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TOPICS IN TRAINING

Factors Influencing Resident Satisfaction and Fellowship Selection in Orthopaedic Training Programs

An American Orthopaedic Association North American Traveling Fellowship Project

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Background: There is limited literature available about educational satisfaction and fellowship selection among orthopaedic surgery residents. The purpose of this study was to identify factors that influence resident subspecialty career choice, fellowship selection, and satisfaction with orthopaedic training programs.

Methods: A self-report survey was electronically administered to orthopaedic surgery residents at 44 academic centers in the United States and Canada. Basic demographic information and level of satisfaction with a number of factors (surgical independence, mentorship opportunities, etc.) were evaluated using a 5-point Likert scale ranging from “excellent” to “poor.” Summary statistics and group differences for discrete variables were compared with use of a chi-square test.

Results: Of the 283 respondents, 77% rated residency program satisfaction as “very good” or “excellent,” and 93% said they would choose the same training program again. Decreased surgical independence ($p < 0.01$), poor faculty reputation ($p < 0.01$), reduced volume and variety of cases ($p < 0.01$), inadequate mentorship ($p < 0.01$), and reduced educational opportunities ($p < 0.01$) were associated with low satisfaction. Surgical variety and job opportunities were the top 2 factors contributing to subspecialty choice. Sports medicine and joints were the most popular career choices; case volume, surgical variety, and program reputation were the top factors contributing to fellowship program selection.

Conclusions: In order to achieve resident satisfaction, orthopaedic training programs should strive to improve resident surgical independence, surgical case variety, mentorship programs, faculty reputation, and educational opportunities. Important factors for fellowship program selection include case volume, surgical variety, and overall program reputation.

Orthopaedic surgery residency education is constantly evolving. Most recently, the ACGME (Accreditation Council for Graduate Medical Education) implemented work hour restrictions, which have been shown to reduce the amount of time

that residents participate in clinical care, operating room training, and teaching by faculty¹⁻⁵. Constant reassessment of orthopaedic residency training quality is critical in order to maintain a high-quality educational curriculum and produce competent

*2015 North American Traveling Fellowship (NATF) fellows

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TABLE I Demographic Characteristics of Survey Participants*

Characteristic	No. (%)
Year	
PGY-1	51 (18%)
PGY-2	49 (17%)
PGY-3	55 (19%)
PGY-4	62 (22%)
PGY-5	60 (21%)
Research resident	6 (2%)
Sex	
Male	229 (81%)
Female	52 (19%)
Race	
White	244 (86%)
Black or African American	9 (3%)
Asian	21 (7%)
Other	9 (3%)
Ethnicity	
Not Hispanic or Latino	263 (93%)
Hispanic or Latino	6 (2%)
Age (yr)	
25-29	142 (50%)
30-35	132 (47%)
36-40	9 (3%)
Rank order list†	
1 to 3	223 (86%)
4 to 6	26 (10%)
7 to 9	5 (2%)
10 to 12	6 (2%)

*PGY = postgraduate year. †Some of the respondents did not answer this question, which is reflected in the total number of respondents.

orthopaedic residents who are prepared for independent practice. Residency program satisfaction is a meaningful indicator of perceived educational quality and may produce better-trained surgeons⁶⁻⁸. Various factors that influence resident satisfaction have been proposed, including call-schedule structure, mentorship programs, effective faculty teaching, and surgical independence^{6,7}. However, there is limited orthopaedic literature that has assessed educational satisfaction and the factors that influence career subspecialty choices within residency training programs.

Surgical residency is a highly demanding enterprise, replete with psychosocial stressors. Trainees often find it difficult to balance personal and professional needs, and they are subject to rigorous job demands with steep expectations. These factors can have a profound impact on resident well-being and can lead to physician burnout, a psychological syndrome involving emotional exhaustion, depersonalization, and a diminished sense of personal accomplishment⁹. Burnout is especially prevalent among orthopaedic residents, with 30% showing high levels

of emotional exhaustion and >50% showing high levels of depersonalization¹⁰. Other reports have found burnout rates of 50% to 60% among orthopaedic surgeons, with the highest rates among residents^{11,12}. Burnout also is associated with a decreased quality of medical care that is provided to patients, increased risk of errors in patient care, and decreased career satisfaction¹³⁻¹⁵. As the demand for orthopaedic surgeons continues to increase, programs must continue to find ways to improve the quality of education for trainees by identifying and improving the factors that result in resident dissatisfaction.

