

# Despite Inferior Access to Physical Therapy following Anterior Cruciate Ligament Reconstruction, Medicaid-Insured Patients Exhibit Similar Improvements in Knee Range of Motion and Knee Outcome Survey Scores Compared to Patients with Commercial Insurance

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**INTRODUCTION:** Postoperative outcomes following orthopaedic procedures such as total hip arthroplasty and total knee arthroplasty have been shown to be influenced by patient insurance status (Medicaid, Medicare, and private payors). Anterior cruciate ligament (ACL) reconstruction remains one of the most prevalent orthopaedic surgeries; however, current evidence examining the role of insurance provider on outcomes following this procedure is limited. Therefore, the purpose of this investigation was to explore the effect that insurance carrier had on physical therapy (PT) access, knee range of motion (ROM), and Knee Outcome Survey (KOS) scores.

**METHODS:** A retrospective cohort study identified 149 patients (62 females, 87 males) who underwent anterior cruciate ligament (ACL) reconstruction at a large, multihospital academic health system from 2019-2021 and also completed their postoperative PT at affiliated locations. Patients were partitioned into two cohorts based on their insurance provider: Managed Medicaid (MM, n = 59) or commercial (COM, n = 90). Patient demographics, insurance information, and PT allowances were obtained. Outcomes recorded included change in knee active range of motion (AROM), passive ROM (PROM), KOS score, and reason for the conclusion of PT (e.g., insurance denial versus successful completion). Changes were measured from the first visit to the final visit. Univariate and multivariate analyses were performed by chi-squared tests, Welch's t-tests, as well as multivariable logistic and linear regression with Bonferroni corrections applied to control the familywise error rate.

**RESULTS:** The MM cohort experienced a longer time until the first PT visit, shorter duration of PT, fewer total PT visits as well as insurance-authorized visits, and a smaller maximum number of visits per benefit (Table 1). However, there was no difference between cohorts in the number of visits divided over the treatment duration or the number of visits attended over the total number authorized. Both groups displayed statistically similar improvements in AROM, PROM, and KOS (Table 2) in addition to comparable reasons for concluding PT (p = 0.205). Furthermore, regression demonstrated that no insurance parameter predicted changes in AROM, PROM, KOS, or reason for concluding PT.

**DISCUSSION AND CONCLUSION:** MM provided patients who underwent ACL reconstruction inferior access to PT compared to those insured by COM. However, MM and COM yielded a similar percentage utilization of authorized PT visits and number of insurance denials leading to early PT termination. Both cohorts also demonstrated similar improvements in AROM, PROM, and KOS.

Table 1: Preoperative Demographics, Insurance Information, and Physical Therapy Allowance

	MM (n = 59)	COM (n = 90)	Pooled (n = 149)	P-value (MM vs. COM)
Age (years)	27.6 (9.5)	28.2 (9.7)	27.9 (9.6)	0.735
BMI (kg/m <sup>2</sup> )	29.3 (6.0)	28.8 (8.9)	29.0 (7.9)	0.656
Time Until First Visit (days)	19.1 (9.4)	15.0 (10.6)	16.7 (10.3)	0.023*
Duration of Tx (days)	97.7 (70.1)	177.4 (159.5)	146.0 (137.0)	<0.001***
Total Visits	17.3 (11.7)	28.9 (24.2)	24.4 (21.0)	<0.001***
Total Auth	23.6 (18.6)	38.4 (27.7)	32.6 (25.6)	<0.001***
Max Visits Per Benefit	23.6 (25.3)	45.3 (30.8)	36.8 (30.6)	<0.001***
Total Visits/Duration of Tx	0.21 (0.1)	0.20 (0.1)	0.20 (0.1)	0.663
Total Visits/Total Auth (%)	89.4 (79.1)	87.4 (73.8)	88.2 (75.7)	0.637

Continuous variables are presented as mean (standard deviation). MC = Managed Medicaid cohort; COM = commercial insurance cohort; SD = standard deviation; BMI = body mass index; Tx = treatment; Auth = insurance-authorized visits; \*p < 0.05; \*\*\*p < 0.001.

Table 2: Outcome Measures

	MM (n = 59)	COM (n = 90)	Pooled (n = 149)	P-value (MM vs. COM)
Baseline AROM (°)	75.7 (30.9)	81.9 (30.8)	79.4 (30.9)	0.251
Postoperative AROM (°)	125.2 (12.4)	126.6 (13.2)	126.1 (12.8)	0.665
ΔAROM (°)	58.5 (30.9)	46.1 (35.8)	51.0 (34.3)	0.132
Baseline PROM (°)	79.1 (32.4)	84.3 (30.8)	82.4 (31.3)	0.449
Postoperative PROM (°)	129.6 (14.3)	132.3 (13.0)	131.4 (13.2)	0.662
ΔPROM (°)	71.9 (33.0)	49.8 (36.3)	57.1 (36.1)	0.155
Baseline KOS (%)	37.1 (15.9)	34.8 (17.4)	35.7 (16.8)	0.523
Postoperative KOS (%)	68.0 (16.7)	74.6 (18.2)	72.0 (17.7)	0.153
ΔKOS (%)	32.3 (20.2)	42.6 (23.4)	38.6 (22.6)	0.074

Continuous variables are presented as mean (standard deviation). Baseline measurements were recorded at the first visit. Postoperative measurements were recorded at the final visit. MC = Managed Medicaid cohort; COM = commercial insurance cohort; SD = standard deviation; AROM = active range of motion; PROM = passive range of motion; Δ = change (from first visit to final visit); KOS = Knee Outcome Survey.