The experiences, influences and concerns of future orthopaedic surgeons: comparing UK and non-UK perspectives

Abstract

Aims/background This study aims to identify and analyse the factors that influence or discourage junior doctors in the UK and across the world from wanting to pursue a career in orthopaedics.

Methods A prospective, cohort study was carried out via an online questionnaire targeted at aspiring orthopaedic surgeons.

Results A total of 654 respondents met inclusion criteria; 370 (56.6%) were UK-based and 284 (43.4%) were based abroad. The practical and technical nature of orthopaedics was the biggest influencing factor globally. UK respondents were notably more concerned by the financial impact of training (49%) followed by poor work–life balance (36%). Themes from the comments section revealed concern regarding gender bias and a lack of diverse role models within orthopaedics.

Conclusions Reducing the cost and length of training, diversification of role models, removal of bias and increasing positive early experiences may help to encourage people of all backgrounds to pursue a career in orthopaedic surgery.

Key words: Career aspirations; Career influences; Concerns; Global; Trauma and orthopaedics

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Introduction

Training in trauma and orthopaedics has historically been popular with surgeons because of its exciting and highly practical programme. Despite remaining a popular and competitive surgical speciality in the UK, trauma and orthopaedic training programmes have high trainee attrition rates, falling levels of applicants, lack of diversity and gender disparity in candidate selection and retention (Hampton et al, 2016; Rohde et al, 2016; Green et al, 2017).

Decreased trainee satisfaction levels have been linked to higher rates of attrition, and research suggests that negative comments from other subspecialities, poor work–life balance and a sexist culture contribute to negative perceptions of a career as a trauma and orthopaedic surgeon (Day et al, 2019). Furthermore, the demands of becoming an orthopaedic surgeon can be detrimental to trainees' mental and physical wellbeing, with many reporting financial stress, long working hours and burnout (Sargent et al, 2004; Forel et al, 2018).

Orthopaedic consultants account for 5% of the total consultant medical workforce (Centre for Workforce Intelligence, 2014). With an ageing population and increasing individual patient need, recruitment into orthopaedics should be proportionate to growing healthcare demands (Centre for Workforce Intelligence, 2014). There is a scarcity of literature exploring factors that influence the decision to undertake a career in trauma and orthopaedic surgery. Understanding this could help inform improvements in support structures for current trauma and orthopaedic surgeons, promote diversity and equality within trauma and orthopaedic surgery and remove barriers to prospective trainees, ensuring that talent is not unnecessarily wasted.

This study aimed to identify, analyse and discuss the current influences, discouraging factors, concerns and aspirations of prospective orthopaedic surgeons in the UK and around the world.

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Methods

This was a prospective cohort study, using a mixed qualitative, quantitative questionnaire. Following a literature review, two of the authors (CC, KS) produced a draft questionnaire, focusing on prevalent issues regarding orthopaedics and training. This was evaluated for its content validity by the other authors, and was pilot tested with local orthopaedic trainee- grade doctors before its distribution. Following local dissemination, the final 18-question survey was sent to all delegates registering for a national, free surgical webinar teaching series (Fundamentals of Orthopaedics), distributed via regional training programme directors and via social media.

The Fundamentals of Orthopaedics was a free, 16-session, weekly webinar series that took place from June to October 2021. It was aimed at junior doctors worldwide wishing to pursue orthopaedics, but also welcomed medical students and orthopaedic nurse practitioners. Content was aimed at equipping delegates with skills and knowledge required for their early years as a trauma and orthopaedic registrar or international equivalent. Sessions were delivered by consultant surgeons and orthopaedic registrars via Zoom (Zoom Video Communications Inc., San Jose, CA, USA). Delegates were asked to register for the series via completion of the survey designed on Google Forms (**Appendix 1**). The questionnaire was live for 2 weeks before the first session took place.