The purpose of this study was to survey orthopaedic residents at major academic centers across the United States and Canada in order to identify the factors that are associated with residency training program satisfaction. Additionally, we sought to identify the factors that contribute to subspecialty career choices and fellowship program selection. The findings of this paper highlight the different aspects of orthopaedic residency education that, from the residents' perspectives, require improvement. Furthermore, we have identified important factors that influence residents' selection of subspecialty career and fellowship program choices.

Materials and Methods

A self-report survey was developed by 5 board-certified academic orthopaedic surgeons who had participated in the 2015 American Orthopaedic Association (AOA) North American Traveling Fellowship (NATF); the survey was administered anonymously via REDCap electronic data capture in November 2015 to residents at 44 major academic centers in the United States and Canada. The survey included questions that were intended to assess resident training program satisfaction and reasons for subspecialty and fellowship program selection (see Appendix). Basic demographic information was collected, including age, sex, race, ethnicity, year in residency, and fellowship choice. Additional questions sought to assess resident satisfaction with various aspects of the residency program (surgical independence, mentorship opportunities, etc.) using a 5-point Likert scale ranging from "excellent" to "poor." For the questions that were related to the factors of greatest importance

TABLE II Subspecialty Fellowship Choice

Subspecialty Fellowship	No. (%)
Sports medicine	33 (12%)
Joints	33 (12%)
Hand	23 (8%)
Trauma	16 (6%)
Spine	16 (6%)
Pediatrics	14 (5%)
Foot and ankle	10 (4%)
Shoulder and elbow	7 (2%)
Tumor	2 (1%)
Undecided or not pursuing fellowship	131 (46%)

TABLE III Factors Contributing Most to Subspecialty Career Choice*

Factor	No. (%)	P Value
Surgical variety	90 (32%)	Ref.
Job opportunities	44 (16%)	<0.001
Mentorship opportunities	43 (15%)	<0.001
Prestige/academics	24 (9%)	<0.001
Location	22 (8%)	<0.001
Salary	12 (4%)	<0.001
Other	25 (9%)	<0.001

*Ref. = reference.

that were considered when selecting a residency or fellowship program, respondents were allowed to select up to 2 responses.

Summary statistics were calculated for all continuous variables in terms of means and standard deviations, as well as frequencies and percentages for categorical variables. Group differences among categorical variables were compared with use of a chi-square test. Where questions were not posed as mutually exclusive responses (i.e., up to 2 responses were possible), rate ratios were calculated to determine the significance of associations between the top response and all other responses. All statistical analyses were performed using SAS software (version 9.3).

Results

Overall, 1,088 orthopaedic residents were e-mailed the survey, and 283 orthopaedic residents responded (response rate, 26%). The majority of the residents were white ($n = 244$, 86%), male ($n = 229$, 81%), and between the ages of 25 and 35 years ($n = 274$, 97%). There was a fairly even distribution based on year in residency (Table I).

Respondents applied to 39 (range, 0 to 156) residency programs on average; 86% matched into a top-3 ranked program, and 96% matched into a top-6 ranked program. The average number of hours worked per week was 75 (range, 40 to 120); 38% of residents reported being on call more than every fifth night ($>Q5$), and 93% responded that they would select the same residency program again.

Career Plans and Expectations

Fellowship/Subspecialty Selection

Ninety-nine percent of residents who responded to the survey planned to pursue a fellowship; the most common choices for fellowships were sports medicine (12%) and joints (12%) (Table II). Among those who had already selected a fellowship, the top 2 factors that contributed most to their subspecialty career choice for advanced training were surgical case variety (32%) and job opportunities (16%) (Table III). The volume and variety of cases (24%) and the overall reputation of the program (22%) were of greatest importance when selecting a specific fellowship program (Table IV). "Personal interest/diversifying

my subspecialty area(s)" (77%) was the primary reason noted for respondents who were pursuing >1 fellowship.

