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Fatigue Induced Changes in Dynamic Balance in Trained Ballet Dancers

Christine N. Enright, Nijiera I. R. Addison, Michael G. Wortley, Erin Quinn Bonczek. Georgian Court University, Lakewood, NJ

Previous studies have found no relationship between core muscle endurance and dynamic balance. However, the protocols of these studies did not stress muscular endurance. **PURPOSE:** The purpose of this study is to describe the relationship between core muscular endurance and changes in dynamic balance as measured using the star excursion balance test (SEBT) following a demanding dance routine in trained ballet dancers. **METHODS:** Nine female participants (20.2 ± 1.2 years, 162.6 ± 8.5 cm, 60.5 ± 15.7 kg) were recruited from a university ballet class. The participants began by performing their customary warm-up before completing the SEBT with both legs in three directions: anterior (ANT), posterior-medial (PM), and posterior-lateral (PL). Following the SEBT, core muscular endurance was measured by having the participants perform a prone plank (PP), a right lateral plank (RP), and a left lateral plank (LP) for time. Next, the participants executed a grand allegro (a short ballet with fast movements and high jumps) to music four times with a short rest between each repetition, and then the SEBT was repeated immediately following the final repetition. Comparisons between the right and left ANT, PM, and PL, and between RP and LP were made using paired samples t-tests. The changes in all three components of the SEBT (Δ ANT, Δ PM, and Δ PL) performance were calculated by subtracting the pre-test from the post-test, and correlation coefficients were calculated between Δ ANT, Δ PM, and Δ PL, and the PP, RP, and LP. **RESULTS:** No significant differences between right and left sides were found for any variable, and so only the right side SEBT variables were used to calculate Δ ANT, Δ PM, and Δ PL. Although there were no statistically significant comparisons, there were moderately positive correlations between Δ PL and RP ($r=0.64$, $p=0.0654$) and between Δ PL and LP ($r=0.53$, $p=0.1438$). All other correlations were negligible. **CONCLUSION:** Lateral plank performance appears to be related to fatigue-induced changes in dynamic balance when reaching in the posterior-lateral direction. This result is consistent with existing literature that suggest hip abductor and lateral rotator muscles are more important to dynamic balance than abdominal muscles. Further research is needed to determine if this relationship has value as an injury screening tool.