

Research Article

Career Choice Disclosure and Clerkship Grades Among Orthopaedic Residency Applicants

Mary K. Mulcahey, MD¹^a, Jeffrey M. Henstenburg, MD²^b, Andrew J. Hinkle, MD³^c, Michaela A. Stamm⁴^d, Meghan Morley, MD⁵^e, Joshua Luginbuhl, MD⁶^f

¹ Department of Orthopaedic Surgery, Tulane University School of Medicine, ² Rothman Institute at Thomas Jefferson University, ³ Department of Orthopaedic Surgery, University of Texas Southwestern, ⁴ Tulane University School of Medicine, ⁵ Department of Orthopaedic Surgery, Cooper University Hospital, ⁶ Department of Orthopaedic Surgery, Brigham and Women's Hospital

Keywords: Education, orthopaedics, bias, race, gender, disclosure

<https://doi.org/10.60118/001c.55753>

Journal of Orthopaedic Experience & Innovation

Vol. 4, Issue 1, 2023

Objective

Medical student clerkship evaluations are susceptible to preceptor bias. Students interested in orthopaedics may choose not to disclose their career path during clerkships to avoid bias. The purpose of this study was to identify factors that may lead to grading bias, including career choice disclosure, among medical students interested in a career in orthopaedic surgery.

^a Dr. Mulcahey is a Board Certified orthopaedic surgeon specializing in shoulder and knee surgery and sports medicine. She is a New Hampshire native, who received her Bachelor of Arts in Biochemistry from Dartmouth College and her Doctor of Medicine from the University of Rochester School of Medicine. She completed her orthopaedic residency at Brown University, followed by a fellowship in Orthopaedic Trauma at the same institution. Dr. Mulcahey then went on to do a fellowship in sports medicine at San Diego Arthroscopy and Sports Medicine.

Dr. Mary Mulcahey joined the faculty in the Department of Orthopaedic Surgery at Tulane in April 2017, as the Director of Tulane's Women's Sports Medicine Program. In that role, Dr. Mulcahey has been instrumental in the design, development, and leadership of a comprehensive approach to the care of active women. Dr. Mulcahey is currently the President of the Ruth Jackson Orthopaedic Society. Additionally, she is serving on the AANA Board of Directors, the AOSSM education committee, the AJSM Electronic Media Editorial Board, and she was selected for the AOSSM Traveling Fellowship to Europe in April 2022.

[Visit Dr. Mulcahey's Professional Website](#)

[Visit the Open Payments Data Page for Dr. Mulcahey](#)

[Conflicts of Interest Statement for Dr. Mulcahey](#)

^b Jeffrey Henstenburg is an orthopaedic surgeon in training with an interest in pediatrics. He is interested in spine deformity, sports medicine and fracture care.

[Visit Dr. Henstenburg's Website](#)

[Connect with Dr. Henstenburg on LinkedIn](#)

[Conflicts of Interest Statement for Dr. Henstenburg](#)

^c Andrew Hinkle is an Orthopaedic Surgery Resident at UT Southwestern in Dallas, Texas. He is originally from Seattle, Washington and attended undergraduate at the University of Washington. He attended medical school at Tulane University in New Orleans, Louisiana.

[Visit Dr. Hinkle's Website](#)

[Conflicts of Interest Statement for Dr. Hinkle](#)

^d [Conflicts of Interest Statement for Michaela Stamm](#)

^e Meghan Morley is an Orthopaedic Sports Medicine Fellow at the University at Buffalo, planning to do a second fellowship in Orthopaedic Trauma in Christchurch, New Zealand. She has a strong interest in medical education, particularly teaching medical students.

[Conflicts of Interest Statement for Dr. Morley](#)

^f [Visit the Open Payments Data Page for Dr. Luginbuhl](#)

[Conflicts of Interest Statement for Dr. Luginbuhl](#)

Design

A cross-sectional survey was performed by distributing an anonymous electronic survey. Respondents were asked if they disclosed an interest in orthopaedic surgery during core clerkships and whether or not they believed it impacted their grade. The relationship between demographic variables including age, gender, race, ethnicity, and geographical location were also collected and compared.

