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An analysis of osteopathic medical students applying to surgical residencies following transition to a single graduate medical education accreditation system

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Abstract

Context: Upon requests from osteopathic medical schools, the National Resident Matching Program (NRMP) Charting Outcomes were redesigned to include osteopathic medical school seniors beginning in 2018 and one joint graduate medical education (GME) accreditation system, the Accreditation Council for Graduate Medical Education (ACGME), formed in 2020.

Objectives: The goal of this study is to analyze the match outcomes and characteristics of osteopathic applicants applying to surgical specialties following the ACGME transition.

Methods: A retrospective analysis of osteopathic senior match outcomes in surgical specialties from the NRMP Main Residency Match data from 2020 to 2022 and the NRMP Charting Outcomes data from 2020 to 2022 was performed.

Results: For surgical specialties, results show matching increased as United States Medical Licensing Examination (USMLE) Step 2 CK (clinical knowledge) and Comprehensive Osteopathic Medical Licensing Examination (COMLEX) Level 2 CE (cognitive evaluation) scores increased along with the number of contiguous rankings ($p < 0.001$). The greatest

indication for matching looking at scores alone were those who scored greater than 230 on Step 2 CK compared to below ($p < 0.001$) and above 650 on Level 2 CE ($p < 0.001$). However, those who scored 240 ($p = 0.025$) on Step 2 CK were just as likely to match as those who scored 250 ($p = 0.022$) when compared to those who scored below those scores. Increasing research involvement had little to no significance with the likelihood of matching across most surgical subspecialties.

Conclusions: Our study demonstrates that there are unique thresholds for Step 2 CK scores, Level 2 CE scores, and the number of contiguous ranks for each surgical specialty that, when reached, are significantly associated with match success. Although certain board score delineations are linked with higher match success rates, the rates level off after this point for most surgical specialties and do not significantly increase further with higher scores. In addition, thresholds within contiguous ranks for increasing match likelihood exist and vary across surgical specialties. Overall, this study highlights that the quantitative metrics utilized to assess applicants lack the correlation reported historically, and the data presently available need to be more substantiated.

Keywords: competitiveness; osteopathic match; surgical residency

Prior to 2021, graduate medical education (GME) programs were overseen by separate governing bodies, the American Osteopathic Association (AOA; osteopathic medicine-affiliated programs) and the Accreditation Council for Graduate Medical Education (ACGME; allopathic medicine-affiliated) [1]. Osteopathic applicants were able to match into either, with only a select number of AOA surgical programs and minute osteopathic representation in ACGME surgical residencies (0.5 % of neurological surgery, 0.8 % of orthopedic surgery, and 0.3 % of otolaryngology

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ACGME postgraduate year [PGY]-1 spots in 2015) [2, 3]. It is important to note that during this match era, the match process for osteopathic students took place earlier in the year for those who matched into AOA-approved subspecialties, which removed them from participating in the National Resident Matching Program (NRMP), possibly contributing to these findings. In June 2020, the completion of a single accreditation system for GME between ACGME- and AOA-accrediting bodies was put in place, unifying them under the ACGME to introduce consistency in the practice of medical care in the United States by starting at the resident education level.

Since the establishment of the single accreditation system, despite subtle increases in osteopathic representation in ACGME programs (2020: neurological surgery 4.4 %, orthopedic surgery 12.0 %, and otolaryngology 6.2 %) and a higher number of osteopathic applicants (15 % increase from 2020 to 2022 [902 to 1,036]), there were fewer osteopathic applicants matching into PGY-1 surgical specialty spots than before [579 (2019) vs. 560 (2020)] [4, 5]. With many former AOA programs unable to obtain accreditation through ACGME, allopathic applicants filling residency spots formerly occupied by osteopathic applicants, and a 77 % increase in active osteopathic students in the past decade, the numerator is far outpaced by the denominator in the osteopathic surgical match-to-applicant ratio [5–8]. While there may remain discrimination within this arena, because it has been reported that 63 % of orthopedic program directors would seldom or never interview an osteopathic applicant, the attributes possessed by successful osteopathic applicants are of the utmost importance to students and their prospective residency programs and necessitate further investigation [9].

