

The Preliminary Effects of a Psychologically Informed Physical Therapy Intervention on Lower Extremity Mechanics in Patellofemoral Pain

Corbin M. Rasmussen¹, Fadak Alkazimi², Jaclyn Taylor², Brooke Farmer², **Abbis Jaffri²**

¹Department of Exercise Science & Pre-Health Professions, Creighton University, Omaha, Nebraska, USA

²Department of Physical Therapy, Creighton University, Omaha, Nebraska, USA

Email: abbisjaffri@creighton.edu

Summary

Despite structured physical therapy, many with PFP experience ongoing symptoms and poor lower limb function. Conventional treatments often overlook psychological factors linked to altered mechanics. This study examines a psychologically informed intervention (PIPS) on lower extremity kinetics. Using a within-subjects design with five participants (4F,1M; 23.92 ± 1.92 years), baseline 3D motion capture of hip, knee, and ankle kinetics preceded a four-week program of cognitive behavioral therapy and physical therapy. Post-intervention, knee abduction moments during gait significantly decreased (3-60% stance, $p < 0.001$), and hip abduction moments increased (4-57% stance, $p < 0.001$), indicating better patellar tracking and less joint stress. Larger studies are needed to validate these findings and explore long-term pain and function impacts.

Introduction

Despite structured physical therapy, over 57% of individuals with patellofemoral pain (PFP) still experience suboptimal functionality, and 70-90% reporting recurring symptoms. Conventional approaches focus on physical issues, often neglecting psychological factors, which correlate with altered lower extremity mechanics [1]. We developed a novel biopsychosocial approach that integrates psychological interventions with traditional treatments for PFP. However, the effects of psychologically informed physical therapy intervention (PIPS) on lower extremity kinetics are unknown. This study aims to evaluate the preliminary effects of PIPS on these kinetics.

Methods

This study uses a within-subjects, repeated measures design with five PFP individuals (Sex: 4F,1M; Age: 23.92 ± 1.92 years; Height: 170.2 ± 7.96 ; Mass: 74.19 ± 10.01 kg). Baseline assessments included 3D motion capture of hip, knee, ankle mechanics via Qualisys. Participants then completed a four-week intervention combining cognitive behavioral therapy and physical therapy. Gait was assessed by having participants walk at a self-selected pace for 2 minutes on a treadmill, followed by 30 seconds of data collected. Post-intervention, assessments were repeated. Frontal plane moments for knee and hip were analyzed for 25 strides, normalized to 0-100% gait cycle, and compared using paired t-tests with statistical parametric mapping.

Results and Discussion

Knee abduction moments during gait were significantly reduced post-intervention throughout the stance phase (3-60% of the gait cycle, $p < 0.001$), while hip abduction moments were significantly elevated during most of the stance phase (4-57% of the gait cycle, $p < 0.001$) (Figure 1).

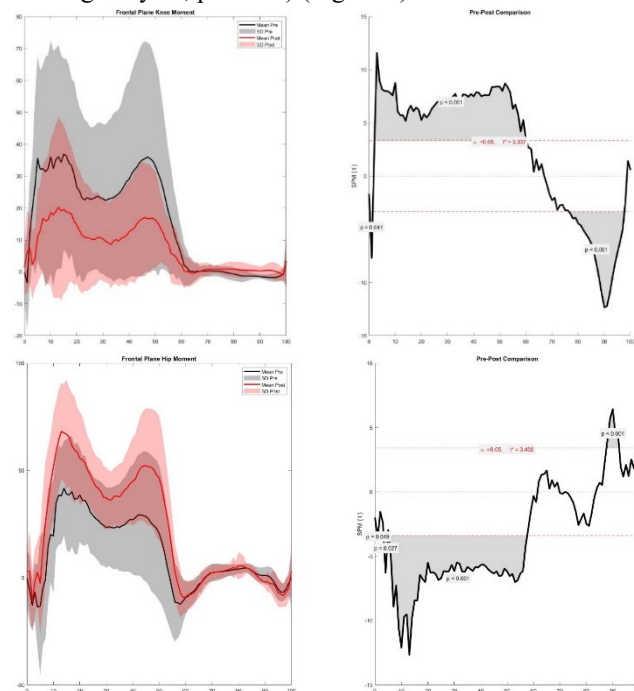


Figure 1: Mean \pm SD knee and hip ab/adduction moments during the pre- (black) and post-intervention (red) visits, alongside results of the statistical parametric mapping paired t-test comparisons.

Conclusions

The significant reduction in knee abduction moments and the increase in hip abduction moments observed post-intervention suggest a beneficial biomechanical shift in individuals with PFP. These changes imply improved patellar tracking and potentially reduced patellofemoral joint stress, which could alleviate symptoms associated with PFP [2]. This supports the idea that a holistic approach, addressing both physical and psychological aspects, can lead to better management of PFP. Further studies with larger sample sizes are warranted to confirm these findings and to explore long-term effects on pain and function.

References

- [1] Jaffri A and Baellow A (2023). *Journal of Athletic Training*, **58**: 849-854.
- [2] Arazpour M et al. (2016). *Arch Bone Jt Surg*, **4**: 298.