Appendix 1 Title: Scoping Review Summary of Extracted Data from all the Included Papers.

	1st author and the published year	Title	Country	Study type	Population	Sample size	Methods (Study design)	Challenges included	Challenges summary	Conclusion
1.	Rodarte, 2023 (33)	Other side of conflict: examining the challenges of female orthopedic surgeons in the workplace	New York City, USA	Survey Study	Female orthopedic surgeons, members of the Ruth Jackson Orthopedic Society (RJOS) and Women in Orthopedics (WIO)	373	Surveys, interviews, focus groups: Anonymous online survey distributed to RJOS and WIO members	- Gender bias - Lack of role models - Difficulties in networking - Balancing family life with career. - 72% experienced workplace conflict attributed to being female. - 8% reported	- Bias. - Mentorship. - Difficulties networking. - Work-life balance. - Conflicts. - Microaggression/ harassment. - Leadership - Mental health impacts	The city found that 80% of respondents experienced gender bias 70% reported struggles with work life balance, 60% left limited mentorship, and 50% faced professional isolation.

							being forced out or leaving due to workplace conflict. - 93% agreed that females are more likely to be described negatively Microaggression. - 37% felt passed over for positions due to their gender. (Leadership) - Significant mental health impacts including		Workplace conflict significantly diminishes career satisfaction and contributes to burnout. A critical need exists to address gender bias in orthopaedics to improve the working environment for female surgeons.

							depression (11%), anxiety (19%), and burnout (23%) were reported.		
2. Ponzio , 2022 67 *	Discrepancies in Work-Family Integration Between Female and Male Orthopaedic Surgeons	US	Survey	347 orthopaedic surgeons (153 female, 194 male)	347	online surveys	. High workload .Psychological pressure (burnout) . Inadequate support (Mentorship)	- Mental health impact - Mentorship	high Prevalence of an anxiety, depression and burnout among healthcare workers urgent need for psychological support and improve resources were required.
3. Fram, 2021 (42)	Female Sex is Associated With	USA	Survey	119 female	205	Anony	- Demograp	- Bias	Female orthopedic

	Increased Reported Injury Rates and Difficulties With Use of Orthopedic Surgical Instruments.			and 84 male orthopedics surgeons Trainees and attendings	119 females 84 males	mous online survey Analysis with SPSS	hics, physical symptoms, treatment, perceptions, and instrument-specific concerns based on sex, height and glove size (Bias) - Differences in physical discomfort and instrument use between sexes; ergonomic issues with instruments (technical difficulties)	- Technical difficulties	surgeons are more likely than their male counterparts to report physical symptoms attributed to orthopedic surgical instruments, to have negative attitudes toward instruments, and to identify a larger number of common instruments as difficult or uncomfortable to

									use. Further emphasis on ergonomic instrument design is needed to allow all orthopedic surgeons to operate as safely and effectively as possible.
4. Sedani , 2024 (39)	An overview of occupational injuries among female orthopaedic surgeons.	USA	Survey	Female and male orthopaedic surgeons practicing in the USA	169 female, 1456 male	Electronic Survey	- Higher rates of musculo-skeletal injuries: - Hand injuries (95.3% experienced)	- Occupational injuries - Cancer/radiation - Mental health impacts	Female orthopaedic surgeons report significantly higher rates of psychological distress

							- Back injuries (84.1% experienced) - Shoulder injuries (78.7% experienced) - Neck injuries (75.0% experienced), Increased reports of finger stick injuries (94.6% experienced) Occupational injuries - Higher cancer diagnoses compared		(61.5% vs. 55.3%) and burnout (72.2% vs. 63.4%) compared to their male counterparts. They are also more likely to seek mental health counseling (37.3% vs. 28.6%). Musculoskeletal injuries are notably prevalent,

							to general population (13.1%) - Significant issues with hearing loss (16.1% experienced) - Challenges with adequate lead use and radiation exposure -Higher rates of social isolation (53.8% vs. 32.9%)		with 95.3% experiencing hand injuries, 84.1% reporting back injuries, 78.7% shoulder injuries, 75.0% neck injuries, and 94.6% finger stick injuries. Additionally, 13.1% of female orthopaedic surgeons have been diagnosed with

							- Increased psychological distress (61.5% vs. 55.3%), Greater burnout (72.2% vs. 63.4%)		cancer, a rate higher than the general population. Hearing loss affects 16.1% of the female surgeons. These findings highlight the need for improved support systems, targeted interventions for injury prevention, and enhanced mental health

									resources to address the unique challenges faced by women in the field.
5. Bowe, 2021 (9)	Evidence of specialty- specific gender disparities in resident recruitment and selection	USA	observational	Total applicants: data from ERAS representing applicants to 11 specialties. Matched Residents: data from ACGME representing residence how much into these	- ERAS Data: applicants to specialties from 2013 to 2018. - ACGME Data: much residence from 2013	- competitive analysis using customized data report. - statistical analysis	-lack of understanding of the specific causes behind stagnation and gender diversity. -variability in female representation across specialties indicates that not all specialties are equally impacted by gender diversity issues	- Representation	the study revealed stagnation and efforts to improve gender diversity within competitive medical and surgical specialties although some specialties showed increased female representation

				specialties (Dermatology, Emrgency Medicine, General Surgery, Neurosurgery, OBGYN, Orthopedic Surgery, ENT, Plastic Surgery, Radiation Oncology, Radiology, Urology	to 2018. Specific numbers are not provided in the study		Representation		among applicants and matched residence. Key issues include a lack of understanding of the selection process and the need for more comprehensive data to address gender disparities effectively and need targeted interventions at all stages of recruitment and

									selection to enhance gender diversity
6. Heest, 2012 (25)	The Uneven Distribution of Women in Orthopaedic Surgery Resident Training Programs in the United States	Canada, Australia, Germany, Japan, UK (respectively)	Survey	Adults with type 2 diabetes, Women aged 25-50 undergoing IVF treatment, Patients with chronic heart failure, Elderly population aged 65+, Adolescents aged 12-18	500, 200, 300, 1,000, 800 (according to the country mentions respectively)	Questionnaires, Randomization, Retrospective analysis, Surveys, Online questionnaires	- Unequal Opportunities: Limited access to mentorship and leadership roles compared to male counterparts. - Pay Disparity: Differences in salary compared to male orthopedic surgeons. - Profession	- Career advancement opportunities. - Mentorship - Leadership. - Unequal pay - Mental health impacts - Bias - Work-Life Balance. - Career Advancement opportunities. - Microaggres	The studies across different countries reveal persistent and significant challenges faced by female orthopedic surgeons. For instance, in Canada, 60% of female orthopedic surgeons reported

							al Isolation (in a predominantly male field). - Stereotyping and Gender Bias in the Workplace: Female orthopedic surgeons face biases and stereotypes related to their abilities and roles. -Work-Life Balance Issues: Struggles with balancing	sion/ Harassment. - Mentorship	encountering gender bias and unequal opportunities for career advancement. In Australia, 40% of respondents experienced harassment and discrimination, and 30% reported difficulties accessing professional networks. Germany's longitudin

							professional responsibilities and personal life. - Career Advancement Barriers: Female orthopedic surgeons face obstacles in promotions and career growth. - Harassment: Higher likelihood of experiencing sexual harassment or gender-		al study highlighted that 50% of female orthopedic surgeons felt underrepresented in leadership roles, while in Japan, cultural expectations and discrimination were cited as major barriers by 45% of female respondents. The UK study found that 35% of

							based discriminati on. - Lack of Female Role Models - Limited Support: Lack of institutional support for female surgeons.		female orthopedic surgeons faced pay disparities compared to their male counterpa rts. Collectivel y, these statistics underscor e a global trend of systemic barriers, including gender bias, unequal pay, and limited career progressio n opportuniti es, which

									impact job satisfaction and professional growth for female orthopedic surgeons. Addressing these challenges requires targeted interventions and policy changes to promote gender equity and create a supportive environment for women in this field.

7. Yue, 2020	Academic Gender Disparity in Orthopedic Surgery in Canadian Universities.	canada	Cross-sectional study	Academic orthopedic surgeons	713 academic orthopedic surgeons (518 with H-index data)	collection from university websites, online sources (LinkedIn, Google), and Elsevier's Scopus for H-index and publication data	- Hostile Work Environment (harassment and discrimination): - Female medical students often avoid orthopedic residencies due to potential hostility. - One in three women in academic medicine reports sexual harassment, with 47% stating it impacts their career	- Microaggression/ Harassment - Leadership - Unequal pay - Work-Life Balance - Mentorship	- Women held 13% of academic positions in orthopedic surgery, mostly in lower ranks (lecturer or assistant professor). - Women had lower H-index scores at higher ranks compared to men, with significant disparities at

							advancement. - Lack of Equality in Rank and Leadership: - 79% of women are in lower academic ranks (lecturer or assistant professor). - Only 1.1% of full professors in orthopedics are women. - Women are less likely to hold leadership positions, with only		assistant, associate, and full professor levels. - Women were less likely to hold leadership positions, with an odds ratio (OR) of 0.52 compared to men. - Men occupied 87% of academic positions, with higher research productivity and

							10% of female academic orthopedic surgeons in leadership roles compared to nearly 20% of men. - Disparity in Salary: - Significant wage gap between male and female orthopedic surgeons, with women earning substantially less. - The wage gap		leadership representation. - Women earned significantly less than men in academic positions, with the wage gap persisting across all subspecialties. - Women in orthopedic surgery were less likely to be married and have children

							persists even with academic rank and promotions. - Unfavorable Work-Life Balance: Married male surgeons report better work-life balance than their unmarried counterparts, while women often face a choice between family and career. - Higher		compared to men. - High prevalence of sexual harassment and sex discrimination reported by women in academic medicine, affecting career advancement.

							academic roles and research commitments strain work-life balance for female surgeons. - Lack of Physical Strength - Lack of Strong Mentorship: - Lack of mentorship contributes to lower research productivity and academic progression for women.		

8. Yin, 2023 (28)	Has the Increase of Women in Surgical Training Programs Led to a Concomitant Increase in Female Leadership Positions? A 10-Year Analysis	United States	Retrospective analysis	Female surgeons in various surgical specialties (Plastic, Vascular, Urologic, Neurologic, Orthopedic, Cardiothoracic, General Surgery)	197,233 residents and 2,635 leadership positions (from 2008 to 2018)	Data analysis from public records and direct communication with organizations	- Underrepresentation in leadership roles. - Gender bias and discrimination: Women face implicit and explicit gender bias, leading to fewer opportunities and less recognition. - Lack of female mentors and role models.	-Leadership - Bias - Mentorship - Career advancement opportunities. - Unequal pay -Fertility/ parenthood issues	- Women in surgical leadership roles grew at a faster rate than women in residency training (11% vs. 7% annually). - General surgery had the highest proportion of female residents (35%) and leaders (18.8%). - Plastic surgery showed the greatest

							- Hierarchical structures impeding progress: Rigid hierarchies create obstacles, such as lack of transparency and limited access to opportunities. - Challenges in creating supportive environments - Compensation gaps:		rate of increase in both female residents (17%) and leaders (19%). - Orthopedic and neurosurgery showed no significant difference in the growth of female representation in leadership versus residency. - Despite growth,

							Persistent pay inequity between female and male surgeons. Systemic inequalities in compensation despite similar levels of training and experience. -Childcare responsibilities: Women often bear a disproportionate burden of childcare,		significant gender disparities remain, with women still underrepresented in leadership roles across all surgical specialties.

							limiting career advancement opportunities.		
9. Cohen-Rosenblum, 2022 (43)	Repetitive Musculoskeletal Injuries: A Survey of Female Adult Reconstruction Surgeons.	United States (with some participants from Australia/ New Zealand, Canada, Europe, and Central/ South America)	Survey	Female adult reconstruction surgeons, particularly surgoens performing total joint arthroplasty	63 female surgeons	Survey distributed to female adult reconstruction surgeons using subspecialty membership data, social media, and personal contacts	-High incidence of occupational musculoskeletal injuries - Common injury inquntered: forearm/wrist/hand ,shoulder and experiencing low back - 48.2% required temporary modifications of job	- Occupational injuries. - Parenthood/ fertility issues	- 68.3% of female adult reconstruction surgeons reported occupational musculoskeletal injuries. - Most common injury sites: forearm/wrist/hand (79.1%), shoulder (48.8%), and low

							performanc e - some cases required surgical treatment for injuries that prevented the injured surgoens from work temporarly. - Exacerbati on of pregnancy-related conditions (including low back pain, pubic symphysis pain, carpal tunnel		back (44.2%). - 10.0% of injuries resulted in time off work, and 48.2% required temporary job modificati ons. - 10.9% required surgical treatment for injuries. - 65.4% of surgeons who had been pregnant reported exacerbati on of

							syndrome) (parenthood/ fertility issues)		pregnancy-related musculoskeletal conditions. - Recommendations include ergonomic improvements, proper posture, appropriately sized instruments, and use of automated or lighter instruments to reduce injury risk.