Career Setting

Most of the residents intend to pursue a career in academic medicine (30%) or in a private/community practice with >10 partners (31%), while only 2% intended to become solo practitioners. Additionally, 37% of the residents planned to work between 60 and 70 hours per week as an attending physician, 37% expected to have a starting salary between \$250,000 and \$349,000, and 28% expected to have between \$200,000 and \$299,000 of debt.

Educational Factors

Overall, 56% of residents rated their level of surgical independence as "very good" or "excellent." Among those who would select the same residency program again, 59% rated surgical independence as "very good" or "excellent," and only 9% rated surgical independence as "fair" or "poor." Conversely, 24% of those who would not choose the same residency program again rated surgical independence as "fair" or "poor" ($p = 0.001$; Fig. 1).

Overall, the great majority (81%) rated the reputation of faculty as "very good" or "excellent." Among those who would select the same residency program again, 84% rated the reputation of faculty as "very good" or "excellent," compared with 52% of those who would not select the same residency program again. Additionally, only 2% of those who would select the same residency training program again rated their faculty as "fair" or "poor," compared with 19% of residents who would not select the same residency training program again ($p < 0.0001$; Fig. 2).

Most residents (76%) rated their program's volume and variety of cases as "very good" or "excellent," compared with 2% who rated the volume and variety of cases as "fair" or "poor." Overall, 78% of those who would select the same residency program again rated the volume and variety of cases at their institution as "very good" or "excellent," compared with 43% who would not select the same residency program again. Less than 1% of those who would select the same residency program again rated the volume and variety of cases at their institution as "fair" or "poor," while 19% of those who would not select

TABLE IV Areas of Greatest Importance When Selecting a Fellowship Program*

Area	No. (%)	P Value
Volume/variety of cases	69 (24%)	Ref.
Overall reputation/academics	62 (22%)	0.428
Surgical independence	42 (15%)	0.001
Caliber or reputation of faculty/staff	36 (13%)	<0.001
Location	34 (12%)	<0.001
Mentorship opportunities	29 (10%)	<0.001
Educational opportunities	15 (5%)	<0.001
Research opportunities	1 (0%)	<0.001

*Ref. = reference.

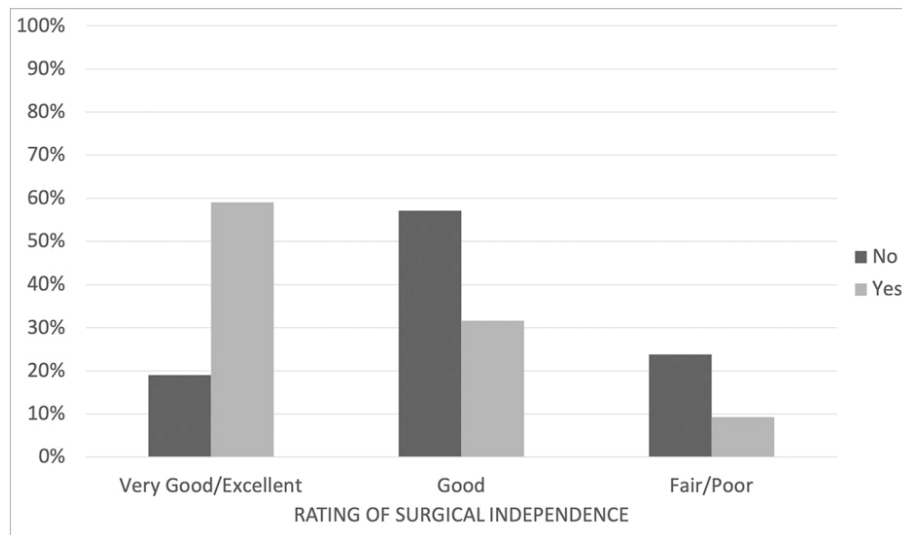


Fig. 1

Bar graph depicting the rating of surgical independence based on the percentage of residents who would or would not select the same training program again.

the same residency program again gave ratings of “fair” or “poor” ($p < 0.001$; Fig. 3).

Overall, the majority (66%) rated mentorship opportunities as “very good” or “excellent”; only 10% viewed mentorship opportunities as “fair” or “poor.” Among those who would select the same residency program, 70% rated their mentorship opportunities as “very good” or “excellent,” compared with 24% of those who would not select the same program again. Among those who would not select the same residency program again, 48% of those rated mentorship opportunities as “fair” or “poor,” compared with 5% of those who would select the same program again ($p < 0.0001$; Fig. 4).