Study inclusion criteria were doctors wishing to pursue a career in orthopaedic surgery. All non-doctor professionals and those not wishing to pursue orthopaedic surgery as a career were excluded. Baseline demographic data were collected including gender, ethnicity and sexual orientation. The survey aimed to assess participants' influences, concerns and aspirations in pursuing an orthopaedic career. The data were anonymised, analysed, tabulated and are displayed as proportions of the final results. The questionnaire also included free text answers, from which the authors derived and collated major themes. Responses to these questions were analysed using a reflexive thematic analysis performed by three of the authors (CC, RG, KS). As per the NHS Health Research Authority's online decision tool, this study did not require formal ethics approval.

Results

A total of 747 delegates completed the questionnaire before taking part in the webinar series. A total of 654 participants met the inclusion criteria, of which 370 (56.6%) were from the UK and 284 (43.4%) were from non-UK countries. Of these respondents, 190 (29.1%) were female and 445 (68.0%) were male. Job titles of UK participants were F1 (12.2%), F2 (9.7%), CT1/ST1 (37.3%), CT2/ST2 (15.9%), trust grade/junior clinical fellow (18.9%) and registrar (5.9%). Non-UK doctors identified as junior intern/house officer (50.4%) and registrar/resident (49.6%). The full breakdown of participants' demographics is shown in **Table 1**. International participants were from 48 different countries as illustrated in **Appendix 2**, most of whom were from Pakistan, India, New Zealand and Egypt. The majority of participants decided to pursue orthopaedics during medical school (**Figure 1**).

The factors that influenced the choice to pursue a career in trauma and orthopaedics are summarised in **Figure 2**. Both cohorts ranked the practical and technical nature of the speciality, job satisfaction and good patient outcomes highly. International participants were more likely to consider income, academia and prestige than their UK counterparts.

The financial requirements, poor work–life balance and length of training were the main factors that dissuaded the UK cohort from pursuing a career in trauma and orthopaedics compared to the international cohort (**Figure 3**). Other specific concerns from UK respondents included lack of diversity, length of training and the need for service provision within the NHS. Participants from non-UK countries were concerned about the lack of training opportunities and resources available to them or the competition ratio for the specialty (**Table 2**).

Participants were asked to rank the top three orthopaedic subspecialties to which they had the most exposure in their careers. Both cohorts had significant exposure to trauma, hip and knee surgery during their training (**Figure 4**). Participants were also asked to rank the top three orthopaedic subspecialties that they would consider as a future career. UK doctors were interested in a career in trauma, knee surgery and hip surgery while international doctors were interested in trauma, knee surgery and sport medicine (**Figure 5**). Reconstruction, paediatric surgery, spine surgery and oncology were more popular in the international cohort.

Table 1. Demographics of participants

		UK participants n (%) *n*=370	Non-UK participants n (%) *n*=284	Total no (n) of participants (%) *n*=654
Gender	Female	121 (32.7%)	69 (24.3%)	190 (29.1%)
	Male	236 (63.8%)	209 (73.6%)	445 (68.0%)
	Non-binary	1 (0.2%)	1 (0.4%)	2 (0.3%)
	Prefer not to say	12 (3.2%)	5 (1.8%)	17 (2.6%)
Sexuality	Heterosexual	321 (86.8%)	242 (85.2%)	563 (86.1 %)
	Gay/lesbian	5 (1.4%)	4 (1.4%)	9 (1.4%)
	Bisexual	7 (1.9%)	6 (2.1%)	13 (2.0%)
	Asexual	0 (0.0%)	7 (2.4%)	7 (1.1%)
	Prefer not to say	37 (10.0%)	25 (8.8%)	62 (9.5%)
Relationship status	Single	240 (64.9%)	164 (57.7%)	404 (6 1.8%)
	Married	77 (20.8%)	83 (29.2%)	160 (24.5%)
	Domestic partnership	20 (5.4%)	18 (6.3%)	38 (5.8%)
	Non-domestic partnership	0 (0.0%)	0 (0.0%)	0 (0.0%)
	Prefer not to say	33 (8.9%)	19 (6.7%)	52 (8.0%)
Number of children	0	314 (84.9%)	213 (75%)	527 (80.6%)
	1	16 (4.3%)	22 (7.7%)	38 (5.8%)
	2	18 (4.9%)	18 (6.3%)	36 (5.5%)
	3	1 0.0%)	20 (7.0%)	21 (3.2%)
	Prefer not to say	21 (5.7%)	11 (3.8%)	32 (4.9%)

When asked about alternative specialties to orthopaedics, both cohorts were most likely to consider plastic surgery and general surgery (Figure 6). International participants were also likely to consider other surgical specialties such as vascular surgery, neurosurgery and cardiothoracic surgery. UK participants were more likely to consider a career outside of medicine than their global counterparts.

