

### Type of Physical Activity in Active Individuals Leads to Differences in Strength

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#### ABSTRACT

The anterior cruciate ligament (ACL) is a very commonly injured ligament in the knee. Typically, the injuries require reconstruction surgery and rehabilitation. The goal of rehab is to achieve the same level of ability and strength as prior to the injury. **PURPOSE:** The purpose of the study was to investigate activity and strength in individuals who have undergone ACL reconstruction and healthy control participants. We aimed to determine the strength differences between participants who do intentional workouts versus those who live an active lifestyle and to determine whether activity alters strength measures. **METHODS:** Using existing data, participants were selected to create two groups based on their reported activity, but not injury status. Participants were included if they were considered to be highly active based on the International Physical Activity Questionnaire (IPAQ). The participants were then sorted into two groups based of their total minutes of involved activity: those who have >40% a week involvement in purposeful exercise and those who participate in 20% or less of purposeful exercise. Peak knee extensor and flexor torque values (Nm/kg) were collected using a Biodex isokinetic dynamometer at 60 degrees/sec and 180 degrees/sec. Due to small sample size, Cohen's d effect sizes were calculated to compare strength between groups. **RESULTS:** There was a moderate effect size between groups in knee extensor strength at both velocities. At 180 deg/sec relative knee extensor strength was greater in the group of individuals who had less purposeful activity (Table 1). Similarly, at 180 deg/sec, there was a large effect between groups in knee flexor strength. Individuals who were categorized as spending a larger percentage of activity with purposeful exercise happened to also be participants who had undergone ACL reconstruction, and those who had less purposeful exercise were the healthy controls. **CONCLUSION:** Although participants with ACL reconstructions participated in more frequent and purposeful exercise, the healthy control participants, who were less purposeful with exercise, showed greater measures of strength. ACL reconstruction status impacted knee strength to an extent that purposeful exercise was unable to overcome.

						Extension		Flexion	
						60 deg/s	180 deg/s	60 deg/s	180 deg/s
	Age	Height (m)	Mass (kg)	Activity (min)	%Purposeful Physical Activity	peak T (Nm/kg)	peak T (Nm/kg)	peak T (Nm/kg)	peak T (Nm/kg)
Healthy	31 ± 4.3	1.73 ± 0.12	70.78 ± 18.45	724 ± 134	17.8 ± 1.9	2.68 ± 0.85	1.88 ± 0.34	1.24 ± 0.51	0.88 ± 0.22
ACL:	34.4 ± 7.54	1.72 ± 0.14	72.83 ± 13.23	1054 ± 599	54.74 ± 12.27	2.16 ± 0.81	1.48 ± 0.47	1.06 ± 0.23	0.7 ± 0.14