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AOA Critical Issues in Education

Osteopathic Students Have Decreased Match Rates in Orthopaedic Surgery Compared with Allopathic Students

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Introduction: Orthopaedic surgery continues to be one of the most competitive specialties to match into as a medical student, particularly for osteopathic medical students. Therefore, in this study, we sought to examine the prevalence of osteopathic students (DO) matching into orthopaedic surgery at traditional Accreditation Council for Graduate Medical Education (ACGME) accredited programs (former allopathic residency programs) in recent years.

Methods: A retrospective review of National Residency Match Program annual reports and Association of American Medical Colleges's Electronic Residency Application Service Statistic reports were performed to determine the number of applications and match rates among osteopathic (DO) and allopathic (MD) medical students into orthopaedic surgery from 2019 to 2023. Data on the degree type of current residents at all ACGME-accredited residency programs were identified.

Results: During the analyzed study period of 2019 to 2023, there were 3,473 (74.5%) allopathic students and 571 (59.9%) osteopathic students who successfully matched into orthopaedic surgery. This match rate for allopathic students was 74.5% compared with 59.9% for osteopathic students. Of the 3,506 medical students who hold postgraduate orthopaedic surgery positions at former allopathic programs over the past 5 years, only 58 (1.7%) hold an osteopathic degree. Of the 560 medical students who hold postgraduate orthopaedic surgery positions at former osteopathic programs over the past 5 years, 47 (8.4%) hold an allopathic degree. The match rate of allopathic students at former osteopathic programs is significantly higher than the match rate of osteopathic students at former allopathic programs.

Conclusions: Osteopathic students continue to match into orthopaedic surgery at lower rates than their allopathic counterparts. In addition, there remains a consistent and low number of osteopathic students matching into former allopathic programs. Allopathic students also have a higher likelihood of matching into former osteopathic programs when compared with osteopathic students matching into previous allopathic orthopaedic surgery programs.

Introduction

Orthopaedic surgery continues to be one of the most competitive specialties to match into as a medical student[1-3]. In addition, orthopaedic surgery is recognized as one of the least diverse medical specialties with an underrepresentation of female, racial/ethnic minorities, and osteopathic physicians (DOs)[1,4-7]. There may be many presumed qualified candidates from osteopathic medical schools who are overlooked solely

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based on their degree. In the 2022 National Residency Match Program (NRMP) survey of program directors, 63% of respondents reported that they seldom or never interview osteopathic applicants while only 16% reported that they seldom or never interview allopathic applicants[8]. This lack of diversity and osteopathic representation is seen throughout the academic spectrum including residents, program directors, and even literature publication rates for orthopaedic journals[9-12].

In June of 2020, the Accreditation Council for Graduate Medical Education (ACGME) and the American Osteopathic Association (AOA) concluded their formal integration into a single accreditation system for all medical residency programs[1,13]. This transition into a single graduate medical education accreditation system was completed with the intent of broadening opportunities and producing uniform nationwide standards for graduate medical education. Despite the aims of the single accreditation process, concerns existed regarding how it would impact match opportunities, particularly in competitive specialties[1,14,15]. One concern raised was that osteopathic medical students would be more likely to match into primary care specialties and have continued barriers when attempting to enter competitive surgical subspecialties such as orthopaedic surgery[1,9,15-17]. Early data have confirmed this concern, showing that more osteopathic students are matching into primary care specialties and less into competitive surgical subspecialties[18].

Therefore, in this study we sought to examine the prevalence of osteopathic students (DO) matching into orthopaedic surgery at traditional ACGME accredited programs (former allopathic residency programs) from 2019 to 2023. The authors hypothesize that there will be a low rate of osteopathic medical students matching at former allopathic programs, with no increase of match rates into orthopaedic surgery over the study period.

Methods

A retrospective review of NRMP annual reports and Association of American Medical Colleges (AAMC's) Electronic Residency Application Service Statistic reports were performed to determine the number of applications and match rates among osteopathic (DO) and allopathic (MD) medical students into orthopaedic surgery from 2019 to 2023. The application data were collected by using the annual main residency match results and data report released each year by the NRMP and AAMC[19,20]. The application and match data for osteopathic medical students during 2019 was collected from the AOA match day report as this occurred before the transition to a single accreditation system[21]. These data included application numbers and match rates for osteopathic and allopathic students and graduates applying to orthopaedic surgery during each respective application cycle. Only US medical students were included in this study; thus, non-US international medical student data were excluded from this analysis.