This study sought to look at the Charting Outcomes data from the NRMP for osteopathic applicants of general surgery, obstetrics/gynecology (Ob/Gyn), orthopedic surgery, vascular surgery, neurosurgery, and otolaryngology. The aim of this study was to analyze the factors recorded (United States Medical Licensing Examination [USMLE] and Comprehensive Osteopathic Medical Licensing Examination [COMLEX] board scores, research involvement, and contiguous ranks) and their association with successfully matching into the previously mentioned specialties. Our aim explores the influence that these factors have in match likelihood, call attention to the potential inadequacy of the current match-related data, and provide recommendation to osteopathic medical students, residency programs, and the NRMP for the interpretation of this data and implications with which to improve its reporting and outcomes.

Methods

Data source and study design

This is a retrospective analysis of publicly available data in the “Charting Outcomes” report for osteopathic applicants participating in the NRMP match process in 2020, 2021, and 2022, with limited data available for 2021 [10–12]. The data included both successful and unsuccessful match participants.

Data collection and categorization

Outcomes of the following specialties were investigated: Ob/Gyn, Orthopedic Surgery, Otolaryngology, Neurosurgery, Vascular Surgery, and General Surgery (categorical). Urology and Ophthalmology were not included because the American Urology Association (AUA) and San Francisco (SF) Match data did not convey similar variables [13, 14], and there were too few data points to evaluate Plastic and Cardiothoracic Surgery. The data collected are described in Table 1.

Statistical analysis

The primary outcome was identifying characteristics associated with matching into a surgical specialty. The secondary outcome was designating threshold values associated with a higher likelihood of matching for each specialty. The survey responses were compared utilizing a *t* test. Bivariate analysis assessed the rates between matching and not matching based on characteristic values. Binary logistic regression analysis determined the likelihood of matching based on reporting certain values within each characteristic. Significance was established *a priori* for odds ratios (ORs) and 95 % confidence intervals (CIs) exclusive of 1.0 and $p < 0.05$. All statistical analyses were conducted utilizing Statistical Package for the Social Sciences (SPSS).

Table 1: Description of the charting outcomes variables and values recorded.

NRMP charting outcome variables	Value ranges
USMLE step 1 & 2	<200–260+ in increments of 10 (i.e., 211–220; scores greater than 260 were recorded within ‘>260’)
COMLEX level 1 & 2	400–800+ in increments of 50 (i.e., 551–600; scores greater than 800 were recorded within ‘>800’)
Research experiences	0–5+ in increments of 1 (quantities of 5 or greater were recorded as ‘5+’)
Research publications (abstracts, presentations, publications)	0–5+ in increments of 1 (quantities of 5 or greater were recorded as ‘5+’)
Contiguous ranks	0–16+ in increments of 1 (quantities of 16 or greater was recorded as ‘16+’)

COMLEX, Comprehensive Osteopathic Medical Licensing Examination; NRMP, National Resident Matching Program; USMLE, United States Medical Licensing Examination.

Results

Cohort

There were 1,097 applicants to the 2020 and 2022 residency match for the six surgical specialties analyzed.

General surgery match

Among the 397 general surgery applicants in 2022, 212 (53.4 %) matched, which was statistically similar to 2020 (202/340, 59.4 %; $p=0.033$). When comparing Matched (M) vs. Unmatched (UM) applicants, Level 2 CE (cognitive evaluation) scores (% scoring above 600: M 64.6 % vs. UM 17.4 %; $p<0.001$), Step 2 CK (clinical knowledge) scores (% scoring above 240: M 69.6 % vs. UM 27.0 %; $p<0.001$), and the number of contiguous ranks (M 11.2 vs. UM: 4.4; $p<0.001$) were different. Increasing the Step 2 CK score led to an increased likelihood of matching, as well as between each successive level (231–240 compared to 241–250, etc.). Increasing research involvement had no association with matching (Table 2). Applicants ranking five to nine programs were more likely to match than those ranking fewer programs, and they were less likely than those ranking 10+ (mean, 8.5). No differences were seen among groups ranking 10 or more programs contiguously (all $p>0.9$).

