



## AOA Critical Issues in Education

# Orthopaedic Fellowship Match: How Do Degree and Gender Type Affect Match Success?

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**Introduction:** Discrepancies have previously been identified in terms of gender and medical degree throughout orthopaedic education. The purpose of this study was to evaluate trends in the degree type and gender of applicants to orthopaedic trauma, sports medicine, adult reconstruction, foot and ankle, shoulder and elbow, and pediatric fellowships.

**Methods:** Official San Francisco match data from 2012 to 2023 were obtained. Data regarding the number of applicants, match rates, and rank list position based on applicant degree and gender were evaluated.

**Results:** The match rate for female applicants increased from a low of 81% (45/56) in 2013 to a high of 99% (94/95) in 2021 (mean 90%  $\pm$  6%), with a significant increase over the study period ( $r = 0.59$ ,  $p = 0.02$ ). For male applicants, the match rate ranged from a low of 85% (416/488) in 2013 to a high of 96% (515/536) in 2021 (mean 90%  $\pm$  4%), with a significant increase ( $r = 0.91$ ,  $p = 0.000007$ ). The match rate for osteopathic applicants increased from 63% (46/73) in 2013 to 94% (84/89) in 2021 (mean 82%  $\pm$  8%). There was a statistically significant increase in the match rate of osteopathic applicants over the study period ( $r = 0.75$ ,  $p = 0.002$ ). The match rate for allopathic applicants ranged from a low of 86% (405/471) in 2013 to a high of 96% (522/542) in 2021 (mean 91%  $\pm$  3%). There was a statistically significant increase in the match rate of allopathic applicants over the study period ( $r = 0.72$ ,  $p = 0.003$ ).

**Conclusions:** Overall, male and female applicants match at equal rates for the orthopaedic fellowship. Osteopathic graduates are less likely to match than allopathic graduates.

### Introduction

Orthopaedic surgery is well recognized as one of the least diverse fields of medicine specifically in relation with gender and academic degree<sup>1</sup>. The American Medical Association's 2022 Physician Specialty Report Data identified that orthopaedic surgery represents the field with the lowest percentage of women physicians, with only 6% of active orthopaedic surgeons being women<sup>2</sup>.

Orthopaedic surgery has also been noted to have a lack of representation among physicians graduating from medical schools granting Doctor of Osteopathic Medicine (DO) degrees compared with those granting allopathic medical degrees. According to the 2024 National Residency Matching Program, allopathic medical students had a 72% match rate for orthopaedic surgery compared with 48% match rate for their osteopathic counterparts.

**Disclosure:** The **Disclosure of Potential Conflicts of Interest** forms are provided with the online version of the article (<http://links.lww.com/JBJSOA/A786>).

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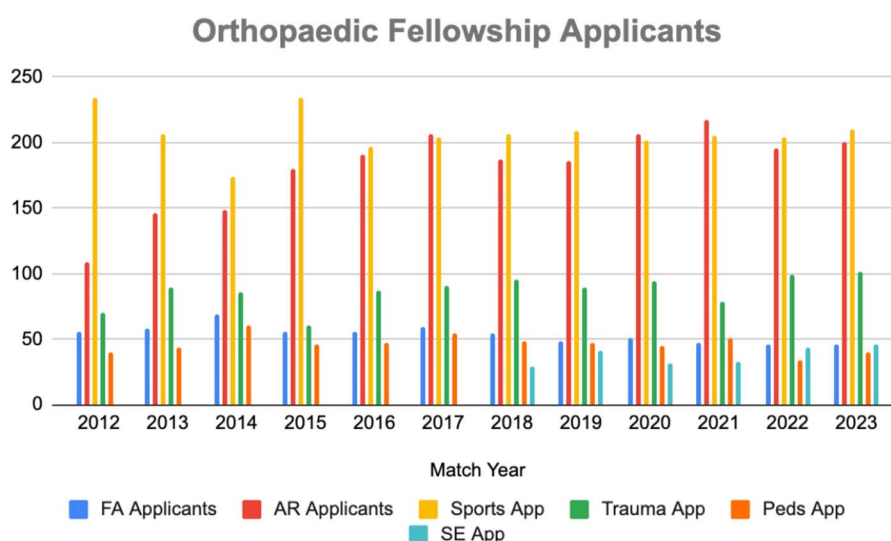


Fig. 1

Bar graph representing the total number of applicants per year by specialty.

Furthermore, the percentage of active DO orthopaedic surgeons (6%) is lower than the national average of active DO physicians in all specialties, which was 8% in 2021.

Orthopaedic fellowship training has become increasingly popular, with the vast majority of residents now pursuing further training<sup>3-5</sup>. Fellowship training has been linked to improved patient outcomes and lower complication rates when compared with procedures performed by surgeons who did not have subspecialty training<sup>6-8</sup>. Together, these trends suggest an increase in importance and interest in orthopaedic fellowship training.

Beginning in 2010, the orthopaedic surgery fellowship match started using the San Francisco Match (SF Match) service for 8 different subspecialties. The purpose of the current

study was to use the SF Match data to delineate trends among gender and degree distinction in orthopaedic surgery fellowship applications and match rates and to identify temporal trends.

