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AOA Critical Issues in Education

Orthopaedic Surgery Faculty

An Evaluation of Gender and Racial Diversity Compared with Other Specialties

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Background: The American Academy of Orthopaedic Surgeons has adopted the strategic goal of evolving its culture and governance to become more strategic, innovative, and diverse. Given the charge to increase diversity, a focus on assessing and increasing diversity at the faculty level may help this cause. However, an analysis of gender and racial diversity among orthopaedic faculty has not been performed. The purpose of this study was to evaluate faculty appointments for underrepresented minority (URM) and female orthopaedic surgeons. We also aim to draw comparisons between orthopaedic surgery and other specialties.

Methods: Data on gender, race, and faculty rank (clinical instructor, assistant professor, associate professor, and professor) of academic faculty for 18 specialties from 1997 to 2017 were obtained from the Association of American Medical Colleges (AAMC) Faculty Roster. Assistant professors were designated as junior faculty, whereas associate professor and professor were considered senior faculty. URMs were defined using the AAMC definition—groups having lower representation than in the general population. Regression analysis was used to evaluate and compare the change over time and to compare the change across different specialties.

Results: Over the 20-year study period, the number of female faculty increased (8.8% pts) but represents a lower proportion than other specialties (13.9% pts) ($p = 0.029$). Female orthopaedic senior faculty grew slower (7.3% pts) than other specialties (14.7% pts) ($p < 0.001$). There was no difference in the growth of URM faculty positions (2.0% pts) compared with all other specialties (2.4% pts) ($p = 0.165$). The proportion of orthopaedic URM senior faculty increased less (0.5% pts) than other specialties (2.5% pts) ($p < 0.001$), whereas more orthopaedic URM junior faculty were added than other specialties (2.2% pts) ($p = 0.012$).

Conclusions: Although orthopaedic surgery has increased the representation of female and URM faculty members, it continues to lag behind other specialties. In addition, fewer female and URM orthopaedic faculty members obtained senior faculty status than other specialties. To address the differences seen in faculty diversity, a concerted effort should be made to recruit and promote more diverse faculty, given similar qualifications and capabilities.

Level of Evidence: Prognostic Level IV.

A diverse workforce of medical professionals has been associated with improved patient-reported outcomes and satisfaction among racial and ethnic groups in the

United States^{1,2}. It has also been associated with medical student diversity and cultural competency among medical school graduates³. The benefits of diversity are not limited to racial and ethnic

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TABLE I Eighteen Medical Specialties Contained in Data and Used for Analysis

Medical Specialties in Faculty Roster		
Anesthesiology	Obstetrics & Gynecology	Pediatrics
Dermatology	Ophthalmology	Physical Med & Rehabilitation
Emergency Medicine	Orthopaedic Surgery	Psychiatry
Family Practice	Other Clinical Sciences	Pub Health & Preventative Med
Internal Medicine	Otolaryngology	Radiology
Neurology	Pathology (Clinical)	Surgery

diversities; diversity of gender has been shown to improve patient-physician interactions and lead to increased rapport and decreased perception of diagnostic uncertainty and ulterior motives⁴. Furthermore, there are suggestions that the availability of same-sex and same-race faculty can result in the greater diversity of trainees⁵⁻⁸.

Substantial inequality in gender and racial differences continue to persist, especially in academic medicine^{1-4,9-16}. The rates of academic promotion for female and racial minority faculty are consistently lower than their male and white counterparts, respectively^{1,4,17}. However, some progress has been made toward addressing these disparities; the proportion of female medical school graduates increased from 6.9% in 1966 to 46.3% in 2016, and the percentage of underrepresented minority (URM) graduates increased from 2.7% in 1972 to 10.3% in 2015¹⁸⁻²⁰. The difference is particularly pronounced among orthopaedic surgery residents and faculty^{13,15}.

Although faculty diversity has been the subject of scrutiny in other medical specialties^{1,3,10,21-23}, there exists a lack of data on gender and racial composition of academic orthopaedic surgery faculty and their rank in the United States. The goal of this study was to examine trends in gender and racial diversity in orthopaedic surgery faculty over the past 20 years. We also aim to compare these trends to those seen in other specialties during the same time period. Identifying the trends in orthopaedic faculty diversity and comparing these results with other specialties will highlight any differences that exist in the diversity among faculty.

