Training opportunities in the management of paediatric fractures: a district general hospital perspective

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ABSTRACT

INTRODUCTION Increasing subspecialisation, the introduction of reforms to surgical training, centralisation of hospitals and the reduction of working hours brought about by the European Working Time Directive (EWTD) has direct implications on the training of surgeons in the UK. The aim of this study was to determine the range and number of procedures performed for paediatric orthopaedic fractures, degree of supervision and possible implications for training.

PATIENTS AND METHODS A retrospective review of procedures for paediatric orthopaedic fractures performed in a district general hospital in a year was conducted.

RESULTS A total of 210 paediatric fracture procedures were performed, including 99 distal radius/ulna procedures, 28 shaft radius/ulna, 25 supracondylar procedures, 15 hand fracture procedures, 14 tibial shaft procedures. Middle grade/registrar and senior house officers performed 188 (89.5%) of all procedures. Consultant supervision was documented in 29 (13.8%) of all procedures performed. The number and type of common, as well as unusual, injuries was documented. The educational value of a training post may only be confirmed by reliable data which would provide an indication of operative opportunities and degree of supervision available to a trainee.

CONCLUSIONS: This study provided a model upon which all operative training opportunities in the orthopaedic department is documented. It is suggested that such data should form the basis of the establishment of training posts within a region. To maintain the high standard of orthopaedic training in the UK, the maintenance of such posts, number of trainees and seniority of trainees appointed to any hospital within a training region should be on the basis of data such as reported in this study.

KEYWORDS

Paediatric fractures – Orthopaedics – Training

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The objective of higher surgical training in the UK is to prepare a trainee (surgical registrar) for independent practice as a consultant in the National Health Service. The first 4 years of training are designed to provide broad and general exposure to the basics of the specialty, including trauma surgery and common elective operative procedures. With increasing subspecialisation, many orthopaedic units may not perform procedures such as paediatric trauma surgery, preferring to refer such cases to regional paediatric hospitals. Reforms to medical training, with the introduction of *Modernising Medical Careers* (MMC), and the *European Working Time Directive* (EWTD) will reduce the number of hours junior doctors work. These factors have direct and profound implications on the training of doctors in the UK, reducing the exposure of trainee

surgeons to various operations. The aim of the study was to determine the range and number of procedures performed, degree of consultant supervision and possible implications for training in a district general hospital.

Patients and Methods

The district general hospital in the study has a catchment population of about 250,000. The orthopaedic unit consists of 6 consultants, 2 staff grade surgeons, 2 specialist registrars (SpRs) and 5 senior house officers (SHOs). Due to anaesthetic reasons, children under the age of 5 years were transferred to a regional paediatric unit. There was a trauma list every day of the week, including the provision of out-of-hours trauma theatre list between 6 pm and 9 pm. A

Table 1 Procedures for fractures of the distal radius and ulna

Procedure	Consultant	Staff grade	SpR	SHO
Wrist MUA	3	42	30	13
Wrist MUA + K wiring		4	5	
Wrist ORIF		1	1	

MUA, wrist manipulation under anaesthesia; K wiring, Kirshner wiring; ORIF, open reduction, internal fixation.

Table 2 Procedures for diaphyseal fractures of the radius and ulna

Procedure	Consultant	Staff grade	SpR	SHO
Forearm MUA	2	12	3	2
Forearm MUA + K wiring	2		1	1
Forearm ORIF	2	3		

MUA, wrist manipulation under anaesthesia; K wiring, Kirshner wiring; ORIF, open reduction, internal fixation.

retrospective review of all procedures performed for paediatric orthopaedic fractures was conducted. All procedures performed on patients under the age of 16 years were documented. The operative log book in trauma theatres was the source of all documentation examined. This log book was meticulously filled in by surgeons or, if inadvertently missed, would be completed by scrub nurses. The period beginning May 2000 to end of April 2001 was chosen for the study.

Results

A total of 210 paediatric orthopaedic procedures were performed in the study period, the equivalent of about 4 procedures a week. Consultants performed 22 of these cases, 104 cases were performed by staff grade surgeons, 67 performed by SpRs and 17 cases by SHOs.

Ninety-nine procedures were performed on distal radius and ulna (Table 1). The majority of these cases were wrist manipulation under anaesthesia (MUA), with or without

percutaneous Kirshner (K) wiring. Open reduction, internal fixation (ORIF) of wrist fractures were uncommon. In addition, 28 procedures on the radius and ulna shaft (diaphysis) were performed (Table 2), 25 procedures were performed for supracondylar (S/C) humeral fractures (Table 3), 15 procedures were performed on various fractures in the hand (Table 4) and 17 procedures were performed on various fractures in tibia and fibula, including 3 ankle ORIFs (Table 5). Other procedures performed were ORIF of a diaphyseal shaft fracture of the femur, performed by a specialist registrar. Consultant supervision was clearly documented in 29 out of the 210 procedures performed (13.8%).

Discussion

Surgical training as a period of apprenticeship involves academic teaching and learning based on exposure to various clinical cases and training in the operating theatre by a more experienced surgeon. Wide exposure to various clinical cases

Table 3 Procedures performed for distal supracondylar humeral fractures

Procedure	Consultant	Staff grade	SpR	SHO
MUA S/C humeral fractures	2	1	3	
MUA + K wiring elbow		4	5	1
Elbow ORIF S/C humeral fractures	2	7		

MUA, wrist manipulation under anaesthesia; K wiring, Kirshner wiring; ORIF, open reduction, internal fixation (ORIF); S/C, supracondylar.