### Methods

The SF Match data (San Francisco, California) for orthopaedic fellowship applicants from 2012 to 2023 was extracted and analyzed. Data before 2012 were unavailable. Before 2018, adult reconstruction and musculoskeletal oncology matches were combined into a single match process and shoulder and elbow fellowship was not included in the SF Match. Data were limited for foot and ankle and pediatric fellowship matches in 2012, and thus, gender was not included for this 1 year for these fellowships

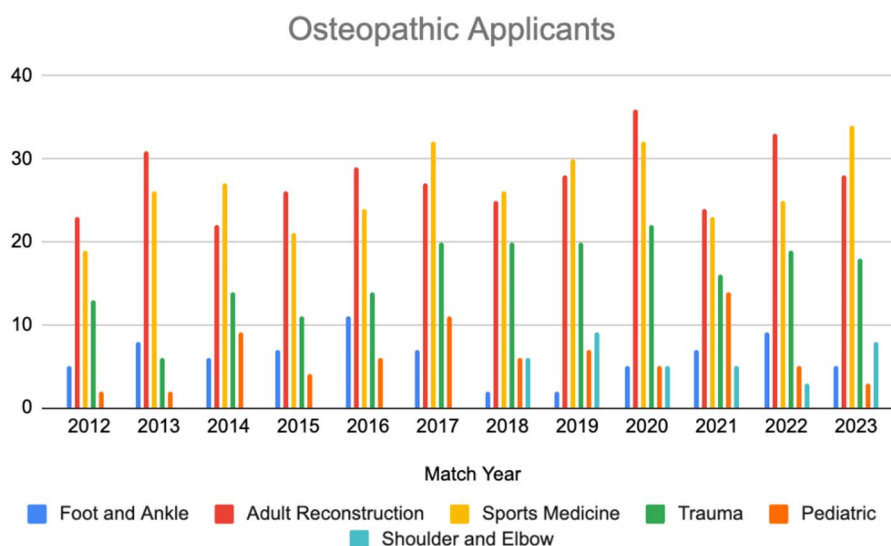


Fig. 2

Bar graph representing the number of osteopathic applicants per year by specialty.

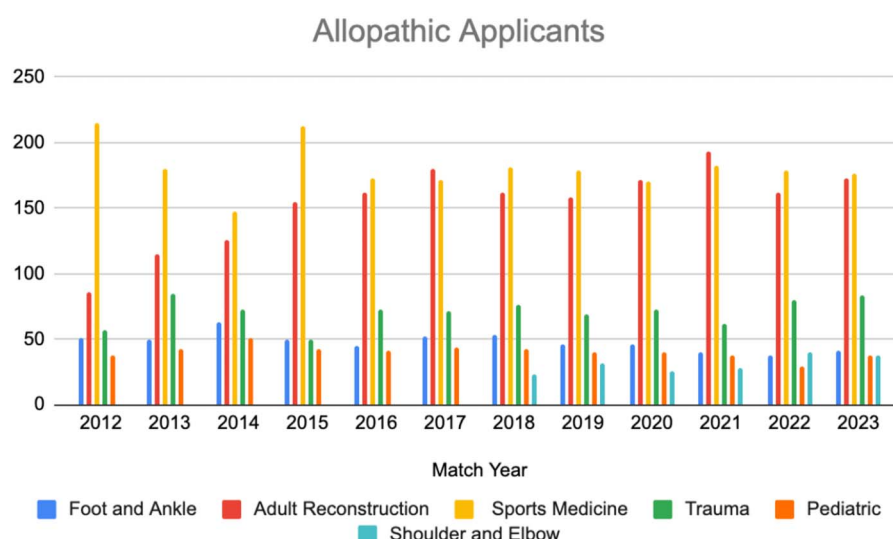


Fig. 3

Bar graph representing the number of allopathic applicants per year by specialty.

in the analysis. Spine and hand surgery were excluded from analysis, given the overlapping applicant profile with neurosurgery and plastic surgery, respectively. There were 10,186 applicants for trauma, sports medicine, foot and ankle, pediatrics, adult reconstruction, and shoulder and elbow fellowships from 2012 to 2023. There were 3,058 international medical graduates (30%) who were excluded from these analyses, leaving a cohort of 7128 US-based applicants in this study.

From 2020 to 2024, adult reconstruction fellowship programs increased from 96 (177 available positions) to 119 (231 available positions), sports medicine increased from 87 (228) in 2019 to 92 (230) in 2024, trauma increased from 61 (91) to 64 (97), foot and ankle increased from 45 (75) to 48 (81), pediatrics increased from 44 (72) to 45 (73), and shoulder and elbow increased from 27 (37) to 34 (46).

Beginning in 2015, gender data were included in the SF Match data and could be directly extracted. Before this, gender was not recorded for orthopaedic fellowship applicants. For all applicants before 2015, an internet search was performed for each applicant. Gender was determined based on gender documented or on pronouns used on publicly available websites, which were confirmed by multiple available websites per applicant. Each applicant name was thoroughly investigated with an internet search, using websites such as Doximity.com (San Francisco, CA), LinkedIn.com (Sunnyvale, CA), and Healthgrades.com (Denver, CO) to confirm pronouns. The degree type, gender, number of applicants, number of matched applicants, applicant rank on the program list, and program rank on the applicant list for the orthopaedic fellowship were recorded from SF Match data. In addition, annual trends

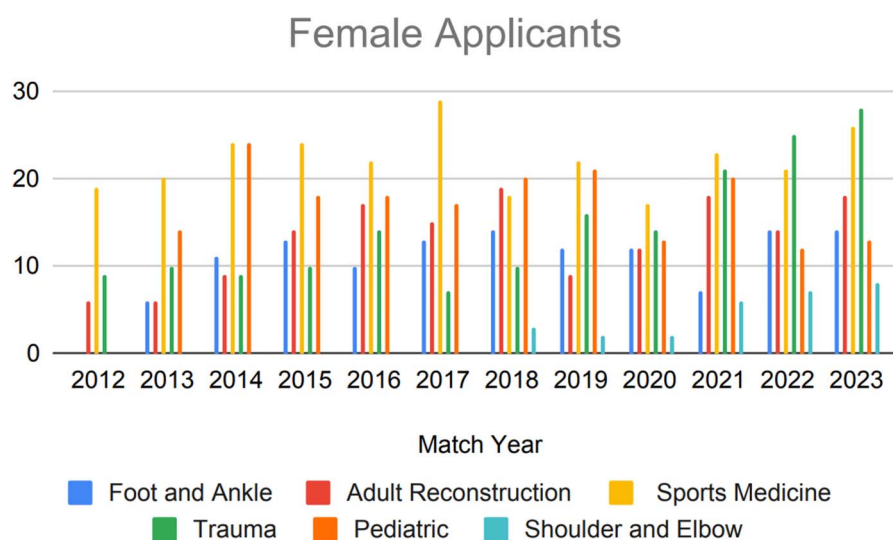


Fig. 4

Bar graph representing the number of female applicants per year by specialty.