Overall, most residents (71%) rated their educational opportunities as “very good” or “excellent,” while 7% of those

completing the survey rated their educational opportunities as “fair” or “poor.” The majority of those who would select the same residency program again (73%) rated their educational opportunities as “very good” or “excellent,” compared with 40% of those who would not select the same program again. Meanwhile, 40% of those who would not select the same residency program again and 5% of those who would select the same residency program again rated their educational opportunities as “fair” or “poor” ($p < 0.0001$; Fig. 5).

Preparation for independent practice was assessed as a measure of overall training-program effectiveness. The majority (68%) felt prepared for independent practice, while only 4% felt unprepared. Of those who would select the same residency program again if given the opportunity, 73% felt that their program

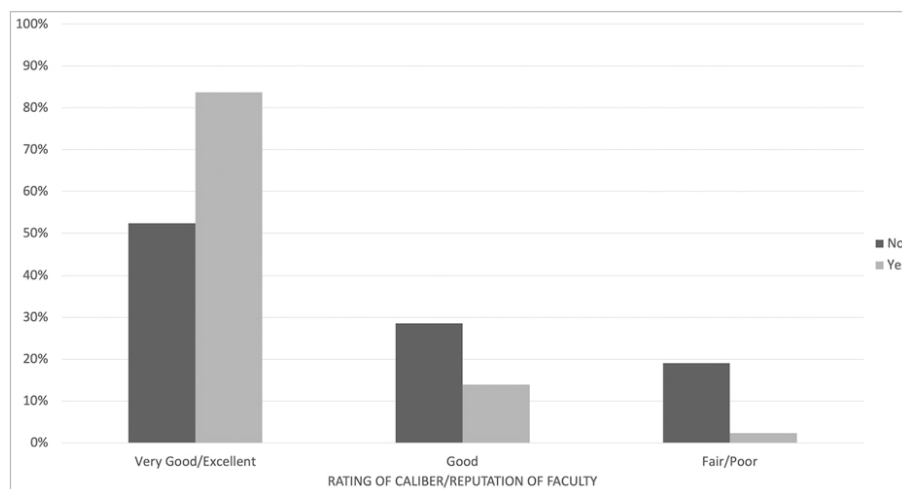


Fig. 2

Bar graph depicting the rating of caliber or reputation of faculty/staff based on the percentage of residents who would or would not select the same training program again.

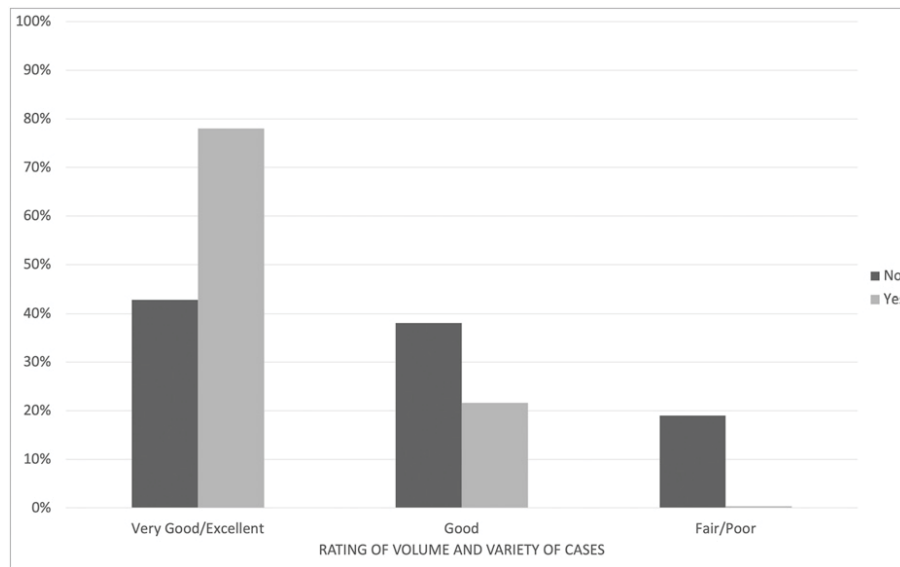


Fig. 3

Bar graph depicting the rating of volume and variety of cases based on the percentage of residents who would or would not select the same training program again.

has prepared them for independent practice, while just 2% felt unprepared. Conversely, among those who would not select the same program again, only 29% felt prepared for independent practice, and 25% felt unprepared ($p < 0.001$).