Methods

Data

Annual data on gender, race, and medical faculty rank from 1997 to 2017 were obtained from the Association of American Medical Colleges (AAMC) Faculty Roster²⁴. All allopathic medical schools accredited by the Liaison Committee on Medical Education submit self-reported demographic and academic rank information for full-time academic faculty annually to the Faculty Roster. No written consent for use of the data was obtained, given the research agreement collected by the AAMC at the time of the data collection. In addition, the data are fully deidentified and only presented at a year-specialty-rank level, negating the possibility for both institutional and individual identification. As such, on consultation from the institutional review board, no approval was needed. We did, however, obtain collaboration support from our institution and the AAMC.

The 20-year data set (1997-2017) was categorized into the following 4 academic ranks for all 18 specialties (Table I): clinical instructor, assistant professor, associate professor, and professor. Assistant professors were classified as *junior faculty*, whereas associate professor and professor were classified as *senior faculty*. Given that clinical instructor titles are very frequently applied to fellows, their data were reported but excluded from the analysis as *junior faculty*. Gender was reported as either male or female. There are 10 groups in the race category: American Indian/Alaskan Native, Asian, Black, Hispanic/Latino, Native Hawaiian, White, Multiple (Hispanic/Latino), Multiple (Non-Hispanic/Latino), Other, and Unknown. The AAMC definition for the

TABLE II Ethnicity—US Census 2016 vs. AAMC Faculty Roster

Ethnicity	US Census (2016), %	All Specialties (2016), %	Orthopaedic Surgery (2016), %
American Indian/Alaskan Native	0.7	0.12	0.06
Asian	5.2	17.5	11.6
Black	12.3	3.6	2.7
Hispanic/Latino	17.3	3.1	1.8
Native Hawaiian	0.2	0.12	0.03
White	62.0	68.7	78.5

Bold indicates underrepresented minority.

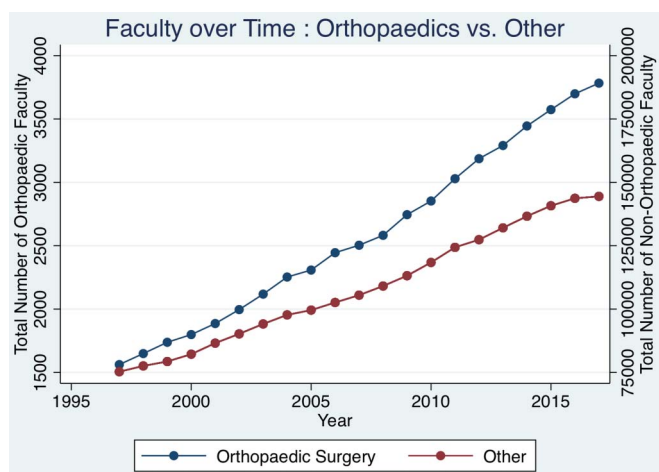


Fig. 1 The total number of faculty over time, orthopaedic surgery (left y-axis) vs. all other specialties (right y-axis). The left and right y-axes are scaled differently, but owing to proportionate increases, the axes illustrate the greater rate of increase in orthopaedic surgery.

classification of URM, “Racial and ethnic populations that are underrepresented in the medical profession relative to their numbers in the general (US) population,” was used²⁵. Using the 2016 US Census data²⁶, the following groups were considered URM in this study: American Indian/Alaskan Native, Black, Hispanic/Latino, Native Hawaiian, and Multiple (Hispanic/Latino) (Table II). Those who reported their race as “Other” (0.3% of all faculty) or “Unknown” (5.7% of all faculty) were excluded from the analysis. No data for faculty gender were excluded from the analysis because gender was consistently reported across all data.

We also obtained publicly available data from the Graduate Medical Education supplement published in the Journal of American Medical Association that detailed the proportion of female and URM residents present by each specialty from 2005 to 2017. Data were not available for both female and URM residents before 2005. We used these data to serve as proxy for the available pool of female and URM physicians entering the field and compared the changes seen in that pool with the trends seen at the faculty level to account for a potential confounder that may influence the percent of female and URM faculty present in different specialties during the study period.

TABLE III The Number and Proportion of Female and Underrepresented Minority Orthopaedic Faculty in 1997 and 2017			
Orthopaedic Faculty	1997 (%)	2017 (%)	p-Value
Female	133 (8.5)	676 (17.9)	<0.001
Under Represented (UR) Minority	61 (4.0)	209 (6.1)	<0.001
Total faculty	1,562	3,783	

Bold indicates significant p-value.

