

The Effects of Fatigue at the Gastro-Soleus Complex on Dynamic Balance During a Single-Leg Landing

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Introduction

- Dynamic postural stability is believed to be important in minimizing risk of injury and optimizing performance.
- Researchers suggest fatigue has a negative impact on dynamic postural stability.

Purpose

- To examine the effects of local fatigue at the ankle joint on dynamic postural stability in collegiate female athletes.

Results

- A dependent t-test revealed no significant differences in dynamic stability between the pre-fatigue ($M = 3.212$, $SD = .594$) and post-fatigue ($M = 3.13$, $SD = .533$), $t(8) = .598$, $p > .05$ ($d = 0.15$).

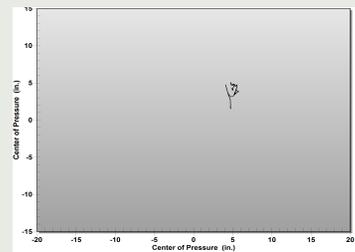


Figure 1.1. A display of the center of pressure during a single leg box drop landing on an AccuPower force platform.

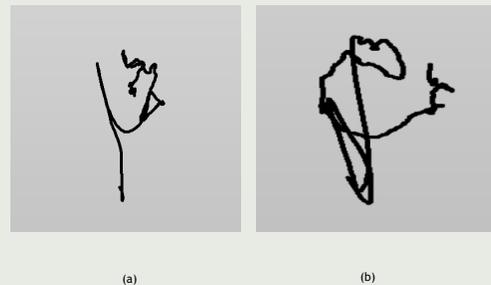


Figure 1.2. Change in the movement of the center of pressure in a pre-fatigued state (a) and after the fatigue protocol (b).

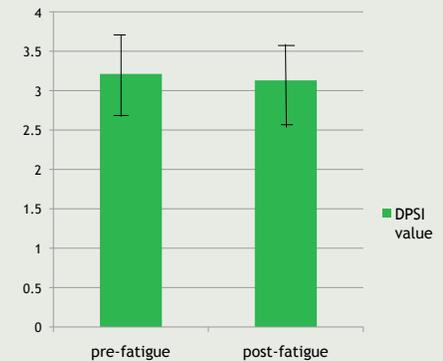


Figure 1.3. Comparison of the mean and standard deviation of DPSI scores of pre-fatigued to post-fatigue trials.

Methods

- Subjects: 9 female collegiate soccer and lacrosse players consented to participate.
- After a standardized dynamic warm up, the athletes performed a maximum vertical ankle jump on a Just Jump mat (height measured to the nearest centimeter).
- Initial non-dominant single-leg box drop landing onto the AccuPower force platform was performed in a pre-fatigued state (data sampling at 400Hz).
- Athletes then performed the fatigue protocol consisting of double leg ankle hops until a 33.3% decrease in maximal vertical ankle jump height was achieved.
- A second, single-leg box drop landing onto the force platform was performed immediately after the fatigued state was achieved.
- Center of pressure movements in the medial-lateral, anterior-posterior, and vertical directions were used to calculate the Dynamic Postural Stability Index (DPSI).

Discussion

- Functional fatigue equal to 33.3% reduction in maximal ankle jump height induced at the ankle joint did not impair dynamic postural stability during a single-leg box drop landing.
- The small effect size indicates a Type II error did not occur.
- Future research should utilize a more sport-specific fatigue protocol that induces fatigue at a level consistent with sport participation.

Conclusion

- Results of this study suggest that local fatigue at the gastro-soleus complex, equal to a 33.3% reduction in lower extremity power, does not affect dynamic stability in collegiate female athletes.

References

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