Data on the degree type of current residents at all ACGME-accredited residency programs were identified using the American Medical Association's residency database, Fellowship and Residency Electronic Interactive Database, and the AAMC's Residency Explorer tool (https://freida.ama-assn.org, https://www.residencyexplorer.org/Home/Dashboard) in January 2024 corresponding to those residents who mostly matched in the 2019 to 2023 match cycles[22,23]. There were 208 ACGME-accredited orthopaedic surgery programs identified initially[24]. Eight of these programs were identified as military orthopaedic surgery programs and were excluded from this study, leaving 200 ACGME-accredited programs included in the study population. We then identified which programs were previously solely ACGME accredited or solely AOA accredited by reviewing the AOA programs that transitioned to ACGME accreditation report and the current list of ACGME-accredited orthopaedic surgery programs (Former AOA Programs That Have Transitioned to ACGME Accreditation, ACGME Orthopaedic Surgery Programs)[24,25]. There were 38 previous AOA-accredited programs with continued ACGME-accreditation following the implementation of a single accreditation system[25].

Utilizing this information, we were able to establish which current osteopathic residents over the last 5 years were undergoing their training at previous solely ACGME-accredited programs, which traditionally favored allopathic students for their programs. Match rates between osteopathic and allopathic students obtained from the NRMP annual main residency match results, and data report were compared with assess for any notable changes.

Statistics were performed using Microsoft Excel (Seattle, WA). Descriptive statistics were used for all categorical variables and included counts and proportions. Statistical analysis performed included Z-tests for the comparison of osteopathic match rates into previous solely ACGME-accredited programs year by subsequent year. Unpaired *t*-test was used in comparison of total osteopathic match rates into previous ACGME-accredited programs versus previous AOA-accredited programs. Fisher exact tests were utilized for the comparison of match rate outcomes between osteopathic and allopathic students for each application cycle from 2020 to 2023. Statistical significance was defined as $p < 0.05$.

Results

Match Rates

During the analyzed study period of 2019 to 2023, there were a total of 6,413 applicants for orthopaedic surgery residency programs. Of these applicants, 4,664 (72.7%) were allopathic medical students and 953 (14.9%) were osteopathic medical students. There were 3,473 (74.5%) allopathic students and 571 (59.9%) osteopathic students from this applicant pool who successfully matched into orthopaedic surgery. This represents a match rate of 74.5% for allopathic students and 59.9% for osteopathic students ($p < 0.001$, Table I).

Osteopathic Match Rates at Previous Allopathic Programs

Of the 3,506 medical students who hold postgraduate orthopaedic surgery positions at former allopathic programs over the past 5 years, only 58 (1.7%) hold an osteopathic degree. Osteopathic students were significantly more likely to match into former osteopathic programs ($p < 0.001$, Table II). Over the study period, 58 (10.2%) of the 571 osteopathic students

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TABLE I Match Rates for Osteopathic and Allopathic Students From 2019 to 2023 Demonstrates a Significantly Higher Match Rate for Those Applicants With an Allopathic Degree

	DO	MD	Total
Matched	571 (59.9%)	3,473 (74.5%)	4,044
Unmatched	382 (40.1%)	1,191 (25.5%)	1,573
	953	4,664	p < 0.001

who matched into orthopaedic surgery matched into previous allopathic programs. The remaining 513 (89.8%) matched at previous osteopathic programs. From 2019 to 2023, only 9 to 14 osteopathic medical students matched at former allopathic programs annually (Fig. 1). When examining each application cycle's match rates into previous AOA-accredited vs ACGME-accredited programs and comparing with the subsequent cycle, no time period demonstrated any significant change (2019-2020, p = 0.190; 2020-2021, p = 0.386; 2021-2022, p = 0.218; 2022-2023, p = 0.179, Table III).

Allopathic Match Rates at Previous Osteopathic Programs

Allopathic medical graduates are more likely to match into previous allopathic programs when compared with previous osteopathic programs (p < 0.001, Table I). Of the 3,506 graduates who matched at prior allopathic programs, 3,448 (98.3%) were allopathic students. Allopathic students currently hold 47 (8.4%) postgraduate orthopaedic surgery resident positions of the 560 at previous osteopathic programs. Former osteopathic programs were significantly more likely to match allopathic medical students than previous allopathic programs were to match osteopathic medical students (p < 0.001, Table IV).

