

Paper #139

The Effects of Hip Abductor and External Rotator Fatigue in Patients with Patellofemoral Pain Syndrome, Compared to Healthy Individuals

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Summary:

The majority of the subjects demonstrated a decrease in performance after fatigue, and there were no differential effects between ER or ABD fatigue in any functional measure with the exception of HHD.

Abstract:

PURPOSE

Patellofemoral Pain Syndrome (PFPS) is a leading cause of pain and disability in active individuals. The purpose of this study was to determine the effects of fatigue-induced hip weakness on knee alignment and performance in healthy individuals compared to those with PFPS. We hypothesized there would be no differences in any outcome measure after fatigue of the hip external rotators (ER) compared to fatigue of the hip abductors (ABD). Furthermore, we hypothesized there would be no differences in any outcome measure after fatigue when comparing the healthy group to the PFPS group.

SUBJECTS

Thirty physically active subjects were included in this study. The thirty subjects were subdivided into two groups, healthy (n=15, age=22.27 ± 3.58 yrs, height=170.69 ± 8.03 cm, weight=71.63 ± 15.14 kg) and PFPS (n=15, age=21.87 ± 2.72 yrs, height=169.84 ± 7.30 cm, weight=62.23 ± 7.83 kg).

METHODS

Subjects were tested using five performance tests: single leg step down, drop-jump, single leg hop, Vertec vertical jump, and hand-held dynamometry (HHD) of the hip ABD or ER before and after fatigue. Data was analyzed using a repeated measures MANOVA (RM-MANOVA).

RESULTS

Baseline measures between groups were similar with the exception of weight (P=.043). RM-MANOVA showed an overall significant difference in performance tests. The model showed significant pre-post differences (F4,53=.021, P=.000), between-group differences (F12,141=.602, P=.006), and pre-post interaction by group (F1,56=.743, P=.000). Post-hoc testing revealed no within or between group differences for step down test (F1,28=2.014, P=.161), (F3,28=2.040, P=.119). Both drop-jump and single leg hop tests demonstrated a significant within group difference (F1,58=9.812, P=.003), (F1,1127=33.650, P=.000), however, pre-post by group interaction was not significant (F3,12=2.126, P=.107), (F3,40=1.204, P=.317) respectively. There were no within or between group differences for the Vertec jump (F1,21=.275, P=.602), (F3,163=2.151, P=.104). HHD revealed a significant difference for both within group effects (F1,59=14.728, P=.000) and between group effects (F3,12=2.904, P=.043). Further post-hoc testing revealed a significant difference between the ABD PFPS group and the ER PFPS group (P=.000).

CONCLUSION

The majority of the subjects demonstrated a decrease in performance after fatigue. There were no differential effects between ER or ABD fatigue in any functional measure with the exception of HHD. There was a greater HHD

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Paper #139

decline in ABD fatigue when compared to ER fatigue in PFPS subjects. This difference could be attributed to the fatigue protocol, the size of the muscle mass, or the overall differential force output between the muscle groups. Therefore, it is important to perform strengthening exercises for both hip ABD and ER to treat patients with PFPS, which may aid in prevention of lower extremity injuries.

CLINICAL RELEVANCE

It is important to perform strengthening exercises for hip ABD and ER to treat patients with PFPS and may aid in prevention of lower extremity injuries.