

The Influence of a Novel Pelvis Support Garment on Frontal-Plane Hip Biomechanics during Gait

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Hip abductor muscle dysfunction is a common mechanism of regional interdependence of the kinetic chain. It is plausible to suggest this dysfunction stems from a particular movement pattern or strategy that when utilized over numerous gait cycles results in increased tension or pressure on specific muscles, tendons, nerves or bones. A novel pelvis support garment may provide an individual with the appropriate mechanical and sensory stimuli to finely tune hip abductor muscle function and dynamic frontal plane hip alignment during gait. **PURPOSE:** The purpose of this study was to determine the effects of a novel pelvis support garment on the frontal-plane hip biomechanics during gait. **METHODS:** Fourteen healthy participants (9 male, 5 female) performed over-ground walking at 1.4 m/s and a cadence of 60 bpm while wearing form-fitting shorts with pelvis support (PS) and shorts without pelvis support (NPS). Frontal plane pelvis and hip kinematics and kinetics were calculated using 44 markers and scaled models in OpenSim. The participants were rank ordered according to the magnitude of the average frontal plane pelvis position during single leg stance measured without pelvis support and then divided into 2 equal subgroups (low obliquity (LO) and high obliquity (HO)). Two-way mixed factor repeated measures ANOVA with hip abductor strength as a covariate was used to determine the effects of pelvis support on the peak hip abductor moment and the average frontal-plane hip position during single leg stance in participants with high and low levels of pelvis obliquity. **RESULTS and DISCUSSION:** Pelvis obliquity was different between groups ($p=.01$; LO -1.8 ± 1.2 deg; HO, -3.7 ± 1.4 deg). The effect of pelvis support on the average frontal-plane hip position during single leg stance and the peak hip abductor moment were both dependent upon the level of pelvis obliquity (interaction term; position, $p=.004$; moment, $p=.032$). The LO group demonstrated 14.7% less hip abduction during the PS condition compared to the NPS condition resulting in an 9.9% increase in the peak hip abductor moment, whereas the HO group was 21.5% more abducted during the PS condition resulting in a 3.4% decrease in the peak hip abductor moment. **CONCLUSION:** Gait performance with the pelvis support garment adjusted the muscular effort of the hip abductor muscles either up or down dependent upon the individual's original frontal plane movement strategy. Pelvis support garments, therefore, may provide the necessary mechanical and sensory stimuli to optimize movement patterns.