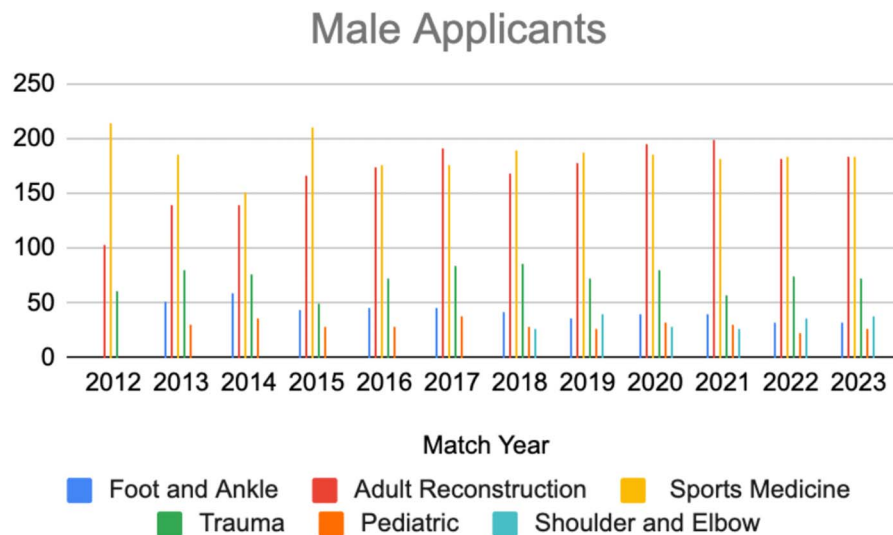


Fig. 5

Bar graph representing the number of male applicants per year by specialty.

regarding the number of applicants and match rates based on applicant degree and gender were evaluated.

The SF Match data used were deidentified data before data analysis. Given the data analysis included only large databases and publicly available records, this study was institutional review board exempt.

Data were compiled and analyzed using Microsoft Excel (Microsoft). Pearson correlation tests were used to evaluate trends and proportions for the number of applicants and match rates. Fisher exact tests were used to compare the match rates of allopathic and osteopathic applicants and women and men candidates.  $p$  values were considered statistically significant if  $p < 0.05$ , while  $r$  values were used to demonstrate the vertical trend for the data of interest.

## Results

From 2012 to 2023, there were 939 female applicants (13%; Fig. 1) and 6,093 male applicants (87%; Fig. 1) for trauma, sports medicine, foot and ankle, pediatrics, adult reconstruction, and shoulder and elbow fellowships. Furthermore, there were 1,028 osteopathic applicants (14%; Fig. 2) and 6,100 allopathic applicants (86%; Fig. 3).

The number of female applicants ranged from a low of 34 in 2012 to a high of 107 in 2023 (mean  $78.3 \pm 18.9$ ; Fig. 4), with a statistically significant increase over the study period ( $r = 0.82$ ,  $p = 0.0003$ ). The specialty with the highest number of women applicants was sports medicine with 28% (265/939) of total women applicants, followed by pediatrics 21% (190/905), trauma 18% (173/939), adult reconstruction 16% (157/939), foot and ankle 14% (126/905) and shoulder and elbow 5% (28/531, 2018-2023). The specialty with the highest proportion of women applicants was pediatrics with 34% (190/557), followed by foot and ankle 20% (126/647), trauma 17% (173/1,041), shoulder and elbow 16% (28/223, 2018-2023), sports medicine 11% (265/2,486), and adult reconstruction 7% (157/2,174).

For male candidates, the number of applicants ranged from a low of 327 in 2012 to a high of 560 in 2020 (mean  $507.8 \pm 49.4$ ; Fig. 5), with a significant increase over the study period ( $r = 0.78$ ,  $p = 0.0008$ ). The specialty with the highest number of male applicants was sports medicine with 37% (2,221/6,093), followed by adult reconstruction 33% (2,017/6,093), trauma 14% (868/6,093), foot and ankle 8% (465/5,714), shoulder and elbow 6% (195/3,237, 2018-2023), and pediatrics 6% (327/5,714). The specialty with the highest proportion of male applicants is adult reconstruction with 93% (2,017/2,174), followed by sports medicine 90% (2,221/2,486), shoulder and elbow 87% (195/223), trauma 83% (868/1,041), foot and ankle 72% (465/647), and pediatrics 59% (327/557).