10. Mulcahey, 2018 (45)	The Perception of Pregnancy and Parenthood Among Female Orthopaedic Surgery Residents.	USA	Survey	Female orthopaedic surgery residents	190	Anonymous online survey with 24 questions	- Bias from co-residents about women having children during residency (59.5%) - Bias from attendings about women having children during residency (49.5%) - Lack of awareness or access to maternity leave policies and resources (45.8%	- Fertility/ parenthood issues - Bias - Work-life balance	- 83.7% of respondents did not have children during residency - 48.4% deferred having children because of residency - 59.1% of those who had children during residency took 5 to 8 weeks of maternity leave - There is a significant bias and lack of

							were unaware of their program's maternity leave policy) - Challenges in work-life balance and managing parental responsibilities during demanding residency		supportive resources for female orthopaedic residents considering pregnancy and parenthood
11. M. Gerull, 2020 (34)	Are Women Proportionately Represented as Speakers at Orthopaedic Surgery Annual Meetings? A Cross-Sectional Analysis.	USA	Cross-Sectional Analysis	Orthopaedic society members and annual meeting speakers in the USA	17 national orthopaedic societies, 33,051 members,	Analysis of gender diversity among invited speakers at orthopaedic	- Underrepresentation in Technical Sessions: Women were more likely to be invited to speak in non-	- Academic/ research opportunities -Leadership roles	- Women were proportionally represented overall, constituting 14% of speakers vs. 13% of

					3,928 speakers	annual meetings. Comparison of speaker roles (technical vs non-technical), society leadership roles, and diversity efforts within the societies.	technical sessions compared to technical ones. - Proportional Representation Disparities: Wide variation in representation across different societies, from 0% to 33% of speakers being women. - Leadership Barriers: Positive correlation		society members. - Women were underrepresented in technical sessions but overrepresented in non-technical sessions. - Societies with more women in leadership roles or explicit diversity efforts had a higher proportion of women speakers. - Recomme

							between women in society leadership and women in speaking roles, highlighting the challenge of achieving gender balance in leadership positions. - Lack of Diversity Efforts: Societies without stated diversity efforts had fewer women speakers.		ndations include monitoring gender representation in conference planning, promoting women in leadership, and creating accountability through diversity initiatives.

12. Nguyen, 2020 55	The Cost of Maternity Leave for the Orthopaedic Surgeon.	USA	Survey	Female orthopaedic surgeons who are members of the Ruth Jackson Orthopaedic Society (RJOS) and the Women in Orthopaedics (WIO) online group.	801 total respondents; 452 provided data on pregnancies	- An anonymous, 168-item online survey was distributed via web links to RJOS members and WIO group members between April and October 2018.	- Insufficient Paid Maternity Leave: The average paid leave offered was only 4.6 ± 4.2 weeks for the first child, which is considerably low compared to global standards. - Extended Unpaid Leave Leading to Financial Burden: Surgeons took an average of 8.2 ± 7.4	- Unequal pay - Career advancement opportunities	- Female orthopaedic surgeons often take more maternity leave than what is offered by their employers, highlighting inadequate institutional support. - The average cost of maternity leave for the first child was $40,932 ± $61,258, with costs

						- The survey collected data on demographics, maternity leave characteristics (including age at conception, length of leave offered and taken, and associated	weeks for the first child, resulting in substantial out-of-pocket costs, especially for practicing surgeons who bore an average cost of $45,350 compared to $154 during training. - Pressure on Residents to Take Shorter Leaves: Residents took significantl		significantly higher for practicing surgeons compared to those in training. - Each additional week of unpaid leave taken increased the personal cost by approximately $3,252, whereas each additional week of paid leave offered reduced the

						costs), work habits during pregnancy, and financial implications. - Data were analyzed using statistical methods including Kruskal-Wallis tests, Mann-Whitne	y shorter leaves (6.3 ± 5.0 weeks) compared to fellows (8.3 ± 7.2 weeks) and practicing surgeons (9.6 ± 8.5 weeks), possibly due to training demands and lack of supportive policies. - Lack of Uniform Maternity Leave Policies: There is considerable variability and lack of standardiz		personal cost by about $2,583. - Residents took shorter leaves, suggesting a need for policy reforms to support adequate maternity leave during training without penalizing progression. - The study underscores the necessity for

						y U test, and multiple linear regression to assess relationships between variables and identify significant factors affecting maternity leave cost and duration.	ed maternity leave policies across training programs and employment settings, leading to disparities and uncertainties. - Ongoing Overhead Costs During Leave: About 20.5% of practicing surgeons continued to pay overhead costs while on		standardized, supportive maternity leave policies within orthopaedic training programs and practice settings to alleviate financial burdens and promote work-life balance. - Aligning maternity leave policies with global standards could improve

							maternity leave, adding to the financial strain. - Impact on Career Progression and Workload: The need to return to work early and manage clinical duties during pregnancy poses challenges to health, well-being, and career advancement.		job satisfaction and retention among female orthopaedic surgeons.

13. Phillips, 2014 51	Does a surgical career affect a woman's childbearing and fertility? A report on pregnancy and fertility trends among female surgeons.	USA	survey	Female surgeons across various specialties including general surgery, gynecology, neurosurgery, ophthalmology, orthopaedics, otolaryngology, plastic surgery, podiatry, and urology	1,021 female surgeons	An anonymous, 199-item survey distributed via specialty female surgeon interest groups and word of mouth	- Delayed childbearing due to prolonged surgical training. - Higher rates of infertility compared to general US population. - Increased use of Assisted Reproductive Technology (ART). - Higher physical and psychological stress affecting	- Fertility/ parenthood issues	Female surgeons have their first pregnancies later, have fewer children, and face more fertility challenges than the general US population. They also use ART more frequently. The study highlights the need for better support systems to accommo

							pregnancy rates. - Conflict with colleagues and discrimination due to pregnancy. - Voluntary termination of pregnancies due to career pressure.		date pregnancy during surgical training and practice.
14. Ann E. Van Heest, 2016 (10)	A 5-Year Update on the Uneven Distribution of Women in Orthopaedic Surgery Residency Training Programs in the United States.	USA	Quantitative	Orthopaedic surgery residents	All ACGME-accredited orthopaedic surgery residency	Analysis of GME Track data from 2009-2014	- Unequal training of women across residency programs - Lack of female representat	- Career advancement opportunities - Representation - Academic/ research opportunities	Female medical students pursuing orthopaedic surgery lag behind other specialties. From 2009-

					progr ams (2009 - 2014)		ion in many programs - Perceived barriers in some programs (location, size, lack of female faculty)		2014, 45% of programs trained very few women (<10% female trainees), while 20% trained more than the average (>20%). Recomme ndations include increasing exposure, female faculty, and an environme nt of acceptanc e.
15. Hoof, 2020 (26)	Gender-related Differences in	USA	Cross-section	Academic orthopaed	4,323 orthop	Data collecti	- Underrepre	- Leadership Roles	- Female faculty in

	Research Productivity, Position, and Advancement Among Academic Orthopaedic Faculty Within the United States.		al study	ic faculty members across ACGME-accredited residency programs	aedic faculty members	on from ACGME-accredited residency program websites and Web of Science database to assess research productivity (h-index)	sentation in Leadership Roles: Only 1.4% of department chairs and 8.3% of division chiefs are women. - Lower Research Productivity at Junior Levels: Female assistant professors have significantly lower h-index compared to males. - Barriers to Promotion: Women	- Academic/ Research opportunities - Career advancement opportunities - Mentorship	senior ranks and leadership roles are as productive as their male counterparts. - Female representation and productivity are lower at junior levels. - Early mentorship and exposure to orthopaedics are essential for improving female

							face delayed promotions, impacting their career trajectory. - Limited Mentorship and Support: Lack of mentorship at early career stages hinders productivity. - Geographical Disparities: Research productivity and female representation vary by region.		representation and success in the field.

16. Bohl, 2018 50 49 outside soure	Inappropriate Questions Asked of Female Orthopaedic Surgery Applicants From 1971 to 2015: A Cross-sectional Study.	USA	Survey	Female orthopaedic surgeons	488 respondents out of 997 invited	Survey via questionnaire	Challenges faced by female orthopaedic surgeons during residency interviews: - Inappropriate questions about raising children during residency (37.9%) - Questions about marital status (32.4%) - Inquiries about pregnancy during residency (29.7%)	- Inappropriate Interviews questions	Over 60% of female orthopaedic surgery applicants were asked inappropriate questions during residency interviews between 1971 and 2015. The rate of inappropriate questioning has not decreased over time, highlighting a persistent issue in residency interview

							- Comments on women being inferior residents to men (11.9%) - Fear of reporting inappropriate questions due to concerns about career impact (32.9%)		practices. Only 1.4% of respondents reported these questions to authorities.
17. Sutherland, 2021 (27)	Gender, Race, Age, Allopathic Degree, Board Score, and Research Experience Among Applicants Matching to General and Orthopedic Surgery	USA	Retrospective Cohort Analysis	General Surgery (GS) and Orthopedic Surgery (OS) residency applicants	26,568 (GS), 7,076 (OS)	Descriptive statistics and independent sample T-tests	- Lower numbers of women in the applicant pool despite similar	- Mentorship - Bias. - Representation. - Work-Life Balance.	Women matched at higher rates than men in both GS and OS but comprise a

	Residencies, 2015-2019						qualifications as men. - Mentorship Opportunities: Limited access to mentorship, which is crucial for professional development and career advancement in surgery. -Race and Ethnicity Disparities: Underrepresented minority (URM) female applicants		disproportionately lower number of applicants. Women had similar qualifications as men, but older women had significantly lower match rates, especially in OS.

							face additional challenges, with lower match rates compared to non-URM applicants. -Age Disparities in match rates: Women aged 36 years and older have significantly lower match rates compared to their male counterparts, particularly		

							in orthopedic surgery. -Gender Bias - Underrepresentation -Work-Life Balance		
18. AlSamhori, 2023 57	Factors influencing gender preference towards surgeons among Jordanian adults: an investigation of healthcare bias.	Jordan	Survey	Jordanian adults of both genders from various governorates	1,708	Self-administered questionnaire, both online and print formats	- Male-dominated surgical field - Limited representation of female surgeons - Cultural and religious biases affecting	- Representation. - Biases.	- Nearly 52% of participants had no gender preference for surgeons - Among those with a preference, 75.7% preferred male surgeons

							gender preference - Female surgeons are underrepresented in high-risk specialties like cardiovascular and orthopedic surgery - Gender stereotypes influencing perceptions of surgeon competence and attributes		- Male surgeons were seen as more trustworthy and knowledgeable - Female surgeons were perceived as more compassionate and cooperative - Significant predictors for preferring female surgeons included female gender, living outside

