

# The TROJAN project: creating a customized international orthopedic training program for junior doctors

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## Abstract

Musculoskeletal problems account for a vast proportion of presentations encountered by doctors globally, with figures ranging from 15-36%. However, the time medical schools allocate to learning orthopedics is by no means proportional to this. This study aims to bridge this gap by developing an international orthopedic teaching program tailored to the specific knowledge and skills required by junior doctors in different countries. This prospective study asked fifty junior doctors, who had recently completed an orthopedics job, what three orthopedic teaching topics taught retrospectively would have benefitted their clinical practice. The most requested topics were used to design educational workshops for junior doctors and these consequently comprised the TROJAN (Teaching Requested by Orthopaedic Juniors And Novices) training program. Data was collected from twenty-five junior doctors in KwaZulu-Natal State, South Africa, and twenty-five in London, UK. It is therefore in these two countries that the TROJAN program was subsequently made available. Participants who selected topics were within two years of graduating medical school and had worked an orthopedic or Accident and Emergency job within the last year. 49% of topics chosen by SA doctors were practical skills such as wrist and ankle fracture reduction techniques, and management of open fractures. The most requested topic by UK doctors (11 out of 25) was management of neck of femur fractures. This is rationalized by the fact South African doctors require more hands-on responsibility in their daily practice whereas in the UK greater emphasis is placed on optimizing patients for theatre and making sound management plans. TROJAN currently develops orthopedic skills and knowledge in junior doctors in South Africa and United Kingdom with teaching customized based upon location. Feedback has been exceptionally positive with every candidate thus far rating the usefulness of TROJAN as the highest option, *very useful*.

## Introduction

Internationally, musculoskeletal problems account for a large proportion of presentations encountered by doctors in both the primary and secondary care setting. In Cape Town, South Africa (SA), one study of 1,005 people attending community health centers revealed 36% had reported a musculoskeletal condition not due to trauma in the previous three months.<sup>1</sup> Elsewhere, in Europe, a comparative study for 10,000 patients showed that 21% in the United Kingdom (UK) had consulted a primary or secondary care physician for a musculoskeletal condition in the previous year, with the percentage slightly lower at 16% in Sweden.<sup>2</sup> Even in the USA one study reported 23% of 2285 patients visiting their doctor in a family health center were for musculoskeletal problems.<sup>3</sup>

With such high global prevalence of musculoskeletal problems, it would be natural to assume this was proportionally reflected during the undergraduate training of medical students. Unfortunately, this is not true. Orthopedics, despite being a particularly practical and hands-on speciality, is often only allocated two to three weeks of clinical time during a medical students entire five or six year education in medical school, internationally. The problem is compounded by the fact the orthopedic training that does exist often gets diluted by joining clinical attachments with other worthy, but probably also neglected, specialties such as dermatology.

This is reflected in a study in Cape Town where 79 Interns who, in their first postgraduate year and working at the renowned Groot Schuur or Tygerberg Hospitals, sat a musculoskeletal competency examination. Staggeringly, only 9% passed.<sup>4</sup> Elsewhere, a study in the USA which created a musculoskeletal physical examination decision-making test also concluded that there are deficiencies in the educational skills of medical students.<sup>5</sup> Another USA study also created a post-graduate musculoskeletal examination and showed that 82 per cent of eighty-five medical school graduates failed to demonstrate *basic competency* and that *medical school preparation in musculoskeletal medicine is inadequate*.<sup>6</sup> However, what was interesting in this particular study is that doctors who had taken an elective orthopedic surgery course during their medical school years scored better by 10.5% on average. This at least creates some optimism that orthopedic courses can act as a simple yet effective way to bridge the gap in training. It is therefore no surprise that there are in fact courses which aim to enhance the orthopedic and trauma knowledge of postgraduate doctors. Some of the most successful and renowned courses internationally are the AO

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trauma courses, which tend to be highly dedicated to developing practical and operative skills.<sup>7</sup> The Orthopedic Trauma Association developed a trauma course prior to the Orthopedic In-training Examination, which is an exam aimed at orthopedic residents in the USA.<sup>8</sup> Their results showed that such a course, when combined with a trauma rotation, did improve test scores. It is the belief of the authors that with such little undergraduate emphasis on orthopedics, doctors across the world would both welcome, and benefit from, a post-graduate orthopedic training program. This is exactly what this study aims to deliver, starting in two countries that the authors worked in, SA and UK. However, in designing such a program there are several factors which first need to be considered.

First of all, previous literature has recommended some key attributes that an orthopedic course should follow. A study in Bristol University in the UK assessed how best to design an orthopedic course, albeit at an undergraduate level, and ascertained that most orthopedic courses are traditionally lecture based, but would have a greater impact by maximizing clinical contact with small groups and having fewer lectures.<sup>9</sup> Furthermore, it must be considered that, once graduated, junior doctors in different countries face varied orthopedic challenges. In SA, for example, doctors enter two years of Internship training and their orthopedics rotation exposes them to high levels of trauma from road traffic accidents and violent crime, with presentations often complicated by delayed presentations and high prevalence of HIV. The interns will often be the first to see the patient thus their practical skills and ATLS principles tend to be

very refined.<sup>10</sup> Junior doctors in the UK follow a similar two year program, called Foundation Training. In orthopedics, however, they are more exposed to low-energy trauma that occurs in the elderly population. Furthermore, it is actually Accident and Emergency (A&E) doctors who usually deal with the initial management of the patient such as fracture reduction and reducing dislocations. This means the orthopedic junior doctors are less experienced in the practical skills department but often more experienced at medically managing patients with multiple co-morbidities and preparing them for early theatre.

