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REVIEW

Evidence-based quality leadership in orthopaedics

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Abstract

There is a paucity of literature analysing the importance of leadership within trauma and orthopaedics. However, such skills are essential to make an orthopaedic surgeon proficient in their various roles. This literature review on leadership within orthopaedics enables an understanding of current issues.

A narrative literature review was conducted using Pubmed, Medline and The National Centre for Biotechnology databases. The search string used to conduct the narrative literature review was (orthopaedic) and (leadership[Title]). The articles were screened by title, abstract and full text. A reference search was subsequently conducted on these papers using the same inclusion and exclusion criteria. The papers then underwent a thematic analysis to understand the issues surrounding leadership in orthopaedics.

The critical themes recognised were quality improvement, training, women in leadership, inequality and traits of a leader. Through reviewing the themes in this article, a framework was developed to identify the current issues and potential avenues of advancing orthopaedic leadership.

This narrative literature review has demonstrated a paucity of research in orthopaedic leadership. Further work would create a robust evidence base, outline ideal orthopaedic leadership and standardise training to create better orthopaedic leaders.

Key words: Leadership; Literature review statements; Orthopaedics

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Introduction

There is a paucity of literature analysing the importance of leadership within trauma and orthopaedics and the exemplar characteristics which leaders possess. Research on the topic has mainly been conducted in the USA with limited studies conducted in the UK. Although work on leadership has been done in other surgical specialities, the orthopaedic specialty comes with its own challenges. In a study by Klein et al (2013), the challenges were identified as clinical, administrative, educational and research. Therefore, a desire for personal development is required to maintain a high level of health, happiness and job satisfaction. Moreover, during the COVID-19 pandemic, surgeons have been forced to react to this unprecedented clinical challenge by systematically repurposing surgical wards (Hirpara and Taylor, 2020). Soft skills such as leadership are therefore essential to make an orthopaedic surgeon proficient in the variety of roles they acquire and situations they encounter. A literature review on the current research regarding leadership within the orthopaedic specialty enables an understanding of the themes and relevant pressing matters.

Methods

A narrative literature review was considered more appropriate than a systematic review as it allows for a broader scope (Green et al, 2006). However, a systematic approach was used to prevent selection bias resulting in misguided conclusions (Rumrill and Fitzgerald, 2001). This narrative literature review involved using a search string and inclusion-exclusion criteria.

Pubmed, Medline and The National Centre for Biotechnology databases were used for the analysis. The search string used to conduct the narrative literature review was (orthopaedic) and (leadership[Title]). The word orthopaedic was translated by the search to include 'orthopaedic'[All Fields], 'orthopaedics'[MeSH Terms], 'orthopaedics'[All Fields], 'orthopaedic'[All Fields], 'orthopaedical'[All Fields], 'orthopedical'[All Fields]

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or 'orthopaedics'[All Fields]. Therefore, all the relevant articles concerning leadership within orthopaedics were included in the literature review.

Inclusion and exclusion criteria were used to filter through the most relevant papers generated from the search string. The criteria are as follows:

Inclusion criteria:

1. All papers regardless of date of publication
2. Papers that focused on the characteristics of leadership
3. Papers studying orthopaedics
4. Greater than level four research (case series) (Burns et al, 2011).

Exclusion criteria

1. Non-English language
2. Abstract only articles
3. Papers that were unavailable.

Screening the results

From an initial search eighty-one results were generated. Two articles were duplicates and therefore removed. The remaining articles were screened by title, abstract and full text using the inclusion and exclusion criteria, which left twelve papers for analysis. A reference search was subsequently conducted on these papers using the same inclusion and exclusion criteria. Two extra papers were added through this methodology, leaving fourteen papers for the qualitative analysis. The collection and screening process is presented in the PRISMA diagram (Figure 1).

Common themes were identified from the papers, which were then collated into a structured fashion to understand the issues surrounding leadership in orthopaedics. The critical themes recognised were quality improvement, training, women in leadership, inequality and traits of a leader. These themes were further explored, allowing the gaps in the literature to be recognised and future areas of research suggested.

