Current Concepts Review

Being a woman and an orthopaedic surgeon—A primer on the challenges we face

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ABSTRACT

A higher number of women are graduating from medical schools than men, yet orthopaedic surgery continues to register the lowest proportion of female surgeons and residents of the surgical specialties. This trend is observed not only in North America but also globally. The presence of a more diverse workforce has been shown to lead to improved patient outcomes, enhanced efficiencies, and overall wellness within healthcare systems and would be of benefit to the orthopaedic surgery profession. This primer aims to provide surgeons and leaders with evidence-based insights into diversity, equity, and equality, as well as define barriers and potential solutions pertaining to women in orthopaedic surgery.

INTRODUCTION

Women are avoiding pursuing training and entering orthopaedics compared to other surgical specialties [1]. This reality contradicts data showing that medical schools admit and graduate more women than ever (56.9%) [2]. In the United States, orthopaedic surgery ranks the lowest compared to other medical and surgical specialties for representation by gender. This trend is evident globally, with very low percentages of women in orthopaedics worldwide [3]. (Table 1)

Diversity is defined as “the practice or quality of including or involving people from a range of different social and ethnic backgrounds and of different genders, sexual orientations, etc” [4]. Simply, diversity indicates that an organisation is composed of different elements and expressions of humanity. Diversity in medicine would be represented by non-uniformity of gender, race, language, religion, socioeconomic status, ability, and other characteristics in the workforce.

Equality, or simply the state of being equal, refers to the same status, rights, and responsibilities for all the members of a society, or group [5]. Regardless of background or need, each person is treated equally or the same. Medicine demands a more nuanced approach than simple equality for all patients and practitioners due to care requirements, the complexity of each situation, and expertise.

Equity is “freedom from bias or favouritism” [4], which, in a just world, would result in equality of opportunity. Equity is not based on the same treatment for all. Equity uses fairness and justice as guiding principles, leading to differing treatments and resources distributed to minimise imbalances for individuals and communities. Equity in medicine requires the profession to recognise and address the barriers that limit opportunities for patients and medical professionals.

Building a diverse and equitable medical profession is imperative under justice and human rights principles [6]. Diversity within a profession provides for the needs of the individual and the group, ensuring all members have equal opportunities for success and personal well-being. This is important for the health and well-being of orthopaedic surgeons and the patients they serve. A lack of gender diversity among physicians can lead to disparities in how male and female patients are treated [7–9]. When a profession is composed of a diverse group of individuals, it is better equipped to provide the best care for a broad range of patients. Diversity in caregivers improves access to care, clinical outcomes, patient satisfaction, and efficiency of healthcare delivery [10–14]. For surgeons, a diverse workforce can increase job satisfaction, reduce the incidence of burnout, improve mental wellness, and create a more robust professional life [15]. Having more women in leadership positions improves institutional culture to one of greater fairness and
equity, and provides mentorship and sponsorship opportunities for other women. The positive effects of diversity initiatives, such as clearly defined parental leave guidelines, job-sharing opportunities, and improved access to daycare in hospitals, benefit women and those of all genders by promoting a healthier and more balanced personal and professional life [16].

Without equity, orthopaedic surgery will fail to attain diversity; without diversity, the profession will fail to achieve equity. Notably, being of a specific gender is not a requirement to perform orthopaedic surgery. Therefore, it is crucial to identify and address the obstacles women encounter in orthopaedic surgery to foster a diverse, vibrant, and supportive workforce [15]. This primer is intended to outline the challenges women surgeons face in terms of their perceptions and experiences within their professional sphere. The information presented draws from literature, pivotal studies, and direct quotes from female surgeons to emphasise the identified barriers. The authors emphasise that gender in this primer is delineated as male or female. The space for those who do not identify in this binary way is recognised; however, the multifaceted nature of researching and exploring gender in surgery is complex, and this is an evolving area of study.

### BARRIERS TO GENDER EQUITY

A barrier is defined as “anything that prevents or obstructs passage, access, or progress” [17]. While there are no well-established classifications or frameworks for the barriers specific to women in orthopaedic surgery, we can turn to studies that draw from real-world experiences and the existing literature for insights into understanding them. These range from a perspective related to perceptions and biases [18–20] to a structural perspective [14].

