



Supplementary Material

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Table i. Table summarizing the key study findings from all papers that met the inclusion criteria.

Study	Design	Sample size	Data collection method	Study findings
Malik-Tabassum et al (2020) ¹	Mixed method	200 final year medical students across the UK	Surveys	The average placement was only 2.5 weeks long and 37.4% of respondents rated their exposure as 'poor'. The perceived competency of medical students in a number of orthopaedic skills was also low (< 6 using a ten-point Likert scale).
Boutefnouchet and Budair (2017) ²	Cross-sectional study	157 fourth year medical students attending Birmingham Medical School	Questionnaire	57.8% of respondents found consultant bedside teaching to be an 'extremely useful' component of their placement. This was followed by small group teaching seminars and bedside teaching with junior doctors or trainees (rated as 'extremely useful' by 54.5% and 51.6% respectively).
Al-Nammari et al (2015) ³	Mixed method	210 final year medical students who have passed their final university exams	Survey and Freedman and Bernstein questionnaire	The average T&O placement was 2.65 weeks long and only 68% of participants felt they received 'adequate mandatory exposure'.

Ghani et al (2015) ⁴	Mixed method	200 junior doctors including GPs, foundation trainees, core medical and surgical trainees and registrars	Survey	Two-thirds (66%) of respondents had four or fewer weeks of orthopaedic undergraduate placement and 37% reported that their undergraduate placement did not prepare them for foundation training. 33% cited six weeks as the optimal duration of an attachment to prepare them for a T&O-related foundation post.
Baker et al (2015) ⁵	Mixed method	171 year four students who had undertaken a 'bended teaching' approach; 148 year five students who have taken the traditional teaching programme	Questionnaire	Overall course satisfaction, approval of innovative teaching methods, and satisfaction with the clarity of course information significantly improved with the implementation of the new teaching programme ($p < 0.001$).
Blake (2014) ⁶	Mixed method	76 trainees and consultants across five UK medical schools	Survey	The most common teaching methods were practice on real patients (75.9%) and practising on peers (72.4%). The top preferred methods among respondents included practising on real patients (79.3%) followed by simulation patients (51.7%).
Kelly et al (2014) ⁷	Mixed method	125 medical students	Freedman and Bernstein assessment, 55 question end of year exam and OSCE	A one-week intensive programme demonstrated an increase in exam pass rate (61%), significantly increased from the pre course pass rate of 3.3% ($p < 0.001$). The pass rate of the end of year exam was 69.9% and 96.7% of students pass the OSCE. Students reacted positively to the addition of expert clinician led sessions and there was a high demand of additional supplemental learning resources.
Vioreanu et al (2013) ⁸	Mixed method	140 medical students	35 question exam and questionnaire	Following a two-week intensive T&O teaching programme, exam score increased from 136/280 pre-course to 201/280 post-course (significance was not disclosed). 75% of students thought that the module improved their presentation skills and 91.7% found the extracurricular activities such as table quizzes and presentations to be a helpful learning tool.

Ali and Bulstrode (2013) ⁹	Cross sectional study	60 respondents including consultant orthopaedic surgeons, consultant general physicians, GPs and consultant anaesthetists	Questionnaire	Surgeons thought a median length of eight weeks was sufficient, followed by GPs and anaesthetists (six weeks) and finally physicians (four weeks). However, 97% of respondents felt that undergraduate T&O placements should be at least four weeks in length.
Queally et al (2011) ¹⁰	Quantitative	92 medical students taking the new course against a historical control of 72 students	Freedman and Bernstein exam	Individuals that were taught using the new two-week T&O module scored significantly better than the historical control group in terms of score (62.3% vs 54.3%, respectively; $p < 0.001$). A significantly higher satisfaction rate was also (63% vs 15%, respectively ($p < 0.001$)).
Atrey et al (2010) ¹¹	Mixed method	95 junior doctors and medical students	Questionnaire style exam set by a large multi-speciality group of surgeons.	Individuals participated in a two-week case-based learning programme, before retaking the exam. Before exposure to the learning programme, only 35% of F1s at the district general hospital (DGH) passed, 54% at the teaching hospital and 45% of medical students. Upon completion of the programme, the average pass was 88%. In addition, upon completion of the programmes the affirmative response to the question 'do you feel confident being an orthopaedic doctor-on-call?', rose from 42% to 79%.
Williams et al (2010) ¹²	Quantitative	139 students taking the new course were compared to a historical control of 130 students.	200 MCQ exam	Following a seven-week T&O programme, there was a 5.2% increase in the exam score between the control group (69%) and the group studying under the new course (74.2%, $p < 0.001$).
Al-Nammari et al (2009) ¹³	Mixed method	112 doctors following completion of their foundation programme	Freedman and Bernstein exam and survey	The mean examination score for the group who had exposure to orthopaedics during foundation training was significantly higher (62%) compared to the group with no orthopaedic exposure (51.6%; $p = 0.005$). Only 15% of foundation year doctors have any formal exposure to musculoskeletal medicine

				during their foundation posts and just 13% felt that they had received “adequate” exposure to the field.
Queally et al (2008) ¹⁴	Mixed method	303 volunteers including GPs, GP trainees, medical students and orthopaedic registrars as a control	Freedman and Bernstein exam and survey	Only 13 GPs (24%) and 29 GP trainees (28%) achieved the set passing mark. 85% of GP trainees, were not satisfied with their postgraduate musculoskeletal knowledge, with the primary reason sighted as inadequate undergraduate orthopaedic training.
Costa et al (2007) ¹⁵	Quantitative randomized study	77 students, 40 students taught via interactive discussion and 37 taught via didactic lectures.	Ten question short answer test	The average score in the written paper was significantly greater in the interactive lecture taught group compared to those who had lecture-based teaching (7.8/10 vs 8.3/10; $p < 0.05$). Using a five-point Likert scale, the presentation of content from the discussion group was rated as significantly higher than those from the lecture group (4.3 vs 3.8; $p < 0.001$).
Bulstrode et al (2003) ¹⁶	Quantitative, randomized control trial	106 fifth-year medical students receiving half of content via donut teaching and half via lectures	MCO exam following the course, ten weeks later, and 17 months later	Following the course, content covered by donut teaching scored higher (41/50) compared to content covered via lecture-based teaching (40.1/50). At ten weeks, both scores (36.3/50 and 37.3/50, respectively). Results increased when assessed at 17 months (38.7/50 and 38.1/50, respectively). However, there was no significant difference between exam performance for any of the three exams.

GP, general practitioner; MCQ, multiple-choice question; OSCE, Objective Structured Clinical Examination; T&O, trauma and orthopaedics.

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