

Experiences of Canadian Female Orthopaedic Surgeons in the Workplace

Defining the Barriers to Gender Equity

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Background: Only 13.6% of orthopaedic surgeons in Canada are women, even though there is nothing inherent to the practice of orthopaedic surgery that favors men over women. Clearly, there is a need to identify, define, and measure the barriers faced by women in orthopaedic surgery.

Methods: An electronic survey was distributed to 330 female-identifying Canadian orthopaedic surgeons and trainees and included the validated Gender Bias Scale (GBS) and questions about career burnout. The barriers for women in Canadian orthopaedics were identified using the GBS. The relationships between the GBS and burnout were investigated. Open-text questions explored the barriers perceived by female orthopaedic surgeons.

Results: The survey was completed by 220 female orthopaedic surgeons and trainees (66.7%). Five barriers to gender equity were identified from the GBS: Constrained Communication, Unequal Standards, Male Culture, Lack of Mentoring, and Workplace Harassment. Career burnout correlated with the GBS domains of Male Privilege ($r = 0.215$; $p < 0.01$), Disproportionate Constraints ($r = 0.152$; $p < 0.05$), and Devaluation ($r = 0.166$; $p < 0.05$). Five main themes emerged from the open-text responses, of which 4 linked closely to the barriers identified in the GBS. Work-life integration was also identified qualitatively as a theme, most notably the difficulty of balancing disproportionate parental and childcare responsibilities alongside career aspirations.

Conclusions: In this study, 5 barriers to workplace equity for Canadian female orthopaedic surgeons were identified using the validated GBS and substantiated with qualitative assessment using a mixed-methods approach. Awareness of these barriers is a necessary step toward dismantling them and changing the prevailing culture to be fair and equitable for all.

Clinical Relevance: A just and equitable orthopaedic profession is imperative to have healthy and thriving surgeons who are able to provide optimal patient care.

Gender equity has been recognized as a pressing human rights issue in many professional fields, and medicine is no exception. The culture of gender bias in medicine originates from a history in which the male physician and surgeon are the default standards¹. During their careers, two-thirds of female academic physicians report gender discrimination, and one-third experience sexual harassment². The cultural and organizational gender biases inherent in medicine systematically disadvantage women from closing the gender gap^{3,4}. In Canada, female-identifying students made up 57% of recent

medical school classes⁵; however, equal gender representation is not evident in all fields of medicine. In particular, orthopaedics has the lowest representation of women among all medical and surgical specialties^{6,7}. In 2020, 13.6% of orthopaedic surgeons in Canada were women, representing an increase from 5.5% in 2001, an improvement that has taken 20 years to realize⁸⁻¹⁰.

Understanding the barriers that exist for women in the different spheres of medicine is paramount, as these may vary according to the systems and culture of the specialty. A medical specialty that does not prioritize gender diversity is doing a

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disservice to both the profession and patients³. Without parity, the skills and talent of close to half the population are not being utilized to their full potential. Medicine serves a diverse patient population, and therefore a diverse workforce is necessary to provide optimal care¹¹. Since there is nothing inherent to the practice of orthopaedics that favors men over women, the gender gap likely stems from the culture within the specialty. The barriers for women that are specific to orthopaedic surgery should be identified, defined, and measured, to allow strategies to dismantle these barriers to be evaluated and implemented.

In order to synthesize the challenges that exist for female leaders, the Gender Bias Scale (GBS) was developed and validated to measure women's perceptions and experiences of gender bias in the workplace^{12,13}. Considering that leadership skills are fundamental to practicing as a surgeon, the GBS was an appropriate outcome measure for this study. The purpose of this study was to determine the barriers to gender equity faced by female Canadian orthopaedic surgeons and trainees, using a mixed-methods approach. The secondary purpose was to investigate the relationship between the barriers identified by the GBS and career burnout.