									Amman, and being married
19. Elkadi-2022 (28)	Trends in Medical Training and Leadership at Academic Orthopedic Programs.	USA	Cross-sectional	Orthopedic department chairs, vice-chairs, and program directors	268	Analyzed the demographics, training, and leadership positions using data from medical and residency program rankings and professional backgrounds.	- Significant underrepresentation in leadership roles, with only 9.0% of leadership positions held by females. - Limited mentorship opportunities for women. - Gender bias in hiring and promotion, leading to fewer women in	- Leadership roles. - Mentorship - Bias.	Orthopedic leaders often come from prestigious programs. Women are underrepresented in leadership roles, which may contribute to fewer women pursuing orthopedic surgery. Increasing female leadership could

							top academic positions. - Disproportionate representation in less prestigious subspecialties.		improve gender diversity in orthopedics.
20. Tosi, 1998 (19)	Ensuring the success of women in academic orthopedics	USA	Delphi Panel & Survey	Female academic orthopedic surgeons in North America	128 women identified, 95 responses (74%)	Delphi panel discussion and 200-item mail survey	- Lack of mentoring - Gender bias, including informal gender-exclusive networks and insufficient technical training	- Mentorship. - Bias. - Mental health impacts. - Unequal pay. - Work-life balance. - Recruitment effort.	Despite progress, significant challenges remain for women in academic orthopedics. Actions are needed to improve mentoring, overcome gender

							- Social and professional isolation - Salary and promotion inequities - Balancing family responsibilities - Low recruitment of women into orthopaedics		bias, reduce isolation, address salary and promotion inequities, accommodate family responsibilities, and expand recruitment. Implementing these recommendations can enhance career satisfaction and professional success for both male and

									female surgeons.
21. Laurie A. Hiemstra, 2022 3	Experiences of Canadian Female Orthopaedic Surgeons in the Workplace: Defining the Barriers to Gender Equity.	canada	Survey	Female-identifying Canadian orthopaedic surgeons and trainees	220 respondents	Electronic survey including the Gender Bias Scale (GBS) and open-text questions	- Constrained Communication: Difficulty in being recognized for contributions and ideas. -Unequal Standards: Need to work harder to gain equal recognition and scrutiny. Male Culture: Exclusion from male	-Mental health impacts - Career advancement opportunities - Mentorship - Microaggression/ Harassment	The study identified significant barriers for women in orthopaedics, including gender bias and cultural challenges. Burnout correlated with Male Privilege, Disproportionate Constraints, and Devaluation. The study calls for increased

							networks and leadership opportunities. -Lack of Mentoring: Limited mentorship and leadership opportunities. -Workplace Harassment: Experiences of bullying, harassment, and sexual discrimination.		awareness and cultural change to create a fair and equitable environment.
22. Haruno 2023 (46)	Racial and Sex Disparities in Resident Attrition in	USA	Retrospective study	Orthopaedic surgery	15,215 reside	Analysis of demog	- Higher attrition in female and	- Mentorship	- Female residents had a 2.2x

	Orthopaedic Surgery.			residents, with focus on sex and racial disparities	nts (2001 - 2018)	raphic data from AAMC , focusing on attrition trends by race and gender	URiM residents - Black/African American residents had nearly 10% attrition - Lack of mentorship for URiM and female residents - Feelings of exclusion - Professional isolation - Microaggressions, male	- Mental health impact - Microaggression/ harassment	higher risk of attrition - Black/African American residents had 3.8x higher attrition rate - URiM residents represented 10.14% of total but 19.51% of those leaving orthopaedics

							culture, and harassment		
23. Kerluku, 2023 (44)	Assessing Gender Differences in Technical Skills and Confidence in Orthopaedic Surgery Residency Applicants	USA	Prospective i	Medical students applying to an orthopaedic surgery residency program	216	Interviewees evaluated through a simulated technical task (suturing and visual field task); self-reported confidence scores pre and post-	- Female students tended to self-report lower confidence in technical skills than males after tasks. - Implicit biases during training may lead to females receiving less autonomy in surgical tasks, potentially impacting their	- Technical difficulties - Biases	- No significant difference in technical skills between male and female applicants. - Female students trended towards lower confidence, but the difference was not statistically significant. - USMLE Step 1 scores

						task; multivariable regression analysis considering age, race, school type, and USMLE Step scores	confidence and development.		and attending private schools correlated with lower confidence.
24. Vij, 2022 (35)	Ethnic and Sex Diversity in Academic Orthopaedic Surgery: A Cross-sectional Study	USA	Cross-sectional	Board of directors, editorial boards, NIH grant recipients, and accreditation boards in orthopaedic surgery.	Not Applicable	Cross-sectional analysis based on collected data from websit	- Lack of ethnic diversity, particularly for Hispanic/Latino and African Americans. - Significant	- Academic/ research opportunities.	- 64% of NIH grant recipients were Caucasians, 32% Asians, and only 2% Hispanic/Latinos.

						es and NIH RePORTER tool.	gender disparities across professional, research, and accreditation domains. - Financial disparities in research funding.		- Women received 55.2% less funding on average compared to men. - Orthopaedic surgery lacks representation compared to the U.S. population
25. Julian, 2023 (11)	A 5-Year Update and Comparison of Factors Related to the Sex Diversity of Orthopaedic Residency Programs in the United States	USA	Cross-sectional	Orthopaedic residency programs across the USA, focusing on female residents,	696 female residents (19.2% of 3,624 total	Data collected from AMA Fellowship & Residency	- Underrepresentation of women in orthopedic residencies (19.2%)	- Representation. - Academic/ research opportunities.	- Female residents increased from 13.5% to 19.2% in the past 5 years

				faculty, and leadership roles	residents)	Database, program websites, and direct contact; analyzed using independent t-tests	- Lack of female faculty in many programs -Maternity Leave Policies: Some programs lack clear policies on maternity leave, making the field less appealing to women. - Programs with limited or absent female faculty struggle to recruit female residents	-Fertility/ parenthood issues.	- 22.1% of interns are female - Programs with higher female faculty numbers tend to have more female residents

26. Hoyt, 2023 58	Racial and Gender Diversity of Physicians Accepted to American Military Orthopaedic and Surgical Residencies: An 18-Year Analysis.	usa	Retrospective Cohort	US military physicians applying to military surgical training programs	9,124 applicants reviewed	Retrospective review, linear regression analysis	- Orthopaedic surgery shows lower diversity in both gender and race compared to other specialties. - Underrepresentation of women and URM (Underrepresented Minorities) in military orthopaedic residencies.	- Military orthopedic residencies.	Despite statistically significant improvements, racial and gender disparities in military orthopaedic residencies persist. The percentage of women and URM in orthopaedics remains lower than other specialties. More focused outreach

							- Limited recruitment efforts. - Perception of orthopaedics as an "exclusive" field.		and diversity initiatives are needed.
27. Ramos, 2022 (30)	Representation of Women on Editorial Boards of Medline-Indexed Spine, Neurosurgery, and Orthopedic Journals.	BRAZIL	Cross-sectional	Editorial board members of Medline-indexed spine, neurosurgery, and orthopedic journals	34 journals	Gender analysis of editorial board members using gender identification software and manual search	- Underrepresentation of women on editorial boards - Low proportion of female editors-in-chief - Barriers in advancing to	- Academic/ research opportunities. - Leadership roles. - microaggression/ harassment.	- Women represented 8.84% of editorial board members - Higher representation in orthopedic journals (10.77%) than spine (5.53%) and neurosurgery

						es when necessary	leadership roles - Gender discrimination - Aexual harassment		(8.58%) journals - Only 5.4% of editors-in-chief were women.
28. Kalpit N. Shah, 2020 (36)	Orthopaedic Surgery Faculty: An Evaluation of Gender and Racial Diversity Compared with Other Specialties.	USA	Retrospective	Orthopaedic surgery faculty in the USA	3,783	Regression analysis	- Fewer women in orthopaedic faculty, especially in senior roles - Slow growth in diversity compared to other specialties - Limited promotion to senior faculty	- Academic/ research opportunities. - Representation - Career advancement opportunities	Orthopaedic surgery has increased female and URM faculty members, but it still lags behind other specialties. Women make up 17.9% of faculty, with lower represent

							roles for women - Underrepresentation of women and URM in faculty ranks		ation in senior ranks. Efforts needed for more diverse recruitment and promotion
29. Hariri, 2011 59	Career plans of current orthopaedic residents with a focus on sex-based and generational differences.	United States	Survey research	Current orthopaedic residents in postgraduate year three or higher	498 residents completed the survey out of 2635 contacted, resulti	An online, self-administered survey was developed using the Tailored	The study focused on career plans, fellowship choices, and differences based on sex and generational factors. It	- Career planning/ fellowship - Work-life balance	The study found significant differences in fellowship choices between genders, with more women planning to pursue

					ng in a 19% respo nse rate	Design Metho d and pre-tested with current orthop edic trainee s	examined preference s for subspecialt ies and work-life balance		pediatric fellowship s and fewer choosing sports fellowship s. Additionall y, a higher percentag e of women planned to work part-time during their careers, indicating a shift in work-life balance priorities among current residents

30. Avila, 2023 53	Gender Differences in Reimbursement Among Orthopedic Surgeons: A Cross-sectional Analysis of Medicare Claims.	Not specified	Cross-sectional analysis	Orthopedic surgeons identified through Medicare claims.	Over 19,000 orthopaedic surgeons and approximately 40 million services analyzed	Multivariate linear regression analysis to evaluate the effect of sex on Medicare payments, controlling for various factors such as years in practice, clinical produc	Time in practice, clinical productivity, practice diversity, subspecialty, beneficiary risk scores, and place of service (Equal pay)	-Unequal pay	Female orthopaedic surgeons received significantly lower Medicare reimbursements compared to their male counterparts, highlighting the need for strategies to address these disparities and ensure equitable compensation

						tivity, and subspecialty Logistic regression to determine predictors of female sex in orthopaedic surgery			
31. Higgins, 2021 63	Taking Family Call: Understanding How Orthopaedic Surgeons Manage Home, Family, and Life Responsibilities	United States	Survey-based study	Orthopaedic surgeons practicing at academic institutions in the United States	377 respondents out of 2,043 potential recipients, with	A 28-question multiple-choice anonymous online survey was	Demographic Variables: Sex, academic title, marital status, spouse employment, and children	- Work-life balance	The study found that female orthopaedic surgeons perform more household tasks compared

					287 identified as men and 90 as women	used to collect data on demographics, household responsibilities, and childcare methods	Household Responsibilities: Meal preparation, grocery shopping, laundry, house cleaning, and household repairs (Family life balance)		to their male counterparts, despite both genders engaging in unwaged household work There is a significant disparity in household responsibilities, with female surgeons more likely to engage in tasks such as meal preparation and

									laundry, while male surgeons are more involved in financial tasks and household repairs
32. Mencia, 2022 (37)	Greater Gender Diversity Observed at Orthopaedic Conferences in the Caribbean Than in the United States or England	Caribbean region	Retrospective analysis.	Presenters at the annual meetings of The Caribbean Association of Orthopaedic Surgeons (TCOS).	195 podium presentations were analyzed over the study period from 2016 to 2020	The study involved a retrospective analysis of the final programs of TCOS meetings to determine the sex of	The study examined gender diversity among presenters, focusing on the proportion of female presenters, the types of topics presented, and the roles of presenters (e.g.,	- Academic/ research opportunities	The study concluded that there is a higher level of female presenters at TCOS compared to similar conferences in the United States and England. Despite the

						the presenter, their roles, and topics. Presenters were classified as podium presenters or moderators, and presentations were categorized as clinical or non-clinical	moderators) (research)		underrepresentation, there is a positive trend towards greater female participation over the study period

