The need for specialist training exposure in residency programs

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Abstract In modern orthopedic practice, some degree of subspecialist expertise is required and training programs must provide for this. Specialist training in university teaching hospitals provides opportunities beyond just exposure to the complex case mix of a tertiary center. Specialist orthopedic hospitals provide care and leadership with national and international expertise. Their role in orthopedic training is substantial. With legislative reductions in permissible working hours orthopedic training continues to adapt to provide surgeons with the opportunities to fully develop skills, with teaching hospitals well placed to facilitate this. This article discusses the role of specialist training and teaching hospitals in contemporary orthopedic surgery.

Keywords Training · Specialist · University · Education · Exposure · Competence · Residency program

Introduction

The aim of modern senior orthopedic surgical training is to equip trainees to practice general orthopedics with a degree of subspecialty expertise. Training continues to follow the master apprentice model, essential for medical education and in particular for a craft specialty such as surgery.

The practice of orthopedic surgeons varies on a spectrum from those performing a breadth of mostly primary procedures with a degree of special interest to those undertaking complex tertiary level surgery within a subspecialty of orthopedics.

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Specialist training has great overall benefits, not only preparing those who will eventually have a tertiary practice but for all trainees, beyond just case mix exposure.

What is a teaching hospital?

Commonly, those practicing tertiary level surgery in the UK are based in university teaching hospitals. University hospitals are those with major teaching and research interests. Although a significant proportion of clinical training of medical students, junior doctors and registrars is also undertaken by general hospitals, in the UK the term “teaching hospital” refers to a university hospital, specifically the 44 members of the Association of UK University Hospitals (AUKUH). All trusts that are the primary hosts for medical schools in the UK are members of AUKUH. The first private medical school in the UK, The Buckingham Milton Keynes Medical School, is due to open in 2015. It is to be associated with University of Buckingham and Milton Keynes Hospital, which is not yet a member of AUKUH.

Registrar training programs are managed by teams led by surgeons in teaching hospitals. As part of a discussion of specialist training, therefore, it is important to consider the role of teaching hospitals in senior orthopedic surgical training.

Training in teaching hospitals

The emphasis on management of complex cases, research and training of teaching hospitals offers educational opportunities not available in general hospitals.

Exposure to complex cases

Trainees in teaching hospitals are exposed to more specialist cases. Just a few examples include complex primary and revision arthroplasty including joint replacement for younger

adults, complex pediatric surgery, limb reconstruction, peripheral nerve injuries and surgery for bone tumors. Maintaining a sufficiently high caseload of complex cases for certain subspecialties often requires the wide referral base of a university teaching hospital. Even though it is now usual for some more complex cases to be performed regularly in general hospitals, from which trainees will gain specialty experience, the overall number of complex cases and regularity is greater in teaching hospitals, hence, learning opportunities are more frequent.

It is also common for university hospitals to be regional major trauma centers. The introduction of regional trauma networks has formalized trauma care in England recently [1, 2] with teaching hospitals making up 19 of the 22 major trauma centers, providing exposure for trainees to not just the operative management of musculoskeletal injuries but also insights into the multisystem and multidisciplinary care of major trauma.

After training is complete even though a surgeon's practice may not be in tertiary level care it is essential to possess an understanding of such care to allow clinicians to identify patients for which more intervention is required and refer to tertiary care appropriately.

Research

University teaching hospitals provide a fertile research environment, attracting significant research funding [3] resulting in those institutions becoming national or international leaders in cutting edge clinical care. Guided by university professors or other clinical academics, access to facilities and the expertise of other nonclinical research staff can allow trainees to acquire skills and perform high quality research. Many universities offer higher degrees either in parallel with clinical training or as a temporary full time academic break from training for completion of a doctorate.

Teaching

Learning to become a trainer is an essential part of senior surgical training. Consultants in teaching hospitals are likely to have formal university educational roles enhancing the clinical competencies and teaching skills of trainees. With a large number of student doctors and more junior trainees in teaching hospitals there are more opportunities to participate in bedside teaching and formal lecturing.

Specialist orthopedic hospitals

Specialist orthopedic hospitals contribute considerably to orthopedic training. Particular examples include those members of the NHS Specialist Orthopaedic Alliance, which are a group of specialist orthopedic hospitals in the UK, centers of national and international expertise, providing quaternary

level orthopedic care. Strong links to university musculoskeletal departments result in high quality translational research and national orthopedic leadership. In addition to experiencing management of the most complex cases trainees benefit from the particularly high number of primary orthopedic procedures performed in these centers. Although small in number these hospitals provide training to a large proportion of orthopedic surgeons in the UK.

The need for subspecialty training

As orthopedic surgery has evolved with an increase in the number and complexity of orthopedic operations, it is impossible for a surgeon to remain surgically competent in all areas of orthopedics. For example, it has become clear that for certain procedures arthroscopic surgery is superior to open surgery and as arthroscopy has progressed, more complex new interventions may be challenging for the generalist.