The real-life experiences of female leaders have been studied, with the result being the creation of a validated Gender Bias Scale (GBS), which identifies barriers faced by women [18]. Originally validated in women in law, faith-based organisations, higher education, and health care, this scale identifies specific barriers that women face in the workplace. The GBS was used to survey Canadian female orthopaedic surgeons, who identified six themes or barriers: constrained communication, unequal standards, male culture, lack of mentoring, workplace harassment, and work-life integration [20]. (Table 2)

### BARRIERS FRAMEWORK

An alternative approach to categorising these barriers is to consider how they are embedded in the structure and governance of organisations or via their connection to a culture based on a patriarchal framework [14]. However viewed, it is a fact that there are certain biological characteristics that are associated with being female. Women are the ones who have children and are vital for nutrition in the first months of an infant's life. These facts will require consideration to achieve equity for women in surgery.

### Table 1

<table>
<thead>
<tr>
<th>RANK</th>
<th>COUNTRY</th>
<th>POPULATION (million)</th>
<th>ORTHOPAEDIC SURGEONS</th>
<th>SURGEON: POPULATION</th>
<th>FEMALE ORTHOPAEDIC SURGEONS</th>
<th>% OF FEMALE ORTHOPAEDIC SURGEONS</th>
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<td>Brunei</td>
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</tr>
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</tr>
<tr>
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<td>1 : 146,081</td>
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<tr>
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<td>Singapore</td>
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<td>253</td>
<td>1 : 22,924</td>
<td>8</td>
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</tr>
<tr>
<td>20</td>
<td>Kuwait</td>
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<td>1 : 31,543</td>
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</tr>
<tr>
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<td>Myanmar</td>
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<td>1 : 108,200</td>
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</tr>
<tr>
<td>22</td>
<td>Sri Lanka</td>
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<td>90</td>
<td>1 : 236,666</td>
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<td>1.1%</td>
</tr>
<tr>
<td>23</td>
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<td>23.7</td>
<td>1,982</td>
<td>1 : 11,957</td>
<td>20</td>
<td>1.0%</td>
</tr>
<tr>
<td>24</td>
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<td>8227</td>
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</tr>
<tr>
<td>25</td>
<td>India</td>
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<tr>
<td>26</td>
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</tr>
<tr>
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</tr>
<tr>
<td>29</td>
<td>Cambodia</td>
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<td>100</td>
<td>1 : 165,000</td>
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<tr>
<td>30</td>
<td>Laos</td>
<td>7.2</td>
<td>50</td>
<td>1 : 143,400</td>
<td>0</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

* Data collected from each nation’s Orthopaedic Association. Asia-Pacific data courtesy of PC Chye.
Table 2  
Barriers identified by Canadian female-identifying orthopaedic surgeons [20].