TABLE IV The Percentage of Women Faculty in 1997 and 2017 by Specialty			
Department	% Female 1997	% Female 2017	Change
Obstetrics & Gynecology	37.0	60.5	23.5
Psychiatry	34.1	50.8	16.7
Family Practice	33.8	49.5	15.7
Pediatrics	40.7	56.3	15.6
Dermatology	34.3	49.4	15.2
Neurology	24.1	39.1	15.0
Internal Medicine	24.3	38.8	14.5
Ophthalmology	22.5	36.4	13.9
Pub Health Prevent Med	40.4	53.5	13.1
Pathology (Clinical)	27.9	41.0	13.1
Otolaryngology	18.4	31.2	12.8
Emergency Medicine	22.8	35.4	12.6
Surgery	11.6	23.5	11.9
Orthopaedic Surgery	8.5	17.9	9.4
Anesthesiology	27.6	35.5	7.9
Other Clinical Sciences	30.1	37.2	7.2
PM&R	38.9	45.8	6.9
Radiology	22.1	28.9	6.8

The change over the 20 period is displayed in the last column, and the specialties are listed based the amount of change seen (highest to lowest).

Analysis/Statistics

All results were calculated using STATA 15.1. Independent analyses of orthopaedic faculty trends for each rank and for all positions combined were performed for both gender and race using standard ordinary least squares regressions with robust standard errors to correct for heteroskedasticity. Trends in percentage of female faculty and URM faculty in orthopaedic surgery were analyzed both independently and in comparison to the other 17 specialties, whose trends were weighted by their relative number of faculty in a given rank and year. Trend analyses for junior and senior faculty classifications in both cases were appropriately weighted based on the relative numbers of faculty in each rank. Each trend was calculated and reported based on the robust regression coefficient spanning the studied time frame to adjust for random error, rather than a point subtraction method (i.e., % in 2017 minus % in 1997). This did not alter the statistical significance of any result. A p-value < 0.05 was defined as significant in all analyses.

Results

The total number of allopathic academic medical school faculty across all specialties and ranks increased over time, but orthopaedic surgery faculty increased at a higher annual percentage rate (mean: 4.5% per year) than the combination of 17 other specialties (mean: 3.3% per year) (p = 0.0051) (Fig. 1).

Department	% URM 1997	% URM 2017	Change
Pub Health Prevent Med	8.9	18.1	9.2
Other Clinical Sciences	4.7	9.8	5.1
Otolaryngology	2.9	7.8	4.9
Obstetrics & Gynecology	11.3	15.6	4.3
Internal Medicine	7.0	9.7	2.8
Neurology	5.1	7.8	2.7
Psychiatry	7.4	10.0	2.5
Family Practice	10.5	13.0	2.4
Pediatrics	8.5	10.9	2.4
Orthopaedic Surgery	4.0	6.1	2.2
Surgery	6.8	8.9	2.1
Anesthesiology	7.4	9.3	1.9
Dermatology	5.4	7.2	1.9
Pathology (Clinical)	5.8	7.4	1.6
PM&R	8.5	9.9	1.3
Ophthalmology	5.5	6.3	0.8
Radiology	5.9	6.5	0.6
Emergency Medicine	9.2	9.0	-0.2

The difference between the 20 year period is shown in the last column, and the specialties are listed based the amount of change seen (highest to lowest).

The proportions of orthopaedic faculty who were female or URM were both substantially higher in 2017 than in 1997 (Table III). The changes seen in the proportion of female or URM between 1997 and 2017 for all specialties, including orthopaedic surgery are shown in Tables IV and V, respectively.

The mean change for female faculty members for all specialties was 12.9% over the 20-year period, median change was 13.1%, and the change seen in orthopaedic surgery was 9.4%. The mean change for URM faculty members for all specialties was 2.7% over the 20-year period, median change was 2.3%, and the change seen in orthopaedic surgery was 2.2%.

Gender Diversity

Compared with other specialties, orthopaedic surgery had the lowest percentage of female faculty in both 1997 (133 faculty members; 8.5%) and 2017 (676 faculty members; 17.9%) (Fig. 2). However, the percentage of female faculty in orthopaedic surgery increased from 1997 to 2017 in all ranks ($\Delta = 543$ faculty members; 8.8 percentage points [% pts], $p < 0.001$) Namely, there were significant increases of female faculty in the professor (7.7% pts), associate professor (6.7% pts), assistant professor (8.5% pts), and clinical instructor (16.9% pts) (all $p > 0.001$). (Table VI). Junior faculty demonstrated a larger increase ($\Delta = 279$ faculty members; 8.5% pts) than senior faculty ($\Delta = 165$ faculty members; 7.3% pts) ($p < 0.001$).