Materials and Methods

This study received ethics approval from the University of Calgary (REB21-0201), and all participants provided digital informed consent. An electronic survey was distributed via SurveyMonkey (Momentive). Inclusion criteria were female-identifying Canadian orthopaedic surgeons, including those in training, practicing, or retired. Participants were identified through the Canadian Orthopaedic Association and the provincial licensing databases. The survey was distributed via email, with reminders issued at 2 and 4 weeks, and it was also posted on a private social media group for female orthopaedic surgeons in Canada.

Demographic variables, including stage and years of practice, practice setting, age, marital status, and ethnic heritage, were collected. The survey included the GBS (see Appendix A), 2 questions about career burnout, and 3 open-text questions. The GBS contains 47 questions answered on a 5-point Likert scale to evaluate 15 barriers to gender equity that are further classified into 6 higher-order domains^{12,13}. The questions regarding career burnout were previously validated and correlated with emotional exhaustion and depersonalization, the strongest components of burnout syndrome^{14,15}. Open-text questions explored the barriers perceived by female orthopaedic surgeons.

Data Processing and Statistical Analysis

Anonymized demographic and survey data were analyzed descriptively. The barriers to gender equity were identified using a median score of ≥ 4 , which indicated agreement that the barrier existed. The Cronbach alpha was employed to assess content validity. A Pearson correlation coefficient was employed to explore relationships between burnout and the domains of the GBS.

A qualitative analysis of the open-text responses was conducted, drawing on a grounded-theory approach¹⁶. Two methodology and context experts independently read and re-read the responses, and coded and analyzed themes using

NVivo 12 (QSR International). The researchers met twice to align coding and to compare themes. The identified themes were then compared and contrasted with the 15 barriers of the GBS. To increase the analytical diversity of the research team, a third context expert reviewed the raw data and discussed emergent themes with the coders.

Source of Funding

This project was funded through a Smith & Nephew research grant and a University of Calgary research award.

Results

The inclusion criteria were met by 330 surgeons. Of these, 220 submitted complete surveys, for a response rate of 66.7%. The demographics of the respondents are presented in Table I. Five barriers to gender equity were identified by the surgeons' responses to the GBS. The barriers with a median score of ≥ 4 on the GBS were: Constrained Communication, Unequal Standards, Male Culture, Lack of Mentoring, and Workplace Harassment (Table II). Descriptive data for the GBS barriers, higher-order domains, career burnout, and Cronbach alpha values are presented in Table II. Burnout correlated with the GBS domains of Male Privilege ($r = 0.215$; $p < 0.01$), Disproportionate Constraints ($r = 0.152$; $p < 0.05$), and Devaluation ($r = 0.166$; $p < 0.05$).

Open-text responses were provided by 66% of the participants. Five main themes emerged from the responses and were labeled as *unequal standards*, *male privilege*, *lack of mentoring*, *hostility/harassment*, and *work-life integration*. The exemplar quotes supported and reinforced the importance of the barriers to gender equity identified by the orthopaedic surgeons in the GBS (Table III). The open-text responses indicated that surgeons had been penalized in the past for being confident, candid, assertive, decisive, and accomplished. The surgeons described being expected to nurture the most challenging patients and trainees. A common sentiment was not receiving deserved credit and having to work harder and perform better to receive similar recognition as a male peer. Respondents also reported receiving intense, unequal scrutiny of their performance. Male culture played a large role in women's experience of non-belonging, including exclusion from male networks and opportunities for camaraderie, support, participation, leadership, and advancement. Women in this study noted that men were listened to more, were allowed more leeway for mistakes, and were provided with more opportunities. Female surgeons reported that mentoring and leadership were deficient in their training and career, leading to challenges in their professional development and a sense of isolation. The open-text responses revealed distressing treatment of female surgeons by colleagues and superiors, with comments specific to bullying, sexualized remarks, harassment, and ageism predominating.