Overall Satisfaction

Overall, 77% of residents rated overall program satisfaction as “very good” or “excellent”; just 4% rated satisfaction with their program as “fair” or “poor.” For those who would select the same residency program again if given the opportunity, 83% rated satisfaction with their program as “very good” or

“excellent,” while 1% responded with “fair” or “poor.” Conversely, of those who would not select the same residency program again, 38% rated satisfaction as “fair” or “poor” ($p < 0.001$; Fig. 6).

Predictors of Resident Satisfaction

Overall training program satisfaction was associated with study participants’ desire to choose the same residency program again if given the opportunity ($p < 0.01$). A disproportionately larger number of study participants who would not select the same program again indicated program dissatisfaction. Age,

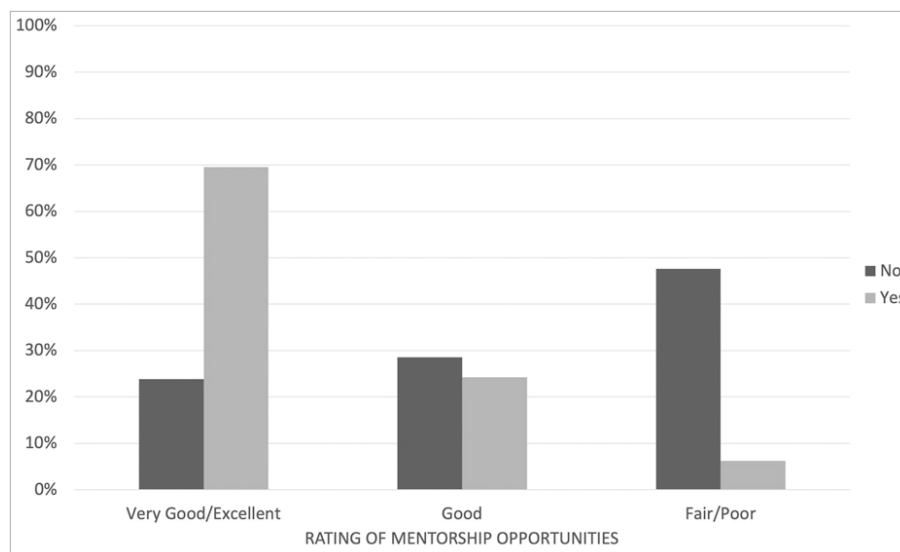


Fig. 4

Bar graph depicting the rating of mentorship opportunities based on the percentage of residents who would or would not select the same training program again.

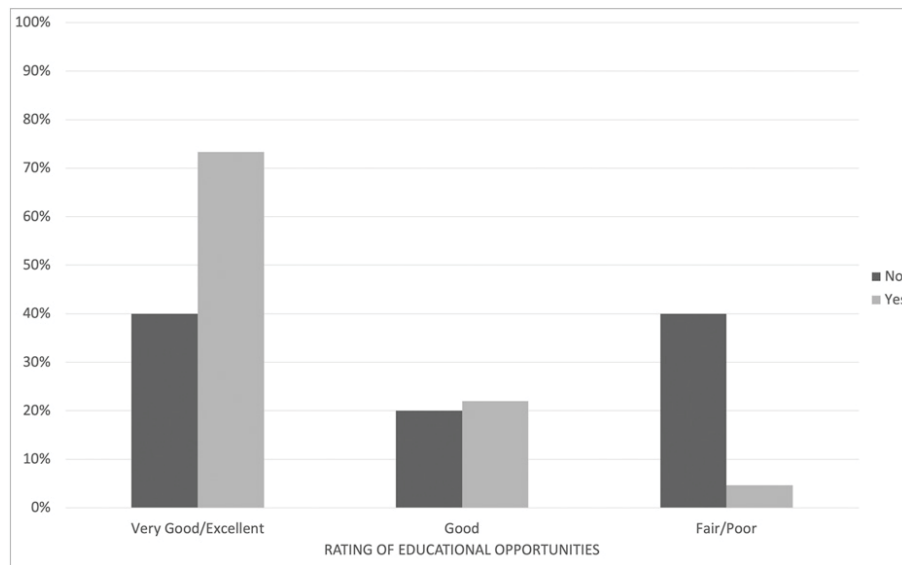


Fig. 5

Bar graph depicting the rating of educational opportunities based on the percentage of residents who would or would not select the same training program again.

