

Orthopaedic Authorship: Sex-Based Resident Publication Trends

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INTRODUCTION:

Orthopaedic surgery is historically a male-dominated medical specialty where females are underrepresented in training, practice, academia, and professional societies. In 2022, 7.4% of practicing orthopaedists and 18.3% of orthopaedic residents in the United States identified as female despite accounting for over 50% of medical school students in 2019, 2021, and 2022. Researchers have put great effort into quantifying these disparities, prompting discussions of gender equity and the evolution of professional norms. As more women enter the field, an updated inventory is needed to identify how diversity efforts influence scholastic activity. The purpose of this study was to analyze gender-specific publication trends of orthopaedic surgery residents to understand the current status of female representation in academia.

METHODS:

Resident demographic information was collected from orthopaedic surgery residency program websites listed by the Accreditation Council for Graduate Medical Education (ACGME). Resident publications and citation metrics were searched through PubMed and Scopus respectively and statistically analyzed in relation to demographic information.

RESULTS:

A total of 203 orthopaedic surgery residency programs were listed in the 2021 Accreditation Counsel for Graduate Medical Education (ACGME), 186 (91.6%) of which provided resident demographics. A total of 3,345 residents were identified, 2,736 (81.8%) of which were male and 609 (18.2%) were female. Female residents were more likely to attend a top 20 residency program ranked by the Doximity Residency Navigator (28.6% vs. 19.2%, $p=0.0000026$). They were also more likely to have graduated from both top a 50 medical school (45.7% vs. 34.8%, $p=0.0000036$), and attend a residency program affiliated with a top 20 research medical school (19.0% vs. 14.1%, $p=0.0026$) as ranked by US News. Demographic analysis is reported in Table 1. Of the 10,622 articles assessed 1,740 articles (16.4%) were published by female residents and 8,801 (82.9%) were published by male residents. No significant difference was found for any publication metrics such that the H indices and median (IQR) of the total, first, second, and last authorships were comparable between genders. The proportion of time residents were published in the top five orthopaedic journals as determined by the google scholar h5 index were also equivalent. Publication data is provided in Table 2.

DISCUSSION AND CONCLUSION:

Recent publication data shows that male and female orthopaedic surgery residents demonstrate comparable research productivity. These findings indicate improved female representation within orthopaedic academia. Efforts are still needed to bolster the number of female orthopaedists; however, proportional research output suggests that diversity efforts are trending positively.

Table 1. Resident and Program Attributes: Sex Distribution Analysis

		Total (N = 3345)		Male (N = 2736, 81.8%)		Female (N = 609, 18.2%)		P value
		3345	100%	2736	81.8 %	609	18.2%	
Training Year	PGY1	844	25.2%	675	80.0%	169	20.0%	0.022*
	PGY2	829	24.8%	674	81.3%	155	18.7%	
	PGY3	838	25.1%	682	81.4%	156	18.6%	
	PGY4	825	24.7%	700	84.9%	125	15.1%	
	PGY5	9	0.3%	5	55.6%	4	44.4%	
Location	NE	836	25.0%	668	79.9%	168	20.1%	0.065
	S	987	29.5%	818	82.9%	169	17.1%	
	MW	1001	29.9%	837	83.6%	164	16.4%	
	W	521	15.6%	413	79.3%	108	20.7%	
Top 50 research medical schools **		1109	37.0%	857	34.8%	252	45.7%	0.0000036*
Programs with top 20 research school affiliations **		526	17.0%	362	14.1%	112	19.1%	0.0026*
Top 20 doximity residency programs		751	22.0%	525	19.2%	174	28.6%	0.0000026*
Highest research output***		896	26.8%	715	26.0%	168	27.6%	0.462

*Indicates statistical significance (p value < 0.05)

**Unknowns excluded

***Defined as the top 75% of total published articles per residency class

Table 2: Research Productivity: Sex Distribution Analysis

		Total (N=10622)		Male (N=8801, 82.9%)		Female (N=1740, 16.4%)		p value
		N	Median	N	Median	N	Median	
Training Year	PGY1	2051	1.0 (0-4)	1604	1.0 (0-4)	427	1.0 (0-4)	0.17
	PGY2	2241	1.5 (0-4)	1887	2.0 (0-4)	330	1.0 (0-4)	0.17
	PGY3	2826	2.0 (0-5)	2286	2.0 (0-5)	517	2.0 (0-6)	0.30
	PGY4	3423	2.0 (1-6)	2968	2.0 (1-5.75)	441	2.0 (0-6)	0.90
	PGY5	81	8.0 (5-13)	56	13.0 (8-13)	25	6.0 (3.75-8.5)	0.14
% Publications	First author	26.0%	(0%-50%)	22.5%	(0%-50%)	20.8%	(0%-50%)	0.50
	Second Author	21.3%	(0%-42%)	19.6%	(0%-40%)	21.1%	(0%-50%)	0.93
	Last Author	2.2%	(0%-0%)	2.9%	(0%-0%)	1.9%	(0%-50%)	0.13
	First, Second, or Last Author	39.9%	(0%-100%)	47.0%	(14%-100%)	45.6%	(0%-100%)	0.57
	Top Orthopaedics Journal	1.4%	(0%-0%)	1.5 %	(0%-0%)	1.1%	(0%-0%)	0.42
	H Index	2	(1-4)	2	(1-4)	2	(1-5)	0.086

*Indicates statistical significance (p value < 0.05)

**Only residents with at least one publication included

***Residents with no H index excluded