



AOA Critical Issues

Orthopaedic Surgery Away Rotations

Current Issues and Lessons Learned

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Introduction: Away rotations have become a critical factor for a successful orthopaedic surgery residency match. Away rotations significantly improve an applicant's chance of matching into an orthopaedic residency. Away rotations were limited during the 2020 to 2021 academic year because of the COVID-19 pandemic. During the 2021 to 2022 academic year, the American Association of Medical Colleges coalition recommended students only complete 1 rotation outside their home institution, whereas the American Orthopaedic Association Council of Residency Directors argued that multiple rotations should be allowed. We sought to quantify the impact of these restrictions on orthopaedic surgery applicants during the 2020 to 2021 residency application cycle.

Methods: An online survey was sent to all applicants applying to the authors' home orthopaedic surgery program. The survey asked respondents to indicate how many away rotations they completed and how many they planned to complete but were unable to complete in the 2020 to 2021 application cycle. Historical match data were obtained from the National Resident Matching Program's publicly accessible *Main Residency Match Data and Reports*.

Results: Survey responses were collected from 650 of 812 applicants (80%) to our program. Over a third of respondents (38.1%) reported completing 3 subinternship rotations during the 2020 to 2021 application cycle. Nearly a quarter of respondents (24.0%) reported completing 4 rotations. Most applicants (50.9%) were unable to complete 5 previously planned rotations because of pandemic-related restrictions, and 25.2% reported an inability to complete 4 rotations. Fewer applicants reported canceling 3 rotations (9.2%), 2 rotations (6.8%), or 1 (7.8%) rotation.

Conclusions: Away rotations have been a traditional component of the orthopaedic surgery application process. Restrictions on away rotations in the 2020 to 2021 residency application cycle had affected the number of rotations that applicants were able to complete. However, despite those restrictions, over a third of applicants were able to complete at least 3 rotations. This suggests that the away rotation experience is variable for students and may be multifactorial; however, our study did not investigate the reasons for this. Accordingly, limiting away rotations may support an inequitable environment for medical students applying to orthopaedic surgery, and creating a consensus definition among medical schools, program directors, and orthopaedic chairs of away rotations, their duration, and the maximum number allowed would enhance fairness and reduce inconsistencies.

Disclosure: The **Disclosure of Potential Conflicts of Interest** forms are provided with the online version of the article (<http://links.lww.com/JBJSOA/A376>).

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Introduction

Subinternship rotations, both at a medical student's home institution and when visiting other institutions (away rotations, also known as audition or visiting subinternship rotations), benefit medical students in several ways. Away rotations offer students the opportunity to create professional connections, demonstrate social and emotional intelligence and medical knowledge, obtain letters of recommendation, and gain experience in their specialty of interest¹⁻⁴. Away rotations are particularly valuable to medical students applying to competitive residencies such as orthopaedic surgery^{1-3,5,6}. Because orthopaedic surgery is among the most competitive specialties to match into, applicants apply to an average number of programs 2 standard deviations above the mean relative to all other specialties^{7,8}. According to a survey conducted by the American Academy of Medical Colleges (AAMC), 54.7% of 15,860 survey respondents completed at least 1 visiting subinternship rotation in the 2019 to 2020 academic year⁹. In comparison, more than 95% of applicants to orthopaedic surgery programs completed visiting subinternship rotations in the same period⁹.

Medical students are also more likely to interview and match at programs at which they complete away rotations. A study by Kremer et al. in 2021 found that the odds ratio of being offered an interview after attending an away rotation was highest in orthopaedic surgery relative to all other studied specialties¹⁰. Furthermore, nearly three-fifths of applicants to orthopaedic surgery match to institutions where they completed a rotation^{1,10,11}. This trend is supported by surveys of program directors, as O'Donnell et al. and Mueller et al. independently identified residency recruitment and evaluation of an applicant's fit with other resident personalities, educational expectations, and program culture as the highest priority for residency program directors with visiting students¹²⁻¹⁴.

