

A Cross-Sectional Study of Undergraduate Teaching of Trauma and Orthopaedics in the UK and the Relationship Between Medical Schools and Interest in Trauma and Orthopaedics as a Career

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Sarah Choi¹, Setthasorn Ooi² and Eleanor Carpenter³

¹University Hospital of Wales, UK. ²School of Medicine, Cardiff University, UK. ³University Hospital of Wales, UK.

ABSTRACT

INTRODUCTION: Adequate exposure and teaching of Trauma and Orthopaedics (T&O) to medical students is fundamental in order to obtain sufficient knowledge and sustain their interest in T&O as a career. The primary aim is to assess the exposure and delivery of T&O at all medical schools in the UK. The secondary aim is to determine whether there are any associations between attending a particular medical school and having a strong interest in pursuing a career in T&O.

METHODS: To explore the primary aim, all 33 UK medical schools were investigated in the study, by means of a questionnaire distributed to medical students. This did not include 'new' medical schools, defined as those established from 2014 onwards. To investigate the secondary aim of exploring associations between students' and alumni's medical schools and their interest in T&O as a career, British Orthopaedic Training Association (BOTA) members were reviewed, using the General Medical Council register to identify the universities from which members had graduated. The authors have made the assumption that membership of BOTA signified an interest in T&O as a career.

RESULTS: Results were obtained for all 33 medical schools. The mean total teaching time specifically for T&O throughout medical school was 18 days, ranging from 3 to 60 days in total. 118 BOTA members were reviewed. No member of BOTA in the study had attended medical school in Keele, Liverpool, Plymouth or Lancashire. These universities taught below the national average number of days in T&O.

DISCUSSION: There is a large national variance in the number of compulsory teaching days provided for T&O. The authors advocate medical schools to aim for at least the national average in duration of T&O of 18 days.

KEYWORDS: compulsory training, speciality training, exposure to trauma and orthopaedics, undergraduate curriculum, post graduate medical education, undergraduate medical education

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CORRESPONDING AUTHOR: Sarah Choi, University Hospital of Wales, Heath Park Way, Cardiff, Wales, CF14 4XW, United Kingdom.
Email: sarah.choi@wales.nhs.uk

Introduction

Adequate exposure and teaching of trauma and orthopaedics (T&O) to medical students is important to ensure that sufficient level of knowledge is attained to ensure high quality care to patients in the primary and secondary care setting. There is an increasing burden of musculoskeletal (MSK) conditions on both health and social care systems due to the ageing population. Hence, appropriate referrals from clinicians to orthopaedic surgeons are essential to ensure proper and timely management of patients and efficient use of resources. Additionally, exposure to T&O is paramount to sustain an interest in T&O to ensure it remains a competitive speciality which selects the best candidates for training programmes. Potential candidates require adequate clinical exposure to nurture and develop their interest in T&O.

To the best of our knowledge, there is no published study exploring the state of undergraduate teaching in T&O in all 33 (non-new) medical schools. Our primary aim of the study is to assess the exposure to T&O at medical schools nationally and to ascertain its delivery in the curricula of the medical schools. Our secondary aim is to

determine any associations between attending a particular medical school and having a strong interest in pursuing a career in T&O.

Methods

Participants and Setting

To investigate our primary aim, we established that medical students were eligible to participate if they were enrolled in a non-new UK medical school recognised by the Medical School Council during the academic year 2019/2020. Recent graduates, who are within a year from graduation, were also allowed to participate in the study. New UK medical schools are defined as those established from 2014 onwards; medical students from these schools were excluded from the study. The final list of eligible medical schools included 33 institutions.

Questionnaire Design and Distribution

A novel, 9-item questionnaire was developed (see Table 1). No incentives were offered for participation. An online



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Table 1. Survey questions.

1. Is T&O taught alone or combined with another speciality in a placement block or unit module?
2. If combined, which other specialities is it paired with?
3. What is the total length of compulsory teaching in each placement block or unit module (in days)?
4. What is the total length of compulsory teaching specifically for T&O in each placement block or unit module (in days)?
5. How many of these days are taught in the pre-clinical years (in days)?
6. How many of these days are taught in clinical years (in days)?
7. What is the standard total duration of your medical school (in years)?
8. How many of these are preclinical years (in years)?
9. How many of these are clinical years (in years)?

questionnaire was disseminated using social media channels and emails to student societies. The questionnaire was also distributed to students met through courses or events. Data was collected between May 2019 to October 2019.

Surveying the Existing Members of the British Orthopaedic Training Association (BOTA)

To investigate our secondary aim, we assume that all members of BOTA have a strong interest in T&O. Anonymised data was collected of all individuals registered on BOTA in March 2020. Only those who had graduated from a UK medical school and those who had graduated or would graduate between 2014 to 2020 were included. The General Medical Council register was used to identify the universities of which the members had graduated from.