<table>
<thead>
<tr>
<th>Barriers</th>
<th>Definition</th>
<th>Examples/quotes</th>
</tr>
</thead>
</table>
| Constrained communication             | Constrained communication considers the care taken when female leaders communicate within a group as well as how they present or promote themselves to others | - Women self-censor in order to avoid backlash from not fitting into gender stereotypes  
  “Men who speak up on a topic are considered strong, but when women speak up, they are labelled pushy or emotional.”  
  “I am mindful of my communication approach when exercising authority at work.”  
  (I do not feel I am) “being taken seriously by colleagues when I offer solutions in meetings. Being talked over.”  
  “Male colleagues stereotyping against females with ‘strong personalities’ as ‘they are difficult to work with’.”  
  “I was on committees which were a waste of my time, as I was not listened to, or the guys just took credit for my ideas.”  
  “Constantly having to work harder for the same recognition or outcome as my male colleagues” |
| Unequal standards                     | Unequal standards describe how women are treated differently than men as well as how they are expected to fit the female stereotype. | - Called by your first name (by patients, other healthcare professionals, and colleagues) instead of “Doctor”.  
  - Being mistaken for a nurse or other traditionally female healthcare provider.  
  - Asked to take meeting notes, bring food to meetings.  
  - Assigned roles and tasks that do not lead to promotion or career advancement and are often unpaid.  
  - Referred more challenging patients because they “need a woman to listen to them”.  
  “Male colleagues stereotyping against females with ‘strong personalities’ as ‘they are difficult to work with’”.  
  “I was on committees which were a waste of my time, as I was not listened to, or the guys just took credit for my ideas”.  
  “Constantly having to work harder for the same recognition or outcome as my male colleagues” |
| Male culture                          | A culture that favours men and creates an unwelcoming environment for female surgeons. | - Meetings and social events occur in places more likely to be frequented by men (golf, hockey, motor sports, bars)  
  - Gendered language (e.g., ‘hey guys’, ‘staffman’, ‘godfather’)  
  - Sexist jokes are normalised  
  - Minimal support for pregnancy and maternity leave  
  - Sexism and gender bias  
  “Frequently having patients or allied healthcare workers turn to male subordinate colleagues to approve or verify a medical decision or opinion that was discussed”.  
  “Old boys club—less qualified males are advanced and given leadership roles because they are good guys”.  
  “Left out of decision making, not invited to outings, not welcomed at dinner table during ortho events because seats were reserved for other male colleagues” |
| Lack of mentoring                     | Lack of mentoring for both the amount of mentoring received as well as who provides mentorship. | - Lack of formal programs that encourage young women to enter surgical specialties  
  - There are not enough women in leadership roles resulting in a limited number to serve as mentors.  
  - Informal mentoring leads to people choosing mentees and mentors who think and look like them.  
  - A lack of formal mentoring programs to reduce bias  
  - Women are discouraged from considering orthopaedics as a career.  
  “There is a huge barrier to promotion and leadership for women in surgery. I have put myself forward and met resistance at every turn.”  
  “Lack of female role models; females trying to deter me from choosing orthopaedics early on”.  
  “Lack of females in leadership positions and attending staff positions. Having a female staff mentor would be so beneficial to learning, residency training, and transition to practice” |
| Workplace harassment and hostility    | The experience of abuse, discrimination, or sexual harassment               | - Sextist jokes and language in the workplace  
  - Harassment and hostility by colleagues, patients, and nurses  
  - Sexual harassment and discrimination  
  - Expectations of sexual favours in return for teaching, promotion, or sponsorship  
  - Physical sexual assault, ranging from unwanted touching to rape  
  “Gender assumptions—attitude and abilities to perform certain activities, procedures in the OR because I am a woman and I ‘lack the strength necessary’ to perform in the O(perating) R(oom)”  
  “I am harassed daily at work by my junior peers… have learnt bad behaviour that has been enabled for so long. I do not feel safe at work because it is a toxic male environment NOT driven by patient safety but male ego and a false sense of self-importance”.  
  “Families ask me who will be doing the surgery after I have performed the surgery. I have put myself forward and met resistance at every turn.”  
  “Biggest challenge as a woman is the interaction with O(perating) R(oom) nurses, both as a trainee and staff. I often felt I had to ‘win them over’, earn their trust. (to) create an environment where I didn’t make it seem like I was above them”.  
  (continued on next page)
Structural barriers

Structural barriers are rules, regulations, policies, and agendas that limit or hinder an individual or a group’s ability to enter, succeed, and excel in a workplace. They are embedded within social, economic, or political structures and can perpetuate inequalities or discrimination based on factors such as race, gender, socioeconomic status, or disability. Structural barriers can manifest in various forms, including policies, practices, norms, or physical infrastructure, organisation of systems, governance structures, and institutional guidelines.

Barriers to entry into orthopaedics

Barriers

- **Low numbers of women in orthopaedics**—it is difficult to imagine being a female orthopaedic surgeon when you do not see any around you.
- **Biased interview process**—lack of clear and transparent selection and hiring processes and lack of diversity on interview teams [21].
- **Hidden curriculum**—women continue to be discouraged from applying for orthopaedics, and those who are accepted are encouraged towards lower-paying specialties.
- **Undervaluing diverse people and skill sets**—there are assumptions on what is considered the optimal skill set to be an orthopaedic surgeon (strength, size, athleticism) that are based on gender bias rather than requirements (problem-solving, intelligence, empathy, compassion, patience, curiosity) [22].