In May 2020, the Coalition for Physician Accountability released guidance recommending against all visiting subinternship rotations for fourth-year medical students during the 2020 to 2021

academic year¹⁵. This created difficulty for applicants across all specialties attempting to travel for rotations, especially those in competitive specialties and those who needed standardized letters of evaluation. During the 2021 to 2022 academic year, restrictions have remained in place as the Association of Medical Colleges coalition has recommended students only complete 1 away rotation¹⁶. However, this recommendation was countered by the American Orthopaedic Association Council of Residency Directors, which has published recommendations to permit students to complete more than 1 away rotation¹⁷. The purpose of our study was to evaluate the effect of these pandemic-related restrictions on orthopaedic surgery applicants during the 2020 to 2021 application cycle for away rotation completion, which could potentially persist through the 2021 to 2022 application cycle and beyond.

Methods

After obtaining institutional review board approval, an anonymous online survey (Qualtrics) was sent to the 812 applicants applying to the orthopaedic surgery residency program at the authors' home institution, an academic, private, city-based, smaller sized program in the Southwest. The survey was sent through email, and applicants were informed that survey completion was optional and confidential and had no bearing on their application status. Respondents were asked to answer the following questions: (1) How many subinternship rotations in your desired specialty will you complete this cycle? (2) How many subinternship rotations did you plan to complete but were not able to because of COVID-19 limitations? Answer choices were 0, 1, 2, 3, or ≥ 4 . To evaluate correlated changes in match rates for orthopaedic surgery, historical match data were obtained from the National Resident Matching Program's (NRMP) publicly accessible *Main Residency Match Data and Reports* webpage¹⁸. Match rates in the 2019 to 2020 versus the 2020 to 2021 match cycles were compared using chi square analysis. All statistical analysis was performed using Microsoft Excel (Microsoft).

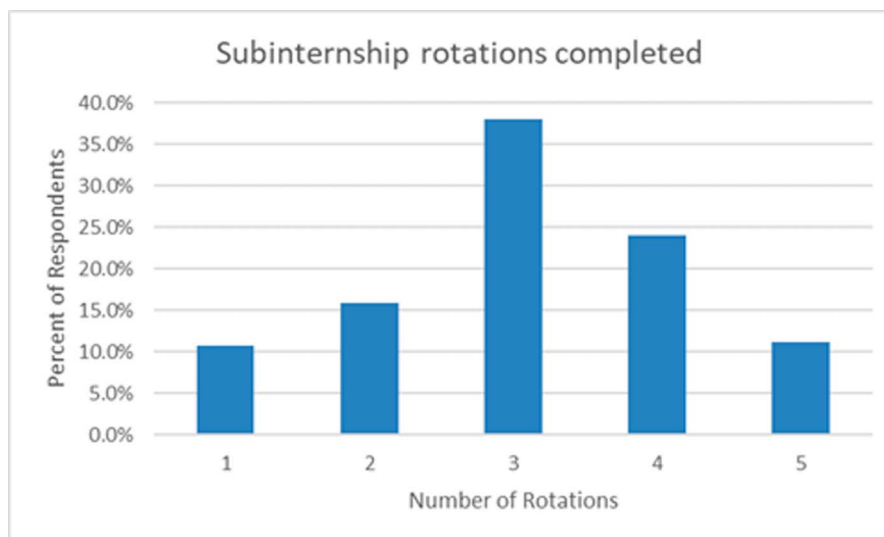


Fig. 1

Reported subinternship rotation completion in the 2020 to 2021 application cycle demonstrated as percentage of respondents.