Discussion

The goal of this study was to examine the incidence of matching into orthopaedic surgery between osteopathic and allopathic medical students over the last 5 years following the implementation of a single graduate medical education accreditation system. The study also sought to identify any significant differences in the match rates of osteopathic medical students into orthopaedic surgery to previous allopathic programs versus previous osteopathic residency programs. We found that from 2019 to 2023, osteopathic applicants have significantly lower chances of matching into orthopaedic surgery than allopathic applicants. We also found that during each application cycle, osteopathic applicants who did match into orthopaedic surgery were less likely to match at former allopathic program as opposed to former osteopathic program and that there continues to be a low number of osteopathic residents training at former allopathic programs. Previous osteopathic programs were also more likely to match allopathic applicants than previous allopathic programs were at matching osteopathic applicants. These findings highlight that the single accreditation system has expanded opportunities for allopathic students matching into orthopaedic surgery more so than it has for osteopathic applicants. Despite applying to both former allopathic and osteopathic programs, osteopathic applicants are presented with less opportunity to match at previous allopathic programs. In 2023, there were 237 osteopathic applicants in orthopaedic surgery, the highest number since the single accreditation system[19]. However, in 2023, there was also the lowest match rate for osteopathic students (50.2%) over the same time period[19]. Thus, while osteopathic students continue to apply in orthopaedic surgery, they are given less opportunity to match in the field than their allopathic counterparts.

TABLE II Annual Breakdown of Osteopathic Students Matching at Former ACGME Versus AOA-Accredited Programs

Previous Accreditation	Year					
	2019	2020	2021	2022	2023	Total
ACGME	9	14	12	9	14	58
AOA	113	98	95	102	105	513
						p < 0.001

Before the transition to a single accreditation system, osteopathic match rates into orthopaedic surgery were almost entirely into AOA-accredited programs. From 2012 to 2019, osteopathic residents only represented 0.5% of residents within traditional ACGME programs[26]. Following the unification of the residency program accreditation, these numbers remain low with osteopathic students, continuing to represent the overwhelming minority when it comes to matching into orthopaedic surgery and matching into former allopathic programs. From 2019 to 2023, the proportion of osteopathic residents in previous allopathic programs has risen less than 1%, averaging 1.36% during the 5-year study period. Ranson et al.[4] reviewed the demographic makeup of orthopaedic surgery residents following the implementation of a single accreditation system in 2021 and found that there were only 40 (1.1%) osteopathic residents compared with 3,500 allopathic residents (98.9%) at previous allopathic programs. This lack in the representation of osteopathic residents at former allopathic programs is still apparent, with the number only slightly rising to 58 total osteopathic residents at such programs in 2023. By ensuring all qualified applicants are given equal opportunity regardless of academic degree, a rise in osteopathic physicians can add diversity of experience to the field of orthopaedic surgery.

In 2019, the year before the start of the single accreditation system, Aiyer et al.[14] reviewed the NRMP data reporting only 15 (2%) osteopathic students made up the 752 filled ACGME-accredited orthopaedic surgery positions[4]. In 2020, the first year of match data following the merger of the ACGME and AOA residency match process, the NRMP reported that 112 (13.3%) of the 844 filled orthopaedic surgery residency postgraduate positions were filled by osteopathic students (Tables 1A and 1B: Results and Data 2020 Main Residency Match)[19]. Although this appears to be a promising increase in osteopathic representation, only 14 (12.5%) of those 112 osteopathic students matched into a previous allopathic program. The remaining 98 (87.5%) matched into former osteopathic

