

The Effects of Kinesiophobia on Landing Biomechanics 6- and 12-months Post ACL Reconstruction

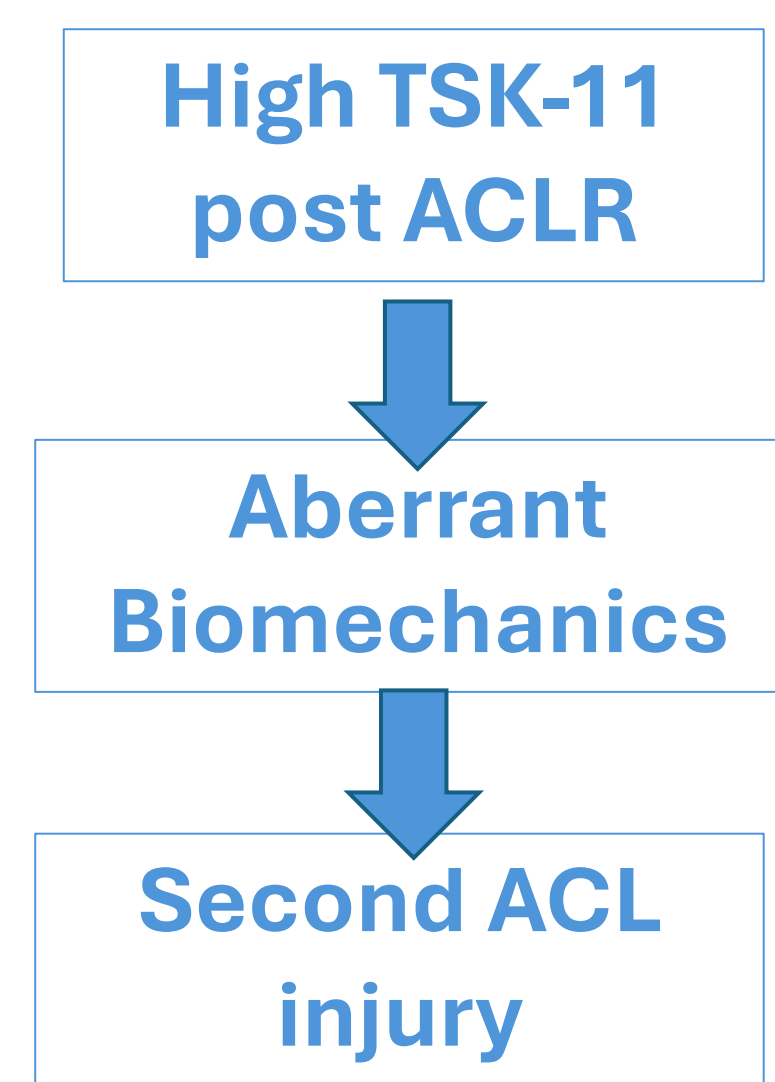
James Louie, Tom Birchmeier, Alex Nilius, Justin Dennis, Troy Blackburn

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The University of North Carolina at Chapel Hill

BACKGROUND

- Kinesiophobia (fear of movement) is related to aberrant landing biomechanics in patients with ACL reconstruction
- Landing with limited knee flexion angle (KFA), high vertical ground force (vGRF), and lesser knee extension moment (KEM) increases ACL loading and the risk of injury
- There is limited longitudinal data documenting the influence of kinesiophobia on landing biomechanics from 6 to 12 months following ACLR as patients are transitioning from rehabilitative care to unrestricted physical activity



PURPOSE

- To assess the effects of kinesiophobia on sagittal plane landing biomechanics at 6 and 12 months post-ACLR