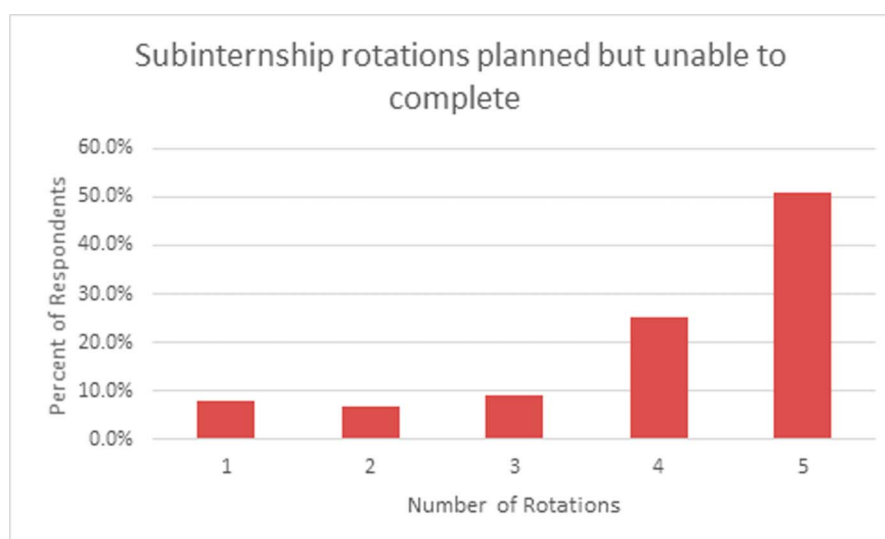


Fig. 2
Subinternship rotations planned but uncompleted in the 2020 to 2021 application cycle demonstrated as percentage of respondents.

Results

Of 1,177 total orthopaedic surgery applicants, 812 (812/1,177; 69%) applied to our program. Survey responses were collected from 650 participants (650/812; 80%). Respondents most frequently reported completing either 3 (38.1%), 4 (24.0%), or 2 (15.9%) subinternship rotations in the 2020 to 2021 residency application cycle. The remaining applicants reported completing either 5 rotations (11.1%) or 1 rotation (10.8%) (Fig. 1). Most of the applicants (50.9%) reported an inability to complete 5 previously planned rotations due to pandemic-related restrictions. One-quarter (25.2%) reported being unable to complete 4 rotations, while 9.2%, 7.8%, and 6.8% reported being prevented from completing 3 rotations, 2 rotations, and a single rotation, respectively (Fig. 2). Match rates in orthopaedic surgery decreased significantly in the 2020 to 2021 cycle relative to the 2019 to 2020 cycle (79.21% to 74.84%; $p = 0.02$) (Table I).

Discussion

The results of this study demonstrate that the ability to participate in subinternship rotations was significantly

limited during the 2020 to 2021 application cycle for orthopaedic surgery applicants. Owing to pandemic-related restrictions on rotations imposed by medical schools both for their own students and for students intending to complete rotations, most of the applicants were unable to complete at least 3 previously planned sub-I rotations, despite more than a third of the applicants still completing 3 or more rotations. Hence, most applicants had planned for a far greater number of sub-I than they were able to complete. Together, these results demonstrate a widely variable medical student experience regarding orthopaedic surgery subinternships in the face of pandemic-related restrictions.

Driven by the COVID-19 pandemic, restrictions were implemented to uniformly reduce travel by students to complete rotations. As such, students may have had only the opportunity to complete a subinternship at their home program or at a local program in their vicinity. Despite these limitations, our results demonstrate that nearly 90% of the applicants were able to participate in more than 1 away rotation. It remains unclear how most students were able to complete additional away rotations. One explanation may involve programs with multiple geographic sites, such that rotations at separate facilities would still be considered a single rotation despite being over 2 or 3 separate months with separate teams. Another explanation would be informal rotations not reported as away rotations because of either being performed during a vacation month or being completed outside the knowledge of the hosting medical school. Each of these involves unique circumstances that depend heavily on program resources, personal relationships, and medical school flexibility.

Efforts have been made to increase opportunities for medical students during the 2021 to 2022 academic year. In January 2021, the AAMC released new guidance allowing up to 1 external sub-I per specialty for students¹⁹. Despite down-trending COVID-19 cases and relaxation of restrictions nationwide, this guidance was upheld in April 2021, with the

TABLE I Match Statistics for US MD Seniors Applying to Orthopaedic Surgery in the 2019 to 2020 Application Cycle Compared with the 2020 to 2021 Applicant Cycle

Specialty	2019-2020 Match Rate (%)	2020-2021 Match Rate (%)	p Value
General surgery	74.96	73.24	0.46
Neurological surgery	74.36	73.61	0.67
Orthopaedic surgery	79.21	74.84	0.02*
Plastic surgery	69.92	69.87	0.80

* $p < 0.05$.