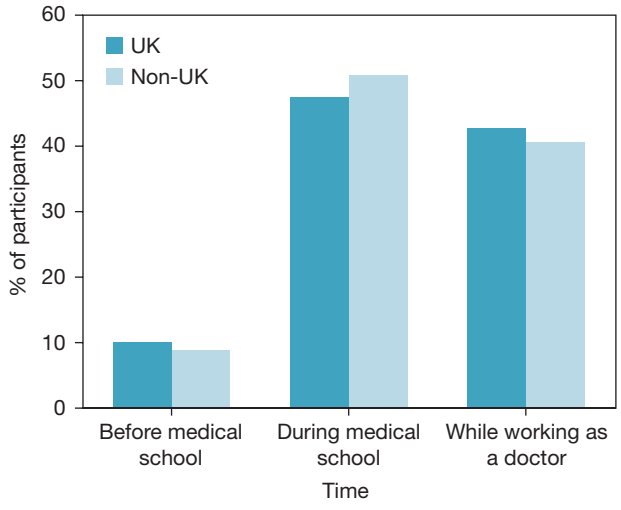

Figure 1. When participants decided to pursue orthopaedics.

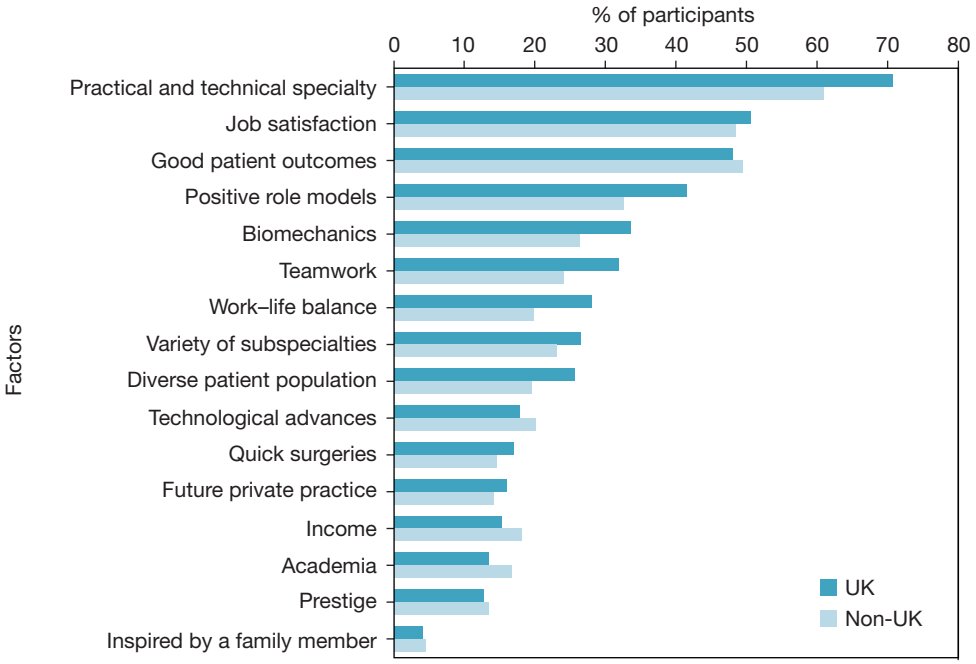

Figure 2. Factors that positively affected the decision to undertaking a career in orthopaedic surgery.