Setting

Multiple institutions in different geographic locations in the US.

Participants

Medical students in orthopaedic interest groups or those who completed an orthopaedic surgery rotation.

Results

Of 149 responses, 90 (60.1%) of students chose to disclose an interest in orthopaedics during all clerkships. Over 50% of students were able to achieve honors in core clerkships except for OB/Gyn (41/112, 36.6% honors) and emergency medicine (17/59, 28.8% honors). On average, 7.9% of students believed disclosure had a negative impact on their grade, but in internal medicine and OB/Gyn, those that disclosed were able to achieve honors more often than those that did not. Males (38/50, 76%) were given honors more often than females (11/24, 45.8%) in their surgery clerkship and those that identified as "other" race (1/6, 16.7%) achieved fewer honors in surgery and pediatrics compared to White, Black, Asian, Indian, and Hispanic students (48/68, 70.6%).

Conclusion

Some students believe disclosing an interest in orthopaedics may negatively impact their grade, but the opposite may be true. Other potential areas of bias include gender and race. More research is needed to improve the clerkship evaluation process given an increasingly competitive application process.



©2022 Pacira Pharmaceuticals, Inc., a wholly owned subsidiary of Pacira Biosciences, Inc. All rights reserved. PP-NP-US-1328 05/22

***Advertisement**

[Click here to learn more about Pacira](#)

INTRODUCTION

Matching into orthopaedic surgery residency in the United States (US) has become increasingly difficult over the past several years ("National Resident Matching Program, Results and Data: 2018 Main Residency Match®" 2018). The average number of applications received per residency position increased from 54.1 in 2008 to 85.7 in 2018, but the number of US orthopaedic residency programs only slightly increased from 160 to 171 during the same period (Triakha et al. 2020). As a result, one in four applicants now go unmatched (Triakha et al. 2020). Applicants have responded by increasing the number of applications sent to programs from 46.5 in 2008 to 74.9 in 2018, further raising the level of competition (Triakha et al. 2020). Orthopaedic surgery applicants are increasingly scrutinized by program directors as they attempt to differentiate themselves among the competitive applicant pool.

Clerkship grades and evaluations are one such differentiator; however, these grades are inherently susceptible to preceptor bias and there is significant variability among medical school grading systems (i.e. pass-fail vs norm-referenced grading) (Takayama et al. 2006). Previous studies have identified areas of potential bias towards factors unrelated to student performance. Lee et al. found that older students were more likely to report worse grades in neurology and internal medicine and minority students were more likely to report worse grades across all clerkships (Lee et al. 2007). Additionally, previous studies have demonstrated inaccurate self-prediction of clerkship grades, suggesting that they may be somewhat ambiguous and subjective (Edwards et al. 2003; Weiss et al. 2005). While clinical grades are supposed to incorporate factors beyond aptitude in pre-clinical coursework, this criteria is rarely clearly defined, making performance extremely subjective. In fact, one study showed that the top and bottom 25% of students at one institution varied significantly in their standardized

**BE A PART OF BETTER ORTHOPAEDIC CARE.
CLICK HERE TO LEARN HOW.**

THE ORTHOPAEDIC IMPLANT COMPANY



*Advertisement

[Click here to learn more about The Orthopaedic Implant Company](#)

test scores, but did not vary in their clinical performances (Silver and Hodgson 1997). Recognizing the subjective nature of clerkship evaluations, medical students pursuing a career in orthopaedic surgery may choose not to disclose their career choice out of fear of bias and the influence this may have on their grade.

As the residency application process becomes more competitive, it is important to identify areas of potential bias towards medical students to improve clerkship performance evaluation. The purpose of this study was to identify factors that may lead to grading bias, including career choice disclosure, among medical students interested in a career in orthopaedic surgery. We hypothesized that medical students interested in orthopaedic surgery have a perception that they will receive lower clerkship grades if they choose to disclose a career interest in orthopaedics during that clerkship. Furthermore, students who chose to disclose an interest in orthopaedic surgery may receive worse grades compared to those that did not disclose their interest.