sex, race, year in training program, residency rank order, average call schedule, future career setting, and anticipated weekly hours as an attending physician were not associated with choosing to select the same residency program again.

When evaluating factors that are related to educational satisfaction, those who were satisfied with their program rated their level of surgical independence ($p < 0.01$), caliber and/or reputation of faculty/staff ($p < 0.01$), volume and variety of cases ($p < 0.01$), mentorship opportunities ($p < 0.01$), and overall educational opportunities ($p < 0.01$) significantly higher than those who were dissatisfied with their residency program (Table V). Furthermore, those who would select the same residency program again felt significantly more prepared

for independent practice than those who would not select the same residency program again ($p < 0.01$).

Overall, academic reputation (56%), location (45%), and surgical independence (31%) were the areas of greatest importance when selecting a residency training program ($p < 0.001$). Volume and variety of cases, caliber or reputation of faculty, educational opportunities, mentorship, and research opportunities were all rated as less important (Table VI).

When asked about an area of improvement for the residency program, most of the residents selected surgical independence (50%), followed by educational opportunities (17%), faculty reputation (14%), and mentorship opportunities (6%) (Table VII); 29% of those who would not select the same

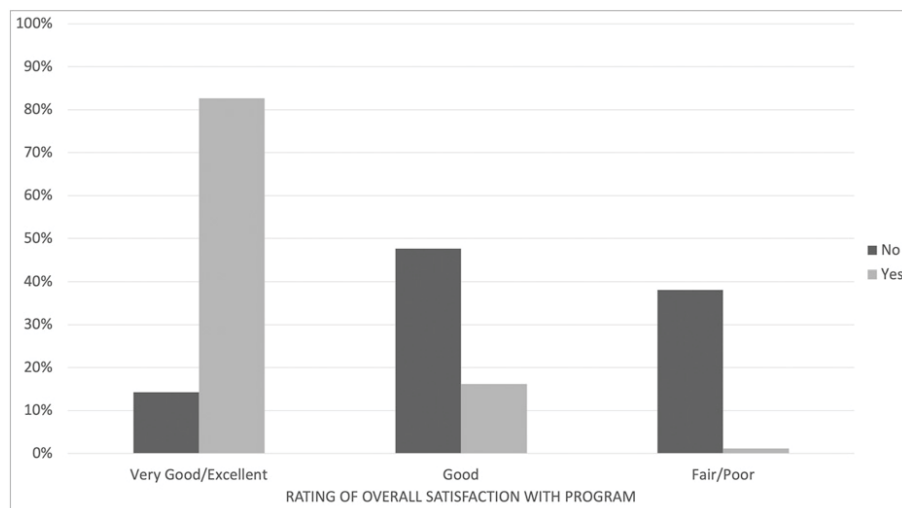


Fig. 6

Bar graph depicting the rating of overall satisfaction with a particular program based on the percentage of residents who would or would not select the same training program again.

TABLE V Important Factors Related to Satisfaction with a Residency Training Program

Factor	No. (%)
Volume and variety of cases*	278 (98%)
Caliber and/or reputation of faculty/staff*	272 (96%)
Educational opportunities*	262 (93%)
Surgical independence*	254 (91%)
Mentorship opportunities*	254 (91%)
Preparedness for independent practice†	191 (68%)

*Response of excellent, very good, or good. †Response of yes.

TABLE VI Areas of Greatest Importance When Selecting a Residency Program*

Area	No. (%)	P Value
Overall reputation/academics	158 (56%)	Ref.
Location	127 (45%)	<0.001
Surgical independence	87 (31%)	<0.001
Volume/variety of cases	72 (25%)	<0.001
Caliber or reputation of faculty/staff	49 (17%)	<0.001
Educational opportunities	48 (17%)	<0.001
Mentorship opportunities	29 (10%)	<0.001
Research opportunities	11 (4%)	<0.001
Other	12 (4%)	<0.001

*Ref. = reference.

residency program again saw mentorship opportunities as the area requiring the most improvement.