Although the number and percentage of female faculty in orthopaedics increased (8.8% pts) from 1997 to 2017, the percent change was lower than the mean change of other specialties (13.9% pts) ($p = 0.029$) (Table VII, Fig. 3). Similarly, the increase in senior (7.3% pts) female orthopaedic faculty was less than the mean percentage of other specialties (14.7% pts) ($p < 0.001$). The difference in the change of female faculty between orthopaedic and all other specialties was larger for senior faculty than for junior faculty (-7.5% pts vs. -3.4%, $p < 0.001$).

Finally, given that the number of female faculty entering the workforce is dependent on the number of available female physicians in that specialty, we compared the changes in the available resident pool to the changes seen in the faculty. Data on the number of female residents by specialty were available

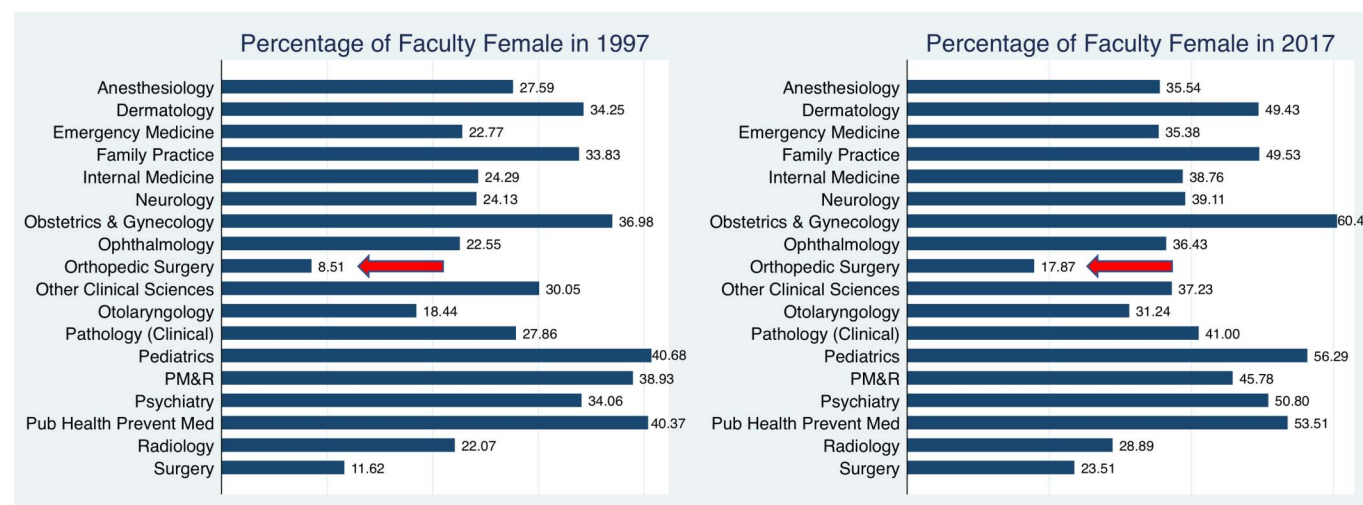


Fig. 2 Percentage of all academic female faculty in by specialty in 1997 and 2017.

TABLE VI Female Faculty Trends by Rank in Orthopaedic Surgery from 1997 to 2017

Female Faculty	Rank	1997 (%)	2017 (%)	Change (Absolute %)	Change (% Pts)	p-Value
	All Positions	133 (8.51)	676 (17.9)	543 (408.3)	8.82	<0.001
Senior Faculty	Professor	5 (1.28)	77 (8.98)	72 (1,440)	7.69	<0.001
	Associate Professor	29 (7.63)	122 (14.5)	93 (320.7)	6.69	<0.001
Junior Faculty	Assistant Professor	71 (10.8)	350 (19.8)	279 (393.0)	8.51	<0.001
	Clinical Instructor	28 (21.4)	127 (39.7)	99 (353.6)	16.9	<0.001
Senior vs. Junior Faculty	Senior Combined	34 (4.41)	199 (11.7)	165 (485.3)	7.27	0.010
	Junior Combined	71 (10.8)	350 (19.8)	279 (393.0)	8.51	

Bold indicates significant p-value.

from 2005 to 2017. Table VIII depicts the percent of residents that was female in 2005 and 2017, the difference between the 2 time points, also the change in female faculty by specialty in the same time frame, and the difference between the change seen at the faculty and resident level. Mean difference between the change in female faculty and resident for specialties, excluding orthopaedic surgery was $4.8\% \pm 4.3\%$, meaning female faculty increased by 4.8% more than the increase seen in the female resident population during the same time period. This change was significantly different than the 1.6% seen in orthopaedic surgery ($p = 0.011$).