METHODS

Prior to study initiation institution review board approval was obtained at all participating institutions. An anonymous electronic survey was distributed to current 3rd and 4th year medical students as well as postgraduate year 1 (PGY1) and PGY2 orthopaedic residents at four different US medical schools in January 2021. Institutional review board approval was obtained at all participating institutions prior to initiation of the study. Surveys were distributed to students who demonstrated an interest in orthopaedic surgery as a career choice. Participants were identified through orthopaedic club or interest group involvement, orthopaedic surgery grand rounds, orthopaedic surgery clinical rotations including acting internships or sub-internships, and recently matched orthopaedic residents. The survey was distributed via email using the Qualtrics XM (Provo, UT) survey platform.

Medical students and junior residents were asked if they disclosed their personal interest in a career in orthopaedic surgery to preceptors during core clinical rotations including internal medicine, general surgery, psychiatry, neurology, obstetrics and gynecology (OB/Gyn), emergency medicine, family medicine, and pediatrics. Participants were asked to elaborate on why they chose or did not choose to disclose this information during the aforementioned clerkships. Those participants who did share their interest in or-

thopaedic surgery were asked their subjective opinion on the impact this information may have had on their final clerkship grade. Demographic variables including age, sex, race, ethnicity, and geographical location data were collected to identify other potential areas of bias. Survey participation was voluntary and anonymous. 157 responses were received. 8 responses were eliminated because the respondent did not have an interest in orthopaedic surgery, leaving 149 responses included in the final analysis.

Mean and frequency were calculated for each variable. Percentage of students achieving honors among each clerkship were compared using Fisher's exact test across all independent variables. A p-value of <0.05 was considered statistically significant. Quotes were extracted from subject responses as to why they chose or did not choose to disclose to qualitatively highlight student impression of the grading process.

RESULTS

DEMOGRAPHICS

Out of 80 respondents that chose to provide demographic information, the majority were 26–32 years old (55, 68.8%), identified as male (54, 67.5%), and were White/Caucasian (58, 72.5%). Most respondents were 3rd (63, 42%) and 4th (76, 52%) year students and went to school in the northeast (41, 51.9%) ([Table 1](#)).

The overall disclosure rate among clerkships was 60.1% (90/149). Females were more likely to disclose in surgery clerkships (24/25, 96.0%) compared to males (41/53, 77.3%) ($p=0.039$). This was also true for neurology (22/24, 91.6% female vs 34/51, 66.7% male) ($P=0.02$), OB/GYN (22/24, 91.6% female vs 35/50 male, 70.0%) ($p=0.038$), psychiatry (22/25, 88.0% female vs 34/51, 66.7% male) ($P=0.047$), and emergency medicine (22/23, 95.7% female vs 32/42, 76.2% male) ($P=0.045$).

There was variability in response rate due to respondents completing clerkships at different times in their training. The highest disclosure rate was during the surgery clerkship (87/143, 64.4%) and the lowest was in psychiatry (77/132, 58.3%). Of those that disclosed, the most respondents felt it negatively impacted their grade in emergency medicine (4/34, 11.8%) and the least felt it negatively impacted their grade in neurology (2/46, 4.3%) ([Table 2](#)).

The most respondents achieved honors in family medicine (60.3% honors, 23.8% high-pass, and 15.1% pass) and

Is there anything better than a balanced knee?

Because isn't a **balanced knee** what it's all about?

Learn more about
VeraSense® for Triathlon® Sensor Technology

A surgeon must always rely on his or her own professional clinical judgment when deciding whether to use a particular product when treating a particular patient. Stryker does not dispense medical advice and recommends that surgeons be trained in the use of any particular product before using it in surgery. The information presented is intended to demonstrate the breadth of Stryker's product offerings. A surgeon must always refer to the package insert, product label and/or instructions for use before using any of Stryker's products.