The match rate for female applicants increased from a low of 81% (45/56) in 2013 to a high of 99% (94/95) in 2021 (mean  $90\% \pm 6\%$ ; Fig. 6), with a statistically significant increase over the study period ( $r = 0.59$ ,  $p = 0.02$ ). Female applicants had the highest match success in sports medicine with 94% (249/265), followed by shoulder and elbow 93% (26/28), pediatrics 93%

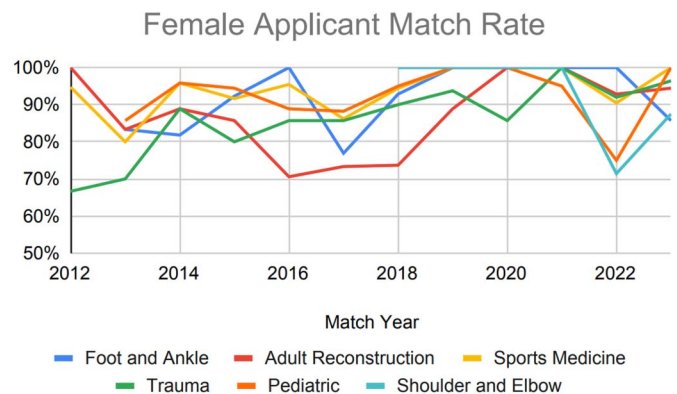


Fig. 6

Line graph representing the match rate (%) per year for female applicants.

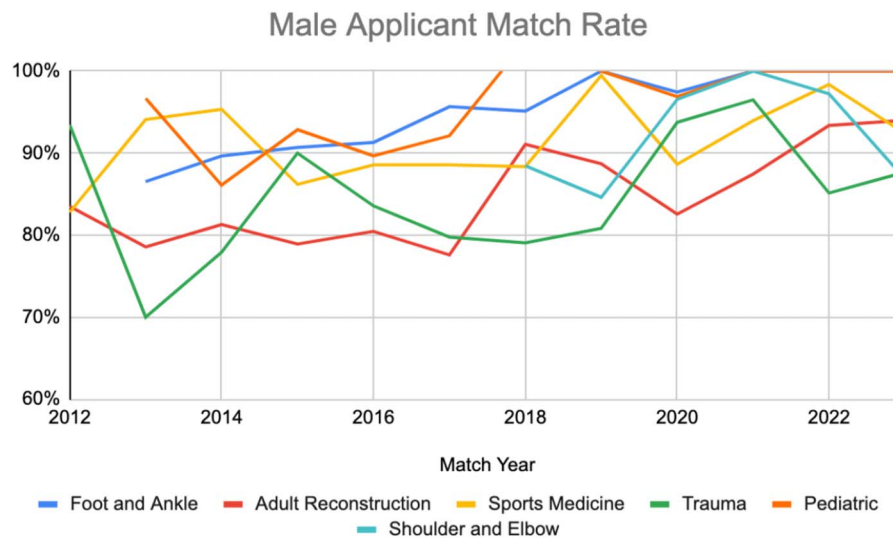


Fig. 7

Line graph representing the match rate (%) per year for male applicants.

(176/190), foot and ankle 92% (116/126), adult reconstruction 88% (138/157), and trauma 86% (149/173). Over the study period, female applicants experienced a statistically significant increase in match rate in sports medicine ( $r = 0.5$ ,  $p = 0.04$ ) and trauma ( $r = 0.8$ ,  $p = 0.0002$ ) and a statistically significant decrease in match rate in shoulder and elbow ( $r = -0.7$ ,  $p = 0.049$ ).

The match rate for male applicants ranged from a low of 85% (416/488) in 2013 to a high of 96% (515/536) in 2021 (mean  $90\% \pm 4\%$ ; Fig. 7). There was a significant increase in the match rate of male applicants over the study period ( $r = 0.91$ ,  $p = 0.000007$ ). Male applicants had the highest match success in pediatrics with 96% (314/327), followed by foot and ankle 95% (442/465), shoulder and elbow 92% (180/195),

sports medicine 91% (2,030/2,221), trauma 85% (736/868), and adult reconstruction 85% (1,710/2,010). Over the study period, male applicants experienced a statistically significant increase in match rate in foot and ankle ( $r = 0.9$ ,  $p = 0.000002$ ), adult reconstruction ( $r = 0.7$ ,  $p = 0.002$ ), and pediatrics ( $r = 0.7$ ,  $p = 0.01$ ).

The number of osteopathic applicants ranged from a low of 62 in 2012 to a high of 105 in 2020 (mean  $86 \pm 13$ ), with a statistically significant increase over the study period ( $r = 0.82$ ,  $p = 0.0003$ ). The specialties with the highest number of osteopathic applicants were adult reconstruction with 32% (332/1,028) of total osteopathic applicants and sports medicine with 32% (319/1,028), followed by trauma 19% (193/1,028), foot and ankle 7% (74/1,028), pediatrics 7% (74/1,028), and

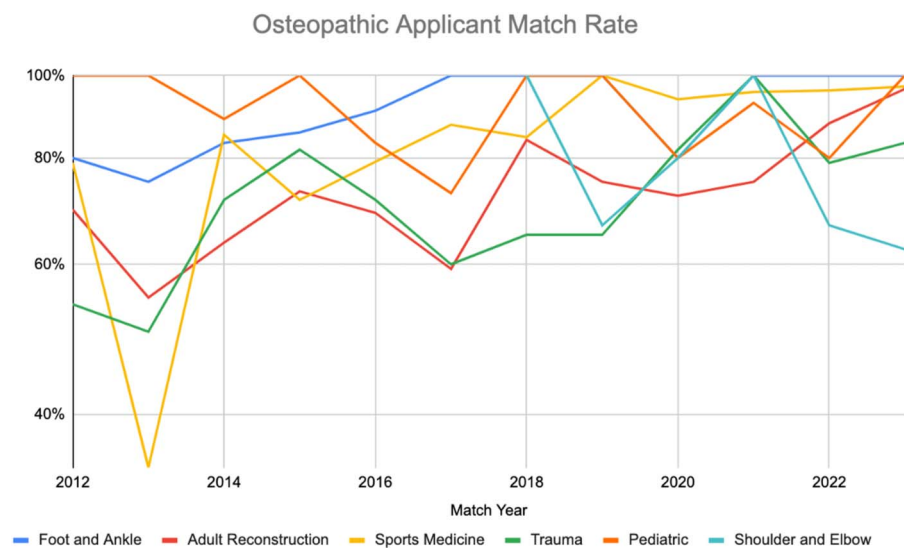


Fig. 8

Line graph representing the match rate (%) per year for osteopathic applicants.