Thematic analysis

Training

Orthopaedic surgeons are naturally leaders within their hospital and team. Therefore, they must nurture leadership and encourage others to 'lead early and lead often' (Benzel, 2004). Benzel stated that training has six fundamental aspects. These are:

1. The technical (operative or procedural) educational process
2. Teaching on the ward
3. Teaching in the outpatient setting
4. Teaching 'soft skills' (for example professionalism and ethics)
5. Teaching didactic skills
6. Establishing and nurturing an enriched environment.

These facets require different skills that develop with experience but are fundamental to an academic leader. Williams et al (2020) concurred with this point, stating that according to their survey, respondents felt that leadership could be taught and was not an inherent characteristic.

Therefore, training programmes to foster leadership are extremely important. Donnally et al (2020) highlighted a 'correlation between specific training programmes and production of future fellowship spine surgery leaders'. An assessment of the American Academy of Orthopaedic Surgeons Leadership Fellows Programme for Orthopaedic Surgeons demonstrated that academically orientated applicants who 'have an academic practice and hold an academic rank' were more likely to be selected for the programme (Day et al, 2010). Moreover, fellows felt that the course had a positive impact on their leadership competency and were more likely to assume future leadership positions. However, in evaluation the course could have picked applicants that were more academically oriented, and the assessment of CVs was not standardised, thus leading to possible selection bias.

Yayac et al (2019) agreed that such training programmes are essential to improve the leadership skills that are vital in surgical theatre and academia. Nonetheless, the