Products may not be available in all markets because product availability is subject to the regulatory and/or medical practices in individual markets. Please contact your sales representative if you have questions about the availability of products in your area. Stryker Corporation or its divisions or other corporate affiliated entities own, use or have applied for the following trademarks or service marks: Stryker, Triathlon, VeraSense. VERAS-AD-9_33611 Copyright © Stryker 2022

***Advertisement**

[Click here to learn more about VeraSense](#)

Table 1. Respondent Demographics

Variable			
<i>Age (years)</i>		N=80	
	<26	22	27.0%
	26-32	55	68.8%
	32-38	2	2.5%
	>38	1	1.3%
<i>Gender</i>		N=80	
	Male	54	67.4%
	Female	26	32.6%
<i>Race</i>		N=80	
	White/Caucasian	58	72.5%
	Asian/Pacific Islander	7	8.8%
	Hispanic	7	8.8%
	Black/African American	1	1.3%
	Indian/Native American	1	1.3%
	Other	6	7.5%
<i>Level of Training</i>		N=149	
	3 rd Year Medical Student	63	42%
	4 th Year Medical Student	76	52%
	1 st Year Resident	8	5%
	2 nd Year Resident	2	1%
<i>Region</i>		N=79	
	Northeast	41	51.9%
	South	36	45.6%
	Midwest	2	2.5%
	West	1	1.3%

the least achieved honors in emergency medicine (28.8% honors, 23.7% high-pass, and 38.8% pass). No respondent failed a clerkship ([Table 3](#)).

PREDICTORS OF GRADE

Internal medicine: Respondents that disclosed an intention to apply to orthopaedic surgery received a better grade than those that did not. Of those students and residents that dis-

closed a career interest in orthopaedic surgery, 63.3% (38/60) achieved honors, whereas 37.0% (17/46) of those that did not disclose achieved honors ($p=0.011$). No other variable was associated with the final grade in internal medicine.

Surgery: There was a significant association between sex and grade. 76.0% (38/50) of men achieved a grade of honors, whereas 45.8% (11/24) of women achieved a grade of honors ($p=0.017$). Race also had an impact on grade. 70.6%

Table 2. Disclosure and Feelings of Negative Impact on Grade Among Respondents

Variable	n	%
<i>Disclosure</i>		
Emergency Medicine	76/122	62.3%
Surgery	87/143	60.0%
OB/GYN	78/130	60.0%
Pediatrics	78/131	59.5%
Family Medicine	79/134	59.0%
Internal Medicine	77/132	58.3%
Neurology	77/131	58.8%
Psychiatry	77/132	58.3%
<i>Feelings of Negative Impact on Grade</i>		
Emergency Medicine	4/34	11.8%
OB/GYN	5/49	10.2%
Internal Medicine	7/69	10.1%
Psychiatry	5/53	9.43%
Family Medicine	4/56	7.14%
Pediatrics	3/54	5.56%
Surgery	3/64	4.69%
Neurology	2/46	4.34%

(48/68) of those identifying as White/Caucasian, Black/African American, Asian/Pacific Islander, Indian/Native American, and Hispanic achieved honors, whereas 16.7% (1/6) of those identifying as a race other than one of these achieved honors ($p=0.015$). The geographic location of the respondent's medical school also had an effect on grade. 77.5% (31/40) of those in the northeast achieved honors compared to 52.9% (18/34) in the rest of the country ($p=0.030$).

OB/Gyn: Respondents that disclosed their intention to apply to orthopaedic surgery received a better grade than those that did not. Of those that disclosed a career interest in orthopaedic surgery, 48.3% (28/58) achieved honors, whereas 25.6% (11/43) of those that did not disclose achieved honors ($p=0.024$). No other variable was associated with the final grade in OB/Gyn.

Pediatrics: Race had an impact on grade. 73.8% (45/61) of those identifying as White/Caucasian, Black/African American, Asian/Pacific Islander, Indian/Native American, or Hispanic achieved honors, whereas 20.0% (1/5) of those identifying as a race other than one of these races achieved honors ($p=0.027$).

No variables were associated with clerkship performance in neurology, family medicine, psychiatry, or emergency medicine.

Respondents provided explanations for their interest in orthopaedic surgery during clerkships. Select responses are available for review in [Table 4](#).