“Orthopaedic culture continues to reinforce that successful surgeons (especially females) are aggressive, pushy, or harsh with respect to their personality and behaviours. As a result, quieter, respectful female residents are often seen as less competent because they come across as ‘less confident’, i.e., just because the resident is not overconfident or aggressive that is interpreted to = less able or less qualified’

“Being told by the Dean of Medicine that I was too small for ortho at my medical school graduation”

Solutions

- Acknowledge and address the male culture that is pervasive in orthopaedics.
- Consider how to increase the number of women and diverse professionals in orthopaedics.
- Make entrance applications and hiring criteria fair, equitable, and transparent to ensure a diverse pool of applicants.
- Ensure the interview team is diverse to bring different perspectives to the selection process.
- Develop and evaluate programs that increase exposure to orthopaedic surgery for university and medical students to improve interest and application rates. Examples include such as the Perry Initiative and Nth dimensions.
- Mandate orthopaedic rotations in medical school to increase exposure to orthopaedics for medical students.

Barriers to career advancement and satisfaction

Barriers

- **Unequal standards**—describes how women are treated differently than men and how expectations for women are often higher than for men for the same work.
- **Gendered stereotypes and communication**—women are expected to fulfill traditional female roles, being caring and nurturing. They are penalised when they act in ways considered traditionally male, such as in charge, and confident.
- **Lack of women in leadership roles**—the culture of a profession follows leadership. More women in leadership roles will help to change the culture of programs and organisations.
- **Dead end work**—women are assigned non-promotable and often unpaid tasks, including being leaders in promoting diversity, equity, and inclusion [23,24].
- **Lack of women on the podium**—there continue to be all-male panels at conferences and webinars [25,26]. Women asked to be faculty in orthopaedic congresses are often given topics on rehabilitation and radiology, whereas men present more complex clinical orthopaedic topics [27,28].
- **Glass cliff**—women are more likely to rise to organisational leadership positions in times of crisis than in times of success. Women are then set up for failure, and when they fail, it is blamed on the fact that they are women [29,30].
- **Lack of mentorship**—a mentor is ‘an individual who has knowledge and shares it with you and someone who talks to you’ [31]. A lack of mentorship is a consistent barrier reported by female healthcare professionals [32,33].
• Lack of sponsors—a sponsor is ‘an individual who has power and influence and will use it for you. Someone who talks about you [31].

“you’re too busy because of..(children, family, pregnancy)”

“Women must work twice as hard for half the credit”.

“In my organization, women are rarely sponsored. In addition, system structures fail to accommodate for family commitments or work-life balance”

Solutions

• Implicit bias training to understand the unconscious perceptions around gender stereotypes.
• Increase understanding of the value of diversity, including different viewpoints and ideas to solve problems.
• Value all aspects of an orthopaedic career, including leadership, education, research, and clinical work.
  ○ Leadership—develop strategies to increase women in leadership positions and eliminate bias in promotion criteria.
  ○ Education—appropriately compensate for participating in surgical education.
  ○ Research—eliminate bias and gender inequities for granting research funding [34]. Increase female authors by encouraging inclusive author guidelines and research collaborations (research primer, this special issue).
  ○ Clinical—require transparency and equity in hiring practices, referral patterns, pay structure, and operating-room resources.
• Prevent the attrition of women in every step of the pipeline. Women are leaving orthopaedics and leadership roles at an alarming rate. Determining the causes and culture that underlies this will increase the numbers of women in leadership positions [35].
• Develop formal and informal mentorship programs. Mentorship programs can improve career development, promotion, and retention, as well as contribute to team diversity and growth [36,37]. Organisations that have formal mentoring programs have lower attrition and burnout [38,39].
• Encourage mentorship opportunities by teaching surgeons how to be effective mentors [40]. Highlight female orthopaedic role models to make them more visible to younger colleagues [37]. Host networking events for female surgeons and ensure educational courses feature more female faculty.
• Encourage sponsorship by educating and encouraging surgeons to sponsor diverse individuals.