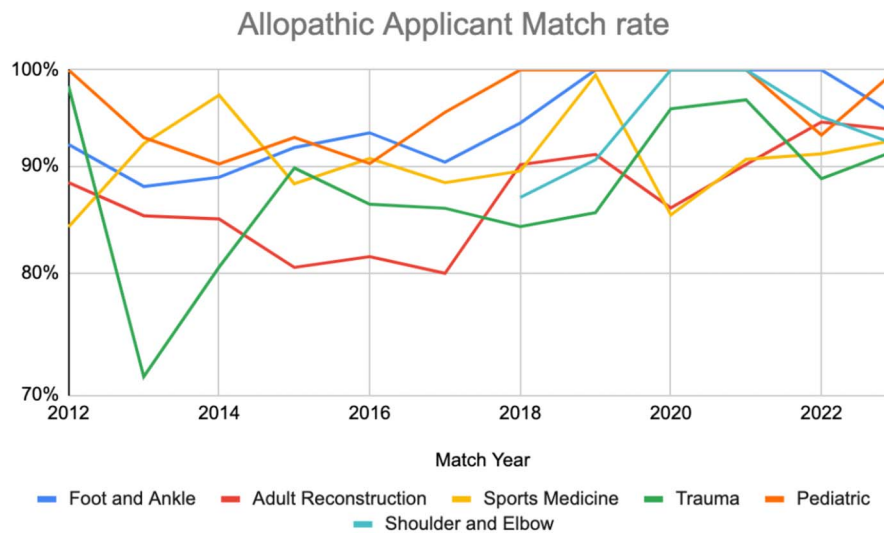


Fig. 9

Line graph representing the match rate (%) per year for allopathic applicants.

shoulder and elbow 6% (36/565, 2018-2023). The specialty with the highest proportion of osteopathic applicants was trauma with 19% (193/1,041), followed by shoulder and elbow 16% (36/223), adult reconstruction 15% (332/2,174), pediatrics 13% (74/557), sports medicine 13% (319/2,486), and foot and ankle 11% (74/647).

For allopathic residents, the number of applicants ranged from a low of 447 in 2012 to a high of 548 in 2023 (mean 508  $\pm$  34), with a statistically significant increase over the study period ( $r = 0.9$ ,  $p = 0.00001$ ). The specialty with the highest number of allopathic applicants was sports medicine with 36% (2,167/6,100) of total allopathic applicants, followed by adult reconstruction 30% (1,842/6,100), trauma 14% (848/6,100), foot and ankle 9% (573/6,100), pediatrics 8% (483/6,100), and shoulder and elbow 6% (187/3,203, 2018-2023). The specialty with the highest proportion of allopathic applicants is foot and ankle with 89% (573/647), followed by sports medicine 87% (2,167/2,486),

pediatrics 87% (483/557), adult reconstruction 87% (1,842/2,174), shoulder and elbow 84% (187/223), and trauma 82% (848/1,041).

The match rate for osteopathic applicants increased from 63% (46/73) in 2013 to 94% (84/89) in 2021 (mean 82%  $\pm$  8%, Fig. 8). There was a statistically significant increase in the match rate of osteopathic applicants over the study period ( $r = 0.75$ ,  $p = 0.002$ ). Osteopathic applicants had the highest match success in pediatrics with 92% (68/74) and foot and ankle with 92% (68/74), followed by sports medicine 84% (267/319), shoulder and elbow 80% (29/36), adult reconstruction 73% (243/332), and trauma 72% (139/193). Osteopathic candidates experienced a statistically significant increase in foot and ankle ( $r = 0.7$ ,  $p = 0.003$ ), adult reconstruction ( $r = 0.8$ ,  $p = 0.001$ ), sports medicine ( $r = 0.7$ ,  $p = 0.003$ ), and trauma ( $r = 0.7$ ,  $p = 0.005$ ). There was a nonsignificant decrease in match rate seen with pediatrics and shoulder and elbow fellowships.

TABLE I Mean-Matched Female Applicant Rank on Programs' Rank List

Match Year	Foot and Ankle	Adult Reconstruction	Sports Medicine	Trauma	Pediatrics	Shoulder and Elbow
2013	1.83	2.82	1.74	2.67	2	NA
2014	1.6	4.07	1.86	3.11	2	NA
2015	2.83	3.56	1.88	3.44	2	NA
2016	2.6	2.7	1.9	3.3	3	NA
2017	1.71	3.88	2.29	3.08	2.5	NA
2018	1.5	2.76	2.5	4.85	2.33	2.17
2019	1.5	3.57	2.86	4.79	2	4.17
2020	2.5	4.46	1.97	4.75	1.75	3
2021	1.29	4.79	4.14	3.19	2.17	8.6
2022	2.78	2.67	1.77	3.71	1.8	3.5
2023	1.33	2.54	2.33	2.8	1	4

TABLE II Mean-Matched Male Applicant Rank on Programs' Rank List

Match Year	Foot and Ankle	Adult Reconstruction	Sports Medicine	Trauma	Pediatrics	Shoulder and Elbow
2013	2.84	2.85	2.14	3.93	2.31	NA
2014	2.93	2.69	1.69	3.78	3.3	NA
2015	2.28	3.25	2.17	2.96	2.39	NA
2016	2.14	3.23	1.99	4.06	2.02	NA
2017	2.63	3.55	2.04	2.82	2.1	NA
2018	2.55	2.84	2.07	3.98	2.24	2.17
2019	2.28	3.15	2.46	2.86	2.18	3.38
2020	2.62	3.68	2.25	4.26	2.11	3.6
2021	1.87	4.41	2.58	3.33	1.95	3.07
2022	1.83	2.59	2.18	3.64	1.67	5.03
2023	2.05	3.17	2.42	3.68	2.06	6.03