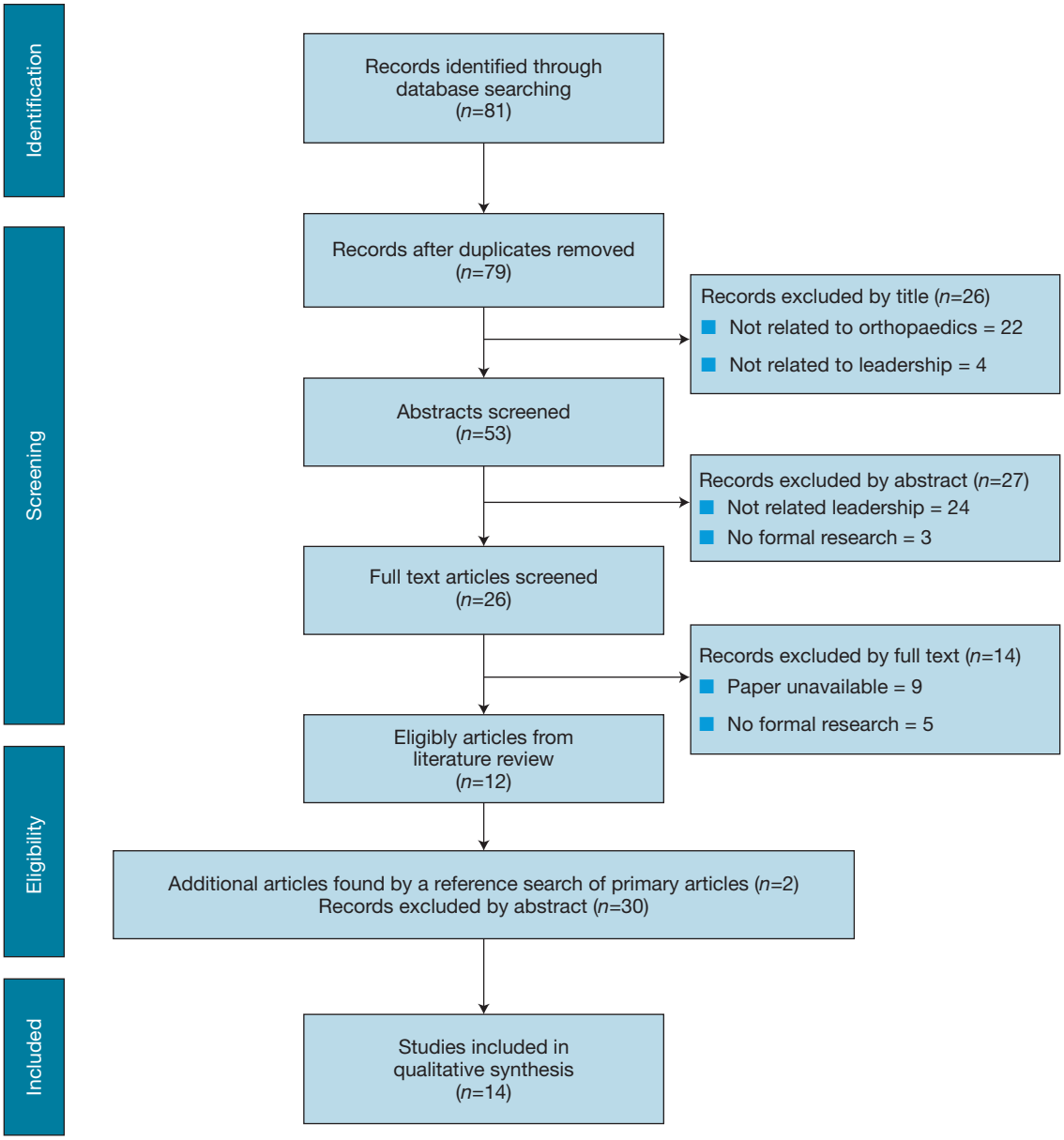

Figure 1. PRISMA diagram showing the literature review process used in this study.

number of programmes on offer is insufficient to meet the demand, and the protected time designated to develop such skills is extremely limited. Moreover, a lack of standardisation in leadership training leads to trainees feeling that there is no formal teaching available and instead seeking opportunities as committee positions to bridge the gap. The authors also highlighted a clear distinction between leadership and mentoring. They argued that mentoring requires a 'more personal, collegial relationship than that between a leader and team member' and therefore, mentorship schemes should not be classed with leadership programmes. Nonetheless, mentorship programmes have been shown to improve leadership behaviours in both mentors and proteges in other professions (Vatan and Temel, 2016). Therefore, this distinction needs to be investigated further.

Quality improvement

Quality improvement is how hospitals evolve, innovate and ensure clinical governance. Orthopaedic surgeons are integral to this when translating the innovations into direct patient care. Kuo and Robb identified six essential surgical safety elements to reduce surgical harm (Kuo and Robb, 2013; Mells et al, 2018). These are:

1. Effective surgical team communication

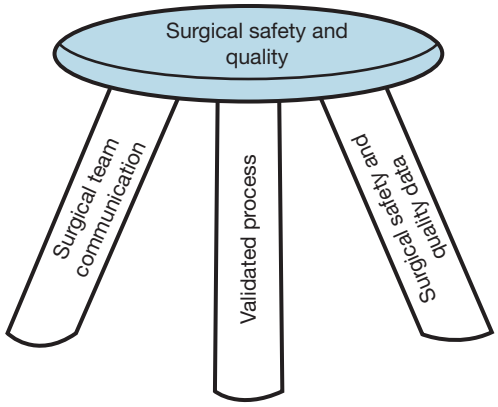

Figure 2. American Academy of Orthopaedic Surgeons orthopaedic surgical safety and quality stool (Kuo and Robb, 2013).

2. Proper informed consent
3. Implementation of surgical checklists
4. Surgical site or procedure identification
5. Reduction of distractions
6. Routine surgical data collection and analysis.

The 'American Academy of Orthopaedic Surgeons orthopaedic surgical safety and quality stool' (Figure 2) further reiterates these and acts as a framework that allows a continual self-assessment. These elements need to be supported through a culture of safety and administrative support. Furthermore, surgical champions are essential to role-model and embed these characteristics into practice (Kuo and Robb, 2013). Gray et al (2020) stated that at the highest levels of 'physician activation' surgeons will 'overcome system inertia and hierarchy to operationalise novel and transformative payment and delivery models'. The importance of a physician's insight not only lies in introducing innovations but also in bridging the gap between health systems and their colleagues. Unfortunately, physician engagement in care innovation is falling, thus creating the need to 'encourage physicians to lead rather than resist health system transformation'.