Neurosurgery match

Among the 24 neurosurgical applicants in 2022, 9 (37.5 %) matched, which was statistically similar to 2020 (3/18, 16.6 %; $p>0.3$). When comparing Matched vs. Unmatched applicants in 2020 and 2022, Step 2 CK scores (% scoring above 240: M 70.0 % vs. UM 26.7 %; $p=0.033$) and the number of contiguous ranks (M 9.0 vs. UM 3.8; $p=0.002$) were different. Increased likelihood of matching was not seen with increasing scores on Step 2 CK and Level 2 CE when utilizing linear regression. With binary logistic regression, matched applicants had higher rates of scoring >700 on Level 2 CE (27.3% vs. 0.0 %; $p=0.013$) and >240 on Step 2 CK (70.0% vs. 26.7 %; $p=0.033$; Table 4). The number of research publications did not demonstrate an association with matching, but the number of experiences did, although it was subject to a small applicant pool. Applicants ranking 9+ programs had a higher match likelihood compared to those ranking four to seven programs (mean, 6.4; Table 2).

Table 2: Logistic regression analysis for factors in match success in general surgery, neurological surgery, and Ob/Gyn.

	Odds ratio (OR)	95 % confidence interval (CI) [lower limit-upper limit]	p-Value
General surgery			
Step 2 CK score	2.3	[1.7–3.1]	<0.001^a
Level 2 CE score	2.1	[1.7–2.6]	<0.001^a
Research presentations	1.0	[0.9–1.2]	0.996
Research projects	1.0	[0.9–1.2]	0.612
Contiguous ranks (<5 vs. 5–9)	10.2	[4.6–22.6]	<0.001^a
Contiguous ranks (5–9 vs. 10+)	6.3	[2.8–14.2]	<0.001^a
Neurological surgery			
Step 2 CK score	1.6	[0.8–3.1]	0.156
Level 2 CE score	1.5	[0.9–2.4]	0.126
Research presentations	1.5	[0.9–2.7]	0.148
Research projects	4.4	[1.5–13.0]	0.007^a
Contiguous ranks (<4 vs. 4–7)	5.5	[0.5–59.0]	0.159
Contiguous ranks (4–7 vs. 9+)	12.0	[1.1–136.8]	0.045^a
OB/Gyn			
Step 2 CK score	2.1	[1.6–2.7]	<0.001^a
Level 2 CE score	1.7	[1.4–2.0]	<0.001^a
Research presentations	1.1	[1.0–1.3]	0.136
Research projects	0.9	[0.8–1.1]	0.551
Contiguous ranks (<7 vs. 7–10)	5.5	[2.9–10.5]	<0.001^a
Contiguous ranks (7–10 vs. 11+)	7.1	[2.7–18.8]	<0.001^a

^aIndicates p value less than 0.05, deemed statistically significant. CE, cognitive evaluation; CK, clinical knowledge.

Obstetrics/gynecology (Ob/Gyn) match

Among the 396 Ob/Gyn applicants in 2022, 242 (61.1 %) matched, which was statistically similar to 2020 (221/338, 65.4 %; $p>0.8$). When comparing Matched vs. Unmatched applicants, Level 2 CE scores (% scoring >550 : M 73.4 % vs. UM 42.7 %; $p<0.001$), Step 2 CK scores (% scoring >230 : M 84.7 % vs. UM 48.4 %; $p<0.001$), and the number of contiguous ranks (M 10.8 vs. UM 4.8; $p<0.001$) were different. While utilizing linear regression, increasing Step 2 CK and Level 2 CE scores led to an increased likelihood of matching (Table 2). When utilizing binary logistic regression, applicants scoring a Step 2 CK score >230 had an increased likelihood of matching compared to those with 230 or less (OR 5.9; 95 % CI, 3.1–11.2; $p<0.001$) and were not less likely to match when compared to those scoring in the 240s, 250s, and 260s (all $p<0.3$), similar to those scoring from 551–600 on Level 2 CE (all $p<0.8$ when compared to each group scoring >600). Increasing research