Barriers to surgeon wellness

Barriers

• Lack of pregnancy and parenting leave policies and guidelines [41].
• Inflexible working hours—long and inflexible work hours including being on call for 24 h or longer. Scheduling inflexibility with the timing of meetings and rounds during important family time.
• Discrimination, harassment and hostility—these come from colleagues, nurses, and patients [20].
• Sexual discrimination and harassment—this can include verbal, emotional, and physical offences [42]. Sexist jokes give permission to push the envelope to more egregious sexist behaviour.
• Sexual abuse and assault—this ranges from unwanted touching to assault and rape [43–45].
• Lack of career promotion—the need to work harder to achieve success leads to burnout and feeling undervalued [46,47].
• Burnout—gender-based barriers contribute to high rates of burnout in female surgeons [46,47].

• Gender pay gap—women are expected to spend more time with patients, address multiple complaints, and address more psychosocial issues. In a fee-for-service model, male surgeons are referred patients who need procedures which receive higher pay.

“expected to do the unpaid work, lack of help at home, lack of acknowledgement of the unpaid work”

“Men tend toward high-volume practices, which get paid well. Women lean into more complicated areas, spend more time in communication … and are then seen as less valuable (because their volumes are lower).”

Solutions

• Inclusive meetings and rounds which include an opportunity for virtual or flexible/rotating hours for meetings.
• Re-evaluate the process of after-hours coverage, including the length and frequency of call coverage, and provisions for pregnant and ageing surgeons.
• Parenting-leave guidelines and policies should be clear, comprehensive, transparent, and equitable. For those who are pregnant, this includes accommodation for fertility treatments, prenatal care, pregnancy, pregnancy-related complications, miscarriage, as well as the peri- and post-partum periods. For those who have become parents, this includes all new parents, including the birth parent, partner of the birth parent, adoptive parents, and parents through surrogacy [48].
• Family-leave guidelines will give consideration for parents of children with special needs and care for ageing or ill parents or partners.
• Normalising job-sharing which includes starting a practice, practicing, and retiring from practice. Increased work schedule flexibility increases job satisfaction and productivity [49].
• Encourage networking through diversity-related societies such as the Ruth Jackson Orthopaedic Society (RJOS), Women of Orthopaedic Worldwide (WOW), and International Orthopaedic Diversity Alliance (IODA).
• Eliminate the gender pay gap. Include women on the committees that determine fee schedules and eliminate biases in fee schedules related to patient gender [50,51]. Consider a centralised referral process to reduce referral bias.
• Provide childcare at healthcare institutions.
• Create a safe mechanism to report harassment and abuse. A clear and robust policy for reporting abuse and harassment must be available. An engaged and committed third party would minimise barriers to reporting [52].
• Unbiased promotion/career advancement criteria should take into account pregnancy, parental leave, and health-related absences.

Cultural barriers

The barriers outlined in this document stem from a society that is patriarchal. A patriarchal society is defined as one that is male-dominated, male-centred, and male-identified [53]. Collectively, we adhere, whether actively or passively, consciously or unconsciously, to the norms and regulations of these systems, often opting for the path of least resistance [53]. This culture leads to gender stereotypes where men are seen as dominant, aggressive, and strong leaders, and women are seen as gentle, caring, and weak. These stereotypes are woven throughout society as well as throughout our medical systems.

Barriers

• Privilege—a right, advantage, or opportunity available only to a particular person or group [54]. By virtue of your natural
characteristics, such as gender, sex, race, height, or socioeconomic status, you are given the benefit of the doubt.

- **Gender stereotypes**—men and women are expected to act in certain ways based on their gender.
- **Default male culture**—a culture that perpetuates maleness and creates an ‘old boys club’. Women are considered to be outsiders, with society favouring the ‘default male’, creating a workplace where merit is based on male traits [53,55].
- **Gendered language**—the use of male-centric language in the workplace such as ‘guys, manpower, chairman’ are words that reinforce the perception that it is a man’s world and that women do not belong.
- **Gender assumptions**—unequal standards for men and women. When women portray what is considered a ‘male’ trait, they are labelled negatively. Duties considered female duties, such as child rearing and elder care, are not supported and are seen as a detriment to being a surgeon. Women are forced to work in their profession and maintain their full duties at home (second- and third-shift phenomena) [56–58].
- **Tokenism**—organisations and institutions deliver their diversity plan by allowing a token woman into a role. They feel ‘the job is done’, and the token woman, alone, is set up for failure without true support or culture change. They are given few chances to make mistakes and are left bearing the weight of reputation for all women [59].

