

Can We All Agree? Predictors for High-Performance in Orthopaedic Surgery Residency

Taylor Bradley¹, Cale Jacobs, Ryan D Muchow

¹University of Kentucky College of Medicine

INTRODUCTION:

As objective metrics fade, subjective elements of orthopaedic surgery applicants carry increasing importance during recruitment. Academic orthopaedic surgeons believe they can select for high-performing orthopaedic residents. However, can they agree? The purpose of this study is 1.) to analyze an academic orthopaedic surgery department to determine if they agree on which residents performed best during residency; 2.) to correlate pre-residency and intra-residency factors to post-residency evaluations of resident performance.

METHODS:

With IRB-approval, a survey assessment was distributed to an academic orthopaedic surgery department for evaluation of residency performance for the past 10 years of graduated residents. The survey consisted of: 1) Post-Residency Class Rank - faculty reranked each graduating class (from 1 to 5) based on individual perspective on the resident's performance relative to their class; 2) Rank List Score – the faculty were asked to score each residency graduate on a 5-point scale based off the American Orthopedic Association (AOA) Standardized Letter of Recommendation (SLOR) used at our institution during applicant interviews to measure how likely faculty would have them in our program again based on performance. Faculty inter-rater agreement was assessed using free-marginal Cohen's kappa statistics. Pre-residency USMLE Step 1 and 2 scores, research publications, AOA status, medical school grades, interview scores, and final match rank were correlated to OITE scores, research productivity, ABOS pass rate, and the faculty-derived rankings. Linear regressions with forward variable entry ($p < 0.05$) were utilized to determine factors associated with excellent resident performance.

RESULTS:

Eighteen out of 26 faculty members (14/15 ACGME CORE faculty) provided survey responses evaluating 46 residents. Faculty members from all orthopaedic subspecialties were represented. The faculty produced a Post-Residency Class Rank that determined 1st through 5th positions. However, there was considerable variability in each resident's mean ranking with a standard deviation of 0.8. Thus, for Post-Residency Class Rank, faculty agreed 37% of the time (kappa 0.26). Likewise, for Rank List Score, standard deviation was 0.8, and faculty registered 38% agreement (kappa 0.23). Step 2 score was the only pre-residency factor with significant association to Post-Residency Class Rank ($p = 0.03$) and Rank List Score ($p = 0.02$). PGY-4 OITE score was the only intra-residency factor with significant correlation to both Post-Residency Class Rank ($p = 0.002$) and Rank List Score ($p = 0.01$). The pre-residency rank list position had no correlation with the Post-Residency Class Rank ($p = 0.43$). Some 50% of the top-ranked residents pre-residency ended up ranking in the top 1 or 2 spots post-residency. For Rank List Score, there were 5 residents who averaged >4.4 and 3 residents that averaged <2 rankings. Despite these results, no pre-residency factors or pattern of factors that these residents possessed statistically predicted for high performance.

DISCUSSION AND CONCLUSION:

A group of academic orthopaedic surgeons attained weak agreement on a resident's performance as assessed by a Post-Residency Class Rank and a Rank List Score. Regardless of faculty differences in specialty, perspective, and experience, a department of academic orthopaedic surgeons was able to agree on which residents performed best during residency – both relative to peers in the same year of training and an objective standard. When assessing pre-residency factors that correlate best with these post-residency scores, Step 2 score was the only statistically significant variable associated with Post-Residency Class Rank and Rank List Score. Given significant association with high residency performance, USMLE Step 2 score may influence residency program recruitment. Additionally, OITE Score from a resident's PGY-4 year was the only intra-residency factor that correlated with higher post-residency metrics of performance and may serve as a predictor of high overall residency performance.



Figure 1: Displayed are Post-Residency Class Rank and Rank List Score from a survey to evaluate whether agreement exists among a department of academic orthopedic surgeons on residency performance for the past 10 years of graduates.

Faculty-Derived Post-Residency Class Rank and Rank List Score

Resident	Post-Residency Class Rank	Rank List Score
A	1.4 ± 0.6	4.4 ± 1.2
B	2.1 ± 0.8	3.9 ± 1.0
C	4.9 ± 0.3	1.6 ± 0.6
D	2.6 ± 0.8	3.5 ± 1.0
E	3.9 ± 0.4	2.5 ± 1.0

Table 1: Rank List Score and Post-Residency Class Rank (mean ± standard deviation) for each resident in one representative residency class (5 out of 46 residents) is displayed with standard deviation of faculty rankings.

Relationship of Pre-Residency and Intra-Residency Factors to Post-Residency Class Rank and Rank List Score

	Pre-Residency Factors	
	Post-Residency Class Rank	Rank List Score
Objective Score	-0.16	0.30
Position on Rank List	0.18	-0.1
Interview Score	0.01	0.20
Step 1 Score	-0.25	0.18
Step 2 Score	-0.20	0.38*
Publications	0.14	0.03

	Intra-Residency and Post-Residency Factors	
	Post-Residency Class Rank	Rank List Score
OITE-1	-0.20	0.19
OITE-2	-0.31	0.26
OITE-3	-0.27	0.13
OITE-4	-0.28*	0.18*
OITE-5	-0.25	0.31
Publications	-0.13	0.23
Average OITE	-0.34	0.29
ABOS Part 1 Score	-0.23	0.24
ABOS Part 1 Percentage	-0.22	0.19
ABOS Part 1 Prior Fails	0.24	-0.04
ABOS Part 2 Prior Fails	0.13	-0.10

* indicates significant correlation (p<0.05)

Table 2: Displayed are calculated Pearson correlation values of pre-residency, intra-residency, and post-residency factors to assess relationship to Post-Residency Class Rank and Rank List Score. Of note, objective score was a collective score for medical school grades, letters of recommendation, and research experiences.