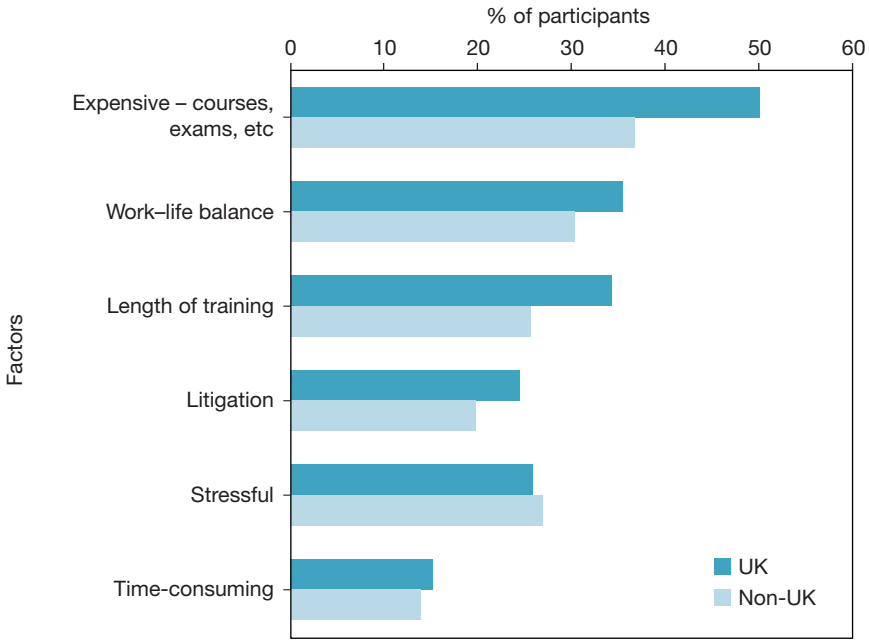

Figure 3. Factors that negatively affected the decision to undertake a career in orthopaedic surgery.

Discussion

Trauma and orthopaedic surgery is an exciting, popular and rewarding surgical speciality. Currently, training positions in orthopaedics remain sought after, both in the UK and around the world. However, recent years have seen a significant decline in numbers of applicants and increased trainee attrition rates, alongside an increased perceived lack of diversity within the expert field. The reasons for this remain unclear. Investigating the demographics, aspirations and factors that influence and discourage prospective orthopaedic surgeons from around the globe should increase discussion about these issues. Identifying and addressing these factors could help to modernise the training programme, which would improve the overall popularity and diversity of orthopaedic surgery.

Table 2. Themes from free-text responses when asked about concerns in pursuing a career in orthopaedic surgery	
UK	Lack of geographical security
	Racial and gender bias: 'old boys' club'
	Difficulty in attaining a consultant post
	Service provision
	Length of training
Non-UK	Competition ratio
	Lack of training opportunities and courses
	Low income
	Gender bias
	Healthcare costs for patients

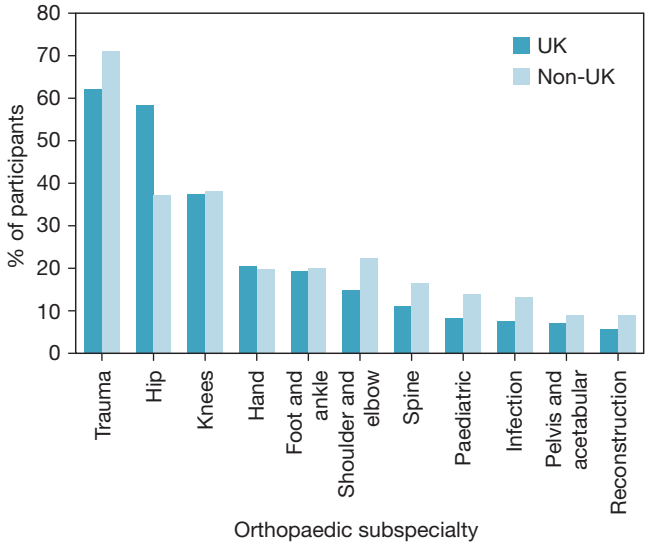

Figure 4. Orthopaedic subspecialties to which participants have had the most exposure.