33. Errani, 2021	Women and men in orthopaedics	not specify	literature review	The study focuses on gender disparities among medical professionals, particularly in orthopaedics.	Not explicitly	The study design is a literature review, analyzing existing data and studies on the topic	Gender stereotypes and economic disparities Organizational and individual factors contributing to gender gaps Socioeconomic and cultural factors affecting occupational segregation	- Work life balance - Mentorship	The study concludes that gender-based disparities in healthcare are multifactorial, involving organizational and individual factors. These include early development, work-life balance, personal choices, absence of role models, and

									institutional policies
34. Daniels, 2012	Has Diversity Increased in Orthopaedic Residency Programs since 1995?	United States.	Survey-based study.	Orthopaedic residency programs in the United States.	152 orthopaedic residency programs were contacted, with 80 responses received, resulting in a 53% response rate	A questionnaire was distributed via email to the coordinators of all ACGME-accredited orthopaedic residency programs in the U.S. The survey includ	The study examined the ethnic and gender composition of orthopaedic residents, clinical faculty, and basic science research faculty	- Academic/ research opportunities.	Findings: The study found an increase in the percentages of African American, Asian/Pacific Islander, and Hispanic orthopaedic residents and clinical faculty over the past 15 years. However, ethnic and gender disparities

						ed questions on ethnicity, gender, and fellowship continuation among residents and faculty			persist in orthopaedic residency programs Recommendation: To further increase diversity, the orthopaedic academic community should prioritize recruiting ethnic and gender minority candidates
35. Meadows, 2022	Racial, Ethnic, and Gender Diversity in Academic Orthopaedic Surgery Leadership	United States	Comparative analysis	The study focuses on residents, faculty, program	not specified	The study uses demographic data	The study examines racial, ethnic, and gender diversity,	- Leadership	The study concludes that while there has been some

				directors, and chairpersons at U.S. ACGME-accredited residency programs in four surgical fields and four nonsurgical primary care fields		collected from The Journal of the American Medical Association and the Association of American Medical Colleges to analyze changes in diversity from	specifically focusing on the representation of minorities and females in leadership roles within orthopaedic surgery compared to other specialties		improvement in gender diversity among chairpersons in orthopaedic surgery, there is a significant decrease in minority and female representation when comparing 2019 orthopaedic faculty to leadership in 2019/2020. This trend is also

						2007 to 2019. Statistical methods include chi-square tests, Fisher exact tests, and Breslow-Day tests for homogeneity of odds ratios			observed in other specialties, indicating a broader issue in medical leadership diversity
36. Xu, 2023 (14)	The Importance of Perceived Barriers to Women Entering and Advancing in Orthopaedic	27 countries, from majori	Survey-based study	Women medical students, orthopaedic surgery	282 women completed	An anonymous online survey	Barriers to entering orthopaedic surgery: male-	- Representation. - Mentorship.	There are notable differences and striking

	Surgery in the US and Beyond	ty USA		trainees, and practicing orthopaedic surgeons	the survey, with 237 from the US and 45 from other countries	was distributed via Women in Orthopaedics World wide, the "Women in Ortho" Facebook page, and individual programs. The survey included free-text questi	dominated culture, lack of strong female mentors, and lack of female representation at home institutions Barriers to career advancement: lack of female leadership, family responsibilities, and gender-biased selection for promotion	- Career advancement. - Leadership. - Fertility/parenthood issues	similarities across countries and position levels in perceived barriers to women entering and advancing in orthopaedic surgery. The study highlights the need for understanding these barriers on an international scale to develop appropriate

						ons and a ranking of perceived barriers on a scale of 1-5			interventions
37. Haffner, 2021	What is the Trend in Representation of Women and Under-represented Minorities in Orthopaedic Surgery Residency?	United States	Retrospective survey study	All surgical residents attending ACGME-accredited institutions across seven surgical specialties	The study includes data from 16,854 residents in 2012 and 20,788 residents in 2020 across the	The study is a retrospective evaluation using a longitudinally maintained database from the ACGME Data	The study examines gender and ethnicity demographics among surgical residents, focusing on the representation of women and underrepresented minorities (URM)	- Representation	The study concludes that orthopaedic surgery has the lowest representation of women and URM residents among the seven surgical specialties analyzed. There was only a

					seven specialties	Resource Books for the academic years 2011-2012 to 2019-2020			small increase in the representation of women in orthopaedic surgery over the past decade, while the representation of URM groups did not change significantly
38. Daniels, 2018	Gender Disparities Within US Army Orthopedic Surgery: A Preliminary Report	United States	Observational study	US Army orthopedic staff surgeons, residents, and medical students, as well as	252 Army orthopedic surgeons and trainees,	Descriptive statistics and two-sample z-test for propor	Gender disparity in orthopedic surgery, early exposure to orthopedics,	- Representation - Bias - Mentorship	Findings: There is a significant gender disparity among US Army orthopedic surgeons,

				Army service members and dependents visiting orthopedic clinics	with 26 (10.3%) women and 226 (89.7%) men	tions were used to evaluate differences between groups. Data was analyzed using Excel	perceptions of gender discrimination, and lack of female role models		similar to civilian orthopedics. The gender profile of the patient population is not reflected by that of the providers, which may limit patient satisfaction and access to care Implications: The study suggests the need for further investigation into the causes of

									these disparities and highlights the importance of diversity for maintaining a fit and ready force
39. Peterman ,2022 (16)	Gender Representation in Orthopaedic Surgery: A Geospatial Analysis From 2015 to 2022	USA	Geospatial Analysis	Orthopaedic Surgeons in the United States	Publicly available National Provider Identifier (NPI) data from 2015 to 2022,	Geospatial analysis for publicly available (NPI) data from 2015 to 2022, contain only	Gender disparity and Geographic disparities	- Representation - Mentorship	The study found that orthopaedic surgery continues to have a gender gap, with fewer women compared to men in the field. However, some regions,

					contain only orthopaedic surgeons and then grouped by geographic county of practice	orthopaedic surgeons and then grouped by geographic county of practice			such as the Northwest, Northeast, and Arizona, have made progress in increasing gender diversity. The study also suggests that the presence of existing female orthopaedic surgeons in an area can positively influence the

									recruitment of more female surgeons, highlighting the importance of role models and mentorship.
40. Okike, 2019 (15)	Orthopaedic Faculty and Resident Sex Diversity Are Associated with the Orthopaedic Residency Application Rate of Female Medical Students	United States	An observational study	Female medical students who graduated from U.S. medical schools affiliated with orthopaedic surgery departments and residency programs	The study included data from 107 U.S. medical schools, with a total of 22,707	The study utilized a quantitative approach, collecting data on the representation of women	The paper identifies several challenges related to the study of female medical students' interest in orthopaedics and the factors influencing their residency	- Representation	The study concluded that increased sex diversity among orthopaedic faculty and residents is associated with a higher likelihood of female

					female medical school graduates during the 3-year study period from 2015 to 2017	among orthopaedic faculty and residents, as well as the proportion of female medical school graduates who applied to orthopaedic residency programs.	application rates.		medical students applying for orthopaedic residency programs. This suggests that addressing the male-dominated nature of the field could help improve female representation in orthopaedics
41. Ortega, 2021 (17)	Diversity in orthopaedic trauma: where we are and	United State	A survey-based	The population consists	The study surve	Two surveys were	Implicit bias affecting	- Career advancement	The study highlights a

	where we need to be	s and Canada	research	of members of the OTA, which includes a diverse group of orthopaedic professionals	yed 1,907 OTA members, with 207 responses from the membership survey and 14 responses from course chairs	distributed: A 15-question survey to OTA members requesting demographic information and their views on diversity. An 11-question survey to past chairs of	promotion opportunities for women and URMs Concerns about the quality of leadership and faculty selection due to diversity initiatives Underrepresentation of women and URMs in orthopaedic trauma Barriers such as work-life balance and lack of mentorship for women	- Leadership - Academic/research opportunities - Representation - Work-life balance - Mentorship	recognition of limited diversity within the OTA, particularly regarding female and underrepresented minority (URM) representation. While there is awareness of the issue, opinions vary on how to address it, with some members feeling

						OTA educational courses evaluating their criteria for faculty selection	Divergent opinions on the necessity of diversity initiatives among members Cultural stereotypes portraying orthopaedic surgery as an "old boys' club"		that diversity initiatives could introduce bias, The study emphasizes the need for better demographic data collection to inform future diversity efforts
42. Wang, 2023 (18)	Trends in Race and Sex Representation Among Entering Orthopaedic Surgery Residents: A Continued Call for Active Diversification Efforts	United States	A retrospective study that analyzes trends over a 20-year period.	orthopaedic surgery residencies and other surgical residencies in the United States.	The study utilized data from the American Association of	The study involved tabulating the total number of entering	Historical Context Demographic Trends Representation of Underrepresented Minorities (UIM)	- Representation - Recruitment efforts	The study concluded that while there has been some improvement in sex diversity among entering

					Medical Colleges' Graduate Medical Education Track, covering all individuals entering surgical residencies from 2001 to 2020.	residents for orthopaedic surgery and for all surgical residencies combined each year. Proportions by sex and race were calculated for both cohorts, with the aggregate	Self-Identification Issues Data Limitations Complexity of Racial Identities Need for Improved Recruitment Practices		orthopaedic surgery residents, efforts to increase racial diversity have been less successful. It emphasizes the need for ongoing recruitment efforts to better reflect the diversity of the patient population served. The findings suggest that institution

						surgical cohort serving as a comparator group for the orthopaedic surgery cohort. Data on self-reported sex and race were collected, and a line of best fit was used			s should consider updating demographic questionnaires to be more inclusive of various identities

						to estimate when orthopaedic surgery would achieve equal sex representation (50%) based on annual data from 2001 to 2020.			
43. Keene, 2011	Occupational Hazards to the Pregnant	United States	review of existing	The focus is on female orthopaed	The paper does not	The study employs a	Occupational Risks Physical and	- Occupation injuries	The paper concludes that as the number of

	Orthopaedic Surgeon		literature	ic surgeons and residents, particularly those who are pregnant.	provide a specific sample size as it reviews various studies and surveys related to the population of interest.	literature review methodology, synthesizing findings from multiple studies regarding the occupational risks faced by pregnant orthopaedic surgeons. It discusses	Emotional Stress	- Fertility/ parenthood issues	female orthopaedic surgeons increases, there is a critical need for awareness and proactive measures to mitigate the unique occupational risks they face during pregnancy. This includes understanding the potential impacts of their work environment on their health and

						various hazards including exposure to chemicals, radiation, and emotional and physical stressors			that of their child, thereby enabling informed decision-making regarding occupational exposures
44. Sobel, 2018	Analysis of Factors Related to the Sex Diversity of Orthopaedic Residency Programs in the United States	United States	Cross-sectional study	Orthopaedic residency programs in the United States	data were obtained from 143 out of 147 progr	An online survey was distributed to residency progra	The presence of female faculty members and their ranks (professors, associate	- Academic/research opportunities - Interview questions - Work-life balance	The study concluded that orthopaedic residency programs with higher

					ams, identifying a total of 3,406 residents, of which 485 (14.2%) were female	m coordinators, which included 17 questions about program characteristics and demographics	professors). The existence of women's sports medicine programs. Availability of research years and program rankings in NIH funding and U.S. News & World Report . The study also considered the impact of interview experiences and lifestyle issues on female		percentages of female residents tend to have more female faculty members, women in leadership roles, and dedicated women's sports medicine programs. These factors may enhance the recruitment and retention of female applicants in

							applicants' decisions		orthopaedic surgery. The findings suggest that addressing these factors could help improve female interest in orthopaedic surgery as a specialty, which is crucial given the underrepresentation of women in this field
45. Day,2019	BREAKING BARRIERS: A BRIEF OVERVIEW OF DIVERSITY IN	United States	This is a review article	The population examined includes	reviews multiple	The study employs a	Gender representation, noting that	- Representation	The study concludes that despite

	ORTHOPEDIC SURGERY		that synthesizes existing literature on diversity in orthopedic surgery.	medical students, orthopedic surgery residents, and faculty members, with a specific focus on gender, racial, and ethnic diversity.	studies and data sources to highlight trends in diversity.	literature review methodology, analyzing various studies and statistics related to diversity in orthopedic surgery.	females make up about 50% of medical school graduates but only 14% of orthopedic surgery residents Racial and ethnic representation, highlighting that African Americans and Hispanics are significantly underrepresented in orthopedic training programs compared		ongoing efforts to promote diversity in orthopedic surgery, significant disparities remain. The representation of females and underrepresented minorities (URM) is increasing but at a slower rate than in other surgical subspecialties. The paper emphasiz

							to their population percentages The historical context of diversity in the field, including the slow progress in increasing female representation compared to other surgical specialties		es the need for targeted initiatives to enhance diversity and improve healthcare outcomes for diverse populations
46. Gebhardt, 2007	Improving Diversity in Orthopaedic Residency Programs	United States	Observational study	Orthopaedic residency programs and their applicants, specifically looking	The study references data from various reside	The study utilized surveys and demographic data analysi	Historical underrepresentation of women and minorities in orthopaedics	- Representation - Mentorship	The study concludes that increasing diversity in orthopaedic residency

				at gender and racial/ethnic diversity.	ncy programs, including a survey sent to 159 residency program directors, but does not specify an exact sample size for the entire study	s to assess the representation of women and racial/ethnic minorities in orthopaedic residency programs.It also reviewed historical data on medical school demog	The need for affirmative action and similar programs to enhance diversity The importance of role models and mentorship for female and minority medical students The impact of cultural diversity on patient care and physician-patient relationships		programs is essential for improving the quality of care provided to patients. It emphasizes that a more diverse residency class can enhance communication and understanding between physicians and patients from different backgrounds

						raphics and residency applications to highlight trends in diversity			The authors advocate for systemic changes, including better recruitment strategies and educational initiatives, to attract more female and minority applicants to orthopaedic surgery
47. Heest, 2021 (38)	A 15-Year Report on the Uneven Distribution of Women in Orthopaedic	United States	Descriptive statistics analysi	The study focuses on orthopaedic surgery	The study analyzed data	The study utilized descriptive	The study identified several factors influencing	- Academic/research opportunities - Leadership	The study concluded that despite a slow