Clearly, with both cohorts of doctors exposed to different types of situation, the skill set required of junior doctors differing from one country to the next, it would naturally be prudent to customize the teaching course based upon the surgeons' location. Furthermore, it therefore seems sensible to select teaching topics based upon the insight of junior doctors who have recently worked in orthopedics. We anticipate that designing an international orthopedic teaching program for junior doctors in such an evidence based way would be both novel and effective.

## Objectives

The aims of this study are: i) to develop an international post-graduate orthopedic teaching program for junior doctors; ii) the subject matter should be recommended by junior doctors who had recently worked in orthopedics, and thus the individual topics should vary and be tailored to the local requirements of doctors in different countries; iii) evaluate such a course in both countries and get feedback for improvement.

## Materials and Methods

There were 25 doctors recruited from both SA and UK, and the question they were asked was: *What three specific Orthopaedic topics taught at the beginning of your Orthopaedic job (or A&E job if from UK) would have improved your clinical practice?*

All participants conformed to the following criteria: i) Doctors were within two years of graduating medical school thus deeming them junior doctors; ii) all participants from SA to have worked an orthopedic job in KwaZulu-Natal State; iii) all participants from UK to have worked either an orthopedic or A&E job in London. A&E was accepted for UK doctors as they deal with and manage many acute orthopedic cases; iv) the orthopedic or A&E job they had worked in was within the last year. This was to ensure data collected was relevant as, with medical practices constantly evolving, it was important to assess the current skills and

knowledge required; v) all participants were asked the exactly worded question as outlined above with no coercion or idea suggestions; vi) participants were not allowed to discuss the question with other doctors before giving their answer; vii) all participants were requested to fill a questionnaire which asked the following questions: a) How did you rate the presentation (Poor, Average, Good, Excellent); b) How useful was the presentation (Not Useful, Averagely Useful, Very Useful); c) What was particularly good or bad (Open space answer); d) What more could have been taught to aid your education (Open space answer).

## Results

South African doctors choose the following topics: wrist fracture, reduction technique and acceptable limits (13); open fracture management (9); ankle fracture reduction (8); presenting XRs (6); POP application: general technique (6); how to do a wrist block/digital block (3); shoulder, elbow and hip dislocation-relocating (3); supracondylar fracture management (3); septic knee diagnosis (2); ankle fracture management (2); POP application: U-slab (2); cold limb management (2); degloving injuries examination (2); reading C-spine XRs (2); knee exam (2); pelvic fracture management (2); POPs application: duration for upper and lower limb (1); how to apply skin traction (1); examination of hand nerves (1); examination of hand tendons (1); hip fractures classification (1); tibial plateau fracture management (1); nail bed injuries acute management (1); conscious sedation for fracture manipulation (1).

On the other hand, UK doctors choose: NOF fractures, classifications and management (11); wrist fracture, reduction technique and acceptable limits (9); shoulder, elbow and hip dislocation, relocating (5); knee examination (4); POP techniques for reductions (4); post op complications management of lower limb (4); presenting X-rays (4); ankle fracture management (3); ankle fracture reduction (2); cauda

equina diagnosis (2); follow-up time frames for fractures (2); how to buddy strap (2); open fracture management (2); pelvic X-ray assessment (2); diagnosis septic arthritis (2); shoulder examination (2); assessing extent of soft tissue injury (1); ATLS basic principles (1); brachial plexus exam (1); chronic back pain (1); compartment syndrome diagnosis (1); DHS steps (1); spinal fracture management (1); examine hip (1); finger fracture management (1); flexor tendon sheath infection dx (1); knee aspiration (1); managing knee ligament injury (1); read c-spine X-rays (1); three point reduction technique (1); tibial plateau fracture (1).

In summary, the main categories chosen by SA and UK doctors were (Figure 1): history and communication [SA 6 (8%); UK 4 (5%)]; examination [SA 6 (8%); UK 15 (20%)]; investigations [SA 4 (5%); UK 3 (4%)]; practical procedures [SA 37 (49%); UK 25 (33%)]; management [SA 20 (27%); UK 28 (38%)].

## Discussion

Several key differences were established in the answers given by the two cohorts. Neck of femur fractures are commonplace in the UK due to its elderly population. Understanding the management of such fractures is seen as a vital aspect of orthopedic surgery in UK explaining why 11 doctors of 25 chose this topic. The incidence of such an injury is much less in SA, where high levels of trauma tend to occur in the younger population from road traffic accidents and violent assaults. This explains why topics such as open fractures were selected with higher frequency by doctors in SA.