Racial Diversity

Orthopaedic surgery had the second lowest percentages of URM faculty members with 4.0% in 1997 and became the least diverse specialty in 2017 with 6.1% (Fig. 4). The percentage of URM in orthopaedic surgery faculty increased in all positions from 1997 to 2017 ($\Delta = 148$ faculty members; 2.0% pts, $p < 0.001$) (Table IX). There were significant increases of URM faculty in both the assistant professor and associate professor ranks over the study period ($p < 0.001$), whereas no difference was observed for clinical instructor and professor ranks ($p = 0.832$ and 0.229 , respectively). Combined junior and senior faculty groups both experienced an increase in the percentage of

URM faculty from 1997 to 2017 ($\Delta = 108$ faculty members; 3.4% pts, $p < 0.001$ and $\Delta = 40$ faculty members; 0.5% pts, $p = 0.032$, respectively), although the increase for junior faculty was greater than the increase for senior faculty ($p < 0.001$).

Although both increased from 1997 to 2017, there was no difference between the increases in percentage of URM faculty for orthopaedic surgery (2.0% pts) and all other specialties (2.4% pts) ($p = 0.165$) (Table X, Fig. 5). The percentage of senior URM faculty in orthopaedics demonstrated a smaller increase (0.5% pts, $p = 0.032$) than all other specialties (2.5% pts) ($p < 0.001$). By contrast, the percentage of junior URM faculty in orthopaedic surgery demonstrated a greater increase (3.4% pts, $p < 0.001$) than all other fields (2.2% pts) ($p = 0.012$).

Because the number of URM faculty entering the workforce is dependent on the number of available URM physicians entering that specialty, we compared the changes in the available resident pool to the changes seen in the faculty. Data on the number of URM residents by specialty were available from 2005 to 2017. Table XI depicts the percent of URM residents in 2005 and 2017, the difference between the 2 time points, also the change in URM faculty by specialty in the same time frame, and the difference between the change seen at the faculty and resident level. Mean difference between the change in URM faculty and resident for specialties, excluding orthopaedic surgery was

TABLE VII Female Faculty Trend Differences by Rank, Comparing Orthopaedic Surgery with All Other Specialties from 1997 to 2017

Female Faculty	Rank	Change in Orthopaedic Surgery, % pts (n)	Change in All Others (% pts)	Difference (% pts)	p-Value
	All Positions	8.82 (543)	13.9	-5.06	0.029
Senior Faculty	Professor	7.69 (72)	13.0	-5.31	0.001
	Associate Professor	6.69 (93)	14.8	-8.14	<0.001
	Senior combined	7.27 (165)	14.7	-7.51	<0.001
Junior Faculty	Assistant Professor	8.51 (279)	12.0	-3.50	0.174
	Clinical Instructor	16.9 (99)	13.0	3.98	0.363

Bold indicates significant p-value.

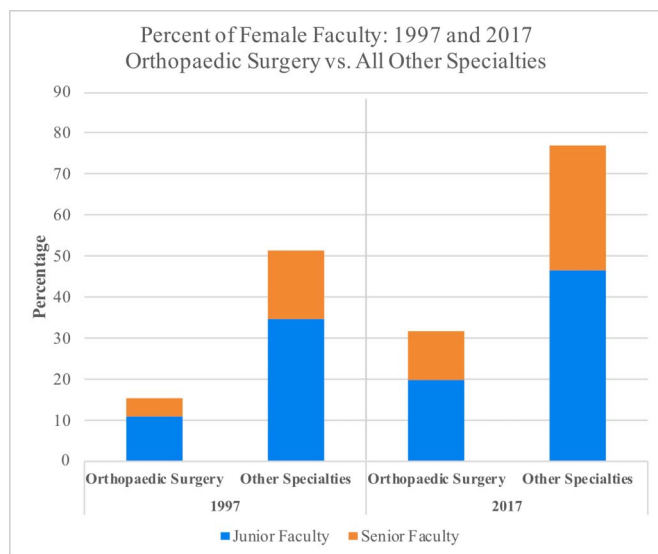


Fig. 3 Proportion of junior and senior female faculty in 1997 and 2017, comparing orthopaedic surgery with other specialties. *Smaller proportion of female orthopaedic faculty were noted at both time points compared with all other specialties ($p < 0.05$).

