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Personalized Blood Flow Restriction for Anterior Cruciate Ligament Rehabilitation

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Statistical Analysis

For the biomechanical variables, two primary sets of statistical comparisons were performed. First, the healthy and anterior cruciate ligament reconstruction (ACLR) group were compared to each other for the final set of step-ups during both the control and personalized blood flow restriction (PBFR) exercise conditions. Then, both groups were compared between the control and PBFR conditions for the same timepoint (repeated measures). Statistical parametric mapping a technique which allows the temporal data such as that collected during this type of biomechanical study to be compared, was used to test for statistically significant differences between the kinematic and kinetic waveforms. This approach allowed the full dataset to be compared, rather than looking at discrete values such as the peak range of motion. The significance level was adjusted to $\alpha = 0.001$ to account for multiple comparisons. Descriptive statistics were calculated for the peak movement for all motions. Participant reported scores for difficulty and discomfort were compared using Wilcoxon signed-rank tests (between exercise conditions) and Wilcoxon rank-sum tests (within exercise conditions). Data were analyzed using R V3.5.2 and Python 2.7. Figures were produced using the ggplot2 package.