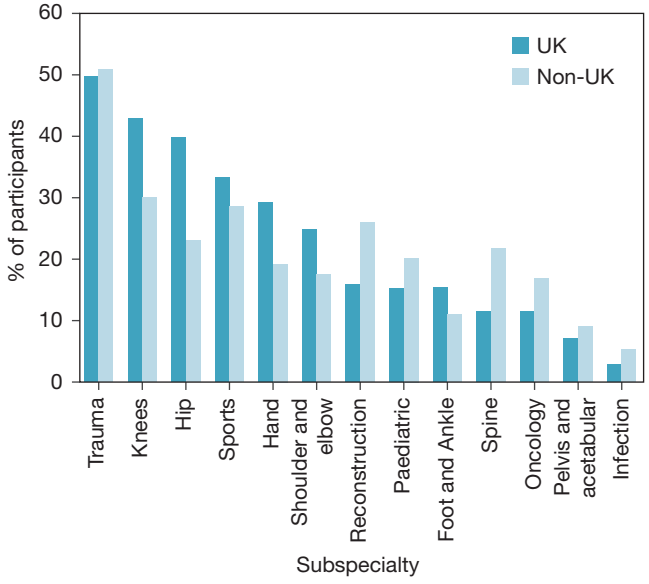

Figure 5. Favoured subspecialties for a future career.

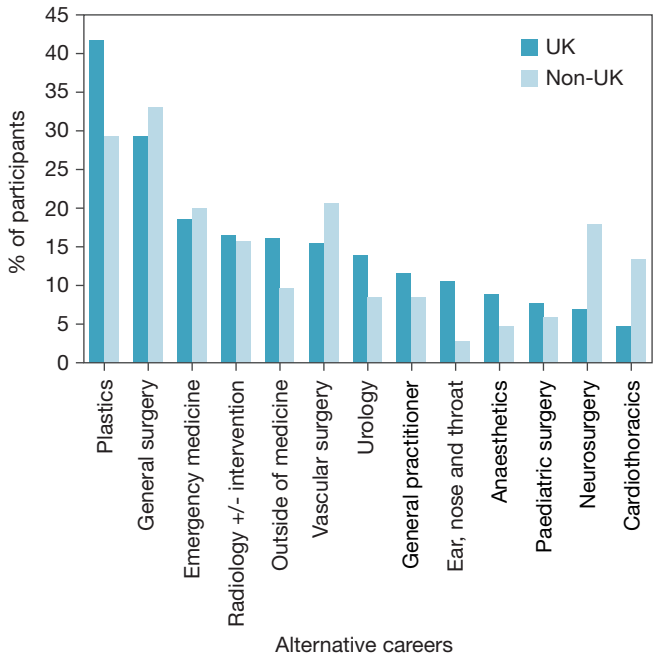

Figure 6. Alternative careers to orthopaedics.

This study found that both UK and non-UK participants were most likely to be influenced to pursue orthopaedics during their time in medical school. Many students begin medical school with an idea of their preferred discipline, although this is susceptible to change over the course of their degree (Compton et al, 2008). The choice to pursue a particular speciality is multifactorial, having been attributed to an interaction of personal factors (attitude, personality, aptitude and sociodemographic information) and personal experience before, during and after medical school (Woodward, 1990). An increase in clinical exposure attracts applicants to surgery (Kassenbaum and Szena, 1994). The choice of medical school also influences a student's eventual career path (Goldacre et al, 2004). The factors affecting the decision to choose orthopaedics are clearly complex. Nevertheless, medical school is a pivotal point where a significant number of students decide to pursue orthopaedic surgery, so more effort should be made to increase exposure to experiences and positive clinical role models within orthopaedics at this time.

The 'practical and technical' nature of orthopaedic surgery was the largest influencing factor across the world. This quality applies broadly to many surgical specialities (Johnson et al, 2012), although orthopaedics is particularly practical, with UK consultants spending up to 40% of their time operating (Young et al, 2010). Unfortunately, the restructuring of surgical education from the traditional firm-based apprenticeships to a competency-driven system threatens trainees' time in theatre. This, in combination with the reduced working hours enforced by the European Working Time Directive, has led to a reduction in the average number of operating cases performed per trainee (Richards, 2009). This valuable practical experience is further threatened by the increase in consultant-led operating (Hallam et al, 2013). There are positive lifestyle implications and patient safety motives for these changes, but the effects that a less practical, more senior-led and service-provision focused environment has on orthopaedic recruitment and training must be considered. The authors believe that a balance must be struck between these factors, while ensuring the continuity of the highly practical, stimulating elements of this surgical speciality.