Discussion

To our knowledge, this study is the first to investigate the factors that influence educational satisfaction, career choice, and fellowship program selection among residents within orthopaedic surgery training programs across the United States and Canada. Our study found that trainees are generally very satisfied with their current program, and the overwhelming majority would select the same program again if given the opportunity. Satisfaction with orthopaedic surgery training programs in our study was comparable with satisfaction among residents across other specialties¹⁶. The majority (93%) of orthopaedic residents would choose the same residency program again if given the opportunity. The demographic factors of orthopaedic residents, including age, sex, race, and year, made no difference in overall training program satisfaction and correlated well with the general demographics that previously have been reported for orthopaedic trainees. For example, the sex distribution in our study population (81% male) with a majority (86%) of white respondents is representative of reported national percentages¹⁷.

We hypothesized that trainees' preconceived views of their respective programs could influence their subsequent satisfaction. For example, trainees who matched to programs lower on their rank order list may have higher rates of dissatisfaction with that program. However, we found this statement to be false. The vast majority (86%) of residents in our survey matched into 1 of their top-3 ranked programs, and rank order did not influence whether the trainees would select the same program again. Other factors were more influential in resident satisfaction with their own training programs than where they fell on the rank order list when they matched.

Many orthopaedic training programs differ in their resident call schedules. On average, 38% of those surveyed in our study reported being on call >Q5. Previous studies have implicated call schedule as a factor that influences resident quality of life¹⁸. However, we found no correlation between call schedule and orthopaedic trainee satisfaction in our study. Implementation of a night float call system to decrease the overall frequency of calls and the number of hours spent on call in certain training programs may improve the residents' quality of life and overall satisfaction¹⁹. However, Zahrai et al. reported that residents in the standard call group had better health-related quality of life compared with those in the night float group¹⁸. It is still debatable whether the rigor or frequency of the call schedule will influence a resident's satisfaction and ultimately play a role in his or her subspecialty career choice.

Our study identified educational factors that can be targeted directly by programs to improve trainee satisfaction. First, poor faculty reputation was correlated with decreased satisfaction among residents. This finding is important, and it requires a long-term commitment to faculty development and resource allocation by programs. Overall program reputation and trainee satisfaction should improve by aggressively recruiting and providing incentives to retain high-caliber faculty. We found that residency reputation and academic rank were the areas of greatest importance to residents when selecting a residency training program. Academic prestige is largely influenced by faculty teaching reputation within that program as well as the quality and the quantity of ongoing research. Second, poor quality of educational opportunities, such as core conferences, cadaver laboratories, and lectures, also was associated with lower trainee satisfaction. Orthopaedic surgery residents are expected to balance demanding clinical responsibilities on the floor with operating-room time, while adhering to strict ACGME work

TABLE VII Areas of Improvement Most Needed for Training Program

Area	No. (%)
Surgical independence	141 (50%)
Educational opportunities	47 (17%)
Caliber or reputation of faculty/staff	39 (14%)
Mentorship opportunities	17 (6%)
Other	35 (13%)

hour restrictions. As a result, time dedicated to core lectures and other educational opportunities is valuable but often limited. Quality improvements can be made in lectures, grand rounds, and hands-on skills laboratories to improve trainee satisfaction and overall education. Additionally, frequent citing of medical literature by attending physicians to support patient-care decisions and spontaneous or unplanned presentations by attending physicians are both associated with increased satisfaction among general surgery residents⁶. Orthopaedic surgery training programs should encourage attending physicians to employ these tactics to improve educational satisfaction among trainees.

A third educational variable that we identified as influential in trainee satisfaction is mentorship. Inadequate mentorship was associated with a reduced likelihood of selecting the same training program again. Previously, it has been shown that orthopaedic surgery trainees view mentors as beneficial to their training; mentors assist in helping them achieve career goals as well as job placement. Orthopaedic residents are most satisfied with mentorship when they select their own mentor and when formal mentorship programs are in place²⁰. Orthopaedic surgery training programs can substantially increase their trainee satisfaction by implementing effective mentorship programs.

