

# Discrepancies in Perception of Resident Autonomy and Competency between Resident and Attending Orthopaedic Surgeons in Anterior Cruciate Ligament Reconstruction

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**INTRODUCTION:** There have been growing concerns among recent orthopaedic surgery residency graduates about trainee autonomy and ultimately post-graduate competency in certain procedures. A contributing factor may be the subspecialization of orthopaedic surgery with procedures like anterior cruciate ligament reconstruction (ACLR) now less commonly being performed by generalists and those without sports fellowship training. This study compares resident and attending views on resident autonomy and competency during ACLR.

**METHODS:** Data was prospectively collected through an online survey sent to both attending and resident surgeons at the completion of each primary ACLR performed between August 2021 and September 2022 at our institution. O-SCORE evaluations of residents (validated scale with 40 representing complete trainee independence), perceived percentage of five key steps the resident was given opportunity to perform, and perceived percentage they could complete were compared between resident and attending responses. Results were stratified by resident year, intended fellowship, and time on service. A priori power calculation demonstrated 120 total surveys needed to reach 80% statistical power. Agreement between resident and attending responses were calculated using a linear-weighted Gwet AC<sub>2</sub>.

**RESULTS:** A total of 124 total surveys were completed by 16 residents and 4 attendings. Residents gave themselves higher median O-SCORE evaluations than attendings (36 vs. 26; p<0.001) (**Table 1**). While there were no differences in perceived opportunity afforded the resident (resident score 75% (interquartile range (IQR) 60-82%), attending score 74% (IQR 60-87%), p=0.55), attendings felt residents were only capable of completing 58% (IQR 45-70%) of the cases compared to 72% (IQR 55-82%) reported by the resident (p<0.001) (**Table 2**). This was primarily influenced by significant differences between senior resident and attending perceptions (76% (IQR 61-86%) vs. 54% (IQR 44-67%), p<0.001), while junior residents did not differ significantly from attendings (62% (IQR 47-75%) vs. 58% (48-76%), p=0.87). Agreement between residents and attendings for O-SCORE was moderate at 0.45. Agreement was fair for perceived opportunity (0.22) and perceived completion (0.25). Ultimately 23% of residents felt they could complete the case independently while 0% of attendings agreed. A "lack of technical skill" was most commonly cited as the reason for inability to complete procedure (100% of attending responses), while "unprepared for the case" was rarely cited (5% of attending responses).

## DISCUSSION AND CONCLUSION:

Significant discrepancies exist between attending and resident perceptions of resident competency in ACLR. Few residents and no attendings felt the resident could perform the case independently and this was attributed to a lack of technical skill and not a lack of preparedness. These findings should prompt discussion of current residency expectations and training in certain procedures in the setting of increasing subspecialization. Furthermore, opportunities to improve technical skills outside of the operating room, including surgical simulation, should be further explored.

**Table 1.** Comparison of O-SCORE Responses Between Resident and Attending Physicians\*\*

	Median Resident Score	Median Attending Score	Median Difference (Range) (n = 62)	P-Value	Agreement (95% CI)
O-SCORE (out of 40)	32	26	6 (-7 - 20)	<0.001	0.45 (0.35 - 0.55)
1. Preoperative plan	4	3	1 (-2 - 3)	<0.001	0.53 (0.38 - 0.67)
2. Case preparation	4	3	1 (-1 - 3)	<0.001	0.45 (0.31 - 0.58)
3. Knowledge	4	3	1 (-2 - 4)	<0.001	0.27 (0.11 - 0.42)
4. Technical performance	3	3	1 (-2 - 3)	<0.001	0.50 (0.38 - 0.63)
5. Visuospatial skill	4	3	1 (-2 - 3)	<0.001	0.52 (0.40 - 0.65)
6. Postoperative plan	5	4	1 (-1 - 3)	<0.001	0.45 (0.32 - 0.57)
7. Efficiency/flow	3	3	1 (-2 - 3)	<0.001	0.37 (0.19 - 0.56)
8. Communication	5	4	1 (-1 - 2)	<0.001	0.46 (0.35 - 0.57)

\*\*Median differences are resident minus attending scores and compared using a Wilcoxon signed-rank test.