−0.2% ± 1.8%, meaning URM faculty increased but by 0.2% less than the increase seen in the URM resident population. This change was not significantly different than the −1.0% seen in orthopaedic surgery ($p = 0.11$).

Discussion

The importance of the orthopaedic workforce adequately representing the diverse patient population it serves is being increasingly recognized. In fact, the American Academy of Orthopaedic Surgeons (AAOS) has outlined fostering diversity as 1 of the AAOS strategic goals and is actively promoting *Faces of Orthopaedics*, a social media campaign designed to publicly encourage diversity in orthopaedic care²⁷. Although achieving such aims remains a challenge, given substantial historical underrepresentation of female and minorities in orthopaedics^{7,13,15,28-36}, it is not impossible. Other surgical specialties with similar deficiencies in the gender and racial diversity of their workforce such as obstetrics/gynecology and general surgery have made overwhelming progress^{33,37-41}.

Over the past 2 decades, although faculty diversity has increased significantly, the rate at which female and URM are appointed to faculty positions in orthopaedic surgery continues to lag behind other specialties. Female faculty in orthopaedic

TABLE VIII Change in the Percent of Female Residents Between 2005 and 2017 Are Shown in the First 2 Columns

Department	% Female Residents 2005	% Female Residents 2017	Change in Female Residents	Change in Female Faculty	Δ Faculty – Δ Resident
Surgery	27.9	38.4	10.5	7.0	−3.5
Otolaryngology	25.4	34.7	9.3	8.7	−0.6
PM&R	36.9	39.3	2.5	2.9	+0.4
Anesthesiology	30.7	35.4	4.7	5.4	+0.7
Orthopedic Surgery	11.0	14.8	3.9	5.5	+1.6
Pub Health Prevent Med	42.9	48.2	5.3	7.6	+2.3
Ophthalmology	35.8	41.6	5.7	8.1	+2.4
Dermatology	61.7	64.6	2.9	6.6	+3.7
Family Practice	52.1	54.8	2.7	8.2	+5.5
Neurology	40.2	43.2	3.0	8.6	+5.6
Radiology	27.9	26.0	−1.9	4.2	+6.1
Pediatrics	70.1	72.8	2.6	9.4	+6.8
Internal Medicine	42.4	42.8	0.4	7.7	+7.3
Obstetrics & Gynecology	75.6	82.7	7.1	15.4	+8.3
Emergency Medicine	35.3	35.1	−0.2	9.7	+9.9
Pathology (Clinical)	51.3	49.9	−1.4	8.5	+9.9
Psychiatry	53.3	51.9	−1.4	10.4	+11.8

The change in female faculty during the same time is compared to the change in residents. The difference between the 2 illustrates the rate at which female faculty members are added to the specialty in comparison to the residents entering the specialty. The specialties are ranked by the difference seen between female faculty and residents (lowest to the highest).

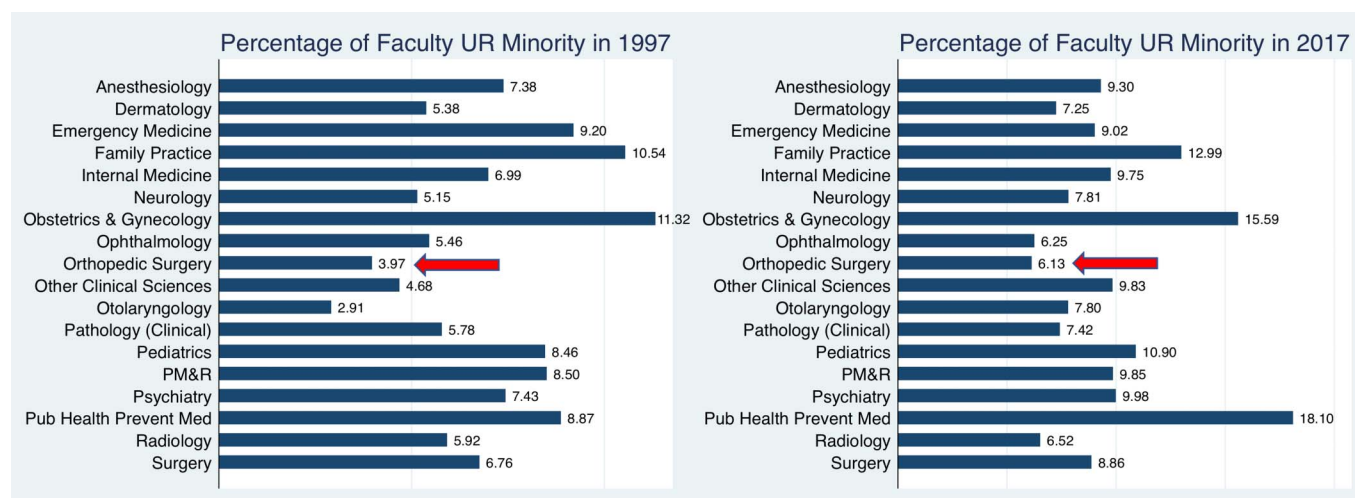


Fig. 4 Percentage of all faculty considered URM in 1997 and 2017, by specialty.