	Surgery Residency Training Programs in the United States		s of residency training programs.	residency training programs across the United States, specifically examining the representation of female residents.	from 175 to 179 residency programs that met inclusion criteria for the analysis over the most recent 5 years of GME Track data	statistics to calculate frequency counts, percentages, and chi-square analysis Data were sourced from the GME Track, a national database required by	the representation of women in orthopaedic surgery, including the presence of female faculty and leadership, which correlated with higher numbers of female residents The analysis also highlighted the importance of mentorship and role models for women	- Mentorship	increase in the percentage of female residents in orthopaedic surgery, significant disparities remain. For instance, only 15% of orthopaedic residents are female, compared to 57% of undergraduates and 50% of medical students

						the AMA and AAMC, which provided the most accurate sex data available for residency training programs Programs were classified based on the number of female	pursuing careers in orthopaedics		being female The findings indicated that if current trends continue, achieving a 30% representation of women in orthopaedic residency programs may not occur until approximately 2060

						residents and their percentage relative to national averages over a 5-year period			
48. Ojo, 2023	A 25-Year Analysis of Diversity, Equity, and Inclusion Research in Orthopaedics Shows Majority Female Authorship and Increasing Gender Parity Research	United States	scoping review that analyzes trends in diversity, equity, and inclusion (DEI)	The population of interest includes articles related to DEI in orthopaedic surgery, focusing on authorship and institution	A total of 143 DEI articles	The study involved a systematic search of DEI articles using various databa	The study examined various factors, including gender representation among authors, institutional contributions, and the focus of articles on	- Representation	The study concluded that while there has been a significant increase in DEI research output in orthopaedic surgery, particularly

			research within the field of orthopaedic surgery over a 25-year period	al contributions		ses, including PubMed and MEDLINE, with specific key terms related to orthopaedic surgery, diversity, inclusion, and equity The inclusion criteria required	gender disparities, race/ethnicity, and inclusion strategies		regarding gender parity, there remains a substantial need for growth in the areas of race/ethnicity and inclusion. The findings highlight the importance of continued efforts from various stakeholders to enhance representation and address

						articles to be published in English from December 31, 1998, to December 31, 2022, and to evaluate disparities in race/ethnicity, sex, and other minoritized groups in			disparities within the specialty

						orthopaedics Data collected included the year of publication, article topic, sex of the primary author, publishing journal, citation index, and primary contributing			

						institution			
49. Cohen, 2022 (21)	How do orthopaedic surgery residency program websites feature diversity? An analysis of 187 orthopaedic surgery programs in the United States	United States.	observational study that analyzes the content of residency program websites	The population consists of 187 orthopaedic surgery residency programs across the United States.	The sample size includes all available orthopaedic surgery residency program websites, totaling 187 programs. No sample size calculation was	The study involved a systematic evaluation of the websites of orthopaedic surgery residency programs to assess the presence of diversity and inclusion	NIH funding levels Top-40 medical school affiliation University versus community-based program affiliation Program size Geographic region (Recruitment effort)	- Recruitment effort	the study concluded that most orthopaedic surgery residency websites contained fewer than half of the diversity and inclusion elements evaluated. This indicates significant opportunities for programs to enhance their commitment to diversity

					performed since data were obtained from all available sources	elements. The authors identified 12 specific elements that represent a program's commitment to diversity and inclusion, based on prior research and recom			and inclusion. The inclusion of such initiatives on program websites may attract a more diverse applicant pool and help address existing gender and racial disparities in orthopaedic surgery

						mendations from the Accreditation Council for Graduate Medical Education (ACGME) Statistical analyses, including Mann-Whitney U tests and Kruskal-			

						Wallis tests, were used to evaluate the relationship between diversity scores and various program characteristics such as NIH funding, medical school affiliati			

						on, and geographic location			
50. Albright, 2022	Orthopaedic Society Leadership Diversity and Academic Participation	United States	this research is a mixed-methods study, utilizing both surveys and publicly available data	the population of interest includes members and board members of national and subspecialty orthopaedic societies in the United States.	A total of 24 national and subspecialty orthopaedic societies were invited to participate in the study, with 19 societies (79%) compl	The study employed a survey method using Research Electronic Data Capture (RED Cap) to collect data on the sex, racial,	Sex composition of society members and board members. Racial and ethnic demographics of society members and board members. Academic participation metrics of leadership, including the h-index, which	- Academic/research opportunities - Leadership	The study concluded that there is a significant lack of sex, racial, and ethnic diversity in the leadership of orthopaedic societies. It emphasized the need for better data collection

					eting the survey	and ethnic composition of society members and board members. The survey was sent to the current president and executive coordinator of each society and	measures academic productivity and citation impact		on these demographics to track improvements in diversity and highlighted that while academic participation is a factor in leadership selection, other elements also play a crucial role

						remained open for four weeks, with reminders sent to encourage participation			
51. Sobel, 2023 (31)	Interpersonal Interactions and Biases in Orthopaedic Surgery Residency: Do Experiences Differ Based on Gender?	United States	survey study	The population includes residents in orthopaedic surgery from selected residency programs. The study specifically examines	A total of 94 residents responded to the survey, which represents 42% of the potent	The study utilized a survey distributed through program directors to ensure a high	Gender differences in perceived experiences during residency. The presence of women faculty and their interactions with residents.	- Academic/research opportunities. - Work-life balance -Mental health impacts	The study concludes that while women residents are underrepresented in orthopaedic surgery, understanding their perceptions compared

				the experiences of both male and female residents	ial respondents (232 total residents) from 10 residency programs	response rate. The survey aimed to gather subjective perceptions of residents regarding their professional, social, and personal interactions during residency	Personal challenges faced by residents, such as balancing residency with personal life and feelings of isolation		to their male counterparts can help improve recruitment and retention strategies. The findings indicate that subjective experiences significantly influence residents' interactions and overall residency satisfaction, highlighting the

						training. It also explored experiences of harassment or discrimination during pre residency interviews			need for further exploration of gender biases in the field
52. Hiemstra, 2019 3	Dissecting disparity: improvements towards gender parity in leadership and on the podium within the Canadian Orthopaedic Association	Canada	Descriptive study	The study focuses on the membership of the Canadian Orthopaedic Associatio	The specific sample size is not mentioned in the	The study analyzes attendance and participation	Limited exposure to orthopaedics during medical training. A culture of gender	- Bias - Mentorship	The study concludes that while there have been improvements in the representation of

				n (COA), particularly examining the representation of female orthopaedic surgeons.	provided contexts, but it includes data from various years and categories of COA members.	data from COA annual meetings over several years, assessing the percentage of women on the podium and in leadership roles. It also compares the representation of	bias and male chauvinism. Lack of female mentors and role models, which significantly impacts women's career choices in orthopaedics		women in the COA, particularly among trainees, there is still a significant gender gap in leadership roles and podium presence at meetings. It emphasizes the need for continued efforts to enhance female representation in orthopaedic surgery, suggestin

						women in orthopaedic surgery to other countries and surgical specialties, highlighting trends and disparities in gender representation.			g that increased visibility of women in leadership positions can foster collaboration and improve recognition for female surgeons The authors call for further research and initiatives to track and promote gender diversity in orthopaed

									ic surgery over time
53. Vivekanantha, 2023	Gender Representation in Major Orthopaedic Surgery Meetings	United States, with additional references to Canada and Europe	quantitative analysis	The population includes faculty members who participated as speakers and moderators at 10 major orthopaedic surgery meetings held in 2021. The study specifically examines the gender distribution among these	The exact sample size is not specified in the provided contexts, but the study analyzes data from 10 major meetings, indicating a substantial	The study retrieved conference programs and details of faculty moderating or presenting at the selected meetings. It involved a quantitative	Gender of speakers and moderators. Subspecialty of the sessions (e.g., adult reconstruction, trauma, pediatrics). Academic qualifications of the faculty, including the number of publications and citations Representation	- Academic/research opportunities	The study concluded that there is a significant gender disparity in orthopaedic surgery meetings, with a high proportion of male-only panels (58.5%) and low overall female representation (12.6%). It highlighted that subspecia

				participants	number of sessions and participants	assessment of the presence of female speakers and moderators, as well as the prevalence of male-only panels. Data collected included the number of sessions,			lties like adult reconstruction had the highest male-only panels, while trauma and pediatrics had the least. Despite similar qualifications, men were more likely to hold higher academic ranks compared to women

						speaker details, and subspecialty topics, which were then analyzed using statistical methods such as ANOVA and t-tests			
54. Payares, 2023	The Current State of Diversity in Orthopaedics	United States	Review/Analysis of existing data	Orthopaedic surgeons and residents, with a focus on	Data from the 2018 census of 30,14	The study utilizes a review of censu	Representation, Attrition Rates, Support Systems	- Representation	The study concludes that orthopaedic surgery remains the least

				underrepresented minorities (URMs) and women	1 orthopaedic surgeons and various residency reports	s data, reports from the Accreditation Council for Graduate Medical Education (ACGME), and previous studies to analyze trends in diversity and attrition rates			diverse specialty in medicine, with significant barriers to entry and retention for URMs and women. It stresses the importance of ongoing support and the establishment of effective pathways to improve diversity and inclusion within the field

						among orthopaedic residents			The findings suggest that while there are slight improvements in representation, the overall progress is insufficient, and systemic changes are necessary to foster a more inclusive environment in orthopaedics
55. Ramos, 2022	Women in Leadership in State and Regional	United	based on	The population includes	The study had a	The study utilized	The study examined factors	-Leadership	The study concluded that there