involvement had less association with matching (Table 2), with 5+ research experiences or publications not leading to a higher likelihood than having zero in either category (both $p>0.3$). Applicants ranking seven to 10 programs were more likely to match than those ranking fewer programs (mean, 8.9; Table 2). There were no differences seen among applicants ranking 11 or more programs contiguously (all $p>0.9$).

Orthopedic surgery match

Among the 162 applicants in 2022, 96 (57.8 %) matched, which was statistically less than in 2020 (109/163, 66.9 %; $p=0.006$). When comparing Matched vs. Unmatched applicants, Level 2 CE scores (% scoring >600 : M 83.2 % vs. UM 48.4 %; $p<0.001$), Step 2 CK scores (% scoring >250 : M 57.3 % vs. UM 37.0 %; $p=0.021$), and the number of contiguous ranks (M 7.2 vs. UM 4.2; $p<0.001$) were different. Applicants with a Step 2 CK score >240 (OR 2.4; 95 % CI, 1.1–5.3; $p=0.025$) were as likely to match as those scoring >250 (OR 2.3; 95 % CI, 1.1–4.6; $p=0.022$). Applicants scoring >230 on Step 2 CK were more likely to match when compared to those scoring <230 (OR 4.6; 95 % CI, 1.2–18.1; $p=0.030$), with similar findings seen for those scoring >600 on Level 2 CE (all $p>0.7$). Increasing research involvement had less association with matching (Table 3). Applicants ranking five or six ranks were more likely to match than those ranking fewer programs (mean, 5.9; Table 3). No differences were seen among groups ranking seven or more programs contiguously (all $p>0.7$).

Otolaryngology match

Of 41 otolaryngological (ear, nose, and throat [ENT]) applicants in 2022, 21 (51.2 %) matched, which was statistically similar to 2020 (17/33, 51.5 %; $p=0.9$). When comparing Matched vs. Unmatched applicants of 2020 and 2022, Level 2 CE scores (% scoring >600 : M 86.1 % vs. UM 61.9 %; $p=0.036$), Step 2 CK scores (% scoring >250 : M 58.8 % vs. UM 23.5 %; $p=0.014$), and the number of contiguous ranks (M 7.6 vs. UM 4.0, $p<0.001$) were different. While utilizing linear regression, increasing Step 2 CK and Level 2 CE scores did not increase match likelihood (both $p>0.2$). Utilizing a t test, matched applicants had higher rates of scoring >750 on Level 2 CE (31.6 vs. 0.0 %; $p=0.010$). Increasing research involvement did not demonstrate an association with matching

Table 3: Logistic regression analysis for factors in match success in orthopedic surgery, otolaryngology surgery, and vascular surgery.

	Odds ratio (OR)	95 % confidence interval (CI) [lower limit-upper limit]	p-Value
Orthopedic surgery			
Step 2 CK score	1.6	[1.2–2.2]	0.003^a
Level 2 CE score	1.5	[1.2–1.9]	<0.001^a
Research presentations	1.2	[1.0–1.4]	0.107
Research projects	1.1	[0.8–1.3]	0.671
Contiguous ranks (<6 vs. 5–6)	4.5	[2.0–10.1]	<0.001^a
Contiguous ranks (5–6 vs. 7+)	5.0	[1.7–14.9]	0.004^a
Otolaryngology			
Step 2 CK score	1.7	[1.0–2.7]	0.034^a
Level 2 CE score	1.6	[1.1–2.3]	0.008^a
Research presentations	1.0	[0.6–1.6]	0.960
Research projects	1.3	[0.8–2.2]	0.281
Contiguous ranks (<4 vs. 4–8)	2.2	[0.4–13.2]	0.394
Contiguous ranks (4–8 vs. 9+)	4.6	[0.4–51.1]	0.217
Vascular surgery			
Step 2 CK score	2.0	[0.6–6.8]	0.283
Level 2 CE score	1.1	[0.7–1.9]	0.635
Research presentations	1.0	[0.6–1.6]	0.960
Research projects	1.3	[0.8–2.2]	0.281