surgery nearly doubled (8.5% to 17.9%); however, the absolute 8.8%-point increase was less than the 13.9%-point increase among all other specialties during this time period. A previous review of publicly available sources from 2006 to 2007 reported a female orthopaedic faculty rate of 13.4%, the lowest among all

specialty groups¹³. The current evaluation expands on such findings with increased granularity and evaluation of trends over a much longer time period.

Although an increase in female orthopaedic representation was observed overall, the increase in female among senior

TABLE IX Underrepresented Minority Faculty Trends by Rank in Orthopaedic Surgery from 1997 to 2017						
URM Faculty	Rank	1997 (%)	2017 (%)	Change (Absolute %)	Change (% pts)	p-Value
Senior Faculty	All Positions	61 (3.97)	209 (6.13)	148 (242.6)	1.98	<0.001
	Professor	14 (3.63)	30 (3.61)	16 (114.3)	-0.33	0.229
Junior Faculty	Associate Professor	12 (3.18)	36 (4.50)	24 (200)	1.53	<0.001
	Assistant Professor	27 (4.17)	130 (8.38)	103 (381.5)	3.67	<0.001
Senior vs. Junior Faculty	Clinical Instructor	8 (6.30)	13 (5.70)	5 (62.5)	0.14	0.832
	Senior Combined	26 (3.41)	66 (4.04)	40 (153.8)	0.48	<0.001
	Junior Combined	27 (4.17)	130 (8.38)	103 (381.5)	3.67	

Bold indicates significant p-value.

TABLE X URM Faculty Trend Differences by Rank, Comparing Orthopaedic Surgery with All Other Specialties from 1997 to 2017						
URM Faculty	Rank	Change in Orthopaedic Surgery, % Pts (n)	Change in All Others (% Pts)	Difference (% pts)	p-Value	
Senior Faculty	All Positions	1.98 (148)	2.43	-0.45	0.165	
	Professor	-0.33 (16)	2.23	-2.57	<0.001	
	Associate Professor	1.53 (24)	2.89	-1.35	0.001	
Junior Faculty	Senior Combined	0.48 (40)	2.50	-2.02	<0.001	
	Assistant Professor	3.67 (103)	2.41	1.25	0.026	
	Clinical Instructor	0.14 (5)	0.12	0.026	0.974	

Bold indicates significant p-value.

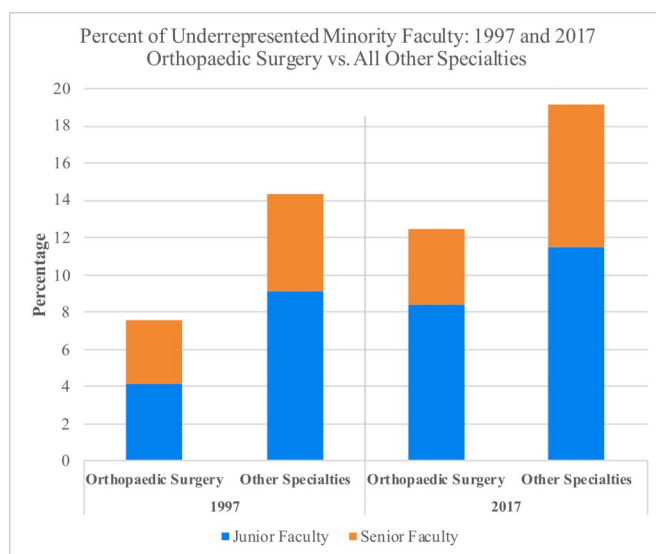


Fig. 5 Proportion of junior and senior URM faculty in 1997 and 2017, comparing orthopaedic surgery with other specialties. *Smaller proportion of URM orthopaedic faculty were noted at both time points compared with all other specialties ($p < 0.05$).