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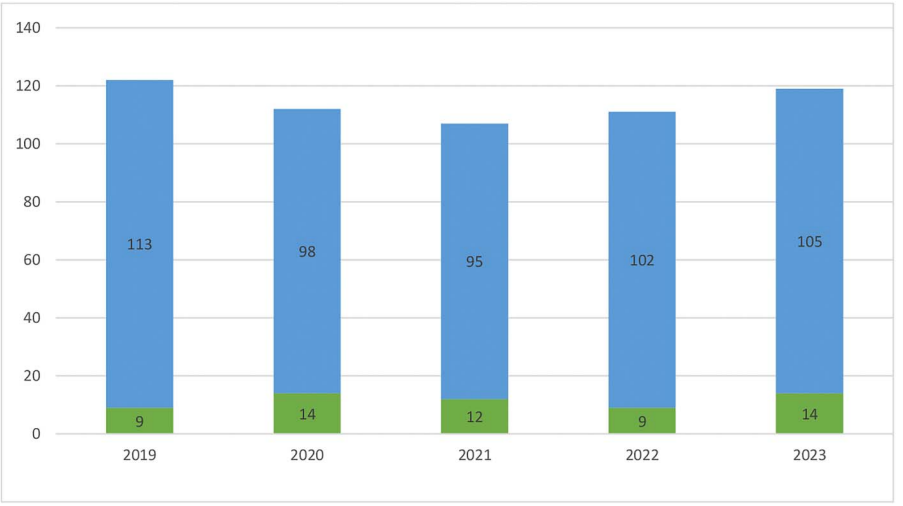

Fig. 1

Proportion of osteopathic students matching at former allopathic vs former osteopathic orthopaedic surgery residency programs. Blue = former osteopathic residency program. Green = former allopathic program.

orthopaedic surgery postgraduate positions. Even with the most recent match data in 2023, there are negligible changes to both match rates for osteopathic students and match rates into previous allopathic programs. Although 119 (13.2%) osteopathic graduates filled the 899 orthopaedic surgery postgraduate positions in 2023, only 14 (11.8%) of the 119 matched into former allopathic programs.

There are many possible explanations for the continued low rate of osteopathic students matching at former allopathic residency programs. It is well recognized that away rotations are a critical component impacting if and where students end up matching[18]. White et al.[18] performed a cross-sectional study in 2021 of ACGME-accredited orthopaedic surgery programs and found that 16 programs publicly published eligibility criteria prohibiting osteopathic students from applying to an away rotation. The same study also reported 5 programs had higher rotation fee requirements for osteopathic applicants ranging from $50 to $5,000[18]. These large increased costs may be viewed as means to indirectly discourage students from applying[18]. As such, decreased rotation opportunities may be one factor influencing the current variation in match rates. Although the data were acquired a few years following the unification of allopathic and osteopathic residency programs, students may continue to allocate funds and applications to programs with traditional match patterns for osteopathic and allopathic students, respectively. However, literature identifying restrictions on away rotation opportunities based on degree along with the high number of orthopaedic surgery programs that seldom or never interview osteopathic students highlight the disparities that exist based on medical school type rather than a holistic merit-based approach of individual applicants[8,18].

This study is not without limitations. All data were collected from publicly available sources and are thus subject to the bias of proper data entry. In addition, it is assumed that all current residents in January 2024 when the databases were searched applied to orthopaedic surgery residency in the 2019 to 2023 application cycles. As a small number of residents are

TABLE III From 2019 to 2023, There Was No Significant Change in the Proportion of Osteopathic Medical Students Matching at Former ACGME and AOA-Accredited Orthopaedic Surgery Residency Programs

	Year		
Previous accreditation	2019	2020	
ACGME	9	14	
AOA	113	98	p = 0.190
	2020	**2021**	
ACGME	14	12	
AOA	98	95	p = 0.386
	2021	**2022**	
ACGME	12	9	
AOA	95	102	p = 0.218
	2022	**2023**	
ACGME	9	14	
AOA	102	105	p = 0.179

TABLE IV Osteopathic Students Are Less Likely to Match Into Former ACGME-Accredited Orthopaedic Surgery Residency Programs Than Allopathic Graduates Are to Match at Former AOA-Accredited Programs

	Previous Accreditation		
Degree	AOA	ACGME	
MD	47 (8.4%)	3,448 (98.3%)	3,495
DO	513 (91.6%)	58 (1.7%)	571
Total	560	3,506	p < 0.001

in a 6-year program, took a leave of absence, or left their residency program, there is potential for slight error in the match rates calculations. Further research is needed to better understand the continued low rate of osteopathic students matching into orthopaedic surgery and matching into former allopathic orthopaedic surgery residency programs.

Conclusion

Osteopathic students continue to match into orthopaedic surgery at lower rates than their allopathic counterparts. In addition, there remains a consistent and low number of osteopathic students matching into former allopathic programs. Allopathic students also have a higher likelihood of matching into former osteopathic programs when compared with osteopathic students matching into previous allopathic orthopaedic surgery programs. ■

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