Physical Therapy Location after Anterior Cruciate Ligament Reconstruction Does Not Impact Patient Outcomes

Brittaney Pratt, Joshua P. Castle, Jhamal Wallace, Michael Gaudiani, Jhamal Wallace, Muhammad Jehad Abbas, Andrew Hannoudi, Thomas Sean Lynch, Vasilios Moutzouros

INTRODUCTION: Physical therapy (PT) is essential for successful surgical outcomes after anterior cruciate ligament reconstruction (ACLR). Multiple PT regimens and modalities can be utilized with a consensus regarding certain elements of ACLR postoperative rehabilitation, however there is no universal protocol. Hospital affiliated PT may be more closely monitored and more strictly adhere to surgeon protocols, while external PT quality can vary. The purpose of this study is to compare the demographics and clinical outcomes between ACLR patients who undergo postoperative PT at hospital affiliated (internal) or external locations.

METHODS: A retrospective review was performed of all ACLRs at a single health system from 2020 to 2023. Inclusion criteria consisted of primary ACLR patients with documented physical therapy location and a minimum one year clinical follow up and completed Patient-Reported Outcome Measurement Information System Physical Function (PROMIS-PF) and Pain Interference (PROMIS-PI) scores. Excluded criteria was revision ACLR, history of previous knee surgery, incomplete 1-year PROMIS scores, and no PT location documentation. Demographic data including age, sex, body mass index (BMI), race, ethnicity, smoking history, employment, and insurance type was collected. Area Deprivation Index (ADI) was calculated using the patient's home address. PROMIS-PF and PI were collected at preoperative, 3 months 6 months, and 1 year postoperative timepoints. Patient PT location was recorded as a health system affiliated (internal) or outside facility (external) location. Statistical analysis was performed with a significance level of p<0.05. A sub-analysis was performed utilizing propensity matching between cohorts via age, ADI, and body mass index (BMI).

RESULTS: A total of 382 patients were included with 228 undergoing internal PT and 154 undergoing external PT. Internal PT patients were significantly older (23.0 [18.0, 34.0] vs. 18.0 [16.0, 25.0] years; P<.0001), higher BMI (26.1 [23.0, 30.1] vs. 23.8 [21.6, 27.0] kg/m2; P <.0001; P<.0001), lived in higher ADI areas (53.0 [30.0, 81.0] vs. 39.0 [21.5, 65.0]; P= 0.0004), more likely to be Black (24.6% vs. 17.5%; P=0.0308), Hispanic or Latino (6.6% vs. 3.9%; P=0.0323), current smokers (9.3% vs. 2.0%), and have public/government insurance (22.4% vs. 10.4%; P=0.0114). Internal PT patients had significantly higher preoperative PROMIS-PI scores (63.0 [57.0, 68.0] vs. 61.0 [56.0, 67.0]; P=0.0427) and lower 1-year PROMIS-PF scores (51.0 [47.0, 54.0] vs. 52.0 [50.0, 64.0]; P=0.0019). No significant differences were found between preoperative, 3-month, and 6-month PROMIS-PF and 3-month, 6-month, and 1-year postoperative PROMIS-PI scores. After propensity match, no significant differences were found between cohort demographics and PROMIS-PI and -PF scores at all time points.

DISCUSSION AND CONCLUSION: ACLR patients who underwent PT at a health system affiliated location were significantly older, had higher BMIs, lived in areas with worse social deprivation, and were more likely to be Black, current smokers, and have government insurance compared to patients who underwent PT at an external location. This suggests that socioeconomic factors influence choice of physical therapy location amongst our patient population. There were no differences in patient outcomes postoperatively indicating the choice of physical therapy setting does not impact postoperative outcomes.