DISCUSSION

This study found that, from a diverse cohort of medical students interested in orthopaedic surgery, approximately

half of the students chose to disclose their interest in orthopaedics during core clerkships, with 5–11% of students feeling that if they did disclose it had an impact on their clerkship grade. Contrary to this belief among some students, it appears that those that disclosed an interest in orthopaedic surgery received a higher grade than those that did not. Furthermore, most students were able to achieve honors in all clerkships, with the exception of OB/Gyn and emergency medicine, in which approximately a third of students achieved honors. We also found that sex and race may impact a student's final grade in some core clerkships.

The association between willingness to disclose an interest in orthopaedic surgery and higher clerkship performance in internal medicine and OB/Gyn is unclear. It is possible that students that chose to disclose their interest in orthopaedics felt more confident doing so because that had received high grades previously. Confidence may play a role in performance. Lee et al. surveyed 2395 medical students across the US to determine demographic variables, perceived quality of clerkship experience, assertiveness, and grade received (Lee et al. 2007). They found an association between "assertiveness" and high clerkship performance, except for in internal medicine. Students that had not received high grades in clerkships, or were less confident with their clinical skillset, may have chosen to avoid other potential sources of bias that could impact their grade and thus chose not to disclose.

As orthopaedics becomes more competitive, achieving higher clerkship grades becomes more important to differentiate oneself from other applicants ("National Resident Matching Program, Results and Data: 2018 Main Residency Match®" 2018; Trikha et al. 2020). The majority of students interested in orthopaedic surgery in this sample were

Table 3. Clerkship Performance

Variable	n	%
<i>Internal Medicine</i>		
Honors	61/116	52.6%
High Pass	43/116	37.1%
Pass	12/116	10.3%
<i>Surgery</i>		
Honors	69/125	55.2%
High Pass	30/125	24.0%
Pass	26/125	20.8%
<i>Neurology</i>		
Honors	77/131	58.8%
High Pass	54/131	41.2%
Pass	27/131	20.8%
<i>OB/GYN</i>		
Honors	41/112	36.6%
High Pass	44/112	39.3%
Pass	27/112	24.1%
<i>Pediatrics</i>		
Honors	65/115	56.5%
High Pass	29/115	25.2%
Pass	20/115	17.4%
<i>Family Medicine</i>		
Honors	76/126	60.3%
High Pass	30/126	23.8%
Pass	19/126	15.1%
<i>Psychiatry</i>		
Honors	63/114	55.3%
High Pass	28/114	24.6%
Pass	23/114	20.2%
<i>Emergency Medicine</i>		
Honors	17/59	28.8%
High Pass	14/59	23.7%
Pass	23/59	38.8%

able to achieve honors in most clerkships, with the exception of OB/Gyn and emergency medicine. Reasons for this variable performance are unclear. While there are areas of overlap, the skillset required for performance in OB/Gyn and emergency medicine are largely different from that of orthopaedics. This does not explain why students in orthopaedics were able to achieve higher grades in other seemingly unrelated specialties such as psychiatry and pediatrics. It is possible that certain clerkships may have more rigorous criteria for achieving honors, which can vary by institution and department. We did not survey students that were not pursuing orthopaedics, so determining an average grade in a specific clerkship among all students was not possible.

We found an association between female sex as well as race defined as “other” and worse clerkship performance in surgery. This could be due to bias towards females and

racial minorities. Female sex representation in surgical fields has historically been lacking (Pories et al. 2019). However, recent efforts to increase female representation has led to an increase in the proportion of females in surgical fields, including within orthopaedics (Day, Lage, and Ahn 2010). Poon et al. analyzed data from the American Association of Medical Colleges (AAMC) and found that the percentage of female orthopaedic surgery residents increased from 10.9% in 2006 to 14.4% in 2015 (Poon et al. 2019). Improved representation of women in orthopaedic surgery may lead to decrease bias against female residents and faculty. Lee et al. surveyed 2,395 medical students and found that underrepresented minorities were more likely to report worse grades across all clerkships and those identifying as Asian/Pacific Islander were more likely to report worse grades in OB/GYN, pediatrics, and neurology (Lee et al. 2007). Identifying areas of bias towards factors unrelated