Table 4 Procedures performed for fractures around the hand

Procedure	Consultant	Staff grade	SpR	SHO
Finger MUA or Finger MUA K wiring		5	5	
MUA Thumb		1	1	
Metacarpal ORIF	1			
Mallet finger K wiring		1		
Scaphoid ORIF	1			

MUA, wrist manipulation under anaesthesia; K wiring, Kirshner wiring; ORIF, open reduction, internal fixation.

Table 5 Procedures performed for fractures of the tibia and fibula

Procedure	Consultant	Staff grade	SpR	SHO
MUA Tibia/fibula		7	4	
ORIF Tibia	1	1	1	
Ankle ORIF	1	1	1	

MUA, wrist manipulation under anaesthesia; ORIF, open reduction, internal fixation.

facilitates the surgical training process. Reforms to the structure of surgical training with proposed reduction of the years of surgical training, implementation of the EWTD may put this process at risk by decreasing working hours and, therefore, the probability of encountering varied clinical cases. The increasing complexity of orthopaedic surgery has resulted in increasing subspecialisation. Increasingly, cases are referred or transferred to regional hospitals for further care, including the care of injuries in children. These factors may contribute to diminish the quality of training for surgeons.

A total of 210 procedures a year for paediatric fractures in a district general hospital probably represents an average volume of operating. Approximately half (47%) of these procedures were performed for common injuries such as distal radius and ulna greenstick fractures. However, concerns have been raised that operative experience in unusual injuries in children may be limited.¹ The lack of unusual children injuries treated operatively in our unit was apparent, with only 3 ankle fractures treated with ORIF for growth plate injuries and 3 ORIFs of tibial fractures (2 tibial eminence fractures, 1 midshaft fracture) treated in a year (Table 5). It is not known if a minimum number cases of supervised operating is required to achieve competency in any surgical procedure. Many factors must be taken into account, including the technical difficulty of the surgical procedure, individual surgical dexterity and previous experience. In the US, a Resident Review Committee (RRC) determines a minimum number of operative experience for each resident.² Similar methods in the assessment of surgical trainees and training posts may be necessary in the UK. Core skills should be defined and an attempt made to attain these skills. In paediatric fractures, distal humeral supracondylar fractures are fractures which may require emergency intervention. Twenty-five supracondylar fractures were performed in a year in our unit, equivalent to about 6 operations performed by a registrar grade surgeon in our unit. Further research may be necessary to establish the

number of supracondylar humeral fractures treated by a trainee to ensure technical competency.

Training opportunities in any surgical unit may be related more to the quality of training obtained by a surgical trainee than the clinical material available. Previous generations of surgical trainees in the UK spent many more years in training and were left unsupervised in their senior years in training. However, consultant trainer supervision is more important than previously, as changes have occurred in surgical training brought about by reduction in working hours. The current study has highlighted an apparent lack of consultant supervision of operative paediatric fracture management (15.8%). This may be attributed to the seniority of trainees in the unit, poor operative note keeping, large volumes of uncomplicated simple fractures, and the existence of out-of-hours trauma lists which were largely unsupervised. The majority of paediatric fractures do not need to be manipulated out of hours and we suggest that these be performed on a routine trauma list the following morning, which would allow consultant supervision and enhanced training quality and opportunities. Our study is comparable to work examining education and training opportunities for orthopaedic trainees some years ago,³ where low levels of consultant-supervised trauma surgery and difficulty in constructing progressive training were identified. Our study confirms that adequate clinical material exists for the training of surgeons in commonly encountered paediatric fractures but that more procedures were carried out by the staff grade compared to trainee surgeons (Tables 1 and 2). However, it may be that due to working time directives, trainee surgeons were on call less frequently than staff surgeons.

In a typical higher surgical training programme, due to service requirements and the large numbers of trainees, clinical attachments in the first 4 years of training may be random. The concern is that service requirements are such that operating becomes repetitive without any real educational value. The educational value of a training post may only be confirmed by the collection of reliable data which would provide an indication of the range of operative opportunities and degree of supervision available to a trainee. This information may be used to 'tailor' any clinical training attachment to the appropriate year of training. Selection of appropriate training posts is crucial to enable progressive training of surgical trainees. Considerable competition exists between various hospitals for specialist registrars to fulfil service requirements and consultant expansion. The use of a database where operative training opportunities and degree of consultant trainer supervision documented may allow appropriate allocation of training posts. It is suggested that such data should form the basis of the establishment and maintenance of training posts within a region.

Conclusions

This study has documented the range and number of procedures performed for paediatric fractures in a typical district general hospital in the UK. Trainees in the unit would benefit from the operative experience of treating relatively large number of fractures in children. However, it has highlighted the need to encourage consultant trainer supervision to enhance operative training opportunities for surgical trainees. The treatment of non-emergency paediatric fractures in routine trauma lists and not during out of hours is suggested. A database documenting the range, volume of operating and degree of operative

supervision for trainees will be useful in the audit of services and training of any surgical unit.

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