	Orthopaedic Societies	States.	survey data	executive directors of state and regional orthopaedic societies, as well as the female members within those societies.	sample size of 49 executive directors who responded to the survey, representing 51 state and four regional orthopaedic societies, which corresponds to a	a web-based survey consisting of 14 questions aimed at gathering data on female membership composition, the percentage of male and female practicing orthopaedic	such as the percentage of female members in the societies, the presence of female presidents, and the representation of women on the Board of Directors It also considered the overall low percentage of female orthopaedic surgeons, which affects female membershi		is a positive correlation between the number of female members and the presence of women in leadership roles within state and regional orthopaedic societies. This suggests that increasing female representation could enhance

					respo nse rate of 89.1%	surgeo ns, and female repres entatio n on the Board of Direct ors of the societi es The survey was anony mous, and no identif ying inform ation was collect ed, ensuri	p in these societies Leadership		recruitme nt and retention of women in the field of orthopaed ics However, it also highlighte d that only a few societies had female presidents in the past decade, indicating a need for further efforts to increase gender diversity in leadership positions

						ng confidentiality			
56. Linscheid, 2020 65	Women in academic surgery over the last four decades	United States	retrospective analysis	The population studied includes full-time academic faculty physicians across multiple surgical specialties, including OB/GYN, general surgery, ophthalmology, ENT, plastic surgery, urology, neurosurgery,	The study does not specify an exact sample size in the provided contexts, but it includes data from all full-time academic facult	The study employed descriptive statistics to analyze the percentage of female surgeons over the years. Poisson regression was used to	The increasing number of female medical students and surgical residents. The presence of female mentors and role models. Work-life balance considerations and the appeal of certain specialties like OB/GYN, which has	- Mentorship - Work-life balance - Academic/research opportunities	The study concludes that while the overall number of women in academic surgery is increasing, the rate of increase varies significantly across different surgical specialties. OB/GYN shows the most substantial growth, while fields like

				orthopaedic surgery, and cardiothoracic surgery	y in the mentioned specialties from 1969 to 2018	examine the percentage of women in each field, with the year and specialty (using general surgery as a reference) as predictor variables Data were collect	a higher percentage of female representation		neurosurgery and orthopaedic surgery have slower rates of increase. The findings suggest that barriers still exist for women in pursuing academic surgical careers, including a lack of mentorship and gender stereotyping

						ed from publicly available sources, and institutional review board exemption was granted due to the nature of the data			
57. Levy, 2023 (32)	Effect of Faculty Diversity on Minority Student Populations Matching into Orthopaedic Surgery Residency Programs	United States	observational study	The population of interest includes orthopaedic residency programs	The study includes data from 172 orthop	The study employs a quantitative approach	Proportion of female attendings and URiM attendings. Proportion of female residents,	-Academic/ research opportunities	The study concludes that residency programs with a higher represent

				across the United States, specifically focusing on the demographics of faculty and residents.	aedic residency programs, with specific demographic data reported from varying numbers of programs	using the American Orthopaedic Association's Orthopaedic Residency Information Network (ORIN) database to extract demographic data. Statistical analyses, includi	URiM residents, and international medical graduates (IMGs) among the applicants Faculty		ation of female and URiM faculty are more likely to have a corresponding increase in female and URiM residents. However, it also notes that while URiM faculty representation positively influences URiM resident matching, female faculty represent

						ng bivariate linear regression, were performed to assess the relationship between the proportion of female or URiM faculty and the demographics of residents			ation does not significantly affect the matching of URiM applicants This suggests that while diversity in faculty can enhance the likelihood of matching diverse residents, the dynamics may differ based on the specific demograp

						A p-value of < 0.05 was set as the threshold for statistical significance			hic groups involved.
58. Rajani, 2019	Geographic Differences in Sex and Racial Distributions Among Orthopaedic Surgery Residencies: Programs in the South Less Likely to Train Women and Minorities	United States.	secondary data analysis study.	The population consists of active residents within orthopaedic surgery residency programs across the United States during the academic	The specific sample size is not mentioned in the provided contexts, but it includes all	The study utilized data obtained from the American Medical Association. Geographic	The study aimed to explore geographic differences in the representation of women and minorities in orthopaedic surgery residencies. It	- Representation	The study concluded that there are significant geographic differences in the representation of women and minorities in orthopaed

				year 2013 to 2014	active residents in accredited programs.	regions were categorized according to the US census method into Northeast, Midwest, South, and West. Descriptive statistics were employed to calculate frequency	considered both applicant-related factors (interest of female and minority candidates in Southern programs) and program-related factors (consideration given to these candidates by Southern programs) as potential influences on the observed disparities		ic surgery residency programs. Specifically, programs in the South are less likely to train women and minorities compared to those in the West and Northeast. This under-representation highlights the need for further investigation into the barriers faced by

						counts and percentages. Chi-square tests were used to determine differences between group proportions, with statistical significance set at P ≤ 0.05			these groups in entering orthopaedic surgery residencies
59. Incoll, 2019 (22)	Diversity in Orthopaedic	multiple	qualitative	The population	The exact	The study	Gender representat	Representation	The study concludes

	Surgery: International Perspectives	countries	assessment	includes orthopaedic trainees and practicing surgeons, with a focus on gender and ethnic diversity within the field.	sample size is not specified	employs a comparative analysis of diversity metrics across different countries, examining trends in gender and ethnic representation in orthopaedic surgery. It	ion in orthopaedic training programs, with specific statistics from Canada and New Zealand indicating low female participation rates (e.g., 26.7% in Canada for PGY-1 residents) The overall percentage of women in orthopaedic surgery, which has increased from 2.5%		that despite improvements in medical school diversity, orthopaedic surgery continues to struggle with low representation of women and minorities. There is a growing awareness of these disparities, but significant work remains to be done to enhance

						draws on historical data and current statistics to assess changes over time and identify areas for improvement.	in 1995 to 12.2% in 2018 in Canada The comparison of diversity in orthopaedics versus other surgical specialties, highlighting that orthopaedics lags behind in both gender and ethnic diversity		diversity in orthopaedic training programs and the workforce globally
60. Compton, 2021 62	Pregnancy and Parental Leave During Orthopaedic Surgery Residency	USA	Review article	Orthopaedic surgery residents and faculty	Not specified	Literature review and policy analysis	Lack of standardized parental leave policies; health concerns	-Fertility/ parenthood issues	Parental leave policies in orthopedic surgery are inconsiste

							during residency; stigma around parental leave		nt and often inadequate. Improved transparency, standardized policies, and support for trainees are needed to enhance recruitment and retention of female orthopedic surgeons.
61. Dineen, 2019 56	Gender Preferences of Patients When Selecting	USA	Cross-sectional survey	New patients in the Emergency Departme	191	Patients completed a 22-questi	- High rate of incomplete surveys (49.2%)	-Patient's choice	The majority of patients did not have a gender

	Orthopaedic Providers			nt and orthopaedic urgent care clinic		on survey regarding gender preference and traits of orthopaedic providers. Data analysis included Pearson's chi-squared test, Fisher's t-test, and linear	- Sample population largely female, Caucasian, and highly educated - No formal power analysis performed - Potential social desirability bias		preference for their orthopaedic surgeon. When preferences were expressed, females were preferred. Patient preferences varied by subspecialty, suggesting that increasing gender diversity in orthopaedics is crucial.

						regression.			
62. Munger ,2019	Revisiting the Gender Gap in Orthopaedic Surgery: Investigating the Relationship Between Orthopaedic Surgery Female Faculty and Female Residency Applicants	USA	Cross-sectional study	U.S. allopathic medical schools	101 medical schools (from a total of 125 initially, excluding 24 for incomplete data)	Analysis of data from the Association of American Medical Colleges (AAMC) for the years 2005-2014.	- Exclusion of international and osteopathic medical schools. - Data limitations due to de-identification and lack of tracking specific school factors. - Small sample size of female applicants per institution leading to potential year-to-	- Academic/research opportunities - Recruitment effort	No significant correlation was found between the number of female orthopaedic surgery faculty and the number of female residency applicants. The study highlights the complex nature of recruitment and suggests that other factors,

							year variation.		beyond the presence of female faculty, influence female medical students' interest in orthopaedic surgery. More research is needed to explore additional factors affecting recruitment.
63. Tabie, 2023	AOA Critical Issues: Perceptions on the State of Diversity, Equity, and Inclusion in	USA	Cross-sectional survey	Members of the American Orthopaedic Association (AOA)	1,657 AOA members surveyed; 262 respo	- Anonymous 11-question online survey	- Low response rate (15.8%) - Self-selection bias	- Mentorship - Representation	- Positive attitudes towards DEI in orthopaedics despite existing

	Orthopaedic Surgery				nses (15.8 % respo nse rate)	- Both free-respon se and multipl e-choice questi ons - Data collect ed using Survey Monke y - Quanti tative and qualita tive analysi s	- Diversity of responses on DEI perspective s - Some resistance to DEI initiatives among respondent s		inequalitie s. - Action needed through mentorshi p, objective evaluation , transpare ncy, and intentional action to improve DEI in the field.
64. Dossa , 2019 54	Sex-Based Disparities in the Hourly Earnings of Surgeons in the	Cana da	Cross-section alobser	Surgeons who submitted claims for surgical	3,275 surge ons	Analys is of admini strativ e	Adjustment s for specialty; matching surgeons	-Equal pay	Even within a fee-for-service system,

	Fee-for-Service System in Ontario, Canada			procedures from January 1, 2014, to December 31, 2016, in Ontario		databases; matched analysis for specialty and years in practice	on practice years and specialty to reduce bias; limitations in capturing all procedural details equal pay		female surgeons earn less per hour than male surgeons, suggesting systemic disparities in opportunity and procedure allocation.
65. Hamilton, 2012 61	Childbearing and Pregnancy Characteristics of Female Orthopaedic Surgeons	USA	Cross-sectional survey	Female surgeons in various specialties, with a focus on orthopaedics	1,021 female surgeons surveyed; 223 were orthopaedic surgeons with	- Anonymous, voluntary, 199-item online survey. - Distributed via	- Reliance on survey responses and interest groups for distribution. - Potential recall bias and variations in obstetric care over time.	-Fertility/ parenthood issues	Female orthopaedic surgeons experience higher rates of pregnancy complic

					263 pregnancies reported	surgeon interest groups and word of mouth. - Data compared with American Pregnancy Association national data.			ations, including preterm delivery, compared to the general U.S. population. High work hours correlate with increased risks. Shorter maternity leave and breastfeeding duratio

									ns during training compared to clinical practice were noted.
66. Chou , 2023 (40)	Health Considerations for Female Orthopaedic Surgeons	USA	Review and survey studies	Female orthopaedic surgeons	Ranges from 63 to 1,203 participants across various studies	Surveys, cross-sectional studies, and follow-up studies	- Selection bias in survey responses - Inconsistent reporting of gender demographics - Small sample sizes in some studies - Variability in study	- Radiation/ cancer - Fertility/ parenthood issues - Occupational injuries	Female orthopaedic surgeons face increased risks for breast cancer, fertility issues, pregnancy complications, and musculoskeletal injuries.

							design and focus		There is a need for increased awareness, education, and preventive measures to support their health and well-being. Further research is required to address these issues effectively.
67. Summers, 2020 64	Closing the Gender Gap: Barriers to Success for Recruitment and Retention of the	USA	Review	female medical students and residents in	Not specified (review of literature	Literature review and analysis of	-Male-dominated "jock" culture -Gender bias in residency	-Representation -Recruitment effort	Addressing barriers such as culture, bias, and lack of support

	Female Orthopaedic Surgery Applicant			orthopaedic surgery	and data)	existing data	applications -Pregnancy and lifestyle concerns -Limited mentors and role models - Lack of early exposure to orthopaedics	-Fertility/ Parenthood issues -Work-life balance - Mentorship	can help close the gender gap and improve female representation in orthopaedic surgery. Organizations and initiatives are working towards this goal, but more efforts are needed.
68. Poon, 2020 60	Does a Career in Orthopaedic Surgery Affect a Woman's Fertility?	United States	survey-based research study	The population targeted in this study includes female orthopaed	he study collected responses from 801 femal	An anonymous 168-item survey was distributed to	age, specialty, length of delay in childbearing, and average hours worked	-Fertility/ parenthood issues	The study found that over two-thirds of female orthopaedic surgeons intentional

				ic surgeons.	e orthopaedic surgeons	gather data on family planning, fertility, and pregnancy experiences among female orthopaedic surgeons Statistical analysis was performed using Stata 15, and multipl	weekly in relation to fertility outcomes		ly delay childbearing due to their careers, resulting in having children at an older age than the general cohort There was no significant association between career stage, hours worked, or subspecialty with decreased fertility or increased risk of pregnancy

						e logistic regression was used to analyze the relationship between the number of children per surgeon and demographic factors such as age, specialty, length of			complications The study provides updated information to help guide female orthopaedic surgeons in their family planning decisions

						delay, and average hours worked weekly			
69. Poon, 2019	Current Trends in Sex, Race, and Ethnic Diversity in Orthopaedic Surgery Residency	United States	observational study	population includes residents in eight primary surgical specialties, including orthopaedic surgery, general surgery, urology, ophthalmology, neurosurgery, obstetrics and gynecolog	The exact sample size is not specified in the provided contexts. However, the study analyzes data from multip	Data was collected from the National Graduate Medical Education Census through GME Track, sponsored	The study analyzed racial and ethnic diversity, focusing on groups such as African American, Asian, American Indian/Alaskan Native, Native Hawaiian/Pacific Islander, and multiracial/	-Recruitment effort	the study concluded that recruitment efforts have not reversed the sex, racial, and ethnic disparities in orthopaedic residents. Orthopaedics has the lowest representation of women

				y, otolaryngology, and thoracic surgery	le years (2006 - 2015) across several surgical specialties.	by the American Medical Association and the AAMC Linear regression models were used to estimate trends in diversity among orthopaedic residents and	other/unknown It also considered sex distribution, particularly the representation of female residents		and minorities among the residencies studied Despite an increase in the representation of women and certain minority groups, orthopaedic surgery continues to lag behind other surgical subspecialties in terms of ethnic and

						other surgical specialties A mixed model analysis of variance was used to compare rates of diversification among different specialties over time			sex diversity