Table 2. PROMIS Scores Between Physical Therapy Location

	Physical Therapy Location		
	Internal PT (N=228)	External PT (N=154)	P-value
Preoperative PROMIS-PI	63.0 (57.0, 68.0)	61.0 (56.0, 67.0)	0.0427*
Preoperative PROMIS-PF	38.0 (32.0, 44.0)	39.0 (32.0, 44.0)	0.7026
3 months PROMIS-PI	60.0 (56.0, 65.0)	60.0 (54.0, 65.0)	0.6622
3 months PROMIS-PF	40.0 (34.0, 45.0)	41.0 (36.0, 46.0)	0.2215
6 months PROMIS-PI	53.0 (50.0, 56.0)	52.0 (47.0, 57.0)	0.2468
6 months PROMIS-PF	48.0 (44.0, 50.0)	48.0 (44.5, 52.0)	0.3724
1 year PROMIS-PI	51.0 (47.0, 55.0)	50.0 (39.0, 53.0)	0.0906
1 year PROMIS-PF	51.0 (47.0, 54.0)	52.0 (50.0, 64.0)	0.0019*

Patient-Reported Outcome Measurement Information System Physical Function (PROMIS-PF), Pain Interference (PROMIS-PI)

Table 1. Demographic Comparison

	Physical Therapy Location			
	Internal PT (N=228)	External PT (N=154)	Total (N=382)	P-value
Patient Age at Surgery (Years)				<.0001*
N	228	154	382	
Median (IQR)	23.0 (18.0, 34.0)	18.0 (16.0, 25.0)	21.0 (17.0, 31.0)	
BMI				<.0001*
N	227	153	380	
Median (IQR)	26.1 (23.0, 30.1)	23.8 (21.6, 27.0)	25.1 (22.3, 28.8)	
MHI Quartile, n (%)				0.0397*
1	58 (25.8%)	20 (13.6%)	78 (21.0%)	
2	30 (13.3%)	25 (17.0%)	55 (14.8%)	
3	47 (20.9%)	32 (21.8%)	79 (21.2%)	
4	90 (40.0%)	70 (47.6%)	160 (43.0%)	
ADI				0.0004*
N	227	148	375	
Median (IQR)	53.0 (30.0, 81.0)	39.0 (21.5, 65.0)	45.0 (25.0, 75.0)	
ADI Quartile, n (%)				0.0018*
1	43 (18.9%)	45 (30.4%)	88 (23.5%)	
2	62 (27.3%)	48 (32.4%)	110 (29.3%)	
3	50 (22.0%)	32 (21.6%)	82 (21.9%)	
4	72 (31.7%)	23 (15.5%)	95 (25.3%)	
Gender, n (%)				0.6512
Female	100 (44.1%)	71 (46.4%)	171 (45.0%)	
Male	127 (55.9%)	82 (53.6%)	209 (55.0%)	
Race, n (%)				0.0308*
Asian	13 (5.7%)	7 (4.5%)	20 (5.2%)	
Black	56 (24.6%)	27 (17.5%)	83 (21.7%)	
Other	22 (9.6%)	8 (5.2%)	30 (7.9%)	
Unknown	17 (7.5%)	24 (15.6%)	41 (10.7%)	
White	120 (52.6%)	88 (57.1%)	208 (54.5%)	
Ethnicity, n (%)				0.0323*
Hispanic or Latino	15 (6.6%)	6 (3.9%)	21 (5.5%)	
Not Hispanic/Latino	189 (82.9%)	118 (76.6%)	307 (80.4%)	
Unknown	24 (10.5%)	30 (19.5%)	54 (14.1%)	
Insurance Type, n (%)				0.0114*
Public/government	51 (22.4%)	16 (10.4%)	67 (17.5%)	
Private/commercial	171 (75.0%)	130 (84.4%)	301 (78.8%)	
None	2 (0.9%)	5 (3.2%)	7 (1.8%)	
Unknown	4 (1.8%)	2 (1.3%)	6 (1.6%)	
Workers' compensation	0 (0.0%)	1 (0.6%)	1 (0.3%)	
Smoking Status, n (%)				0.0052*
Never	186 (81.9%)	142 (92.8%)	328 (86.3%)	
Former	20 (8.8%)	8 (5.2%)	28 (7.4%)	
Current	21 (9.3%)	3 (2.0%)	24 (6.3%)	

IQR=interquartile range. *indicates significant value P<0.05