Although alignment was detected between the qualitative themes and the GBS barriers, some departure was apparent regarding the source of hostility and the manner of the support deficiencies. Hostility/harassment was experienced by female surgeons not only from colleagues and superiors but also from nurses

TABLE 1 Demographics of the Respondents

Demographic Variable	No. of Respondents	Percent of Respondents
Age in yr		
<30	16	7.3%
31-39	111	50.5%
40-49	51	23.2%
50-59	30	13.6%
≥60	10	4.5%
Not reported	2	0.9%
Marital status		
Married	146	66.4%
Single	42	19.1%
Divorced	8	3.6%
Separated	5	2.3%
Other	17	7.7%
Not reported	2	0.9%
Stage of practice		
Resident	44	20%
Fellow	20	9.1%
<5 yr of practice	39	17.7%
5-10 yr of practice	51	23.2%
11-20 yr of practice	36	16.4%
>20 yr of practice	28	12.7%
Not reported	2	0.9%
Type of practice		
Academic	122	55.5%
Private community	63	28.6%
Combined community and academic	28	12.7%
Other	5	2.3%
Not reported	2	0.9%
Ethnic heritage*		
North American	147	66.8%
Aboriginal/Indigenous	7	3.2%
Central American	2	0.9%
South American	2	0.9%
European	78	35.5%
North African	1	0.5%
Central/West African	1	0.5%
South Asian	7	3.2%
East Asian	13	5.9%
Central/Middle East Asian	3	1.4%
Other	1	0.5%
Not reported	2	0.9%

*Responses = 262 responses due to multiple selection by some participants, so percentages will add up to more than 100%.

and patients. Within the *work-life integration* theme, surgeons expressed frustration with balancing their careers with their parental responsibilities. Within the responses, issues regarding reproductive

rights, working while pregnant, maternity leave, and inequitable child-rearing responsibilities were pervasive.

Discussion

In this study, a validated scale was used to identify barriers to gender equity for Canadian female orthopaedic surgeons. Constrained Communications, Unequal Standards, Male Culture, Lack of Mentoring, and Workplace Harassment were identified by surgeons and trainees as barriers to achieving gender equity. Qualitative analysis of the open-text responses supported the barriers identified in the GBS and recognized an additional theme related to challenges with *work-life integration* for female surgeons in the arena of reproductive rights and parental responsibilities. Burnout correlated with the GBS domains of Male Privilege, Disproportionate Constraints, and Devaluation. The identified barriers are interrelated and appear to have their origins in perceived gender roles and the implicit biases that inform these socially constructed stereotypes.

Implicit bias and gender stereotypes have been reinforced in the field of surgery, which has resulted in pervasive gender inequities¹⁷. When women's behavior challenges gender stereotypes, there is a perceived lack of fit¹⁸, resulting in women not being seen as capable leaders and being perceived unfavorably when they exhibit leadership traits traditionally ascribed to men¹⁹. This concept was reinforced in this study, with the surgeons describing the expectation that they fulfill typically female roles but suffering negative repercussions for expressing traits more stereotypically associated with men. The consequences of this gender stereotyping for women are a devaluation of their abilities and performance, a lack of credit for their successes, and being penalized when exhibiting leadership traits typically associated with men¹⁸.

Constrained Communication considers the care taken when female leaders communicate within a group as well as how they present or promote themselves to others. Constrained communication manifests with women suppressing their leadership qualities to avoid backlash and fit more traditional gender roles, but then being perceived as less confident than men²⁰. This role incongruity exists for women, and the current culture reinforces that "powerful men should display their power and powerful women should not."²¹ This barrier was not as strongly voiced in the open-text responses, possibly because female surgeons were more likely to describe personal experiences rather than the accommodations they made to fit into an inhospitable environment.