Table 4. Select Quotes from Respondents by Rotation

	"I was worried about being judged for pursuing a specialty with a high salary. I did not want my preceptor to think I was uninterested in their field."
Overall	"Did not want to shoot myself in the foot. Many attendings and residents view orthopaedics and people who are interested in it unfavorably."
	"I chose to not specify my plan to go into orthopaedics during my early clerkships out of respect to my educator's chosen fields and out of respect to the general medical education process."
Internal Medicine	"After receiving a grade of High Pass, I challenged my overall grade as I felt my performance was that of Honors. Multiple professors asked me if I was applying IM and after I told them I was not, they told me not to worry about my grade. Had I been applying IM, they would have given me Honors."
	"My evaluations reflected my career interest in surgery in a positive manner"
Surgery	"I received significant benefit by disclosing for this rotation, attendings were nicer, let me do more and held me in higher esteem than co-students"
	"Chief resident/PA didn't care when I forgot my stethoscope for ED encounter saying "you want to do ortho anyway" and "bowel and heart sounds don't matter"
	"It did not negatively impact my grade, but I felt some residents were turned off after I disclosed this information"
OB/GYN	"They appreciated that I still cared about OBGYN stuff, even though I was clear I wasn't going into OBGYN"
	"Had a very positive impact. Residents and attendings sought to teach me about OR work."
Pediatrics	"Pediatrics was a very supportive specialty, they even had me see cases related to ortho"
	"Everyone was very diligent teaching about pediatric orthopaedic issues."
Family Medicine	"The attendings showed me many MSK cases during clinic"
	"They appreciated my honesty"
	"Residents and attendings were very supportive of the decision, sought to teach about sports medicine. "
Psychiatry	"Psychiatry was very supportive of me disclosing this information and catered information to my interest in ortho, especially on addiction medicine"
	"Attending was standoffish, rude. I worked extremely hard and got great resident feedback, but the attending was clearly biased negatively"
Emergency Medicine	After disclosing "I was ignored by both residents and attendings on this rotation."

to clerkship performance may allow for more objective evaluations in the future.

We found that 5–11% of students believed disclosing their interest in orthopaedic surgery impacted their grade on certain clerkships; however, we did not find this to be the case. Other studies have found students to be poor predictors of their own clerkship grades (Weiss et al. 2005; Silver and Hodgson 1997). One possible explanation for this is students may believe that factors outside of clerkship performance, such as career choice disclosure, will impact their grade. This can lead a student to falsely predict clerkship grade. Open and objective conversations are important in such scenarios where students feel bias towards them to assist in understanding of their grades.

There are several limitations to this study. First, variability in performance can be affected by the number of clerkships completed. As students progress through clerkships, they may learn how to perform better, which may improve their grade. This was not accounted for in this study, but we also did not observe this trend. For example, emergency medicine is often completed later in medical school, but students performed worse in emergency medicine. Conversely, students may also put forth less effort on rotations that are completed in fourth year compared to their third year of medical school because they have less bearing on residency match. Second, responses are subject to recall bias and thus may not accurately reflect clerkship performance. For example, residents that already matched

into orthopaedics may have less negative feelings towards receiving a lower grade than students that have not yet matched. Third, students interested in orthopaedics are highly motivated and thus represent an inherently biased sample. Willingness to participate in a survey study captures highly motivated respondents even among those interested in orthopaedic surgery. This can shift our sample to reflect higher performing students. Fourth, other confounding variables and differences among institutions in the grading process may have altered results. Schools may weigh standardized tests higher than clerkship evaluations, which are seemingly unaffected by bias. We did find that most institutions used an honors, pass, fail system which helped standardize results. There are also different cultures among institutions regarding the student clerkship experience, which can shift grading curves. Our large sample size can help mitigate some of these effects. We also included multiple institutions in different geographic locations throughout the United States to offset this effect. Even so, results may not be generalizable to all medical schools and higher-powered studies are needed to more accurately predict a national trend.