Alongside improving safety, orthopaedic surgeons play an integral role in generating a culture supportive of quality improvement. Creating this culture is achieved through open communication and all team members contributing to the culture. By facilitating shared decision making as a part of change management, leaders can encourage teams to follow evidence-based guidelines and reduce variation, which leads to better standards of care for patients. In addition to culture change, surgeons have an integral role to play in improving the supply chain. Through the optimisation of contracts, standardisation of supplies and maximising the value from purchases, surgeons will improve the supply chain thereby increasing the 'quality and safety of care'. This example further demonstrates that surgeons must not only adapt but lead the evolution of healthcare (Samora et al, 2020).

Mells et al (2018) denoted that the move in the USA to pay for performance schemes incentivises quality improvement, as reducing medical error, improving efficiency and clinical outcomes attracts investment. Orthopaedic leaders are therefore required to implement quality improvement and adhere to standards. Owing to the evolving field of healthcare informatics, an understanding of data is essential and must be leveraged to assess the effectiveness of quality improvement projects. Therefore, future leaders must have training in healthcare informatics to 'recognise problems before they occur, predict risks and ultimately prevent harm to patients'.

Qualities of a leader in orthopaedic surgery

Multiple studies have highlighted the qualities desirable in an orthopaedic leader (Benzel, 2004; Schiller et al, 2020). When assessing spine surgery fellowship directors, a strong association was noted in 'the level of research prowess'. However, the paper failed to differentiate if research prowess created better leadership qualities or if the individuals were selected for their strong research background (Donnally et al, 2020). Schiller et al (2020) further emphasised the need for research experience which may develop through their

training institutions. Location not only influences research but may also develop networks that keep trainees in that location for their leadership roles. These findings highlight the importance of selecting the right training location in a trainee's early career.

The relationship between a strong academic record and better leadership positions has not been investigated. A potential explanation is that through research and working in teams, clinicians develop leadership skills that can translate into leadership positions. However, it could be that recruiters look at academia to differentiate candidates. Moreover, the importance of academia will depend on the role in question. Training programmes should therefore allocate protected time to research and invest in developing these skills further. A culture of research and quality improvement will not only improve leadership skills but will translate to improved clinical care.

Perceptions of what makes an ideal orthopaedic leader were rarely investigated. According to William et al's work, 'honesty (22%), integrity (18%) and good communication skills (18%)' were the most important traits. Good communication can also help flatten the hierarchy and derive optimal performance from a team, which translates to improved patient care (Williams et al, 2020). Such qualities are needed to move towards a contemporary operating theatre, as highlighted by Kuo and Robb (2013) where responsibilities are shared, and communication is facilitated, thus leading to evidence-based decision making. Respondents agreed that these traits could be taught, therefore strengthening the importance of formal leadership programmes for orthopaedic trainees and fellows. These changes are moving orthopaedic surgery from a surgeon-centric approach towards a more patient-focused and team-based model.

There is a paucity of research in leadership styles within orthopaedic surgery. An effective style, well researched in other settings, is 'transformation leadership', which involves seeking feedback from team members and making changes for the good of the group and individual members (Yayac et al, 2019). The effectiveness of specific leadership styles, such as transformational leadership, must be further evaluated in orthopaedics and integrated into training to improve patient care and team performance.

During the COVID-19 pandemic, the importance of stress management as a leader has been recognised. Orthopaedic surgeons are under significant stress and taking on leadership roles comes with extra challenges. It is important to manage work, and also to create a balance for oneself and family. Long-term stress can lead to burnout and potentially disastrous errors. Methods such as mindfulness and quietening reflex can be effectively practiced to manage stress. Moreover, allowing others to raise their concerns, enabling effective communication and a flat hierarchy will prevent disastrous mistakes from being made. Orthopaedic leaders not only need to manage themselves but also set an example for others to follow. They need to facilitate team-building activities, create a culture of growth and embed collaboration into teams (Quick et al, 2006).