The Unequal Standards barrier highlights how women are treated differently than men as well as how they are expected to fit the female stereotype. Open-text responses confirmed that women did not receive equal recognition for their work compared with men, and also felt pressure to perform additional supportive and nurturing roles. Another burden is the expectation that women take on extra "dead-end" work and non-promotable tasks, such as participating on committees or organizing social events²². "Women thus face a double bind: when they conform to feminine stereotypes, they are perceived as weak leaders. When they conform to stereotypes of 'good leaders,' they are penalized for bucking gender norms."²³ Two recent systematic reviews on gender bias in medicine and surgery highlight these external pressures to conform to

TABLE II Descriptive Data of the Gender Bias Scale Survey (Higher-Order Domains and Lower-Order Barriers) and Surgeon Burnout*

	Median	Cronbach Alpha	Lower-Order Barrier	No. of Questions	Median	Cronbach Alpha
Higher-order domain						
Male Privilege	3	0.89	Glass Cliff	3	2	0.80
			Male Culture	4	4	0.87
			Two-Person Career Structure	3	2	0.75
Disproportionate Constraints	4	0.84	Constrained Communications	4	4	0.81
			Constrained Career Choices	3	2	0.50
			Unequal Standards	4	4	0.87
Insufficient Support	3	0.78	Exclusion	3	2	0.77
			Lack of Mentoring	3	4	0.62
			Lack of Sponsorship	2	3	0.77
Devaluation	3	0.78	Lack of Acknowledgment	4	3	0.80
			Salary Inequity	2	3	0.87
Hostility	3	0.80	Queen Bee Syndrome	4	3	0.83
			Workplace harassment	3	4	0.76
Acquiescence	3	0.65	Self-Silencing	2	3	0.86
			Self-Limited Aspirations	3	3	0.68
Burnout				2	3	0.64

*Bolded values indicate a median score of agreement (≥ 4).

gender stereotypes as well as the hurdles that women face to gain equal standing in their profession^{17,24}.

Male Culture was identified as a barrier to gender equity that creates an unwelcoming environment for female surgeons. Female surgeons are frequently excluded from the “old boys’ club” where relationships and mentorships are fostered²⁵. This male culture includes gendered language that reinforces stereotypes and leads to discrimination in evaluations, recommendations, awards, and academic advancement for female surgeons²⁴. Male culture also provides an environment that is conducive to, and tolerant and permissive of, gender bias, ranging from microaggressions to overt sexual harassment. This culture is harmful to both male and female orthopaedic surgeons²⁶.

The Lack of Mentoring barrier involves both the amount of mentoring received as well as who provides mentorship. In surgery, a mentor is important not only to teaching clinical care but also to imparting “vital aspects of compassion, communication, professionalism, and patient care ethics.”²⁷ Women expressed that the scarcity of mentors and lack of female leadership limited their sense of being heard. Exposure to female role models is important for the recruitment and mentorship of female trainees²⁸, which can have a substantial impact on career choice and trajectory^{29,30}. Layered on this, the perceived challenges for men to act as allies, sponsors, and mentors result in a cumulative paucity of opportunities for women to advance their careers^{31,32}.

The barrier of Workplace Harassment included the experience of abuse, discrimination, or sexual harassment. The open-text responses included stories that align with those in the Twitter forum for orthopaedic surgeons, @SpeakUpOrtho, an initiative to increase awareness of bias, inequities, and harass-

ment within orthopaedics. One of the female surgeons in this study shared, “As a resident, I was sexually harassed and verbally abused. I was told by my chief, ‘no woman would ever finish’ his program.”

A recent survey of a subset of orthopaedic surgeons in the United States demonstrated that 81% of female respondents experienced discrimination, harassment, bullying, and sexual harassment compared with 35% of male respondents³³. These egregious behaviors were also addressed in a recently published review of the disturbing rates of sexual assault within the surgical profession³⁴. An additional theme reported by surgeons in the current study was harassment and bullying by patients and, more notably, nurses. There was a constant thread of the negative treatment female surgeons received from nurses and a perception that this was not recognized or acknowledged by male colleagues. This tension between nurses and surgeons has been previously reported as one of the most stressful behaviors female surgeons face in the workplace³⁵. Bullying is not only harmful to victims; witnesses to these behaviors are also impacted and show signs of burnout³⁶.