Two factors that are specifically related to satisfaction with surgical training and subspecialty career selection by orthopaedic residents include the volume and variety of surgical cases. Among study participants pursuing a fellowship, the factor contributing most to their choice for advanced training was surgical variety. Furthermore, one of the areas of greatest importance in selecting a specific fellowship program was a robust volume and variety of cases. In addition to academic reputation, both mentorship and job opportunities are important factors in fellowship program selection. The 2 most popular choices for subspecialty training were sports medicine and joints. As a result of informal conversations with residents and colleagues, we suspect that selecting sports medicine as a career choice may be related to the outpatient setting and lifestyle, while interest in total joint fellowships may be related to the increased demand in the job marketplace from aging baby boomers.

Lastly, the most important factor in residents' happiness with their training programs was reported to be surgical independence. We found that decreased surgical independence or autonomy was directly related to reduced satisfaction among orthopaedic trainees. Just over half of our survey respondents felt that their level of surgical independence was "very good" or "excellent." Furthermore, 59% of residents who would select the same residency training program again rated their surgical independence as "excellent" or "very good," compared with only 19% of residents who would not select their own residency program again. A similar finding was reported in the field of general surgery where resident satisfaction with individual cases is associated with increased autonomy, a resident's perceived role of being the primary surgeon, and performing more than half of the cases⁶. Furthermore, being the primary operating surgeon in major surgeries is associated with increased overall educational satisfaction among general surgery residents, while being overly supervised in the operating room is

correlated with decreased satisfaction⁶. Our study demonstrates the value of surgical independence and trainee satisfaction in orthopaedic surgery training programs. The majority of our study participants chose surgical independence as the single most important area for improvement in their orthopaedic training program. Moreover, orthopaedic surgery residents desire increased time in the operating room²¹. Orthopaedic residency programs can improve trainee satisfaction by increasing time spent in the operating room and encouraging trainees to serve as the primary surgeon with more autonomy and graduated responsibilities in as many cases as possible.


Most of the orthopaedic trainees who participated in this study felt adequately prepared for independent practice, reflecting effective training programs. However, those who felt unprepared for independent practice were more likely to express dissatisfaction with their training program. This finding may be related to several factors, including decreased surgical independence, mentoring opportunities, or faculty reputation. Orthopaedic surgery residency programs can implement the changes in educational programs that we have identified above to improve educational satisfaction and program quality.

This study does have some limitations. First, we had a relatively low response rate (26%), which may be due to a myriad of factors. Having a low response rate does introduce this study to nonresponse bias, which is error resulting from distinct differences between the people who responded to the survey and the people who did not respond. However, Yun and Trumbo reported that the average response rate in survey research utilizing e-mail is around 25% to 30%²², which is in line with our study. Second, although we surveyed programs throughout the United States and Canada, these were primarily academic and military programs, and we had less representation from community-based residency programs. As a result, we were unable to compare responses based on academic versus community-based orthopaedic residency programs. Furthermore, we only surveyed resident satisfaction at a single time point and were unable to evaluate satisfaction in a longitudinal or prospective fashion. This also leads to another limitation: the surveys included questions of preference even though the majority, if not all, of the respondents had been at only 1 institution for their training because of the rarity of trainees changing programs.

In summary, this survey of current residents identified numerous factors that are associated with satisfaction among trainees and factors that are important for both career subspecialty choice and fellowship program selection. Orthopaedic training programs should strive to improve the caliber and reputation of faculty/staff, mentorship programs, educational opportunities, variety of surgical cases, and, most importantly, surgical independence in the operating room. Surgical variety and job opportunities were the top 2 factors contributing to subspecialty career choice. Important factors in fellowship program selection include volume and variety of cases as well as overall academic reputation. Improving trainee satisfaction may result in an overall increase in happiness in those involved in the training program, which may improve the perceived quality of education while providing a life-work balance. In order to

improve resident satisfaction, orthopaedic residency programs should consider these factors.

Appendix

 Supporting material provided by the author is posted with the online version of this article as a data supplement at [jbjs.org \(http://links.lww.com/JBJS/F190\)](http://links.lww.com/JBJS/F190). ■

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