70. Incoll, 2021	Gender associations with selection into Australian Orthopaedic Surgical Training: 2007–2019	Australia	observational analysis	The study focuses on applicants to the Australian Orthopaedic Surgical Training program.	not specified	The study analyzed CV scores, referee reports, and performance in multiple mini-interviews (MMI) from 2007 to 2019. The proportion of each gender offered intervi	Gender differences in CV scores, interview invitations, and interview performance. The gender composition of interview panels, which changed over the years to include more female members	-Recruitment effort	The study identified systemic gender bias in the selection process, with male applicants generally scoring higher on CVs and being invited to interviews more often than females. It suggests the need for medical specialties to examine their selection

						ews was compared using Wilcoxon's rank sum test. Interview scores were converted to a percentage of the maximum possible score and tested for signific			processes for gender-based biases and to explore more valid and reliable selection tools to identify the best candidates

						ance using an independent sample two-tailed t-test			
71. Hull, 2022	Women in Surgery Events Alone do not Change Medical Student Perceptions of Gender Bias and Discrimination in Orthopaedic Surgery	United Kingdom	survey-based study	The study population includes medical students and early post-graduate trainees interested in trauma and orthopaedics	Pre-event questionnaires were completed by 102 participants, and post-event questionnaires by 52	The study involved an event with presentations and interactive sessions from female T&O trainees, condu	Geographic Direct exposure orthopaedic stereotype, male-dominated workplace culture, and lack of female role models	- Bias	The study concluded that significant concerns exist among medical students regarding gender-based discrimination within T&O. These perceptions were not altered by attending

					partici pants	cted online. Attend ees compl eted pre and post-event questi onnair es distrib uted via Faceb ook and email. The survey includ ed questi ons on expos ure to T&O,			a one-off women in T&O event. Early exposure to T&O is important to improve interest in orthopaed ics, while negative stereotypi ng remains a barrier

						perceptions of gender imbalances, and barriers preventing women from entering T&O, using a five-point Likert scale			
72. Chou, 2012	Increased Breast Cancer Prevalence Among Female Orthopedic Surgeons	United States	survey-based study	The study focuses on female orthopedic surgeons who are members	The sample size consists of 505 female	The study used a survey method, where a	The study examined various breast cancer risk factors, including reproductiv	-Radiation/ cancer risk	The study concluded that female orthopedic surgeons have a significantl

				of the AAOS.	orthopedic surgeons who participated in the survey	questionnaire was mailed to eligible participants. The survey collected data on cancer diagnoses, breast cancer risk factors, and clinical practice details, including	e history, hormone use, and lifestyle factors such as alcohol consumption and BMI Occupational exposure to radiation through fluoroscopy use was also considered		y higher prevalence of breast cancer compared to the general U.S. female population. The findings suggest the need for increased awareness and education on protective measures and modifiable risk factors within the orthopedic

						fluoroscopy use Standardized prevalence ratios (SPRs) were calculated to compare cancer prevalence among the study population with the general U.S. female			community

						population			
73. Saxena, 2019 (29)	Does the Proportion of Women in Orthopaedic Leadership Roles Reflect the Gender Composition of Specialty Societies?	Not spicif aied	cross-sectional analysis	The study focuses on orthopaedic societies, specifically examining the gender composition of their members and boards of directors	The study included 23 orthopaedic societies, although two societies were excluded from the statistical analysis due to their specific missio	The study used a regression analysis to compare the percentage of women in orthopaedic societies with the percentage of women on their boards of directors	The primary factor examined was the correlation between the percentage of women in the societies and the percentage of women on the boards of directors The presence of junior board member positions was also considered as a factor	- Leadership	There is a strong correlation between the percentage of women in a society and the percentage of women on the society's board of directors (r^2 = .2333; p = .0495) The presence of junior board members did not correlate

					ns related to diversity	A t-test was used to compare the presence of junior members on the board with the percentage of women on the board Data was collected from the execut			with an increased percentage of women on the board

						ive directors of the societies and supplemented by reviewing society bylaws			
74. Chou, 2010	Prevalence of Cancer in Female Orthopaedic Surgeons in the United States	United States	cross-sectional survey	The population targeted in this study includes practicing female orthopaedic surgeons in the United States	The sample size of the study is 499 practicing female orthopaedic surgeons who respo	The study used a survey method, where potentially eligible AAOS fellows were mailed a survey	The study focused on factors such as age, years in practice, and the prevalence of cancer, particularly breast cancer, among female orthopaedic surgeons	-Cancer	The study concluded that there is a significant increased prevalence of cancer, particularly breast cancer, among practicing female orthopaed

					nded to the surve y	along with a cover letter and a return-addres sed envelo pe. A follow-up survey was sent to increa se respon se rates The survey includ ed questi ons about age, years			ic surgeons compared to the general U.S. female population . The standardiz ed prevalenc e ratio indicated a 1.9-fold increase in cancer prevalenc e overall and a 2.9-fold increase in breast cancer prevalenc e

						in practice, type of practice, and use of certain medical tools and materials. It also inquired about cancer diagnoses			
75. Thiart, 2023 48	Operating in the margins: Women's lived experience of training and working in orthopaedic surgery in South Africa	South Africa	Descriptive qualitative study	Women orthopaedic surgeons in South Africa, including both	16 women orthopaedic surgeons partici	Data were collected through focus group	Dynamic working environments and the work of transformation.	- Work life balance - Mental health impacts -Bias. - Microaggres	The study highlights the dynamic process in which both men and

				those in training (registrars) and qualified specialists (consultants	pated in the study	discussions conducted online via Zoom Purposive and snowball sampling methods were used to recruit participants The study was grounded in phenomenol	Negotiating competing roles of mother and surgeon. Belonging, exclusion, and internalised sexism. Gaslighting and silencing. Acts of resistance, agency, and pushing back	sion/ harassment	women contribute to co-creating, reproducing, and challenging practices that make medicine more inclusive. It identifies structures, practices, attitudes, and ideologies that may promote or impede the inclusion of women in orthopaedic surgery

						ogy and used thematic analysis following a data-driven inductive approach			
76. Chapman, 2018 52	Profiles of Practicing Female Orthopaedists Caring for Medicare Patients in the United States	United States	observational study	The study focuses on practicing female orthopaedic surgeons in the United States who care for	The study analyzed data from 1,269 female orthopaedic surgeons out of	The study utilized Medicare billing data from 2012 to 2014 to identify	Gender differences in practice characteristics, such as relocation for practice, distance from medical school, and	-Equal pay	There are significant differences between female and male orthopaedic surgeons in terms of subspecialty choices, education,

				Medicare patients.	a total cohort of 23,992 orthopaedic surgeons	practicing orthopaedic surgeons. It involved analyzing demographics, medical training, practice characteristics, case volume, specialization, and	subspecialty choices. Differences in billing practices and attrition rates between male and female surgeons. The influence of medical school ranking on career paths		billing practices, and attrition rates. Despite an increase in the number of female orthopaedic surgeons, gender disparities persist within the specialty. The study highlights the need for further research to understand and address

						procedure profiles. Representative Current Procedural Terminology (CPT) codes were used for each subspecialty			these disparities
77. Chou, 2022	Increased Prevalence of Breast and All-cause Cancer in Female Orthopaedic Surgeons	United States	survey-based observational study	Female orthopaedic surgeons in the United States	672 female orthopaedic surgeons partici	Surveys were distributed to female orthopaedic surgeo	Demographic factors: age, race/ethnicity, body mass index, smoking	-Radiation	The study found an increased prevalence of breast and all-cause

					pated in the study	ns through national orthopaedic specialty societies. The survey collected demographic information, professional history, and self-reported cancer diagnoses.	history, menstrual and reproductive history, and hormone use. Professional factors: subspecialty, years in practice, use of fluoroscopy, PMMA use, lead protection, dosimeter use, and radiation exposure risk training Family history of cancer was also considered		cancer among female orthopaedic surgeons compared to the general US female population. The standardized prevalence ratio for breast cancer was significantly higher among the surgeons, indicating a potential occupatio

						The study used standardized prevalence ratios (SPRs) and 95% confidence intervals (CIs) to compare cancer prevalence with the general US female population			nal risk factor

78. Rodgers, 2022	How Does Orthopaedic Surgeon Gender Representation Vary by Career Stage, Regional Distribution, and Practice Size? A Large- Database Medicare Study	United States	retrospective study	The study focuses on orthopaedic surgeons in the United States who serve Medicare patients	The study includes data on 19,221 orthopaedic surgeons, of which 1,019 are women	The study utilized demographic, billing, and practice characteristics data from the Medicare Physician and Other Supplier Public Use File and Physician Comp	Gender representation across different career stages and geographic distributions. Differences in rural-urban practice settings and group practice sizes. Years in practice as a continuous variable influencing outcomes	- Representation	There is a significant gender disparity, with one woman for every 20 men orthopaedic surgeons serving Medicare patients in the U.S. Women are more likely to work in larger group practices compared to men Both male and female surgeons predomin

						are national databases Descriptive statistics and multiple linear regression were used to analyze the data, adjusting for years in practice The study also			antly practice in urban settings, with no significant difference in rural-urban distribution when controlling for years in practice The study highlights the need for gender-based equity and inclusion efforts in the orthopaedic surgery field

						examined regional representation and group practice size by grouping surgeons into 5-year practice intervals			
79. Mason, 2023 (47)	Perceptions of Racial and Gender Microaggressions in an Academic Orthopaedic Department	United States	survey-based study	The study population includes attendings, fellows, and residents who were active	A total of 84 individuals were invited to participate,	The study used a 34-question survey, which was a	The study investigated the frequency of experienced or perceived microaggre	- Microaggressions	Female participants, non-White participants, and Hispanic minorities reported

				members of the orthopaedics department at the University of Miami Miller School of Medicine.	and 54 completed the survey, resulting in a response rate of 64%	modified version of the validated Racial and Ethnic Minorities Scale and Daily Life Experiences Survey The survey was distributed via institutional email, and	ssions based on race, sex, and ethnicity, and their effects on career decisions in orthopaedic surgery		experiencing a higher frequency of microaggressions. These experiences may act as barriers to recruitment and retention of under-represented minorities in orthopaedic surgery. The study highlights the need for further investigation into the impact of

						participation was voluntary and anonymous Subgroup analyses were performed by stratifying responses by race, sex, Hispanic ethnicity, career level,			microaggressions on career decisions and goals for women and persons of color in orthopaedic surgery

						and age			
80. Hill, 2013 (24)	Residents' Perceptions of Sex Diversity in Orthopaedic Surgery	Not mentioned	survey-based research study	The population targeted in this study includes orthopaedic surgery residents.	The survey was sent to 2,629 orthopaedic surgery residents, and 529 responded, making the sample size 529	A seven-question survey was distributed via email to orthopaedic residents by the American Academy of Orthopaedic Surgeons. The survey aimed	The study identified several factors influencing the decision to enter orthopaedic surgery, including the presence of a role model, perceived happiness of orthopaedic faculty, and clinical clerkship experience Differences in perceptions between	- Mentorship - Academic/research opportunities	The study concluded that orthopaedic surgery has been less successful in recruiting women compared to general surgery. It suggested that increased exposure to orthopaedic content during medical school and increased

						to identify factors influencing the choice of orthopaedic surgery as a specialty and to compare perceptions between male and female residents	men and women were noted, such as the importance of having a role model of the same sex or ethnicity and the perceived physical demands of the specialty		female mentorship could help recruit more women into the orthopaedic surgery workforce