Practical skills (49%) were requested with much greater frequency by SA doctors who often see a greater amount of trauma and have more practical skills responsibilities. By contrast, in UK there is a great responsibility for junior doctors to select correct management plans and medically optimize patients explaining why they selected *Management* (38%)

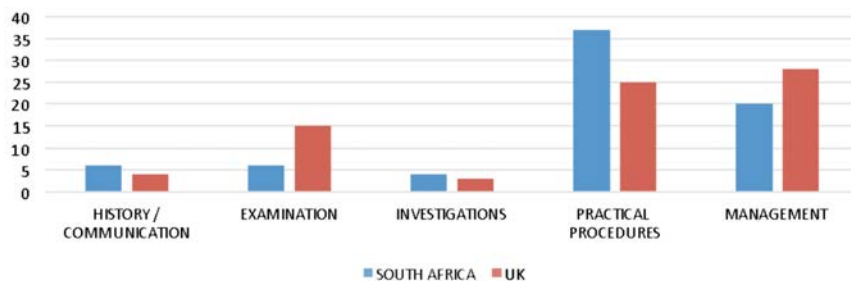


Figure 1. A graph summarizing the main categories chosen by SA and UK doctors.

based topics more often.

Interestingly, however, despite the doctors being trained in very different regions of the world there were also many similarities between the two data sets. Both cohorts selected wrist fracture reduction techniques and acceptable limits as one of their most requested topics (13 for SA, 9 for UK) and this is rationalized by the fact such fractures are one of the most commonly experienced globally. Furthermore, displaced wrist fractures often need reduction and, even if surgical intervention is later indicated, the management thus begins as soon as the clinician makes the acute diagnosis. The fact this was requested by so many doctors also implies it was inadequately taught at medical school.

Other similarities are that the major categories of history taking, communication skills and examination skills were rarely requested by all doctors. This is because developing such attributes are the basic requirement of students at medical school. Furthermore, teaching on appropriate investigations was rarely requested because simple X-rays and bloods are usually suffice in the acute diagnosis of most orthopedic conditions. This contrasts to *practical procedures* and *management* which are skills that can only truly be developed with experience. The fact such little time is given to orthopedics at medical school, and often teaching is didactic and not in the practical setting, explains this phenomena in our data.

The wide variety of requests by both sets of doctors reflects the range of challenges experienced by orthopedic juniors. The speciality is highly diverse with doctors expected to negotiate the subtle differences between seemingly similar pathologies. Ironically, one vital condition not mentioned by any doctor in either UK or SA was compartment syndrome. However, this reflects the fact clinical emergencies such as this are drilled into doctors from an early stage. Overall, however, the data gathered further highlights the fact greater emphasis must be placed on education, at both undergraduate and postgraduate level. Having a training program which aims to cover the aforementioned core topics will provide doctors with better knowledge and tools to provide optimal care for injuries that greatly impact patients' activities of daily living.

## Conclusions

Our data supports both the literature review and our anecdotal knowledge, that there is

indeed a large gap in orthopedic teaching delivered to undergraduates and junior doctors. However, on a positive note, our data successfully allows us to see which particular areas of orthopedics that doctors felt knowledge-deficient or skill-deficient in. It was interesting to see that many requests were for skills which such as wrist fracture reduction, which are often taught *on the job* and in a variable manner, with little formal or evidence-based foundation to the teaching.

Using our data, the authors have set up an international teaching program called TROJAN (Training Requested by Orthopedic Juniors and Novices). This has currently been spread out to various hospitals in South Africa and UK and it aims to develop basic orthopedic skills in doctors according to their local requirements.

The South African teaching program consists of mainly of a practical workshop where skills requested such as reducing wrist fractures and managing compound fractures is covered. Importantly, we have aimed to carry out this training on the first day doctors rotated into their new orthopedic job to help them with their upcoming tasks. The teaching was also important as all junior doctors in South Africa serve a rural, community-service year. Thus the demands on them are really stretched by factors which include *population demographics, distribution of doctors, infrastructural development and socio-economic conditions of the communities*.<sup>11</sup>

In the UK, the teaching sessions did have marginally more tutorial-style, with neck of femur fractures a core aspect. However, similarly to South Africa and in keeping with the recommendations of the literature, the program restricted *lecture-based* themes and largely encompassed practical procedural skills such as fracture reduction techniques.

The feedback thus far has been very encouraging. Thirty candidates from both the UK and SA have given written feedback after experiencing the TROJAN teaching program. Every single participant rated the usefulness of the presentation as *very useful* which was the highest possible option. This highlights the importance to us of tailoring the teaching to the needs of doctors in different countries, and explains why gathering data from the insight of previous doctors is so powerful. Furthermore, every participant rated the teaching as either *good* or *excellent*.

The authors of this write-up would like to continue expanding the TROJAN teaching program to improve the orthopedic knowledge of junior doctors across the world. Our aim is to improve the care given to citizens of any coun-

try and training doctors on the frontline is vital to this. We hope in the future that TROJAN expands beyond South Africa and UK, as we would like to carry out similar data collection in other European and African countries, in addition to the USA.

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