Peak Limb Loading is Related to Patient-reported Function Following Gait Retraining Among Individuals with Anterior Cruciate Ligament Reconstruction

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INTRODUCTION

Previous research suggests a positive relationship between peak limb loading during gait and patient-reported knee function following anterior cruciate ligament reconstruction (ACLR).[1] Therefore, intervening on peak vertical ground reaction force (vGRF) during gait retraining may enhance patient-reported knee function.

PURPOSE

The purpose of this study was to investigate the relationship between peak limb loading and patient-reported knee function following 6 weeks of gait retraining. We hypothesized that participants with greater peak limb loading would report better knee function.

METHODS

Participants Enrolled in Gait Retraining Study

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6 Weeks of Gait Retraining

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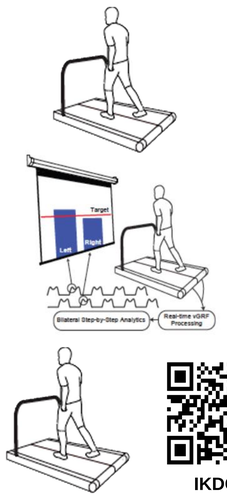
Study Follow-up (Treadmill Walking & Surveys)



IKDC[2]

Outcomes of Interest:
1st Peak vGRF & IKDC Score

STATISTICAL ANALYSIS

We computed descriptive statistics for participant demographics and outcomes of interest. We utilized Pearson's correlations (r) to determine the association between peak limb loading (i.e., peak vGRF) and patient-reported knee function (i.e., IKDC score). Correlations were characterized as: perfect (r=1), strong (1>r≥0.8), moderate (0.8>r≥0.4), and weak (0.4>r>0). Alpha was set *a priori* to 0.05.

EXPLORATORY ANALYSIS

We were not adequately powered to complete multiple correlations to investigate relationships between peak limb loading and other patient-reported outcomes (i.e., Knee injury & Osteoarthritis Outcomes Score (KOOS)). However, we created scatter plots to explore these relationships.

KOOS[3]

RESULTS

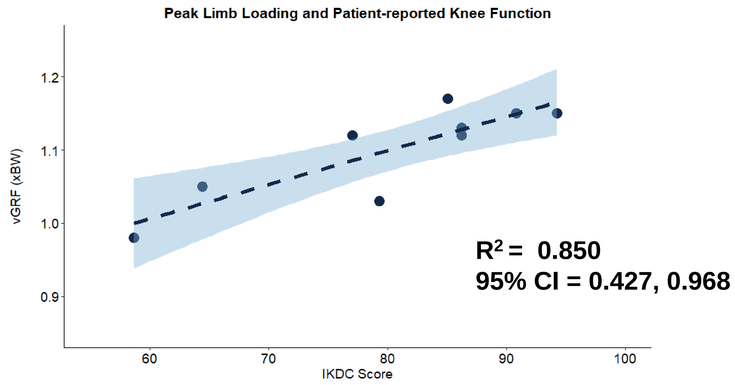


Table 1. Participant Characteristics (N=9)	
Age (years old)	25.7 (5.0)
Sex (Male/Female)*	3/6
BMI (kg/m²)	26.3 (2.0)
Graft Source (BTB/ HAS/QT/ ALL)*	3/2/3/1
Months Since ACLR	24.1 (10.5)
Peak vGRF (x BW)	1.10 (0.07)

BMI = body mass index, BTB = bone-patellar-tendon-bone, HAS = hamstring tendon, QT = quadriceps tendon, ALL = allograft, vGRF = vertical ground reaction force, BW = body weight
Data are presented as Mean (SD), *Data are presented as frequency

RESULTS

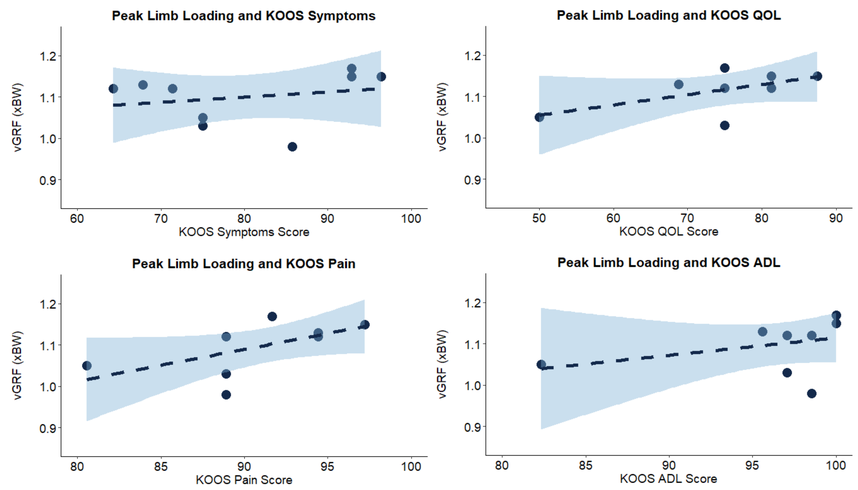


Table 2. Patient Reported Outcome Measure Scores	
IKDC	80.2 (11.9)
KOOS-Symptoms	80.2 (12.0)
KOOS-QOL	68.8 (19.4)
KOOS-Pain	91.4 (5.3)
KOOS- ADL	96.6 (5.6)

IKDC = International Knee Documentation Committee, KOOS = Knee injury & Osteoarthritis Outcomes Score, QOL = quality of life, ADL = activities of daily living
Data are presented as Mean (SD)

DISCUSSION

Our results support our hypothesis that participants with greater limb loading (i.e., greater peak vGRF) report better knee function (i.e., greater IKDC scores). This suggests that intervening on peak limb loading may provide an avenue for enhancing patient-reported knee function among this population.

REFERENCES

[1] Pietrosimone B., et al. Walking Ground Reaction Force Post- ACL Reconstruction: Analysis of Time and Symptoms. Med Sci Sports Exerc. 2019.
[2]Irrgang, James J., et al. Development and Validation of the International Knee Documentation Committee Subjective Knee Form. Am. J. Sports Med. 2001.
[3]Roos, Ewa M., et al. Knee Injury and Osteoarthritis Outcome Score (KOOS)—development of a self-administered outcome measure. J. Sports Phys. Ther. 1998.