Nearly 60% of Patients Return to Sports at a Median of 10 Weeks Following Medial Unicompartmental Knee Arthroplasty: A Prospective Cohort Analysis of 1,819 Patients

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INTRODUCTION: Medial unicompartmental knee arthroplasty (mUKA) is an effective treatment for isolated medial compartment osteoarthritis in young, active patients with high expectations regarding post-operative physical activity. Although existing studies report high return to sports (RTS) rates after mUKA, ranging from 75% to 100%, there is limited evidence on the proportion of patients returning to their pre-operative level of sport, which varies from 60% to 95%. Furthermore, the time required to RTS following mUKA ranges from 3 to 6 months, but factors affecting this timeline remain unclear. The literature also lacks a comprehensive analysis of the factors influencing the inability to RTS after mUKA, with some studies suggesting that age, sex, body mass index, and pre-operative activity level may play a role.The purpose of this study was to 1) determine the rates of RTS after mUKA, 2) evaluate the proportion of patients returning to their specific pre-operative level of sport, 3) quantify the time required to RTS, and 4) identify pre-operative and post-operative factors affecting the inability to RTS following mUKA.

METHODS: A prospective institutional cohort of 1,819 primary mUKAs performed between January 2016 and December 2022 was analyzed. Of these, 260 patients (14.3%) were athletes or participating in sports at baseline, and 224 (86.2%) completed the one-year follow-up. (Table 1) Demographics, comorbidities, baseline and one-year RTS status, time to RTS, type of athlete, and patient-reported outcome measures (PROMs), including the Knee Injury and Osteoarthritis Outcome Score (KOOS) pain, KOOS physical function short form (PS), and Joint Replacement (JR), were recorded. Descriptive statistics, Cox regression analysis for time to RTS, and logistic regression for factors associated with the inability to RTS were performed.

RESULTS: Of the 224 patients, 131 (58.5%) were able to RTS, while 93 (41.5%) were unable to RTS. Among those who returned to sports, 60.3% returned to the same sport at the same level of intensity and performance, 34.3% returned with reduced effort or performance, and 5.4% were able to return to sports overall but not to the same sport. The median time to RTS was 10 weeks, with 90% of patients restarting sports within 25 weeks. (Figure 1) Cox regression analysis revealed that patients who quit smoking for more than 6 months had a higher likelihood of RTS compared to those who never smoked (HR: 1.65, 95% CI: 1.06-2.58). (Table 2) Logistic regression analysis showed that female patients had lower odds of RTS compared to male patients (OR: 0.40, 95% CI: 0.19-0.82), and recreational athletes had higher odds of RTS compared to non-recreational, non-competitive athletes (OR: 0.02, 95% CI: 0.00-0.09). (Table 3)

DISCUSSION AND CONCLUSION:

A majority of the patients who participated in sports before mUKA successfully returned to sports within one year of surgery, with a median time to return of 10 weeks. Most patients returned to their pre-operative sport at the same level of intensity and performance. However, RTS rates varied based on sex, smoking status, and pre-operative competitive level. These findings can guide patient expectations and inform shared decision-making when discussing RTS after mUKA. Surgeons should consider these factors when counseling patients on their post-operative goals and potential barriers to RTS. Future research should focus on developing targeted interventions to improve RTS rates, particularly among female patients and recreational athletes, and on establishing standardized RTS criteria to facilitate comparisons across studies.