^aIndicates p value less than 0.05, deemed statistically significant. CE, cognitive evaluation; CK, clinical knowledge.

(Table 3). There were no differences among the categories of contiguous ranks (mean, 5.8; Table 3).

Vascular surgery match

Among the 16 vascular surgery applicants in 2022, 1 (6.3 %) matched, which was statistically less than in 2020 (5/10, 50.0 %; $p=0.008$). When comparing Matched vs. Unmatched applicants, Level 2 CE scores (% scoring >600 : M 66.7 % vs. UM 27.3 %; $p=0.130$), Step 2 CK scores (% scoring above 240: M 100.0 % vs. UM 57.1 %; $p=0.077$), and the number of contiguous ranks (M 12.7 vs. UM 3.8; $p<0.001$) were different or close to significance. Increasing Step 2 CK and Level 2 CE scores did not increase the match likelihood (both $p>0.2$). Increasing research involvement did not demonstrate an association with matching for experiences (M 3.2 vs. UM 3.1; $p=0.918$) and publications (M 4.6 vs. UM 3.6; $p=0.232$) (Table 3). All matched applicants ranked at least eight programs (mean, 4.7).

Table 4: Logistic regression analysis for thresholds in match success for Step 2 CK scores and contiguous ranks.

	Threshold	Odds ratio (OR)	95 % confidence interval (CI) [lower limit-upper limit]	p-Value
General surgery				
Step 2 CK score	>230	5.9	[3.1–11.2]	<0.001 ^a
Contiguous ranks	>4	10.2	[4.6–22.6]	<0.001 ^a
Neurological surgery				
Step 2 CK score	>240	Matched: 70.0 % vs. Unmatched: 26.7 %		0.033 ^a
Contiguous ranks	>3	1.5	[0.5–59.0]	0.159
Obstetrics/gynecology (Ob/Gyn)				
Step 2 CK score	>230	2.3	[1.7–3.1]	<0.001 ^a
Contiguous ranks	>6	5.5	[2.9–10.5]	<0.001 ^a
Orthopedic surgery				
Step 2 CK score	>230	4.6	[1.2–18.1]	0.030 ^a
Contiguous ranks	>4	4.5	[2.0–10.1]	<0.001 ^a
Otolaryngology				
Step 2 CK score	>250	Matched: 58.8 % vs. Unmatched: 23.5 %		0.014 ^a
Contiguous ranks	>4	2.2	[0.4–13.2]	0.394
Vascular surgery				
Step 2 CK score		Matched: 100.0 % vs. Unmatched: 57.1 %		0.077
Contiguous ranks	>7	All ranking greater than 7 programs matched		<0.001 ^a

^aIndicates p value less than 0.05, deemed statistically significant. CK, clinical knowledge.

Discussion

The transition for AOA and ACGME residency programs into one combined GME created a new landscape, changing the expectations of applicants and the factors associated with matching [1, 2, 13]. The results of our study limit the notion that higher board scores necessarily translate to matching into surgical specialties, and while we determined that reaching a threshold score increases the match likelihood for most specialties, the likelihood does not statistically increase with further increments past that point. Although board scores tended to be more reliable than research publications and experiences, the extent of this effect can vary with each specialty. The number of contiguous ranks associated with a higher likelihood of matching also differed between specialties and may be indicative of

the number of programs available and the disparity of osteopathic applicants within the field. Although the deduction of reasoning for these findings cannot be fully supported by the available data, these observations may be microcosms of the differences in evaluation of osteopathic students and the residency selection process as a whole for surgical specialties when applying in this posttransition era.