The theme of *work-life integration* noted in the open-text responses did not have a corollary in the GBS survey. Female orthopaedic surgeons described a lack of support for parental responsibilities and reproductive rights as the most prominent theme. Research has demonstrated that even when both partners work full time, women continue to perform 3 times more domestic work than men³⁷. This inequality places an unreasonable burden on female physicians and diminishes the valuable role that men should play at home and in the family^{38,39}.

For the surgeons in this study, career burnout correlated with the GBS domains of Male Privilege, Disproportionate

TABLE III Representative Quotes from Open-Text Responses Regarding the Barriers to Gender Equity Identified in the GBS and the Qualitative Themes Derived from the Open-Text Responses*

GBS Barrier	Qualitative Theme	
Constrained Communications		<p>“The lack of recognition for my comments, ideas, or contribution has pushed me to become withdrawn in my professional work and not interested in participating in major projects or long-term committees.” [P58]</p> <p>“Told I am ‘aggressive and confrontational’ when I assert myself.” [P145]</p> <p>“The politics of meetings favor men. Men who speak up against a problem are being strong, and women are being pushy.” [P29]</p>
Unequal Standards	Unequal standards	<p>“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.” [P13]</p> <p>“More scrutiny of my performance than I feel my male counterparts would experience. My experience in my first 2 years of practice felt under the microscope compared with male colleagues at the start of practice where I feel they are not as scrutinized.” [P71]</p> <p>“The need to prove yourself to patients, residents, medical students, nurses, male colleagues time and time again. The fact patients demand more from me and more of my time is frustrating. The fact that to be respected you need to be twice as good to get half the respect.” [P106]</p>
Male Culture	Male privilege	<p>“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.” [P77]</p> <p>“The biggest barrier I have experienced was not being part of the ‘boys’ club’ during residency training. For example, feeling left out of conversations because I don’t follow hockey or golf. I was able to find my own ways to engage with staff/preceptors, but I always felt like it would have been easier if I could relate better like the males in my program.” [P59]</p> <p>“Male residents are given more opportunities to speak, more time actually operating in the OR and are given a bigger leeway to make mistakes. The staff are quicker to warm up to them, listen to their opinions and treat them with the respect of a colleague.” [P63]</p>
Lack of Mentoring	Lack of mentoring	<p>“The lack of a mentor and someone to trust in residency was the biggest barrier. I frequently felt inadequate and isolated.” [P83]</p> <p>“I had a residency supervisor who told me he didn’t know how to treat me because I was female.” [P44]</p> <p>“[There is a] 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.” [P69]</p>
Workplace Harassment	Hostility/harassment	<p>“The undertones of sexual harassment were very clear over time. Comments about my appearance and blatant sexist comments when discussing the position to fuse a man vs. woman’s hip given their major role of standing or lying on their backs.” [P93]</p> <p>“The biggest challenge as a woman is the interaction with OR nurses, both as a trainee and staff. I often felt I had to ‘win them over,’ earn their trust. [I had to] create an environment where I didn’t make it seem like I was above them, even though as the surgeon obviously I’d have to give ‘orders’ on what I needed, etc. I always had to sugarcoat my requests, say ‘thank you’ many times, show so much gratitude and respect (over the top) to finally earn their trust, and have them ‘like me’ as opposed to seeing me as a threat to them of some kind.” [P30]</p> <p>“As a resident, I was sexually harassed and verbally abused. I was told by my chief ‘no woman would ever finish his program.’” [P82]</p>
	Work-life integration	<p>“Having a family...[being] unable to continue breastfeeding due to work expectations and [an] inability to pump to maintain supply, childcare stresses, balancing study with family life, selecting fellowships that work for the family [were prioritized] rather than what’s best for career.” [P7]</p> <p>“Supporting models of practice that are more flexible for everyone will promote everyone’s well-being and destigmatize wanting to invest time elsewhere in one’s life (good for both men and women).” [P132]</p> <p>“Timing kids/maternity leave, meetings at hours impossible with kids’ bedtime, the reality of having a husband that also works and is not stay-at-home-dad to take care of everything else.” [P159]</p>

* [P] = participant, and OR = operating room.

