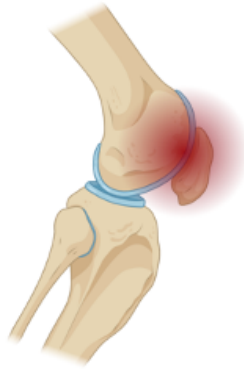


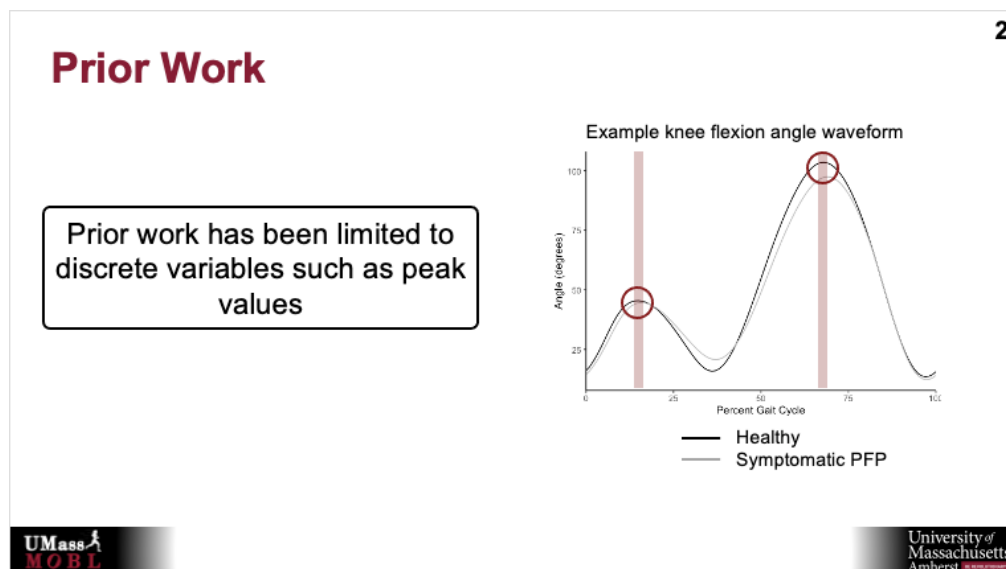
Determining gait abnormalities in runners with patellofemoral pain syndrome using a data mining approach

A sneak peak of the project



Patellofemoral pain (PFP) is one of the most common musculoskeletal injuries experienced by people today. In this project, we attempted to understand various biomechanical features of gait that differentiate those with and without PFP.

Prior work considers discrete metrics of the gait cycle such as peak values

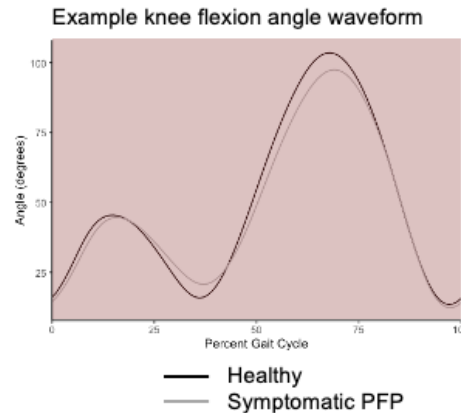


Our approach uses principal component analysis to account for the entirety of the waveform

3

Our Study - Innovation

Account for the entire gait cycle using principal component analysis (PCA)



PCA is a dimensionality reduction method which retains most of the information of the waveform

Methods overview of principal component analysis

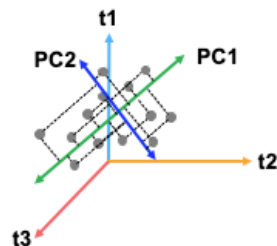
6

Methods - Data Processing

82
observations

Subject ID	Group	t1	t2	t3	...	t101
Subject 1 M1	H	Outpoint	Outpoint	Outpoint	...	Outpoint
Subject 1 M21	H	Outpoint	Outpoint	Outpoint	...	Outpoint
Subject 2 M1	S	Outpoint	Outpoint	Outpoint	...	Outpoint
...	...	Outpoint	Outpoint	Outpoint	...	Outpoint
Subject 41 M21	R	Outpoint	Outpoint	Outpoint	...	Outpoint

101 timepoints



Subject ID	Group	PC1	PC2
Subject 1 M1	H	PC Score	PC Score
Subject 1 M21	H	PC Score	PC Score
Subject 2 M1	S	PC Score	PC Score
...	...	PC Score	PC Score
Subject 41 M21	R	PC Score	PC Score

$$\text{Original Waveform} = \text{APC}_1 + \text{BPC}_2 + \dots + \text{XPC}_N$$

Ran one-way ANOVA with post-hoc t-tests to test for group differences in PC score