainee acquisition of operative skills would lead to a significant likelihood that core surgical training will suffer. Training opportunities are likely to be further limited by pressure on backlogged elective lists and core surgical trainees may be seen as too junior to be allowed to carry out tasks, given the heightened risk adversity. On the other hand, relying on online-based simulation training for operative skills is likely to be slow, expensive to set up and didactic in its approach, without trainees receiving either the materials and equipment they need, or the individualised feedback to refine their skills. Still, it is likely to be some time before nationally organised training courses can resume because of the wide epidemiological mixing of trainees this entails. The authors therefore commend this model of field camps to trainers in other deaneries as a possible way forward to provide high level skills training to stretch core surgical trainees and help ensure that a generation of surgical trainees do not end up under-skilled and set back.

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### Key points

- Hands-on wet lab simulation training is a vital part of modern surgical training.
- Since 2010, surgical 'boot camps' have been run by many UK deaneries to teach basic entry level skills.
- More advanced skills are still taught via national fee-based courses.
- In the Wessex Deanery, multiple, free of charge, core surgical 'field camps' were developed to provide more advanced level teaching in the particular specialty preference of core surgical trainees.
- National hands-on courses will be challenging to provide after the COVID-19 pandemic and deanery-based advanced skills training may be the way forward for craft-based specialties.

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Ethicon – [JBradsh3@its.jnj.com](mailto:JBradsh3@its.jnj.com) (Wessex-based Ethicon rep who can direct readers to their regional rep and provide advice as to the materials which were used.)

Stryker – [enquiries@stryker.co.uk](mailto:enquiries@stryker.co.uk)

Medmeat Ltd – [Medmeat@aol.com](mailto:Medmeat@aol.com) (E-mail and they will send you a price list and sample photos of what they can provide).

## Conflicts of interests

Ethicon Ltd and Stryker Ltd provided equipment to enable the simulation skills. This equipment was provided without charge. No other funding was given by either company either for the course itself or this publication. Medmeat Ltd provided the wet lab specimens at commercial prices without preferential discount. These costs were met through the HEE Wessex Deanery core surgical training budget. The authors therefore declare no conflicts of interests.

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