Job satisfaction was the second most influential factor in the UK and non-UK cohorts. High career satisfaction levels among orthopaedic surgeons have been documented, although these are negatively affected by increased working hours (Cunningham et al, 2015). There is a higher risk of burnout among orthopaedic surgeons than other surgical specialities (Arora et al, 2013). Identifying protective factors may help to reduce burnout for trainees and mitigate its impact on career satisfaction. Furthermore, analysis of factors that discourage prospective trainees can help to maintain high job satisfaction levels, which are a driving force for undertaking training in orthopaedic surgery.

The UK cohort were more likely to be discouraged by the associated expenses of orthopaedic training, poor work–life balance and long time in training than their global counterparts. Surgical careers have higher training costs than medical specialities, with the average cost to meet the mandatory requirements for the completion of training ranging between £20 000 and £71 431 (Walker et al, 2019; Vinnicombe et al, 2022). Vinnicombe et al (2022) demonstrated that trainees were less likely to consider surgical training if the perceived cost was high. Despite this, there has been a gradual shift from fees being paid by NHS employers to being paid by individual trainees (Fitzgerald et al, 2012). To exacerbate matters, medical students are graduating with more debt than before, and most trainees now undertake a self-funded higher degree to facilitate career progression (O'Callaghan et al, 2017). Trainees in the UK are entitled to a study budget, but educational tools, exam fees, medical defence indemnity, medical council fees, postgraduate degrees, online portfolios and other aspirational activities assisting with career progression are mostly self-funded. While these costs are not specific to orthopaedic training, if addressed, this might reduce the perceived barriers and financial disincentive to applying. The authors recommend that the financial awareness of and burden on new applicants is appreciated, assessed and acted on to match the economy, to improve the accessibility of orthopaedics.

Work–life balance appeared globally as both an influencing and discouraging factor in this study. This might reflect the variety in work–life balance across the range of subspecialties that respondents had experienced. Working in a tertiary trauma centre can be overwhelming with busy on-call shifts and reduced rest periods. The overall increase in working hours, when compared to those of orthopaedic surgeons who are primarily performing elective surgery, has been correlated with emotional exhaustion, dissatisfaction and depersonalisation (Sargent et al, 2004; Kirwin et al, 2021). An alternative explanation may be that this reflects the subjective nature of work–life balance, with potentially different societal and cultural perspectives of what this entails (Lewis and Beauregard, 2018). Conclusions are difficult to draw, but work–life balance is important to trainees and the factors that affect this must be appreciated on an individual and institutional level.

The long training time in the UK was a significant deterrent for prospective trainees. UK trainees often train in 'general' surgical disciplines before focusing solely on orthopaedics, differing from North American and Australian programmes (Syed et al, 2009). Furthermore, UK trainees are more likely to take time out of training, often to make their portfolios competitive for application (Cleland and Johnston, 2019). The feeling of being undervalued, career uncertainty and the perception that time out of training is considered 'normal' also fuels the increasingly common decision to take a break from training (Hollis et al, 2020). The UK may benefit from remodelling surgical training to allow doctors to specialise earlier, although given the increase in service provision, capped working hours and the fact that surgical competency can be linked to time spent in theatre, this may not be possible (Walker et al, 2019).

Both cohorts highlighted concerns regarding gender bias within trauma and orthopaedics in the free comments section. The number of women taking up orthopaedic training does not reflect the increased number of women attending medical school, and lags significantly behind many other medical specialities (Maheshwari, 2019). It has been suggested that the ideology of men and women having different working styles and skills has created gender barriers and stereotypes that dissuade women from pursuing orthopaedic surgery (Errani et al, 2021). Other factors that may explain this 'gender gap' are differing institutional policies, individual decisions regarding work–life balance and the absence of female role models and mentorship (Errani et al, 2021). Gender bias represents prejudice, which affects the individuals, their institutions and their patients. Looking to the future, orthopaedic surgery could benefit from the recognised strengths of gender diversity in the workplace (Weiss and Caird, 2016). While continuing to encourage male talent, visible acknowledgement and removal of the barriers women face in orthopaedics will hopefully encourage more into the field, benefiting both the workforce and patients.