faculty lagged behind that for junior faculty. In addition, the increase of each tier of faculty was less than other specialties,

with even less of a change in senior faculty than junior faculty compared with other specialties. Similarly, the increase in URM faculty during this time period was largely because of the increase in junior faculty, showing higher growth than other specialties. However, the 1.3% point difference in growth between orthopaedics and other specialties is not substantial. These trends are not unique to orthopaedics. A recent study evaluating faculty diversity in family medicine found that although overall growth in representation of female and URM was observed among faculty, increasing faculty rank was associated with lower diversity¹⁰. Yu et al., in an evaluation of medical school academic ranks across specialties, concluded that minorities and female remain grossly underrepresented in academic medicine with the greatest disparities noted at the highest academic levels²¹. The underlying reason for the observation remains unclear. This may represent social or institutional barriers to academic promotion among female and URM orthopaedic surgeons⁴². Alternatively, the recent increase of female and URM junior faculty observed in orthopaedics may represent an increased push for female and URM academic representation with eventual promotions to higher academic ranks and gender or racial parity expected over time. However, this “pipeline effect,” and differences in academic productivity or commitment to family life, has been disproven in other fields, although it may be different in orthopaedic surgery because there is such a significant disparity and a

TABLE XI Change in the Percent of URM Residents Between 2005 and 2017 are Shown in the First 2 Columns, Respectively

Department	% URM Residents 2005	% URM Residents 2017	Change in URM Residents	Change in URM Faculty	Δ Faculty – Δ Residents
Pub Health Prevent Med	15.2	24.6	9.4	6.1	-3.3
Emergency Medicine	9.8	12.4	2.6	0.2	-2.4
Otolaryngology	6.7	7.9	1.2	2.1	-1.8
Pathology (Clinical)	9.4	12.7	3.3	1.5	-1.8
Radiology	7.4	9.3	1.8	0.0	-1.8
Surgery	12.1	14.0	2.0	0.8	-1.2
Anesthesiology	10.9	12.6	1.7	0.7	-1.1
Orthopaedic Surgery	7.7	9.8	2.1	1.1	-1.0
Dermatology	8.9	9.9	0.9	0.2	-0.7
Ophthalmology	8.2	8.1	-0.1	-0.4	-0.3
Family Practice	16.5	17.2	0.7	0.8	+0.1
Psychiatry	14.6	16.2	1.6	1.7	+0.1
Internal Medicine	12.3	13.4	1.1	1.5	+0.4
Neurology	10.4	11.9	1.5	1.8	+0.3
Obstetrics & Gynecology	19.4	19.2	-0.2	2.4	+2.6
Pediatrics	14.9	15.0	0.1	1.3	+1.1
PM&R	15.2	13.5	-1.7	1.9	+3.5

The change in URM faculty during the same time is compared to the change in residents. The difference between the 2 illustrates the rate at which URM faculty members are added to the specialty in comparison to those residents entering the specialty. The specialties are ranked by the difference seen between the faculty and resident representation (lowest to the highest).

critical mass of female or URM in the field has not been reached⁴³. Continued observation of the orthopaedic surgery profession over time may further elucidate this question.

A number of studies have postulated that early outreach and recruitment may be key to increasing representation of female and minorities in underrepresented fields such as orthopaedic surgery^{15,37,41,44-46}. Female and URM faculty may provide such outreach to medical students⁴¹ or residents²⁸ with positive results in female or URM representation among residents, respectively. Increased faculty diversity may thus result in a virtuous cycle, enhancing recruitment of female and minority medical students, who ultimately become orthopaedic faculty and mentors themselves.

There are several limitations in this study. The data collected are from the AAMC faculty roster and the available data are potentially at risk of selection bias, detection bias, and/or self-report bias. Approximately 6% of faculty had no race reported and needed to be excluded from the analysis. The faculty roster includes all faculty members appointed by the medical school, from clinical faculty to full-time academic faculty. The faculty roster does not differentiate if the appointed faculty have a teaching role. It is possible that this combination of all types of faculty members (e.g., full-time academic teaching, part-time academic teaching and part-time nonacademic teaching, or nonteaching faculty), regardless of their teaching role, may have skewed the results. However, it is difficult to predict the way in which the results may be confounded. Regardless, the limitation of combining different types of teaching and nonteaching faculty applies to all specialties equally. It is also noted that designation of race is a

complex exercise with many unique designations that are not covered by the typical designation choices. Finally, although we are able to evaluate trends in faculty appointments across time, the underlying reasons for such trends remain unclear. Further study is required to understand such factors. In addition, although these positive trends have been noted over the past 20 years, it is possible that the growth may “level-off” before reaching the representation noticed for both groups, females, and URM in the general population. ■

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