The match rate for allopathic applicants ranged from a low of 86% (405/471) in 2013 to a high of 96% (522/542) in 2021 (mean  $91\% \pm 3\%$ , Fig. 9). There was a statistically significant increase in the match rate of allopathic applicants over the study period ( $r = 0.72$ ,  $p = 0.003$ ). Allopathic applicants had the highest match success in pediatrics with 96% (465/483), followed by foot and ankle 95% (542/573), shoulder and elbow 94% (176/187), sports medicine 91% (1,968/2,167), trauma 88% (745/848), and adult reconstruction 87% (1,606/1,842). Allopathic candidates experienced a statistically significant increase in match rate in foot and ankle ( $r = 0.8$ ,  $p = 0.007$ ) and adult reconstruction ( $r = 0.6$ ,  $p = 0.01$ ).

## Discussion

Over 97% of orthopaedic residents are now pursuing a subspecialty fellowship, with a continued increase in popularity when compared with prior years<sup>9-11</sup>. Consistent with the rise in demand for further training, there has been an associated increase in fellowship programs and positions and an increase in job opportunities requiring fellowship train-

ing<sup>8,9,11-13</sup>. This signifies the growing importance of fellowship and the impact it may have on job opportunities and future endeavors.

The success of female applicants in the orthopaedic fellowship match has been previously investigated. From 2010 to 2014, female applicants had a higher match rate in the orthopaedic fellowship match overall, but the number of female applicants remains significantly disproportionate when compared with their male counterparts<sup>14</sup>. Although previous literature has investigated women in the orthopaedic fellowship match overall, this has not been investigated with more recent match data. Our study demonstrated that orthopaedic fellowships overall experienced a statistically significant increase in the number of women applicants over the study period. Despite the growth of women applicants, they remain disproportionate when compared with their men counterparts.

When comparing degree types, osteopathic residents remain at a disadvantage when applying to the orthopaedic fellowship. Over the study period, osteopathic and allopathic candidates experienced a statistically significant increase in

TABLE III Mean Program Rank on Female Applicants' Rank List

Match Year	Foot and Ankle	Adult Reconstruction	Sports Medicine	Trauma	Pediatrics	Shoulder and Elbow
2013	4.8	4.6	1.71	5.57	1.67	NA
2014	3.1	2.63	1.87	4.25	3.59	NA
2015	2.43	3.5	1.95	3.14	2.5	NA
2016	2.3	3.92	2.1	6	2	NA
2017	2.5	2.45	1.72	2.75	3.13	NA
2018	3	2.79	2.06	3.4	1.71	2
2019	2.08	3.25	2	2.69	2.05	3
2020	1.91	1.82	2.44	4.92	2.62	9.5
2021	1.43	2.72	2.14	3.6	1.53	2.17
2022	2.15	1.09	2.1	3.05	1.92	9.83
2023	1.83	2.5	2.55	2.8	2.08	6

**TABLE IV Mean Program Rank on Male Applicants' Rank List**

Match Year	Foot and Ankle	Adult Reconstruction	Sports Medicine	Trauma	Pediatrics	Shoulder and Elbow
2013	2.5	2.76	2.12	3.66	2.62	NA
2014	2.77	2.87	1.69	3.62	2.78	NA
2015	2.31	3.27	2.17	3.02	2.26	NA
2016	2.2	3.09	1.97	3.56	2.24	NA
2017	2.51	3.66	2.14	2.87	1.74	NA
2018	2.35	2.84	2.13	4.24	2.67	2.19
2019	2.3	3.19	2.57	3.19	2.22	3.41
2020	2.82	3.92	2.18	4.81	1.83	3.07
2021	1.85	3.17	2.83	3.2	2.24	3.62
2022	1.97	2.7	2.13	3.82	1.55	4.53
2023	2	3.15	2.38	3.85	1.92	5.7

the number of applicants overall. Despite the growth in the number of osteopathic applicants for orthopaedic fellowships, osteopathic candidates remain significantly disproportionate to the number of allopathic candidates. From 2012 to 2023, there was a statistically significant difference in match rates between osteopathic and allopathic applicants. Osteopathic candidates are less likely to match into orthopaedic fellowship when compared with their allopathic counterparts.

From 2010 to 2020, there has been a 77% increase in osteopathic medical students and an increase from 85 to 113 (33%) osteopathic orthopaedic residents<sup>15</sup>. Despite the establishment of the single accreditation system for orthopaedic residency in 2020 and a marked increase in osteopathic medical students, only 12% to 14% of orthopaedic residents have a DO degree. Of these DO orthopaedic residents, 98% were matched into former American Osteopathic Association–accredited residency programs and 1% into former Accreditation Council for Graduate Medical Education (ACGME) programs<sup>14,16</sup>. Although disparities in orthopaedics involving DOs have been

evaluated in recent literature, DOs in fellowship training have not yet been reported. Therefore, we sought to investigate fellowship match success for DO residents.

Although female and osteopathic candidates remain disproportionate in the fellowship match when compared with their counterparts, there has been a rise in applicants for both groups. This is consistent with the rising number of osteopathic and female medical students and orthopaedic residents. The continued growth in the number of applicants for both groups should positively influence an increase in both populations within orthopaedic fellowship.