AAMC discouraging additional away rotations²⁰. However, this recommendation has been challenged in the orthopaedic surgery community. The American Orthopaedic Association Council of Orthopaedic Residency Directors released a statement supporting the completion of multiple external sub-Is for medical students, citing the importance of these rotations for residency recruitment and for exposure of medical students without an orthopaedic surgery department at their home institution¹⁷. They also note the disproportionate impact that limiting rotations have on students from smaller programs, underrepresented minority students, and students from less prestigious medical schools. As supported by our results, students will likely continue to complete rotations, but rotation completion may depend on program resources, reputation, and connections, furthering an unbalanced and inequitable environment for students in the 2021 to 2022 application cycle.

Visiting rotations have also been documented to increase chances of matching to a given institution, with estimates of 58% of orthopaedic applicants, 57% of plastic surgery applicants, 33% of neurosurgery applicants, and 3% of general surgery applicants matching into programs where they completed an away rotation¹¹. Similarly, Baldwin et al. identified a significantly increased odds ratio to match into orthopaedic surgery in applicants who had completed 2 or more away rotations relative to those who had not completed any¹. In the 2020 to 2021 application cycle, match rates decreased significantly for senior allopathic students applying to orthopaedic residencies. Although outside of the scope of this study to analyze this change, the decreased overall rate of matching suggests increased competition and interest in orthopaedic surgery relative to other surgical subspecialties in the 2020 to 2021 application cycle. Although speculative, it is possible that the circumstances surrounding this application cycle could have created an unfair or disproportionate setting for applicants in this historically competitive cycle. Virtual interviews offer convenience in that they are less expensive, do not require travel, and are typically of shorter duration. Accordingly, these factors may have led to the top applicants retaining a disproportionate number of interviews relative to years past because there were less financial and logistic barriers to completing as many interviews as possible^{21,22}. In the absence of visiting subinternships, those applicants who may have objectively fallen into lower tiers for interview offers did not have the opportunity to showcase their subjective abilities to programs, which may have altered the distribution of interview offers²³. Consequently, lower tier applicants could have received a disproportionately lower number of interview slots, reducing the chances of a successful match for these individuals.

Several limitations should be considered. Although our institution receives many applications, our sample does not represent the entire orthopaedic surgery applicant population at large. Furthermore, our study did not delineate US allopathic seniors, osteopathic seniors, international medical graduates, and nontraditional residency applicants. In addition,

the NRMP reported a record-breaking number of residency applicants across all specialties during the 2020 to 2021 application cycle¹⁸, as did ophthalmology, which does not participate in the NRMP match process²⁴. In the presence of other factors potentially affecting match rates, we cannot necessarily conclude an exclusive relationship between sub-I rotations and match statistics. In addition, accurate responses to the survey questions depend on a unanimous interpretation of “subinternship rotation,” and this may vary between students.

Conclusion

Away rotations are critical to the orthopaedic surgery application process. Formal restrictions placed on away rotations in the 2020 to 2021 residency application cycle had affected the number of rotation applicants who were able to complete. Despite these limitations, our results demonstrate that over a third of applicants were able to complete at least 3 rotations. This suggests that the away rotation experience is widely variable for students and likely depends on medical school policy, networking, medical school reputation, and program resources (such as capacity limits on medical student rotators or support for home students to travel), and thus, limiting away rotations may support an inequitable environment for medical students applying to orthopaedic surgery. Furthermore, inconsistent adherence to recommendations on behalf of programs or applicants may have led to additional disequilibrium in the distribution of away rotations for medical students. Creating a consensus definition among medical schools, program directors, and orthopaedic chairs of away rotations, their duration, and the maximum number allowed would enhance fairness and reduce inconsistencies. Beyond standardization of away rotation policies, efforts to provide further resources to aid medical students in making connections, showcasing skills, and learning more about programs outside of the away rotation process could include virtual rotations, formal networking events, or expanded interinstitution collaboration. ■

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