This study has several limitations. First, the respondents were taking part voluntarily in an international teaching series. Participants meeting the inclusion criteria may not have been representative of a true cohort of orthopaedic applicants. Furthermore, the nature of voluntary survey completion permits a self-selection bias. Hence, the external validity of applying these results to the prospective orthopaedic higher trainee must be questioned.

Key points

- Understanding the differing factors across a range of stages in a physician's career may help to target intervention to inspire interest in orthopaedic surgery.
- More work must be done in the UK to address the reducing amount of theatre exposure and increased cost of surgical training.
- Individual countries should investigate their trainees' views on a healthy work–life balance and prioritise these alongside the need for surgical skills development.
- The orthopaedic community must recognise the small proportion of women pursuing orthopaedic surgery and deliberately break down the barriers to access that they face.

However, the cohort size was large and geographically diverse. Additionally, 68% of those attending were male, potentially leading to an under-estimation of gender bias as a dissuading factor or concern. There are limitations with comparing junior doctors around the world, as there is a variety in level of experience at each job title or grade. Finally, although the comments and concerns section successfully identified further encouraging and discouraging factors, the original category lists were not exhaustive and may have oversimplified the range of factors that draw or push people away from orthopaedic surgery. The authors believe that it would be useful to investigate the factors that influence the decision to pursue orthopaedics during medical school, comparing them to a postgraduate cohort. Understanding the differing factors across of the stages of a physician's career may help to target interventions to increase interest in orthopaedic surgery.

Conclusions

The areas highlighted in this study should help to focus and inspire strategy to attract women and men of all backgrounds into pursuing a career in orthopaedic surgery. More work must be done in the UK to address the reducing amount of theatre exposure and increased cost of surgical training, to reduce attrition rates and encourage doctors to enter the field. Individual countries should investigate their trainees' views on a healthy work–life balance and prioritise these alongside the need for surgical skills development. The orthopaedic community must recognise the small proportion of women pursuing orthopaedic surgery and break down the barriers to access that they face. Diversification of role models, promoting positive early experiences within orthopaedics and deliberately breaking down the barriers women and under-represented minorities face in orthopaedics are some of the ways in which orthopaedic surgery can be made a more inclusive, diverse and attractive career around the world.

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Conflicts of interest

The authors declare that there are no conflicts of interest.

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Appendix 1. Questionnaire

The purpose of this questionnaire is to explore the differences between UK and non-UK aspiring orthopaedic surgeon regarding their influences, concerns and aspirations in pursuing a career in trauma and orthopaedics. By filling in this questionnaire, you are consenting for the data to be anonymised, analysed and used for research purposes. The data will not be shared to third parties.

Name:

Email:

1. Where are you currently working?

   UK

   Non UK

2. What is your gender?

   Male

   Female

   Non-binary

   Prefer not to say

3. What is your ethnicity?

   Arab

   Asian or Asian British

   Berber - North African

   Black, African or Caribbean or Black British

   Chinese

   Egyptian

   Hispanic-Latin American

   Latin

   Mixed

   Mixed Irish and Asian

   Mixed race- Indian, black, white Caribbean

   North African

   Other white

   South East Asian

   White - British, Irish or any other White background

   Prefer not to say

4. Which deanery are you currently based in? (for UK only)

   East Midlands

   East of England

   Kent, Surrey and Sussex

   London - North Central and East

London - North West

London - South

North east of England

North west of England

Northern Ireland

Scotland

South West

Thames Valley

Wales

Wessex

West Midlands

Yorkshire and Humber

Other

5. How would you described your religious beliefs?

Agnostic

Bahai

Buddhist

Christian inc. Catholicism, Church of England, Protestant and all other Christian denominations