There is a growing need for surgeons to perform what may have previously been considered tertiary level surgery. For example, an ageing population with increasing expectations of higher quality of life into later years will heighten the demand for complex surgery such as revision arthroplasty. Revision surgery as a proportion of total arthroplasty procedures has increased, from 2003 to 2012 rising from 9 % to 12 % of hip and 4.3 % to 6.5 % of knee procedures.¹ Previously the preserve of tertiary centers, it is now usual for general hospitals to have 1 or more surgeons regularly performing revision arthroplasty. Some degree of subspecialization is essential for trainees. In advertisements in the UK press it is usual for a degree of specialization to be sought, with adverts seeking a true general orthopedic surgeon largely absent. The expectation of many patients to be treated by a specialist is also further driving toward subspecialization of orthopedic surgeons.

Avoiding compartmentalization

After completing training, some orthopedic surgeons may perform exclusively tertiary surgery in a teaching hospital. There will be a large number of orthopedic surgeons of different subspecialties in the same hospital so patients presenting with pathology beyond one consultant's field can be treated by another within the same institution. For the majority of orthopedic surgeons who will practice in general hospitals it is important to have sufficient general expertise due to the breadth of clinical presentation they will encounter and the possibility that there may not be a subspecialist available in some fields. An excessive degree of specialization or compartmentalization of practice is not appropriate in a general hospital. There may not be enough work for such a narrow field resulting in a lack of capacity to treat patients with

¹ www.njrcentre.org.uk.

clinical presentations usually manageable by general hospitals.

Orthopedic surgery requires the ability to perform a high number of different procedures, more than many other surgical specialties. Gaining such breadth of ability is another reason why a trainee's progress must be regularly reviewed and directed to the appropriate training posts. In the UK the first 4 years of registrar training aim to achieve competency in the generality of orthopedics and final 2 years to be focused on areas of particular interest. General hospitals trainees will have exposure to a regular flow of orthopedic cases in a secondary care setting, allowing repetition of procedures. A combination of both teaching hospital and general hospital placements throughout a training program results in a well-rounded orthopedic education.

Achieving competency and evidence of competency

In previous decades, registrar or residency training rotations would involve many hours of training and a high number and breadth of procedures performed. Because of the large number of cases and relatively fewer trainees, it was assumed that sufficient opportunities would exist to achieve competency.

With legislation to limit the working hours of doctors [4], a higher number of trainees with consequent fewer opportunities for clinical contact, training must adapt in order to confidently produce competent surgeons.

To help assure breadth of ability, registrars in the UK are required to provide structured evidence of surgical competency including written assessment by trainers of individual procedures and a satisfactory number of procedures performed. A satisfactory breadth and total number of procedures recorded in a surgical logbook are significant requirements for completion of training. These criteria have been somewhat quantified for UK trainees by a requirement to perform a specified minimum number procedures for 14 index or primary operations. To this end training rotations must be carefully structured to provide sufficient exposure to the whole breadth of orthopedics. At formal yearly review, trainees and program directors must work together to identify areas in which a trainee requires more exposure and plan how to achieve competencies in these subspecialties. A teaching hospital will have a large orthopedic department with subspecialists in all areas of orthopedics, allowing trainees to experience expert tuition in all fields.

Simulation and cadaveric surgery

Surgical simulation led by teaching hospitals allows development of early skill, has potential to be used for formal surgical competency assessment [5, 6], and may also be useful for established surgeons learning the fundamentals of new techniques. Trainees who have already developed some of the

necessary motor skills using a simulator will be practically more prepared when undertaking first attempts at procedures in the operating theatre. As well as speeding training this would be expected to improve the quality of surgery performed and, therefore, patient outcome and safety.

Cadaver dissection has a longstanding fundamental role in medical training. Since legislative changes in the UK in 2006 permitting cadaveric surgery there has been an increase in cadaveric surgical training opportunities. There is significant leadership from university teaching hospitals in this field [7].

Fellowship training

Fellowship training is essential for orthopedic surgeons and is likely to be the most specialist exposure a trainee will receive. It is an opportunity to extend skills within a subspecialty, clinically or academically. It is also a time to learn more of the nonclinical roles and practicalities of consultant practice within that subspecialty. Fellowship training is strongly desirable for many consultant posts and the quality of fellowship an important factor in appointment. Although fellowship posts exist in general hospitals and in private practice, the majority are based in teaching hospitals

Conclusions

Teaching hospitals are well placed as part of orthopedic training programs to prepare surgeons for modern orthopedic subspecialty practice. Aside from clinical exposure, they offer other desirable or essential educational opportunities to equip surgeons to be clinicians, research leaders, and educators.

Compliance with Ethics Guidelines

Conflict of Interest David Roberts and Michael Fox declare that they have no conflict of interest.

Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by any of the authors.

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