



Mid Atlantic Regional Chapter of the American College of Sports Medicine

Annual Scientific Meeting, November 1st – 2nd, 2019
Conference Proceedings

International Journal of Exercise Science, Volume 9, Issue 8



Functional Analysis of the Peroneus Longus and Tibialis Posterior Using Over-Stimulation

Nathaniel E. Kozyra, Christopher G. Neville PT, PhD, SUNY Upstate Medical University, Syracuse, NY.

Previous research (Stewart et al, 2006) has shown that muscle actions during walking may induce motion inconsistent with current understanding based on anatomical location and moment arm. Of particular clinical interest is the function of the peroneus longus (PL) and tibialis posterior (TP) in controlling foot motion during walking. **Purpose:** To identify the kinematic movement induced by the TP and PL when over-stimulated during walking. **Methods:** 11 subjects (4 male, 7 female, age = 29.4yrs, BMI = 23.2kg/m²) volunteered to participate in this study. Self-adhesive electrodes were placed on the muscle belly of the PL while ultrasound guidance was used to insert an indwelling fine-wire electrode into the TP. Walking trials were completed in a random order of TP, PL, and no stimulation while kinematic data in the frontal, sagittal, and transverse planes were recorded through the gait cycle. The consistency of the responses across the 11 subjects was examined using a chi-square test. **Results:** Muscle function of the PL and TP was compared at 35% of stance phase due to the high muscle demand to control the foot at this point. In the frontal plane (TP 8/10 inversion vs. PL 9/11 eversion) and transverse plane motion (TP 6/9 adduction vs. PL 9/10 abduction) there was a significant difference ($p < .05$) in the function of the TP and PL. There was not a significant difference in function for sagittal plane movement. **Conclusion:** The TP and PL oppose each other when overstimulated during walking; the TP induces inversion and adduction while the PL induces eversion and abduction. These findings are consistent with literature using anatomical location and moment arm to infer muscle function. This has important clinical implications for understanding the function of these muscles during gait in the context of pathologic circumstances such as tibialis posterior tendon disorder or fibular nerve palsies affecting the PL.