Figure 1. Cumulative Probability of Returning to Sport Per Week

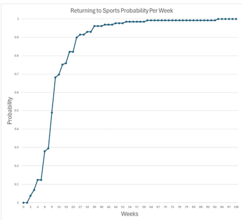

Table 1. Demographics

Variable	Level	Total (N=224)	Returned to Sports (N=131)	Unable to Return (N=93)	p value
Age	Mean (SD)	66.1 (9.3)	67.2 (8.9)	64.7 (9.6)	**0.049**
Sex	Female	73 (32.6%)	33 (25.2%)	40 (43.0%)	**0.006**
	Male	151 (67.4%)	98 (74.8%)	53 (57.0%)	
Race	White	205 (91.5%)	125 (95.4%)	80 (86.0%)	**0.033**
	Black	9 (4.0%)	2 (1.5%)	7 (7.5%)	
	Other	10 (4.5%)	4 (3.1%)	6 (6.5%)	
Smoking	Never	137 (61.2%)	80 (61.1%)	57 (61.3%)	0.636
	Current	9 (4.0%)	4 (3.1%)	5 (5.4%)	
	Quit < 6 Months	5 (2.2%)	2 (1.5%)	3 (3.2%)	
	Quit >6 Months	73 (32.6%)	45 (34.4%)	28 (30.1%)	
CCI	Mean (SD)	0.7 (1.3)	0.6 (0.9)	0.9 (1.6)	0.105
Insurance	Commercial	84 (37.5%)	48 (36.6%)	36 (38.7%)	0.124
	Medicaid	2 (0.9%)	0 (0.0%)	2 (2.2%)	
	Medicare	107 (47.8%)	68 (51.9%)	39 (41.9%)	
	Other	31 (13.8%)	15 (11.5%)	16 (17.2%)	
PROM Phenotype	Pain+PS+MCS+	21 (9.4%)	12 (9.2%)	9 (9.7%)	0.137
	Pain+PS+MCS-	20 (8.9%)	7 (5.3%)	13 (14.0%)	
	Pain+PS-MCS+	47 (21.0%)	24 (18.3%)	23 (24.7%)	
	Pain+PS-MCS-	37 (16.5%)	28 (21.4%)	9 (9.7%)	
	Pain-PS+MCS+	34 (15.2%)	20 (15.3%)	14 (15.1%)	
	Pain-PS+MCS-	46 (20.5%)	28 (21.4%)	18 (19.4%)	
	Pain-PS-MCS+	10 (4.5%)	7 (5.3%)	3 (3.2%)	
	Pain-PS-MCS-	9 (4.0%)	5 (3.8%)	4 (4.3%)	
BMI Classification	Normal Weight	50 (22.3%)	25 (19.1%)	25 (26.9%)	0.624
	Overweight	114 (50.9%)	70 (53.4%)	44 (47.3%)	
	Obese Class 1	46 (20.5%)	28 (21.4%)	18 (19.4%)	
	Obese Class 2	13 (5.8%)	7 (5.3%)	6 (6.5%)	
	Obese Class 3	1 (0.4%)	1 (0.8%)	0 (0.0%)	
Education (Years)	Mean (SD)	15.8 (2.9)	16.0 (3.1)	15.5 (2.8)	0.21
Baseline KOOS P	Median (Q1, Q3)	47.2 (38.9, 61.1)	47.2 (40.3, 63.9)	47.2 (38.9, 58.3)	0.36
Baseline KOOS PS	Median (Q1, Q3)	42.0 (35.3, 49.2)	42.0 (33.6, 48.5)	44.0 (35.3, 51.2)	0.137
Baseline VR 12 MCS	Median (Q1, Q3)	58.5 (50.3, 63.2)	58.4 (52.4, 63.2)	58.8 (48.2, 63.2)	0.243
Competitive Level	None	170 (75.9%)	81 (61.8%)	89 (95.7%)	< **0.001**
	Recreational	42 (18.8%)	41 (31.3%)	1 (1.1%)	
	Competitive	12 (5.4%)	9 (6.9%)	3 (3.2%)	