Results

Results were obtained for all 33 medical schools. 7 (21%) of the medical schools taught T&O as a standalone speciality in a placement block or a unit module. 26 (79%) medical schools taught T&O with other specialities. Of the 26 medical schools that taught T&O with other specialities, rheumatology was the most common speciality to be combined with T&O ($n = 16$; 62%). In 5 of the medical schools, this was in addition to being taught alongside another speciality such as emergency medicine, ophthalmology and dermatology.

The mean total teaching time, in days, specifically for T&O was 18 days, with a range from 3 to 60 days, and a median of 15. Majority of T&O teaching and exposure was during clinical years in 30 (91%) medical schools, with only three medical schools having more days taught in the pre-clinical years. The five medical schools with the longest total teaching time, in days, specifically for T&O was Warwick ($n = 60$), followed by Aberdeen ($n = 50$), Swansea ($n = 40$), Oxford ($n = 40$) and Norwich ($n = 40$).

11 of the surveys were received through contact with a medical or surgical society of the university. 22 surveys were

Table 2. Universities attended by BOTA members, graduating between 2014 to 2020.

University	No. of members
Aberdeen	6
Barts	3
Belfast	1
Birmingham	10
Brighton	1
Bristol	4
Cambridge	2
Cardiff	2
Dundee	5
Edinburgh	5
Exeter	2
Glasgow	6
Imperial	5
Keele	0
KCL	6
Lancashire	0
Leeds	2
Leicester	1
Liverpool	0
Manchester	12
Newcastle	9
Nottingham	6
Oxford	8
Plymouth	0
Sheffield	3
Southampton	3
St Andrews	0
St George's	5
Swansea	1
UCL	4
UEA	2
Warwick	2
York	2

received from individuals who were current students or had graduated within a year from the university.

820 persons were registered to BOTA in March 2019. 126 of those had graduated or would be graduating between 2014 to 2020.

8 persons were excluded as they had graduated from a non-UK medical school. 118 persons were included. The top four medical schools with the most number of recent graduates who registered to BOTA were Manchester ($n=12$), Birmingham ($n=10$), Newcastle ($n=9$) and Oxford ($n=8$) (see Table 2).

Discussion

To date, our study is the most comprehensive survey that includes all 33 (non-new) medical schools in the UK to assess the duration of undergraduate T&O rotations. Adequate training in MSK conditions is essential for medical students for several reasons. MSK conditions are on the rise globally with an ageing population and rapid increase in prevalence of obesity. It has been recorded that 28.9% of the population are living with MSK conditions.¹ MSK conditions also account for 30% of GP consultations.² With such a high MSK workload for GPs, a high degree of skill in dealing with MSK complaints would be expected. However, studies have shown that GPs and GP trainees lack confidence in managing MSK disorders.³

Studies have highlighted UK medical schools' failure in ensuring students' competence in MSK conditions, strongly advocating for better quantity and quality in MSK teaching.⁴ In 2014, BOA published the undergraduate T&O syllabus to guide the provision of teaching in medical schools.⁵ The new syllabus was designed to reflect the needs of graduating students and cater for those who would become GPs.

Adequate T&O exposure in undergraduate training is not only important for ensuring sufficient T&O knowledge. Research has shown that positive student experiences during surgical rotations may lead to students deciding to pursue a career in surgery.⁶ Having time in theatres, access to surgeons and developing professional and mentor-mentee relationships, among others, play a role in these positive experiences. Johnson et al found that the primary influence on student's career choice was their third-year medical school placement.⁷ Adequate exposure to T&O is crucial to inspire and attract the next generation of orthopaedic surgeons and to ensure the speciality maintains competitiveness to select the best candidates. Bouteffouchet et al found that students felt that seeing patients within the clinical setting and the quality of teaching were the greatest motivating factors in developing interest in T&O as a career.⁸ Redlich et al found that direct contact with surgeons in theatre and student's experience in theatre were also positive factors.⁹ Other authors have also found that quantity of attending surgeons, role models in surgery and communication with surgeons were also important factors.^{10,11}

These papers highlight the importance of having adequate exposure in T&O as this can influence one's career choice. To maintain a speciality that selects the best candidates for training, it is imperative to maintain competitiveness for the speciality. BOA recently published an article raising concerns about the decline in surgical post application rates.¹² There will undoubtedly be a higher demand for T&O surgeons with an increasing ageing population and prevalence of lifestyle

diseases. Therefore, it is essential to ensure that the competitiveness of the speciality is maintained by ensuring medical students have enough exposure to the speciality to realise their interest in the speciality. Mentorship is seen as an essential tool in shaping students and trainees. A systematic review and meta-analysis found that mentorship was one of the key factors in choosing a speciality.¹³ Mentor-mentee relationships can be better realised when students have sufficient time on placement in a speciality to build these relationships.

