

# Higher Peak Isokinetic Knee Flexion Torque is Associated with Higher Kinesiophobia post-Anterior Cruciate Ligament Reconstruction

Chiebuka Onuoha, Elaine Reiche, MS, ATC, CSCS, Caitlin Brinkman, MS, ATC, Shelby Baez, Ph.D., ATC  
The University of North Carolina at Chapel Hill



chebby@email.unc.edu

## PURPOSE

To investigate the relationship between kinesiophobia (i.e., fear of movement and/or reinjury) and isokinetic knee extension and flexion torque 4 to 9 months after anterior cruciate ligament reconstruction (ACLR).

## METHODS

- 17 participants with a history of primary, unilateral 4 to 9 months post-ACLR were included. ACL injury occurred during sports participation and participants did not undergo multiple ligamentous surgery.
- Participants completed the Tampa Scale of Kinesiophobia (TSK-11) which is a valid and reliable tool to assess fear of movement, reinjury, and pain. Higher scores reflect worse kinesiophobia.
- Standard isokinetic knee extension-flexion testing was performed at 60°/s. Values were normalized to body weight. Higher torques reflect better functional ability.
- Four separate regression models were conducted with TSK-11 as the predictor variable and isokinetic knee torque as the dependent variable ( $p < 0.05$ ).

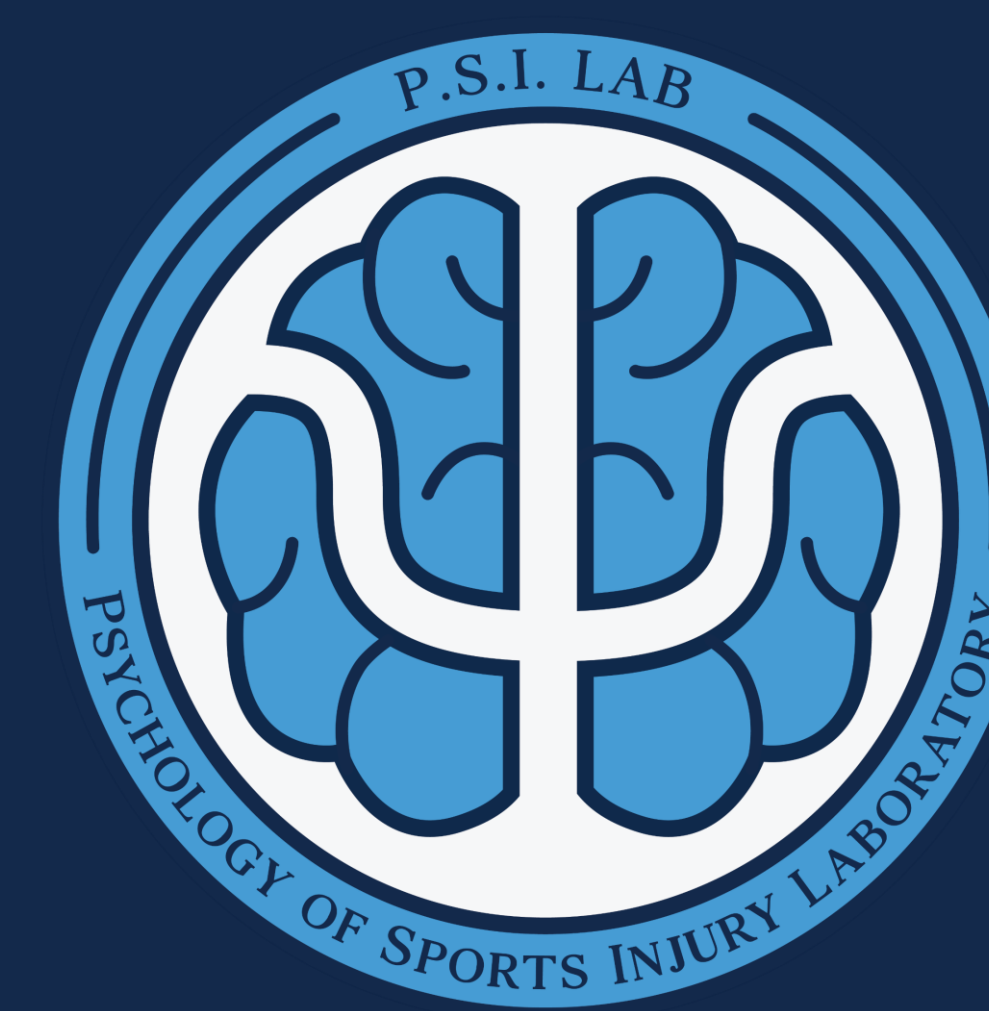
**Table 1. Demographics (N=17)**

Sex	11 Females (64.7%)
Age, years	18.6 (4.0)
Height, centimeters	168.8 (6.8)
Weight, kilograms	71.6 (12.5)
Time Since Surgery, months	6.5 (0.9)
Isokinetic Extension Torque, Nm/kg	
ACLR Limb	1.5 (0.5)
Isokinetic Flexion Torque, Nm/kg	
ACLR Limb	0.81 (0.3)
TSK-11	20.2 (5.8)
Descriptive statistics presented as mean (SD) or count (%)	

# Kinesiophobia was associated with peak isokinetic knee torque production of the flexors, but not extensors after ACLR.



Check us out!



Psychology of Sports Injury Lab

## RESULTS

Predictor Variables	$\beta$ (95% CI)	Adjusted $R^2$	P-Value
Model 1: Isokinetic Extension Torque, ACLR Limb		-0.07	0.92
TSK-11	-0.002 (-0.05 - 0.04)	-----	0.92
Model 2: Isokinetic Flexion Torque, ACLR Limb		0.24	0.03*
TSK-11	0.030 (0.004 - 0.06)	-----	0.03*

**Figure 1.** Regression Models for ACLR Limb.



## DISCUSSION

- TSK -11 scores suggest this sample was experiencing elevated kinesiophobia ( $TSK-11 \geq 17$ ).
- 23% of the variance observed in isokinetic knee flexion torque was explained by TSK-11. For every point increase on the TSK-11, peak torque improved by 0.03 Nm/kg.
- Individuals experiencing kinesiophobia after ACLR may rely on knee flexion torque to reduce translation of the tibia, a potentially pain inducing motion.
- Further research should explore kinesiophobia and other physical function assessments or dynamic movements.

## REFERENCES

- Hsu CJ, Meierbachtol A, George SZ, Chmielewski TL. Fear of reinjury in athletes: implications for rehabilitation. *Sports health*. 2017 Mar;9(2):162-7.
- Woby SR, Roach NK, Urmston M, Watson PJ. Psychometric properties of the TSK-11: a shortened version of the Tampa Scale for Kinesiophobia. *Pain*. 2005 Sep 1;117(1-2):137-44.
- Undheim MB, Cosgrave C, King E, Strike S, Marshall B, Falvey E, Franklyn-Miller A. Isokinetic muscle strength and readiness to return to sport following anterior cruciate ligament reconstruction: is there an association? A systematic review and a protocol recommendation. *British journal of sports medicine*. 2015 Oct 1;49(20):1305-10.
- Paterno MV, Flynn K, Thomas S, Schmitt LC. Self-reported fear predicts functional performance and second ACL injury after ACL reconstruction and return to sport: a pilot study. *Sports health*. 2018 May;10(3):228-33.