Recent changes in the evaluation of osteopathic applicants to surgical specialties have severely limited areas for them to demonstrate interest in the field and to stand out among the applicant pool, despite similar performance in residency [4, 14, 15]. Residency programs currently have little available evidence to compare an osteopathic and allopathic student, given the variability in grading and medical student performance evaluations (MSPEs) [16]. Additionally, osteopathic students rarely have a home program within their desired surgical specialty and often are subject to finding clinical opportunities outside of their assigned rotations [14]. With 19 % of former AOA surgical programs folding during the transition, osteopathic students were further limited, and even more so with the introduction of the COVID-19 pandemic [6, 17–19]. These factors have made it extremely difficult for osteopathic students to find clinical opportunities, obstructing their ability to build in-person relationships, network, and attain the knowledge necessary to excel on subinternships, in addition to mentorship and strong letters of recommendation [18, 20]. The upcoming addition of a pass/fail Step 1 and Level 1 examinations may have further implications on how osteopathic students are able to demonstrate their unique strengths, especially when compared to their allopathic counterparts [21, 22].

However, the institution of the holistic review to the residency selection process may serve as a beacon of hope [22]. Standardized test scores and other objective factors heavily utilized to select residents have shown discordant outcomes with performance on residency rotations and oral board examinations [23, 24]. Instead of allowing these metrics to dictate interview offers, residency programs have opted to consider other subjective attributes and experiences to evaluate candidates [25]. This approach aims to create a diverse and culturally rich environment by placing more emphasis on life experiences, the quality of these experiences, and meaningful personal characteristics alongside academic achievements [26]. By taking this holistic approach, residency programs can look beyond the ‘checked boxes’ and better align their selection criteria to their values to identify applicants that ‘best fit’ their program, resulting in a more successful match process and ultimately a stronger healthcare workforce.

With these considerations in mind, our results demonstrate that the number of applicants continue to outpace the number of positions (8,210 applicants for 5,037 surgical PGY-1 positions in 2023), leading to increased competition [27, 28]. Although objective measures previously allowed students an avenue to stand out, our study demonstrated that obtaining higher board scores past the delineated thresholds only led to a higher match likelihood for general surgery, as seen in previous studies, and it may not be a coincidence that these findings concur with the intent of the holistic process [28–31]. Students should still strive to score their best and not settle for the delineated threshold, because gained knowledge can be helpful in the clinical realm, but the important takeaway is for students to rely less on board scores as the focal point of their application and to spread the wealth and effort among the many factors considered in the current residency selection process [32, 33].

The same could be said for research involvement. Although matched applicants are performing more research during medical school, so are Unmatched applicants [34]. Similarly, the increasing number of research publications did not lead to increased match success for any specialty, although increasing the number of experiences did lead to increased match success only for neurosurgical applicants. However, these findings discount the effects that research involvement can have on match success. Instead of focusing on the number of projects, it is possible that these discoveries can be explained by nonquantifiable means, such as the diversity of projects, types of studies, degree of involvement the student had, how the student's research aligns with personal interests, and soliciting institutions and program faculty for research opportunities to demonstrate interest within the program and gain knowledge within the field [34–36]. Utilization of research projects for multiple purposes can simultaneously aid in accomplishing the many aspects of a successful applicant profile, allowing them to maximize their time outside of the classroom [36, 37]. Research can also provide references that programs recognize and can contact to verify work ethic, commitment, and personality. For instance, in 2017, there were only 7,266 neurosurgeons in the United States [38]. Given the small community, association with surgeons who have contributed significantly to the specialty and possible letters of recommendations obtained from such connections through projects may more reasonably explain the utility of neurosurgeons in match success and the disconnection with research quantity [39–41].