Agreement was calculated using linear-weighted Gwet AC<sub>2</sub>.

†O-SCORE = Ottawa Surgical Competency Operating Room Evaluation.

**Table 2.** Comparison of Resident and Attending Responses Regarding Perceived Resident Opportunity and Perceived Ability to Complete the Predetermined 5 Key Procedural Steps\*\*

	Resident, Median Score (IQR) (n=62)	Attending, Median Score (IQR) (n=62)	P-Value	Agreement (95% CI)
<b>Percent opportunity (overall)</b>	<b>75 (60 - 82)</b>	<b>74 (60 - 87)</b>	0.55	<b>0.22 (0.06 - 0.38)</b>
Diagnostic Arthroscopy	90 (75 - 100)	75 (50 - 100)	0.02	0.50 (0.34 - 0.66)
Notch Preparation	95 (75 - 100)	100 (50 - 100)	0.67	0.56 (0.39 - 0.74)
Tunnel Placement	25 (0 - 70)	50 (33 - 50)	0.04	0.37 (0.24 - 0.50)
Graft Passage	80 (50 - 100)	100 (50 - 100)	0.08	0.65 (0.54 - 0.77)
Graft Fixation	100 (71 - 100)	100 (80 - 100)	0.14	0.71 (0.60 - 0.82)
<b>Percent completed (overall)</b>	<b>72 (55 - 82)</b>	<b>58 (45 - 70)</b>	<0.001	<b>0.25 (0.07 - 0.42)</b>
Diagnostic Arthroscopy	80 (70 - 90)	50 (26 - 75)	<0.001	0.20 (0.03 - 0.36)
Notch Preparation	80 (70 - 90)	50 (25 - 70)	<0.001	0.10 (-0.08 - 0.28)
Tunnel Placement	28 (0 - 63)	45 (21 - 50)	0.24	0.35 (0.20 - 0.49)
Graft Passage	80 (50 - 100)	75 (50 - 100)	0.24	0.62 (0.50 - 0.73)
Graft Fixation	100 (75 - 100)	90 (50 - 100)	0.24	0.59 (0.46 - 0.72)
<b>Could the resident complete the surgery independently, n (%)</b>	<b>14 (23)</b>	<b>0 (0)</b>	<0.001	<b>0.72 (0.56 - 0.88)</b>
Reason resident could not complete the surgery independently				
Lack of technical skills, n (%)	42 (68)	62 (100)	0.01	0.56 (0.35 - 0.77)
Taking too much time, n (%)	29 (47)	33 (53)	0.77	0.03 (-0.22 - 0.29)
Lack of visualization, n (%)	21 (34)	20 (32)	0.48	0.28 (0.01 - 0.54)
Unprepared for the case, n (%)	2 (3)	3 (5)	0.75	0.91 (0.83 - 0.99)

\*\*Median values for continuous variables were compared through a Wilcoxon signed-rank test. Agreement was calculated using linear-weighted Gwet AC<sub>2</sub>. Cohen's interpretation for kappa coefficient will be used with less than 0.20 interpreted as none to slight agreement, 0.21-0.39 as fair agreement, 0.40-0.59 as moderate agreement, 0.60-0.79 as substantial agreement, and 0.80 or greater as almost perfect agreement. Questions of whether the resident could complete the surgery independently and reason they could not complete the surgery independently are reported as counts and proportions and compared in pairs using a Pearson's Chi-squared test. Step A: Diagnostic arthroscopy; Step B: Notch preparation; Step C: Tunnel replacement; Step D: Graft passage; Step E: Graft fixation.

†CI = confidence interval, IQR = interquartile range.