We have looked at the duration of T&O placements as one of the measures of exposure to T&O. We have defined and measured interest in T&O as being an active member of BOTA. This data was taken cross-sectionally in March 2020. From those included in our study, the top four medical schools with the most number of graduates between 2014 to 2020 registered to BOTA were Manchester (12), Birmingham (10), Newcastle (9) and Oxford (8), (see Table 2). Oxford university was the fourth university with the highest number of members registered to BOTA which was also one of the top four universities with the longest total length specifically for T&O in days.

The mean total duration of teaching or placement for T&O in all 33 universities was 18 days, ranging from 3 to 60 days and a median of 15 days. There was no direct association between duration of T&O teaching and exposure and the number of BOTA members at a particular university. The universities that had no members in BOTA were Keele, Liverpool, Plymouth, Lancashire and St Andrews. It is important to note, there will be no record of individuals graduating from St Andrews as students are transferred to other universities for clinical training and proceed to 'graduate' from the university they have transferred to, therefore St Andrews has been removed from Table 2 and discussions. Keele, Liverpool, Plymouth and Lancashire had below the average number of days in T&O, ranging from 10 to 15 days. This relationship could be explained by a 'plateauing' effect, where minimum number of days are required to form an interest in students however after a certain number of days, there is a saturation effect where having more days in T&O does not significantly lead to an increase in interest in T&O. The crucial 'certain number of days' may need to be long enough to expose students in clinics, theatres and on the ward. Our results show that there is a large discrepancy in the length of T&O placements in the UK. There is an obvious need for more consistent durations across the UK, ensuring that students are adequately exposed to T&O.

A recent study investigating T&O undergraduate teaching in the UK found that medical schools were failing to adequately train medical graduates to manage T&O patients.¹⁴ The authors suggested a minimum duration of T&O placement to be implemented nationally. They suggested that educational boards and medical schools should work together to improve the delivery of undergraduate teaching. We also agree with the suggestions from this study. This study however only looked at 13 medical schools. One of the limitations of their study was

that some of the delegates who filled out the survey had not yet had their T&O placement which could have affected their final data and results. It is clear that further research and discussions are required to establish the minimum duration of T&O at an undergraduate level. From our study, we advise that medical schools aim to increase the duration to the national average of 18 days if they are not already meeting this duration.

There is a global need for improvements in MSK education, with studies in America, Australia and Egypt recommending re-evaluation of undergraduate and postgraduate MSK training.^{15–18} This was highlighted by the World Health Organisation (WHO) in ‘the bone and joint decade 2000 to 2010’.¹⁹ They promoted changes to medical school programmes globally, with aims of programmes having at least 6 months of MSK teaching.

The main limitation of our study is that we have to presume that the syllabus has not changed since the time of our efforts to gather the data. We also acknowledge that the validity of the results from the dissemination of our survey relies on one data source for each university. However, the majority survey participants had also provided the relevant medical school handbooks which detailed the T&O teaching delivered in the curriculum. Hence, this allowed us to cross-check the data received in the questionnaire.

More dedicated time in T&O would be beneficial to engage students with the specialty. This, however, will take many years to achieve. Some initiatives to keep students engaged would be through involvement of clinicians in surgical societies in delivering lectures and courses, hosting shadowing schemes and offering meaningful projects for students.

All T&O training responsibilities do not lie with undergraduate training. There are post graduate training opportunities. During and post foundation training, individuals can undertake fellowships and taster weeks. However, in foundation training there can be limited opportunities for clinics and theatres due to the ward cover workload and responsibilities. Fellowships can offer greater exposure to T&O however interest in the specialty is normally realised before undertaking the role.

Conclusion

Adequate exposure to T&O is fundamental to deliver high quality and effective care for patients in the primary and secondary healthcare setting. The duration of training can also influence attracting and retaining future T&O surgeons. This is important to provide a competitive platform to select the best candidates. Exposure to T&O should start early at medical schools, where T&O can be promoted with adequate duration of placement. There is a huge national variance on the number of compulsory teaching days for T&O. Students from medical schools with fewer days of teaching may miss the opportunity to fully appreciate T&O as a specialty and graduate with sub-optimal experience and knowledge. Further research is required to establish a standard guideline for undergraduate duration of teaching and exposure to

T&O. From our study we advocate medical schools to aim for at least the national average in duration of T&O of 18 days.

Authors Contributions

SC designed the study, collected and analysed the data. SC was a major contributor in writing and reviewing the manuscript. SO was a major contributor in the collection of data and was a contributor in writing and reviewing the manuscript. EC was a contributor in writing and reviewing the manuscript.

Supplemental material

Supplemental material for this article is available online.

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