The number of contiguous ranks was also analyzed, providing evidence in how to spread effort when demonstrating interest and networking and proving helpful when deciding how many audition rotations to perform (although

limitations may be present, often school-specific). Meeting these thresholds in specialties with adequate power translated to 5 to 10 times greater odds in matching (surgery, Ob/Gyn, neurosurgery, orthopedics). These differences, in part, may be due to relative considerations within each specialty (the number of programs, relative competitiveness, number of former AOA programs, etc.) [36].

There is clearly a variety of factors considered within an application that accounts for the discrepancies seen between these metrics and matching into surgical specialties [42–47]. Quantitative measures are likely to remain staples to the surgical resident selection process, yet their weight, especially relative to other factors, will always be subjective to each program. Likewise, when reviewing the ever-increasing number of applications, it becomes burdensome to comb through the many activities that students list just to 'pad their CV' and 'check the boxes,' leading to many of the recent changes within the Electronic Residency Application System (ERAS), such as signaling and limiting the number of experiences to 10 [48, 49]. Every student will apply with board scores and most will apply with some form of research involvement, but these are only two rungs on the surgical residency application ladder, and not paying attention to the remaining rungs will rarely result in the applicant successfully climbing to their lofty goal of matching. Therefore, students should find ways to demonstrate their life and career interests, become involved with faculty and mentors who can impact their future, and allow those aspects to shape their application and showcase their unique characteristics in the era of holistic review following the ACGME single-accreditation transition.

Recommendations

Because of the scarce data available and complexity of the selection process, osteopathic students pursuing surgical residencies should seek out personalized advice and guidance from faculty, specialty society academies, and current residents within the field for valuable insight, especially those who recently matched and who mirror their own profile (regional, demographic, etc.). A detailed look into these specialties could shine more light on the factors deployed in a holistic application analysis by surveying those involved in selection and those who have recently applied. Finally, the NRMP should collect other relevant variables from applicants, such as the number/quality of letters of recommendation, amount of audition rotations, and class rankings, to determine the factors that influence matching into surgical specialties. Due to the changing landscape of

the residency selection process, it is essential for the NRMP to update the data collected and reported.

Limitations

Our study was not without limitations. First, the research was performed retrospectively utilizing only the data made accessible. The match is influenced by other factors not captured and are not accounted for when analyzing this bivariate data (i.e., board score: # and match: yes/no). Many of these factors do not give absolute values (i.e., Step 2 CK in increments of 10) or record more than a certain value as a '+'. Therefore, further validating is needed to definitively conclude that the data has limited scope in its use for guidance [50]. This report examines whether a match was made to the specialty of the applicant's first-ranked program or 'preferred' specialty. Applicants who match to a specialty not ranked first or who do not match are not included. Therefore, a large group were excluded due to dual-applying or ranking another preferred specialty. Several specialties, most notably neurosurgery, otolaryngology, and vascular surgery, had few applicants, limiting the power of our analyses. Rather than eliminating those, statistics based on the available data were included because of the scarce literature on osteopathic applicants to those fields. Despite these limitations, the dataset was the most comprehensive combination of surgical specialties for osteopathic applications. Furthermore, it will provide helpful understanding for guidance within the surgical workforce and for future osteopathic student application when assessing competitiveness within these specialties.

Conclusions

Our study demonstrates that there are unique thresholds for Step 2 CK scores, Level 2 CE scores, and the number of contiguous ranks for each surgical specialty that, when reached, are significantly associated with match success. Although certain board score delineations are linked with higher match success rates, the rates level off after this point for most surgical specialties and do not significantly increase further with higher scores. In addition, thresholds within contiguous ranks for increasing match likelihood exist and vary across surgical specialties. Overall, this study highlights that the quantitative metrics utilized to assess applicants lack the correlation reported historically, and the data presently available need to be more substantiated.

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