Hindu

Muslim

Sikh

No religion

Prefer not to say

6. What is your sexuality?

Asexual

Bisexual

Gay/lesbian

Prefer not to say

Straight/heterosexual

Other

7. What is your relationship status?

Single

Married

Domestic partnership

Divorced

Widowed

Prefer not to say

Other

8. Do you have any children?
   - 0
   - 1
   - 2
   - 3+
   - Prefer not to say
9. What is your current grade? (for UK only)
   - CT1/ST1
   - CT2/ST2
   - F1
   - F2
   - Trust senior house officer/junior clinical fellow
   - Trust registrar
   - Speciality registrar in training
   - Medical student
   - Orthopaedic nurse practitioner
10. What country are you currently based in? (Short answer text) (for non-UK only)
11. What is your current grade? (Short answer text) (for non-UK only)
12. When did you decide to pursue a career in trauma and orthopaedics?
   - Before medical school
   - After medical school
   - During foundation training
   - During core training
   - While a senior house officer (not in a training programme)
13. Which orthopaedic sub-specialities have you had most exposure to? (Please choose up to three options)
   - Hand
   - Shoulder and elbow
   - Spine
   - Hip
   - Knees
   - Foot and ankle
   - Trauma
   - Paediatric
   - Pelvis and acetabular
   - Oncology
   - Sports
   - Infection
   - Joint reconstruction
   - Other

14. What influenced you to undertake a career in trauma and orthopaedics? (Please tick all that apply)

- Practical and technical speciality
- Biomechanics
- Positive role models
- Good patient outcomes
- Prestige
- Variety of sub specialities
- Academia
- Income
- Work–life balance
- Diverse patient population
- Inspired by a family member
- Technological advances
- Teamwork
- Future private practice
- Quick surgeries
- Job satisfaction
- Other

15. What do you NOT like about orthopaedics?

- Stressful
- Litigation
- Time consuming
- Work–life balance
- Expensive- course, exams etc.
- Length of training

16. Which orthopaedic subspecialities would you consider as a career choice? (Please choose up to three options).

- Hand
- Shoulder and elbow
- Spine
- Hip
- Knees
- Foot and ankle
- Trauma
- Paediatric
- Pelvis and acetabular
- Oncology
- Sports
- Infection
- Joint reconstruction
- Other

17. What other specialities would you consider other than orthopaedics? (Please choose up to three options).

General surgery

Plastics

Vascular

Cardiothoracics

Neurosurgery

Oral and maxillofacial

Ear, nose and throat

Paediatric surgery

Urology

Medicine

General practitioner

Radiology

Paediatrics

Obstetrics and gynaecology

Ophthalmology

Psychiatry

Anaesthetics

Emergency medicine

Career outside of medicine

Other

18. Is there anything that you are concerned about with regards to pursuing an orthopaedic career? (Free text answer)

Appendix 2. Countries of international participants

Europe	Greece	5
	Republic of Ireland	4
	Spain	2
	Denmark	1
	Netherlands	1
	Poland	1
	Italy	1
	Sweden	1
	Switzerland	1
South Asia	Pakistan	64
	India	52
	Bangladesh	4
	Sri Lanka	4
	Nepal	4

Appendix 2. Countries of international participants (continued)		
Oceania	New Zealand	37
	Australia	16
	Fiji	2
Africa	Egypt	20
	Ghana	9
	South Africa	7
	The Gambia	6
	Sudan	3
	Mauritius	2
	Zambia	1
	Kenya	1
	Nigeria	1
	Somaliland	1
	Uganda	1
Middle East	Saudi Arabia (KSA)	6
	Iraq	3
	United Arab Emirates	1
	Yemen	1
	Jordan	1
	Kuwait	1
	Libya	1
	Bahrain	1
	Qatar	1
South east Asia	Malaysia	7
	Indonesia	4
	Viet Nam	1
	Philippines	1
South America	Colombia	3
	Trinidad and Tobago	2
	Perú	1
	Brazil	1
North America	Canada	1
	USA	1
	Mexico	1