SUBJECT AND STUDY DESIGN

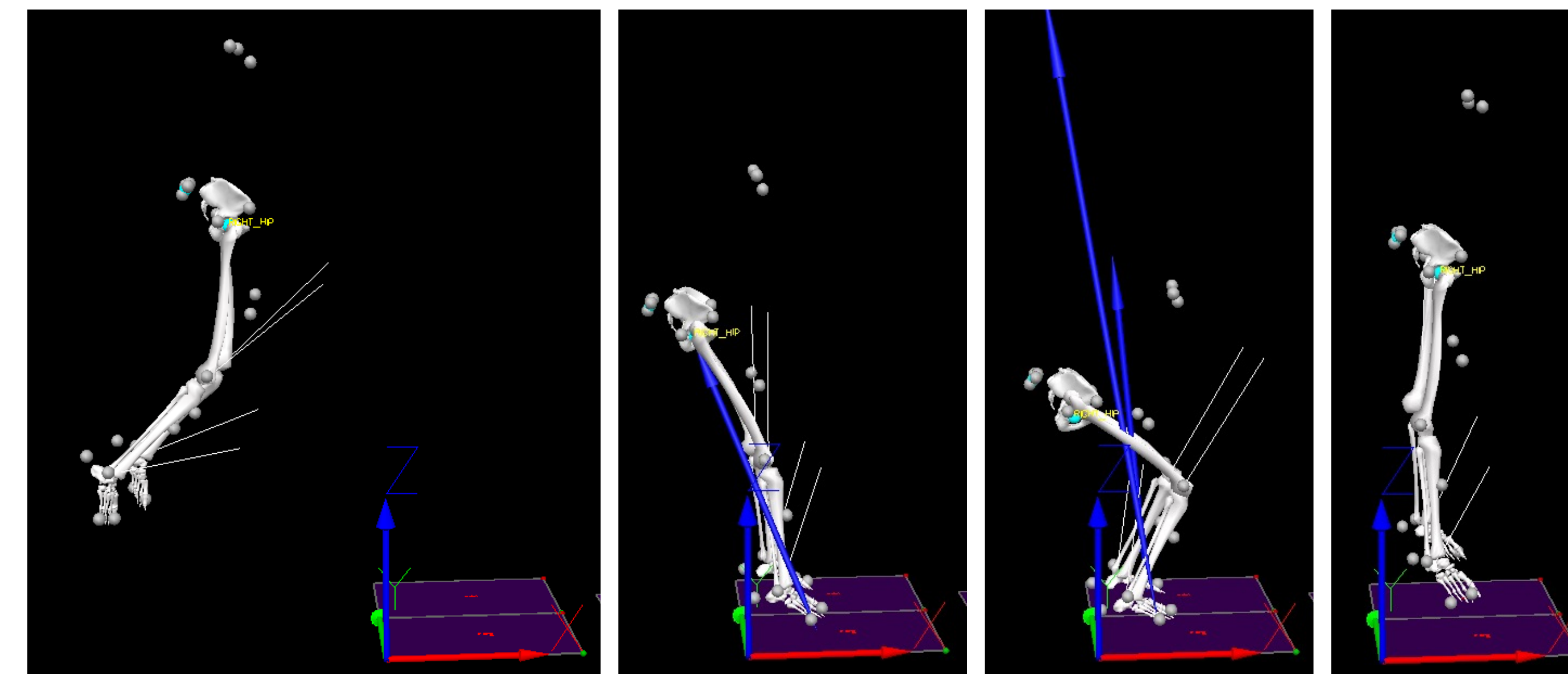
- 12 Participants enrolled in this study
- Landing Biomechanics were collected using 3D motion capture and embedded force plates
- Tampa Scale for Kinesiophobia (TSK-11) was used to assess self-reported fear of movement
 - 11-item questionnaire, higher = greater fear
 - Scores ≥ 19 are associated with 13 times greater risk of second ACL injury
- Participants were grouped into high and low fear based on TSK-11 score at 6 months post-ACLR

METHODS

Landing Biomechanics Assessment:

Subjects performed a drop vertical jump (DVJ) from a 30-cm box placed $\frac{1}{2}$ the participant's height from the force plate

- DVJ sagittal plane biomechanics were then calculated through Visual3D from the data
 - Peak vertical ground reaction force (vGRF)
 - Peak knee extension moment (pKEM)
 - Peak knee flexion angle (pKFA)



Statistical Analysis:

- Repeated Measures ANOVA with partial η^2 effect sizes
 - Within subjects factors
 - KFA
 - vGRF
 - KEM
 - Between subjects factors
 - High/low fear
- Tukey post hoc analysis

Descriptives

	Mean \pm Standard Deviation
6mo TSK-11	21.3 \pm 5.56
12mo TSK-11	18.8 \pm 4.18
6mo TSS (mo)	6.00 \pm 0.215
12mo TSS (mo)	12.2 \pm 0.300
Height (cm)	173 \pm 9.29
Weight (kg)	75.1 \pm 16.0
6mo ACLR pKFA	74.1 \pm 14.7
6mo ACLR vGRF	1.07 \pm 0.112
6mo ACLR pKEM	0.180 \pm 0.173
12mo ACLR pKFA	80.1 \pm 13.4
12mo ACLR vGRF	1.18 \pm 0.128
12mo ACLR pKEM	0.212 \pm 0.170

RESULTS

- Knee flexion angle
 - No main effect for time, $p=0.107$, however, there was a large effect size, partial $\eta^2=0.239$
 - No significant interaction effect for Time*TSK-11, but there was a large effect size, partial $\eta^2=0.112$
- Vertical ground reaction force
 - Significant main effect for time ($p=0.011$, partial $\eta^2=0.488$)
 - No significant interaction effect for Time*TSK-11 ($p=0.873$, partial $\eta^2=0.003$)
- Knee Extension Moment
 - No significant main effect for time ($p=0.394$, $\eta^2=0.074$)
 - No significant interaction effect for Time*TSK-11 ($p=0.346$, partial $\eta^2=0.089$)

Vertical Ground Reaction Force

Post Hoc Comparisons - Time * 6mo_TSK < 19

		Comparison		Mean Difference	SE	df	t	Plukey
Time	6mo_TSK < 19	Time	6mo_TSK < 19					
6mo	0	-	6mo 1	0.0507	0.0700	10.0	0.724	0.885
		-	12mo 0	-0.6913	0.1046	10.0	-6.609	<.001
	1	-	12mo 1	-0.5841	0.1451	10.0	-4.025	0.011
		-	12mo 0	-0.7420	0.1139	10.0	-6.512	<.001
12mo	0	-	12mo 1	-0.6348	0.1479	10.0	-4.291	0.007
		-	12mo 1	0.1072	0.1707	10.0	0.628	0.921

DISCUSSION

Conclusions:

Based on the moderate to large effect sizes in this study, it appears kinesiophobia does influence sagittal plane landing biomechanics from 6 to 12 months post-ACLR. However, the sample size may have influenced our results. Clinicians should consider assessing kinesiophobia while providing rehabilitative care to a patient with ACLR.