We found a slightly higher, nonsignificant increase in the overall match rate for female applicants. Female applicants experienced a significant increase in match rate in sports medicine and trauma. Female candidates experienced a statistically significant decrease in match rate in shoulder and elbow fellowship. Over the study period, male candidates experienced a significant increase in match rate in adult reconstruction, foot and ankle, and pediatric fellowship.

**TABLE V Mean Program Rank on DO Applicants' Rank List**

Match Year	Foot and Ankle	Adult Reconstruction	Sports Medicine	Trauma	Pediatrics	Shoulder and Elbow
2013	5.17	7.06	11.48	7.33	5	NA
2014	3.16	8.79	10.59	4.56	4.63	NA
2015	8	6.44	13.56	8.44	12.67	NA
2016	5.2	7.8	9.9	4.2	10.2	NA
2017	6.57	5.19	13.75	2.83	5.38	NA
2018	7.5	10.43	13.23	4.92	4.33	6.33
2019	1	11.05	15.66	4.84	9.43	8.33
2020	5.75	8.62	10.74	6.85	9.75	5.5
2021	9.43	8.58	16.05	9.25	9.83	10.2
2022	14.44	13.3	19.15	6.18	10.2	8
2023	9.33	10.88	11.74	4.47	5.67	5.33



**TABLE VI Mean Program Rank on MD Applicants' Rank List**

Match Year	Foot and Ankle	Adult Reconstruction	Sports Medicine	Trauma	Pediatrics	Shoulder and Elbow
2013	3.62	6.02	8.27	4.7	5.55	NA
2014	4.91	5.69	9.82	4.86	5.35	NA
2015	6.09	7.42	9.07	5.2	5.91	NA
2016	4.2	6.37	9.73	4.33	5.85	NA
2017	5.19	6.08	10.84	4.72	6.93	NA
2018	6.41	8.12	10.19	4.87	6.49	5.5
2019	6.11	9.05	8.96	5.98	6.2	5.76
2020	5.51	7.7	9.3	4.89	7.37	6.96
2021	8.03	7.42	11.65	6.39	8.95	7.33
2022	5.89	10.15	11.36	6.32	6.83	5.31
2023	6.39	8.78	10.57	5.59	9.88	5.33

When comparing position on rank list (Tables I–VIII), a higher position correlates with an improvement in location on rank list and thus are matching at a more desirable program. Furthermore, a lower position on the rank list is associated with a less desirable position.

Overall, female applicants matched at a lower position on their rank list but matched higher on the programs' rank list when compared with male candidates over the study period. Female candidates matched at a lower position on their rank list in foot and ankle, trauma, pediatrics, sports, and shoulder and elbow. On programs' rank list, female candidates ranked lower in foot and ankle and trauma fellowship. Male candidates experienced a significant decline in the number they matched on both their rank list and programs' rank lists. Female candidates experienced a statistically significant improvement in the rank position of their rank list, but a nonsignificant lower position in programs' rank list.

When comparing applicants by degree type, both osteopathic and allopathic candidates experienced a statistically significant increase in match rate over the study period.

Although both groups showed an increase in match success, there was a statistically significant difference in match rate when comparing allopathic and osteopathic applicants. Osteopathic applicants experienced a statistically significant increase in match rate in foot and ankle, adult reconstruction, sports medicine, and trauma fellowship. Allopathic applicants experienced a statistically significant increase in foot and ankle and adult reconstruction fellowships while also experiencing a nonsignificant increase in sports medicine, trauma, pediatrics, and shoulder and elbow.

In addition, when comparing overall rank lists, osteopathic applicants matched at a lower position on programs' rank lists and higher on their rank list when compared with their allopathic counterparts. Osteopathic applicants matched at a lower position on their rank list in adult reconstruction, sports medicine, trauma, and shoulder and elbow. On programs' rank list, osteopathic candidates matched at a lower position in all specialties included in our study.

This study was not without limitations. Our analysis was limited by the fellowship applications, which did not include

**TABLE VII Mean-Matched DO Applicant Rank on Programs' Rank List**

Match Year	Foot and Ankle	Adult Reconstruction	Sports Medicine	Trauma	Pediatrics	Shoulder and Elbow
2013	5	5	6.21	6	6.27	NA
2014	6.8	5.25	10.96	6.86	6.68	NA
2015	6.71	5.33	9.5	4.14	6.25	NA
2016	4.2	9.25	7.95	5.25	5.84	NA
2017	6.9	3.45	10.36	3.75	4.4	NA
2018	7.08	8.21	8.71	5.6	6.67	3
2019	5.92	6.25	8.67	6.38	6.35	3.5
2020	4.91	6.81	9.38	5.75	7.46	8
2021	7.71	4.72	9.77	5.95	6.82	5.33
2022	10.15	8.09	13.3	7.14	8.77	10.5
2023	7.33	4.06	10.1	4.4	7.85	4.33

TABLE VIII Mean-Matched MD Applicant Rank on Programs' Rank List

Match Year	Foot and Ankle	Adult Reconstruction	Sports Medicine	Trauma	Pediatrics	Shoulder and Elbow
2013	3.67	6.23	8.87	4.68	5.14	NA
2014	4.43	6.12	9.79	4.55	4.25	NA
2015	6.15	7.48	9.44	5.98	6.41	NA
2016	4.31	6.33	10	4.13	6.27	NA
2017	5.02	6.18	11.44	4.44	7.66	NA
2018	6.25	8.42	10.74	4.77	5.89	6.1
2019	5.89	9.43	10.07	5.54	6.93	5.91
2020	5.71	7.96	9.55	4.73	7.66	6.67
2021	8.33	7.82	12.43	7.3	10.32	9.08
2022	6.56	10.79	12.32	6.06	6.45	4.18
2023	6.59	9.63	10.87	6	10.46	5.5

gender until 2016 or additional demographics of each applicant. For all applicants', the gender was confirmed by reviewing the applicant through an internet search, with multiple sources stating their gender. It is possible that the gender or gender identity of an applicant could be classified wrongly in this manner. Through this extensive amount of effort to accurately determine applicant gender, we believe our data are precise with minimal room for error.