“In practice, feeling that I need to listen and talk more (be more nurturing) to the patients because I am a woman as opposed to my male colleagues’.

“Being told I would be hired because workplaces were trying to gender diversify”

**Solutions**

- Create a culture of equity and respect by starting with recognising that patriarchy exists and underlies the norms of behaviour of our society.
- Understand gender stereotyping and recognise when gender stereotypes are being applied to a situation or policy and work to dismantle them.
- Accept zero tolerance for abuse and harassment and ensure there is a mechanism for appropriately addressing unacceptable behaviour.
- Be an upstander and train people to stand up against abuse and harassment in the moment.
- Insist on gender-neutral language to be inclusive and reinforce a diverse culture. Appropriate language is crucial as it enhances accuracy and respectfully and aligns with the universally acknowledged values of equality [60,61].

**IMPACT OF BARRIERS ON FEMALE SURGEONS**

Orthopaedic surgery is a profession of perfectionism, where the assessment of outcomes and accuracy can be measured in millimetres [62]. The specialty also has the misfortune of some of the highest rates of depression, burnout, substance misuse, and suicide of all professions [62–64]. The gender-specific barriers experienced by female surgeons are compounded within this perfectionist and male-dominant culture [20,46]. These structural and cultural barriers result in reduced retention of female surgeons at every step of the orthopaedic career pipeline, disproportionately fewer research and leadership opportunities, hostility and sexual harassment, and professional fatigue and burnout [16,65–69].

To begin to address equity in orthopaedic surgery, it is necessary to recognise that women face unique challenges. Women in orthopaedic surgery report a lack of support, both within their workplace and the broader professional community, resulting in a sense of isolation or exclusion that can negatively impact job satisfaction and well-being. Female surgeons also report being expected to adhere to traditional gender roles in caregiving both at work and at home, leading many to experience burnout.

It is essential to acknowledge that these barriers may exist for all under-represented groups, including gender, gender identity, sexual orientation, socioeconomic status, race, ethnicity, and ability. Those who identify with multiple under-represented categories may experience these barriers in a unique and potentially exponential way. Addressing gender in orthopaedic surgery is the first step in enhancing diversity in orthopaedic care. It is also evident that these gender-specific barriers play a role in the rates of burnout experienced by female surgeons [46]. However, change is slow, and to make a meaningful difference in the well-being of surgeons, these solutions must be fast-tracked to reduce the extent of moral injury currently being experienced by female surgeons.

**SUMMARY/CONCLUSION**

As surgeons, we have an ethical imperative to champion equity and diversity in our specialty, in the same way we strive for health equity for our patients. This first comes with recognising and accepting that unique barriers exist for women in our profession and that we must move towards a more equitable culture in orthopaedics.

Gender-based barriers are a complex and long-standing issue that will require an intentional, dedicated, and multifaceted approach to improve equity in orthopaedic surgery. All members of the profession will be needed to change the culture of the profession and create workplaces that foster diversity, inclusivity, accessibility, and safety for everyone. To do this, we must understand the intentional and unintentional biases that maintain inequitable systems, recognise our own privilege, and understand how others may experience things differently than we do.

The structural and cultural barriers faced by women in orthopaedics have been researched and defined and are largely derived from a system built for males. Systemic changes and transparency will be required to improve constrained communication, unequal standards and male culture, reduce hostility and harassment, eliminate pay inequity, create positive mentorship and leadership opportunities, and strive for improved work-life integration and physician wellness. While the list of barriers is lengthy, these have hindered but not prevented women from becoming successful orthopaedic surgeons. However, exceptions do not make the rule, and using solutions included in this primer could make significant progress towards changing the current culture and improving the quality of life for women in orthopaedics.

In the end, an improved culture of equity in orthopaedics will benefit the whole orthopaedic community and, importantly, improve patient outcomes.

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