CONCLUSION

Disclosure of an interest in orthopaedic surgery as a career during third year clerkships is relatively low. Some students

believe disclosing an interest in orthopaedics may negatively impact their grade, but the opposite may be true. Other potential areas of bias that may impact grades include sex and race. Students should be aware of these findings, as it can decrease stress regarding being honest about career intentions. Conversely, clerkship preceptors can use this data to improve the grading process for students. More research is needed to improve the clerkship evaluation process given the increasingly competitive nature of the orthopaedic surgery residency application process.

ACKNOWLEDGEMENTS

None

FUNDING

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Submitted: September 15, 2022 EDT, Accepted: November 19, 2022 EDT



This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CCBY-NC-ND-4.0). View this license's legal deed at <https://creativecommons.org/licenses/by-nc-nd/4.0> and legal code at <https://creativecommons.org/licenses/by-nc-nd/4.0/legalcode> for more information.

REFERENCES

- Day, Charles S., Daniel E. Lage, and Christine S. Ahn. 2010. "Diversity Based on Race, Ethnicity, and Sex between Academic Orthopaedic Surgery and Other Specialties: A Comparative Study." *Journal of Bone and Joint Surgery* 92 (13): 2328–35. <https://doi.org/10.2106/jbjs.i.01482>.
- Edwards, Rodney K., Kenneth R. Kellner, Christopher L. Siström, and Elizabeth J. Magyari. 2003. "Medical Student Self-Assessment of Performance on an Obstetrics and Gynecology Clerkship." *American Journal of Obstetrics and Gynecology* 188 (4): 1078–82. <https://doi.org/10.1067/mob.2003.249>.
- Lee, Katherine B., Sanjeev N. Vaishnavi, Steven KM Lau, Dorothy A. Andriole, and Donna B. Jeffe. 2007. "'Making the Grade': Noncognitive Predictors of Medical Students' Clinical Clerkship Grades." *Journal of the National Medical Association* 99 (10): 1138.
- "National Resident Matching Program, Results and Data: 2018 Main Residency Match®." 2018. <https://www.nrmp.org/wp-content/uploads/2018/04/Main-Match-Result-and-Data-2018.pdf>.
- Poon, Selina, Daniel Kiridly, Muhammad Mutawakkil, Stephen Wendolowski, Rachel Gecelter, Myriam Kline, and Lewis B. Lane. 2019. "Current Trends in Sex, Race, and Ethnic Diversity in Orthopaedic Surgery Residency." *Journal of the American Academy of Orthopaedic Surgeons* 27 (16): e725–33. <https://doi.org/10.5435/jaaos-d-18-00131>.
- Pories, Susan E., Patricia L. Turner, Caprice C. Greenberg, Maya A. Babu, and Sareh Parangi. 2019. "Leadership in American Surgery: Women Are Rising to the Top." *Annals of Surgery* 269 (2): 199–205. <https://doi.org/10.1097/sla.0000000000002978>.
- Silver, B, and C S Hodgson. 1997. "Evaluating GPAs and MCAT Scores as Predictors of NBME I and Clerkship Performances Based on Students' Data from One Undergraduate Institution." *Academic Medicine* 72 (5): 394–96. <https://doi.org/10.1097/00001888-199705000-00022>.
- Takayama, Hiroo, Rebecca Grinsell, Douglas Brock, Hugh Foy, Carlos Pellegrini, and Karen Horvath. 2006. "Is It Appropriate to Use Core Clerkship Grades in the Selection of Residents?" *Current Surgery* 63 (6): 391–96. <https://doi.org/10.1016/j.cursur.2006.06.012>.
- Trikha, Rishi, Aakash Keswani, Chad R. Ishmael, Danielle Greig, Benjamin V. Kelley, and Nicholas M. Bernthal. 2020. "Current Trends in Orthopaedic Surgery Residency Applications and Match Rates." *Journal of Bone and Joint Surgery* 102 (6): e24. <https://doi.org/10.2106/jbjs.19.00930>.
- Weiss, Patrice M., Craig A. Koller, L. Wayne Hess, and Thomas Wasser. 2005. "How Do Medical Student Self-Assessments Compare with Their Final Clerkship Grades?" *Medical Teacher* 27 (5): 445–49. <https://doi.org/10.1080/01421590500046999>.