Another limitation encountered during our study was the lack of some data available for analysis. The SF Match started in 2010 for orthopaedic surgery, but we only had match data from 2012 to 2023. Before 2016, adult reconstruction and musculoskeletal oncology were combined into one group. Thus, data regarding adult reconstruction from 2012 to 2015 included a small percentage of the musculoskeletal oncology applicants. Furthermore, shoulder and elbow was not included in the SF Match before 2018. Last, data regarding the number of programs and positions offered were only available for 2020 to 2024.

Hand and spine fellowship is not included in the SF Match; thus, data regarding these fellowships were not included. Without the ability to analyze the fellowship data for hand and spine fellowships, our study does not fully encompass all orthopaedic candidates pursuing fellowship. In addition, data were not available for our study to include international candidates or information regarding the number of applications each candidate submitted.

## Conclusion

Overall, male and female applicants match at equal rates for the orthopaedic fellowship. Osteopathic graduates are

consistently ranked lower by orthopaedic fellowship programs in the fellowship match process and are less likely to match than allopathic graduates. Future work may pursue the identification of factors that result in greater parity among orthopaedic fellowship applicants of diverse backgrounds. ■

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## References

- Modica A, Ranson R, Williamson T, Ponce BA, Cohn RM, Bitterman AD. Osteopathic students have decreased match rates in orthopaedic surgery compared with allopathic students. *JBJS Open Access*. 2024;9(2):e24.00027.
- Physician specialty data report 2022. Available at: <https://www.aamc.org/data-reports/workforce/report/physician-specialty-data-report>
- White PB, Henry JP, Partan MJ, Choy K, Hogge CA, Katsigiorgis G, Bitterman AD, Cohn RM. Differences in fourth-year orthopaedic away rotation opportunities and fees among osteopathic and allopathic medical students 1 year after the implementation of the single accreditation system. *JB JS Open Access*. 2022;7(3):e22.00057.
- Naclerio E, Sekar M, Ghattas YS, Steinmann S, Cannada LK, Dehghan N. Women in orthopaedics: 10-year trends of fellowship match rate and subspecialty. *J Am Acad Orthop Surg Glob Res Rev*. 2024;8(5):e23.00269.
- Cannada LK, Luhmann SJ, Hu SS, Quinn RH. The fellowship match process: the history and a report of the current experience. *J Bone Joint Surg*. 2015; 97(1):e3.

6. Singh V, Simcox T, Aggarwal VK, Schwarzkopf R, Long WJ. Comparative analysis of total knee arthroplasty outcomes between arthroplasty and nonarthroplasty fellowship trained surgeons. *Arthroplast Today*. 2021;8: 40-5.
7. Ottesen T, Amick M, Kirwin DS, Mercier MR, Brand J, Frumberg DB, Grauer JN, Rubin LE. Increasing value in subspecialty training: a comparison of variation in surgical complications for pediatric versus other fellowship-trained American board of orthopaedic surgery candidates in the treatment of supracondylar fractures. *J Am Acad Orthop Surg Glob Res Rev*. 2024;8(1):e22.00239.
8. Chan JY, Charlton TP, Thordarson DB. Analysis of orthopaedic job availability in the United States based on subspecialty. *J Am Acad Orthop Surg Glob Res Rev*. 2020;4(11):e20.00195.
9. Cannada LK. Women in orthopaedic fellowships: what is their match rate, and what specialties do they choose? *Clin Orthop Relat Res*. 2016;474(9):1957-61.
10. Alomar AZ. Fellowship and future career plans for orthopedic trainees: gender-based differences in influencing factors. *Heliyon*. 2022;8(9):e10597. Erratum in: *Heliyon*. 2023 May 29;9(6):e16550.
11. Butler BA, Johnson D, Christian RA, Bigach SD, Beal MD, Peabody TD. Factors influencing subspecialty choice of orthopedic residents: effect of gender, year in residency, and presumptive subspecialty. *Iowa Orthop J*. 2020;40(1):19-23.
12. Cannada LK, Luhmann SJ, Hu SS, Quinn RH. The fellowship match process: the history and a report of the current experience. *J Bone Joint Surg*. 2015;97(1):e3.
13. Ruddell JH, Eltorai AEM, DePasse JM, Kuris EO, Gil JA, Cho DK, Paxton ES, Green A, Daniels AH. Trends in the orthopaedic surgery subspecialty fellowship match: assessment of 2010 to 2017 applicant and program data. *J Bone Joint Surg*. 2018;100(21):e139.
14. White PB, Giordano JR, Chen M, Bitterman AD, Oni JK, Zacchilli M, Poon SC, Cohn RM. Residency match rates in orthopaedic surgery based on sex, under-represented in medicine status, and degree type. *JB JS Open Access*. 2023;8(1): e22.00143.
15. Sees JP, Nahian A, Johnson R. A 10-year report on the trends of osteopathic medical students (OMS) in osteopathic orthopaedic residency over the past decade. *J Am Osteopath Acad Orthop*. 2023;7(1). <https://journal.aoao.org/?p=569>
16. Ranson R, Mao H, Saker C, Lehane K, Gianakos A, Stamm M, Mulcahey MK. The demographic make-up of orthopaedic surgery residents in the United States post ACGME merger. *J Orthop Exper Innov*. 2023;4(1). <https://journaloei.scholasticahq.com/article/57307-the-demographic-make-up-of-orthopaedic-surgery-residents-in-the-united-states-post-acgme-merger>