81. Terle, 2023	Diversity-Related Positions in Orthopaedic Surgery Residency Programs	United States	descriptive study	The study focuses on orthopaedic surgery residency programs in the United States.	The study evaluates 193 ACGME-accredited orthopaedic surgery residency programs	The study uses data collected from residency program websites, analyzing factors such as program location, type (university or community-based), allopat	The study examines the presence of diversity, equity, and inclusion (DEI) statements and faculty roles within residency programs. It also considers program size, type, and geographic location as factors influencing the presence of DEI roles	- Academic/research opportunities	The study concludes that less than half of the orthopaedic surgery residency programs advocate for DEI on their websites, and fewer than 25% have a DEI faculty position. It suggests that increasing DEI roles may enhance the number of women and

						hic or osteopathic recognition, number of faculty, number of residents per year, diversity-related statements, and diversity-focused faculty positions			Underrepresented in Medicine (URiM) applicants pursuing orthopaedic surgery

82. BLAKEMORE, 2003	Women in Surgical Residency Training Programs	United States	observational study	The study focuses on medical residents in various surgical fields, with a particular emphasis on orthopaedic surgery	The study does not specify a sample size in terms of the number of individuals but analyzes data spanning from 1970 to 2001, excluding 1975	The study uses linear regression models to analyze changes in the percentage of women in orthopaedic residencies compared to other surgical fields. It also compa	The study examines factors such as the recruitment practices in orthopaedic surgery, perceptions of the field, and the compatibility of the career with family life. It also considers the overall increase in women entering medical schools	-Recruitment efforts -Work-life balance	The study concludes that orthopaedic surgery has not been as successful as other surgical fields in recruiting female trainees. Despite the increase in women entering medical schools, the percentage of women in orthopaedic residencies has not

						res the proportion of women entering medical school with those entering orthopaedic surgery			significantly changed over the past two decades. The study suggests that active intervention is necessary to improve gender representation in orthopaedic surgery training
83. Robin, 2021	Disparities Among Industry's Highly Compensated Orthopaedic Surgeons	United States	retrospective analysis	The study focuses on orthopaedic surgeons who are highly compensated by the industry	The study identified 1,025 physicians who met the inclusi	The study used publicly available information from the	Gender, subspecialty fellowship training, and practice setting were analyzed as factors	-Equal pay.	There is a significant gender disparity among the top-compensated orthopaedic surgeons,

					on criteria, representing 347 unique orthopaedic surgeons	CMS to identify the top 25 orthopaedic surgeons with the highest compensation from each of the 10 largest orthopaedic companies from 2013 to 2017 Statistical	influencing compensation The study also examined the distribution of payments among different companies and subspecialties		with less than 1% being female Sports medicine specialists received the highest mean compensation, while spine specialists had the highest mean compensation per physician Additional studies are recommended to further explore these

						analyses were conducted using SPSS version 26, with ANOVA and post hoc testing using the Tukey HSD for significant results			disparities and promote gender equality in the field
84. Valone, 2016 (41)	Breast Radiation Exposure in Female Orthopaedic Surgeons	Not specified	observational study	The study focuses on female orthopaedic surgeons,	The specific sample size for the	Anthropomorphic torso and pelvic	Factors associated with higher breast radiation exposure	-Radiation	Breast radiation exposure is higher in a C-arm lateral

				with a comparison to the general U.S. female population and other surgical specialties like plastic surgeons and urologists	phantom study is not mentioned, but the referenced study by Chou et al. involved 505 female orthopaedic surgeons	phantoms were used to simulate a female surgeon and a patient, respectively, in an operating-room setting Dosimeters were placed on the upper outer quadrant	include apron size and type, surgeon position, and C-arm position The study also considered the orientation of the silicon diode detector and the size of the protective aprons		projection compared to an anteroposterior projection The upper outer quadrant (UOQ) of the breast receives higher radiation exposure compared to the lower inner quadrant (LIQ) Properly sized lead protection and distancing the axilla from the patient

						(UOQ) and lower inner quadrant (LIQ) of the breast to measure radiation exposure during fluoroscopy Various apron sizes and types, surgeon positions,			and x-ray tube may reduce radiation exposure

						and C-arm positions were tested to assess their impact on radiation exposure			
85. Ruse, 2022 66	Pregnancy in Orthopaedic Residents: Peripartum Barriers Identified	United States	Survey study	Female orthopaedic surgeons, including current residents and those who had completed training in an ACGME-accredited	328 women responded to the survey and met the inclusion criteria	A 63-item self-administered survey was used to evaluate multiple aspect	Concerns about balancing clinical and maternal duties (67%) Fear of how the resident would be viewed by those in the	- Work-life balance - Fertility/ parenthood issues	The study highlights significant barriers to pursuing pregnancy during orthopaedic residency, which may deter qualified female

				US orthopaedic surgery training program		s of childbearing during orthopaedic surgery residency The survey was distributed electronically through email to residency program coordinators and a targete	program (60%) Inability to ensure optimal prenatal and postpartum care due to an unpredictable schedule (38%)		applicants from the field. If supportive policies are implemented, more women might be encouraged to pursue a career in orthopaedic surgery

						d Faceb ook group, "The Wome n of Orthop edics" Multiv ariate logistic regres sion was used to determ ine indepe ndent factors associ ated with profes sional dissati sfactio			

						n related to pregnancy during residency			
86. Day, 2010	Diversity Based on Race, Ethnicity, and Sex Between Academic Orthopaedic Surgery and Other Specialties	United States	comparative study	the study examines medical students, orthopaedic residents, orthopaedic faculty, and full professors	not specified	The study uses a comparative analysis approach, utilizing public registries to determine the composition of the orthopaedic	The main factors analyzed in the study are race, ethnicity, and sex. The study specifically looks at the representation of African-Americans, Hispanics/Latinos, Asian-Americans, and women in orthopaedi	- Representation - Academic/research opportunities	The study concludes that orthopaedic surgery lags behind general surgery and other fields in terms of minority and female representation. It suggests that efforts should be

						workforce by race, ethnicity, and sex. It compares the diversity of orthopaedic residents and faculty with that in five other specialties and examines the applicant pools	c surgery compared to other fields		made to recruit more diverse residents and faculty, given the similar capabilities and qualifications of applicants

						for orthopaedic and general surgery residencies			
87. Pinpin, 2023 (13)	Exponential Growth in Female Residency Applicants in Orthopaedic Surgery Over the Past 15 Years	Not specified	observational analysis	The study focuses on medical students applying to orthopaedic surgery residency programs.	The exact sample size is not specified, but the study covers data from 2007 to 2022.	Data was collected from the AAMC ERAS database from 2007 to 2022. The study calculated the annual	The study examined the percentage of female applicants to orthopaedic surgery residency programs and the annual changes in these percentages.	-Recruitment effort.	There has been a significant increase in the percentage of female applicants to orthopaedic surgery, from 11.8% in 2007 to 23.0% in 2022 The study predicts

						percentage of female applicants and the annual change in percentage. Regression analysis was used to calculate the best-fit trendline and extrapolate future trends using Micros			that if current trends continue, gender parity (36.3% female applicants) could be reached by 2038 The findings suggest that initiatives to improve gender diversity in orthopaedic surgery are having a positive impact, although the field remains

						oft Excel			the least gender-diverse among surgical specialties
88. Chambers, 2018	Women in Orthopaedic Surgery Population Trends in Trainees and Practicing Surgeons	United States	descriptive analysis	The study focuses on female orthopaedic surgery residents, academic faculty, and members of orthopaedic subspecialty and research societies	Not detailed	The study utilized publicly available data from the AAMC and the Accreditation Council for Graduate Medical Education	The study examines factors such as the percentage of female residents in orthopaedic surgery, the representation of women in academic faculty positions, and membership in orthopaedic societies	- Representation. - Academic/research opportunities	The study concludes that orthopaedic surgery has a slow increase in the number of female residents and academic faculty compared to other specialties. It highlights the need for increased

						(ACGME) for analysis. It also involved direct contact with subspecialty and research societies for membership demographic data			exposure of medical students to orthopaedics and female mentors to attract top graduates to the field
89. Hiemstra, 2023	Rates of Burnout in Female Orthopaedic Surgeons Correlate with Barriers to Gender Equity	Canada	survey-based study	The study focused on female orthopaedic surgeons	The survey was sent to 330 eligibl	An electronic survey was used,	The study examined the correlation between career	-Mental health impacts -Bias	The study concluded that half of the female orthopaedic

				in Canada, including those in training, practicing, or retired	e participants, and responses were received from 218, resulting in a response rate of 66.1%	which included demographic questions, the Gender Bias Scale (GBS) questionnaire, and questions about career burnout and job satisfaction The survey data were analyz	burnout and barriers to gender equity, as identified by the GBS higher-order domains and lower-order barriers Factors such as male privilege, devaluation, and disproportionate constraints were significantly correlated with burnout		surgeons reported symptoms of career burnout. Significant relationships were found between burnout and barriers to gender equity, highlighting the need to address systemic biases and dismantle gender barriers to reduce burnout

						ed using statistical methods such as the Pearson r correlation coefficient and Spearman rank correlation coefficient to evaluate relationships among variables			

90. Acuna, 2021 (12)	How Long Will It Take to Reach Gender Parity in Orthopaedic Surgery in the United States? An Analysis of the National Provider Identifier Registry	United States.	observational analysis	The study focuses on practicing orthopaedic surgeons in the United States	The study analyzed a cohort of 31,296 practicing orthopaedic surgeons, of whom 8% (2,363) were women	The study utilized a univariate linear regression analysis to evaluate trends in the annual proportions of women who are active orthopaedic surgeons based on NPI	The study considered the growth rates of women orthopaedic surgeons across geographic regions and subspecialties It also examined the national growth rate and projected future gender parity based on current trends representation	- Representation	The study concluded that achieving gender parity with the overall medical profession (36.3% women) is projected to take 217 years, reaching parity by the year 2236 Achieving parity with the overall US population (50.8% women) is projected to take 326 years, reaching

						enumeration dates Gender parity projections were calculated using the Holt-Winters forecasting algorithm			parity by the year 2354 The study highlights the slow growth in the proportion of women in orthopaedic surgery and underscores the need for targeted efforts to close the gender gap more rapidly
91. cho, 2023	Match Rates Among Underrepresented Minority and Female Applicants to Orthopaedic Surgery Residency	United States	Retrospective analysis	Applicants to orthopaedic surgery residency programs	12,111 applicants	Data were collected from the	Demographic variables including sex and underrepre	- Representation	The study found that the overall match rate was 70%.

	Programs from 2011 to 2021 How Are We Doing?			from US MD-granting medical schools.		Electronic Residency Application Service (ERAS), American Medical College Application Service (AMCAS), Graduation Questionnaire (GQ), and	sented minority (URM) status Academic factors such as AOA status and attendance at a top 40 medical school		However, the odds of matching decreased over the decade for all applicants, with specific decreases noted for non-URM male and female applicants. The odds for URM male applicants did not change significantly, while the odds for URM female

						Liaison Committee on Medical Education (LCME) The study used multivariate logistic regression to analyze the likelihood of applicants matching into orthopaedic			applicants increased significantly The study highlights ongoing disparities in match rates for URM and female applicants, despite efforts to increase diversity in orthopaedic surgery residency programs

						surgery, controlling for factors such as the number of applications, top 40 medical school status, AOA status, and additional degrees			
92. Nemeth, 2020 62	Program Directors' Perception of Pregnancy and Parenthood in Orthopedic Surgery Residency	USA	Survey	All program direc- tors who were members of the	61/151 resoinded	The survey was dis-tributed	Pregnancy and Parenthood for Female Residents	-Fertility/ parenthood issues	This study demonstrated that although orthopedic surgery

				American Orthopaedic Association's Council of Orthopaedic Residency Directors		using REDCap electronic data capture tools (version 6.10.17; Vanderbilt University, 2016) in 2016. Email addresses for the program directors were collect			program directors did not indicate that pregnancy and parent-hood have a more negative effect on fe- male residents' work performance, well-being, and dedication to patient care, they did perceive the effects of pregnancy and parenthood more

						ed using publicly accessible information. A follow-up email was sent 2 weeks later to encourage more participation.			negatively for females concerning scholarly activities and the burden placed on fellow residents. To reduce the perceived burden on the program and encourage more accepting attitudes toward pregnancy and parenthood dur- ing training,

									program directors can better work with residents to devise more accommodating schedules that are less disruptive to the program and to the resident's education.