Virtual computer vision based rehabilitation and in person physical therapy have equivalent outcomes after knee arthroscopy

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INTRODUCTION:
Telerehabilitation involves video communication with real-time synchronous information exchange, closing geographic and motivational gaps to improve treatment protocol adherence. Novel computer vision platforms can track range of motion to augment telerehabilitation. This randomized controlled study aimed to compare rehabilitation following meniscectomy using a computer vision-based platform versus traditional in-person physical therapy for patient-reported outcomes, adherence, and satisfaction.

METHODS: Prospectively recruited patients undergoing meniscectomy were randomly assigned to the in-person physical therapy (control) or telerehabilitation (experimental) group using computer vision (Stabl Inc.). Patient-reported outcomes, including visual analogue scale (VAS) pain scores, Knee Injury and Osteoarthritis Outcome (KOOS) scores, and Tampa Kinesiophobia scores, were collected preoperatively and at 6 weeks postoperatively. Chi-square analyses were used for categorical variables, Mann-Whitney U tests for continuous variables.

RESULTS:
A total of 77 patients were randomized to traditional in-person physical therapy (n=37) or telerehabilitation (n=40). Patients were 67.5% male with median age 50.0 [42.0, 56.0] and median BMI 27.2 [25.1, 30.8]. There were no differences at baseline between in-person and telerehabilitation participants with respect to age, sex, BMI, VAS pain scores, KOOS scores, or Tampa Kinesiophobia scores. Patient-reported outcomes at 6 weeks were available for 38 patients. There was a significantly greater improvement in scores for the KOOS sports and recreation subscale for telerehabilitation participants (35.0 vs. 15.0, p=.031). Telerehabilitation participants had lower satisfaction scores on a scale of 100 (75.0 vs. 100.0, p<.001). There were no differences in patient-reported adherence or changes in other patient-reported outcomes for telerehabilitation and in-person participants.

DISCUSSION AND CONCLUSION: Patient-reported outcomes at 6 weeks after meniscectomy were largely equivalent for computer vision-based telerehabilitation and in-person physical therapy. Satisfaction was lower for the telerehabilitation group. With appropriate patient selection, this study supports the use of computer vision-based telerehabilitation as a potential addition to the physical therapy armamentarium after knee arthroscopy.

Table 1. Change in PROs from Baseline to 6 Weeks

	Stabl (n=22)	Control (n=16)	P-value
VAS pain score[a]	-20.0 [-49.0, -10.0]	-42.0 [-65.2, -15.5]	.280
KOOS[a]			
Symptoms	14.3 [1.8, 19.6]	14.3 [8.0, 20.5]	.639
Pain	22.2 [11.1, 33.3]	15.3 [8.7, 31.2]	.539
ADL	20.3 [9.8, 30.6]	11.8 [2.9, 32.4]	.386
Sports/rec	35.0 [25.0, 50.0]	15.0 [1.2, 25.0]	.031
QOL	18.8 [6.2, 43.8]	25.0 [18.8, 59.4]	.223
Tampa Kinesiophobia[a]	-5.0 [-6.3, -0.75]	-5.0 [-7.2, -3.0]	.646

[a]Continuous variables reported as median [IQR]

Table 2. Patient Satisfaction with Rehabilitation Program

	Stabl (n=22)	Control (n=16)	P-value
Satisfaction scale[a]	75.0 [60.0, 90.0]	100.0 [93.8, 100.0]	<.001
Reported Adherence[a,b]	90.0 [80.0, 100.0]	90.0 [85.0, 100.0]	.811
Would do again?	15 (68.2%)	14 (87.5%)	.248

[a]Continuous variables reported as median [IQR]
[b]Percentage of sessions estimated completed