Diversity and orthopaedic leadership

Lack of diversity in orthopaedic surgery has been highlighted as a major problem in multiple studies conducted in the USA. Female representation was only 4% in spine surgery leadership at the fellowship level (Donnally et al, 2020), 100% of fellowship directors were men (Schiller et al, 2020) and despite the fact that in 2005–6 women represented 49% of graduating medical students, only 10.9% of orthopaedic surgery residents were female (Nguyen et al, 2010). These figures all denote the lack of female representation within orthopaedic surgery. A lack of female leadership and inspiration creates further barriers for women entering the orthopaedic specialty and its leadership roles. Research by Cheng et al (2006) showed that in emergency medicine 'departments led by women had higher proportions of female faculty'. Likewise, more women in leadership positions will provide positive role models and encourage women to join the orthopaedic specialty.

Weiss et al (2014) investigated 'equity in surgical leadership for women' and found that there was a greater proportion of women taking the programme director role over the chair role. They were unable to identify if 'women leaders choose the "caring" Programme Director role, or if they are directed that way by others'. However, the literature supports that both men and women are looking for a work–life balance. Therefore, specialities must accommodate lifestyle during recruitment to 'attract and nurture the best and the brightest,

including women'. Their research highlighted that woman naturally take supporting roles, are more hesitant to approach male attendees and join more gender-based societies, thus taking time away from work. They suggest the first step is to acknowledge issues regarding pregnancy during work and the current gender imbalance. Proposed solutions include increasing the leadership diversity, networking opportunities, addressing a lack of female mentorship, providing women time for research, teaching and support when raising a family. Efforts of increasing female uptake must begin during medical school. Through leaders mentoring and removing the misconceptions associated with a career in orthopaedics, perhaps, women may be more likely to apply for the specialty (Weiss et al, 2014).

Research into leadership positions within the Paediatric Orthopaedic Society of North America showed that women apply for 'committee positions and volunteer at a greater proportion compared to their male counterparts'. However, increased gender diversity is not seen in its leadership. Changes are being made to make the orthopaedic specialty more accessible to women, which is reflected by the fact that women are ascending the ladder at an equal rate to men. However, there will be a time-lag for the effects to translate to a more significant proportion of women leaders. Only time and additional research will tell if the measures are adequate and whether women can achieve 'equal representation at the highest levels of the organisation'. Hence, this issue must be consistently reassessed and made a priority (Poon et al, 2019).

Evaluation

Orthopaedic surgery comes with various leadership challenges depending on the roles that a surgeon adopts. Current literature highlights the need to be adaptable and the core traits that orthopaedic leaders need. However, the effectiveness of a leadership style depends on both context and location (Gemeda and Lee, 2020). Most research in leadership has been conducted in the United States of America, with minimal examination of this topic within the UK. Working in the context of the NHS, which implements a different leadership structure, will present different qualities that are valued in a role model. Therefore, conclusions taken from this literature review are limited because of the location of the studies used.

Diversity has been shown to improve performance, innovation and efficiency (Gomez and Bernet, 2019). Unfortunately, women are vastly underrepresented within trauma and orthopaedics in the UK, with 11% of the British Orthopaedic Association being female and similar percentages seen across the grades of the specialty (British Orthopaedic Association, 2020a). However, there is greater recognition of the importance of increasing the diversity of the specialty, and orthopaedic associations across the world are acting to resolve the issue (The Carousel Presidents, 2019). The British Orthopaedic Association acknowledged the issue at the 2019 British Orthopaedic Association Congress and subsequently produced a diversity and inclusion strategy in 2020, which focuses on five priorities (Table 1) (British Orthopaedic Association, 2020b).