Constraints, and Devaluation. Burnout is characterized by feelings of emotional exhaustion; increased mental distance from one's job, or feelings of negativism or cynicism related to one's job; and reduced professional efficacy^{14,15,40}. Working in an inequitable environment is taking a heavy toll, with rates of burnout for female physicians up to 60% higher than for male physicians, and with suicide rates more than double among female physicians than non-physicians⁴¹. The current culture generates a self-fulfilling prophecy whereby women are unable to work to their full potential because of the inequities they face at work^{41,42}. The barriers that correlated with burnout among female orthopaedic surgeons are consistent with those in other surgical specialties⁴³, and are cause for alarm in terms of retention of female surgeons. Understanding the root causes behind the culture that is causing burnout is essential to the health and safety of all members of the profession.

This study had some limitations. Gender was considered binary and therefore limited to those who identified as women. Despite the assurance of anonymity, there may have been a reticence to voice some issues because of a fear of retribution or an unwillingness to share negative personal experiences. The 5-point Likert scale may have been too coarse to evaluate the nuances of some of the questions. Burnout could be further explored using a full-length, validated inventory along with regression analysis to assess relationships between burnout and gender-bias barriers. These data were collected in the early to mid-COVID-19 pandemic, which may have led to increased reporting of burnout than prior to the pandemic.

Although response bias is a challenge in survey studies, the very high response rate for this survey highlights the importance of this topic for women in orthopaedics. There is potential bias in the open-text responses because these were completed after the GBS questions; however, the 66% response rate and the volume of open-text responses speak to the passion elicited by these topics and the extent to which they affect female surgeons. The barriers identified by Canadian female orthopaedic surgeons using the GBS mirror the barriers that have been previously proposed in medicine. Globally, understanding that Canada has one of the highest percentages of female representation in orthopaedic surgery, this is particularly concerning⁴⁴. The use of a validated outcome measure designed for female leaders lends legitimacy and gravitas to the findings of this study.

The World Economic Forum predicts that it will take 257 years, at the current pace, to close the overall gender gap worldwide, and 151.4 years to close it in North America⁴⁵. Denial may play a role in the difficulty of changing the culture in medicine and especially in orthopaedics⁴⁶. Shedding light on the barriers and increasing awareness is the first step to "disrupting denial" and creating substantial change.^{47,48} To effect real change, men, who

represent >95% of the orthopaedic surgeons around the world, need to be part of the solution. International organizations such as the International Orthopaedic Diversity Alliance (www.orthopaedicdiversity.org) and Women in Orthopaedics Worldwide (www.wowortho.org) are working to promote equitable changes within the broader orthopaedic community. Creating a diverse and equitable culture in orthopaedics will benefit all orthopaedic surgeons and, by extension, all orthopaedic patients.

Conclusions

This study presents barriers specific to Canadian female orthopaedic surgeons and trainees using the validated GBS, substantiated by qualitative assessment using a mixed-methods approach. The barriers identified by the GBS were Constrained Communications, Unequal Standards, Male Culture, Lack of Mentoring, and Workplace Harassment. Awareness of the barriers that women face in orthopaedics is a first step to changing the prevailing culture to be fair and equitable for all. Female surgeons can be reassured in the knowledge that their experiences are valid, and they are not alone. The awareness of inequity has not always resulted in change, and it is hoped that these findings can create a dialogue for cultural growth within the orthopaedic profession.

Appendix

 Supporting material provided by the authors is posted with the online version of this article as a data supplement at [jbjs.org \(http://links.lww.com/JBJS/H72\)](http://links.lww.com/JBJS/H72). ■

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