Table 2. Cox Regression Hazard Ratios

Variable	Level	OR	2.50%	97.5%	P-Value
Age	45-64	Reference	Reference	Reference	Reference
	18-44	0.4356	0.0656	2.8937	0.3897
	65+	1.0139	0.4871	2.1105	0.9705
Sex	Female	Reference	Reference	Reference	Reference
	Male	0.772	0.4872	1.2232	0.2705
Race	White	Reference	Reference	Reference	Reference
	Black	0.9258	0.181	4.7344	0.9262
	Other	0.5456	0.1689	1.7628	0.3113
Smoker	Never	Reference	Reference	Reference	Reference
	Current	1.821	0.4717	7.0303	0.3845
	Quit < 6 Months	1.2044	0.2767	5.2419	0.8042
	Quit >6 Months	1.6517	1.0577	2.5793	**0.0273**
CCI	CCI 0-2	Reference	Reference	Reference	Reference
	CCI 2-4	0.565	0.1817	1.7574	0.3241
	CCI ≥ 5	N/A	N/A	N/A	N/A
Insurance	Commercial	Reference	Reference	Reference	Reference
	Medicaid	N/A	N/A	N/A	N/A
	Medicare	1.0672	0.5025	2.2664	0.8657
	Other	0.9026	0.454	1.7945	0.7701
PROM Phenotype	Pain+PS+MCS+	Reference	Reference	Reference	Reference
	Pain+PS+MCS-	0.4316	0.1322	1.4086	0.1638
	Pain+PS-MCS+	1.2711	0.5523	2.925	0.5727
	Pain+PS-MCS-	0.7706	0.3477	1.7077	0.521
	Pain-PS+MCS+	1.1044	0.4783	2.5503	0.816
	Pain-PS+MCS-	0.6951	0.3109	1.554	0.3756
	Pain-PS-MCS+	0.769	0.2725	2.1703	0.6198
	Pain-PS-MCS-	1.4104	0.3678	5.409	0.6161
BMI Classification	Normal Weight	Reference	Reference	Reference	Reference
	Overweight	0.7973	0.4682	1.3578	0.4043
	Obese Class 1	0.5228	0.2678	1.0207	0.0575
	Obese Class 2	0.8435	0.3107	2.2905	0.7385
	Obese Class 3	0.4634	0.0568	3.7832	0.4727
Competitive Level	None	Reference	Reference	Reference	Reference
	Recreational	1.0731	0.6946	1.6578	0.7505
	Competitive	1.2774	0.5644	2.891	0.5569

Table 3. Logistic Regression ORs for Returning Back to Sport

Variable	Level	OR	2.50%	97.50%	P-Value
Age	45-64	Reference	Reference	Reference	Reference
	18-44	0.6461	0.0664	7.3862	0.7057
	65+	1.1767	0.3811	3.6839	0.7768
Sex	Female	Reference	Reference	Reference	Reference
	Male	0.3956	0.1869	0.8185	0.0135
Race	White	Reference	Reference	Reference	Reference
	Black	6.2696	0.9465	67.2391	0.0807
	Other	2.9098	0.5593	20.4462	0.2286
Smoker	Never	Reference	Reference	Reference	Reference
	Current	1.1381	0.2006	6.1227	0.8792
	Quit < 6 Months	2.2138	0.2454	33.5379	0.5034
	Quit >6 Months	0.9673	0.4585	2.031	0.9298
CCI	CCI 0-2	Reference	Reference	Reference	Reference
	CCI 2-4	0.7730	0.1321	4.2913	0.7664
	CCI ≥ 5	NA	NA	NA	NA
Insurance	Commercial	Reference	Reference	Reference	Reference
	Medicaid	NA	NA	NA	NA
	Medicare	0.6603	0.2055	2.1186	0.4821
	Other	1.5451	0.5444	4.473	0.4145
PROM Phenotype	Pain+PS+MCS+	Reference	Reference	Reference	Reference
	Pain+PS+MCS-	1.6295	0.3714	7.4902	0.5202
	Pain+PS-MCS+	1.7119	0.5017	6.0167	0.3923
	Pain+PS-MCS-	0.3909	0.101	1.4581	0.1639
	Pain-PS+MCS+	0.7383	0.1989	2.74	0.6476
	Pain-PS+MCS-	0.8119	0.2343	2.8367	0.7412
	Pain-PS-MCS+	0.5253	0.0775	3.1094	0.4853
	Pain-PS-MCS-	1.101	0.1519	8.3826	0.9239
BMI Classification	Normal Weight	Reference	Reference	Reference	Reference
	Overweight	0.6559	0.282	1.508	0.3219
	Obese Class 1	0.9296	0.3294	2.6219	0.8898
	Obese Class 2	0.5556	0.1123	2.587	0.4544
	Obese Class 3	NA	NA	NA	NA
Competitive Level	None	Reference	Reference	Reference	Reference
	Recreational	0.0167	0.0008	0.0917	**0.0002**
	Competitive	0.3868	0.0724		0.2186