Table 1. Key priorities of the British Orthopaedic Association diversity and inclusion action plan

Priority 1	To understand and define the groups that are currently under-represented across the British Orthopaedic Association and the trauma and orthopaedic profession, and to demonstrate a commitment to addressing that under representation
Priority 2	To strengthen the diversity of the leadership of the British Orthopaedic Association (Council, Executive and Committees), with the aim of moving towards a composition that reflects the demographics of the membership at large and society
Priority 3	Increase the diversity of chairs, speakers and invited guests at the British Orthopaedic Association Congress and other educational events
Priority 4	To increase the awareness of orthopaedics as a career option, especially for medical students, with the aim of driving greater diversity within the profession
Priority 5	Maintain interest and provide support throughout a trauma and orthopaedics career by increasing student and trainee participation within the Association

From British Orthopaedic Association (2020b)

Alongside improving diversity, the British Orthopaedic Association has begun to bridge the leadership training gap with the Future Leaders Programme. This programme aims to create 'leaders with the skills to improve the delivery of clinical care and to influence positive change within the profession'. Such initiatives are encouraged and need to be driven by current leaders. These changes will improve diversity, quality of leadership and prevent vacancies alongside a decline in quality of care (British Orthopaedic Association, 2020c).

Although certain traits are highlighted to be beneficial for an orthopaedic leader, no framework or model is identified to guide the training and growth of surgeons. Transformational leadership was alluded to improving teamwork within the operating theatre (Yayac et al, 2019). However, during emergency surgeries, other styles that are more direct, may be needed for leadership and to attain the optimal outcome. Further research into these models of leadership, how they are valued and when to use them is needed.

The limited research on leadership within the orthopaedic specialty warrants an assessment of the literature within the field of surgery in general. Lessons learnt from other surgical specialties can be used to identify leadership strategies which are also applicable to orthopaedic surgery. Furthermore, this work will highlight neglected areas of research which can be further developed. Having evidence-based focus on orthopaedic leadership will facilitate evidence-based practice and allow institutions to design effective leadership training programmes for orthopaedic trainees.

Framework for leadership

Through reviewing the themes in this paper, the framework in Table 2 can be used to identify the current issues and potential avenues of advancing orthopaedic leadership. Institutions must look to address the themes through the actions identified in each section.

Table 2. Framework for tackling the issues in orthopaedic leadership

Theme	Actions
Education	■ Create more standardised leadership training programmes ■ Encourage academic exposure ■ Orthopaedic leaders to gain experience in technical, ward-based, outpatient, soft skill and didactic teaching alongside creating an enriched environment
Quality improvement	■ Promote the highest levels of 'physician activation' thereby strengthening the supply chain and transforming care ■ Embed surgical safety, open communication and validated processes into practise ■ Obtain a greater understanding of healthcare informatics ■ Create a culture of quality improvement within training ■ Create a culture of shared decision making within departments
Virtues	■ Promote the qualities that are identified for orthopaedic leadership including research experience, ability to network, honesty, integrity, communication and the ability to manage stress ■ Move towards team based and patient focussed care ■ Evaluate different methods of leadership, particularly transformational leadership
Diversity	■ Acknowledge issues in diversity, particularly the gender imbalance ■ Increase female leadership representation by challenging the stereotypes of orthopaedics held by medical students ■ Encourage networking, support family planning and provide protected time for mentoring research and leadership ■ Accommodate for lifestyle during recruitment ■ Continually reassess and monitor diversity levels

Key points

- This literature review has demonstrated a paucity of research regarding leadership within the orthopaedic speciality in the UK.
- Leadership styles will need to adapt depending on the role adopted by an orthopaedic surgeon.
- More work is needed to understand leadership models, methods of improving diversity and how leadership changes in different contexts and cultures.
- A robust evidence base must then direct standardised training that is focused on building the leadership skills of orthoapaedic trainees within the UK.

Conclusions

This narrative literature review has demonstrated a paucity of research in orthopaedic leadership, particularly outside the USA. There needs to be more research undertaken on effective leadership models, methods of improving diversity and how leadership changes in different contexts and cultures. This work would create a robust evidence base, outline ideal orthopaedic leadership, and standardise training to create better orthopaedics leaders.

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Conflicts of interest

The authors declare that there are no conflicts of interest.

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