

Investigation into Lower Extremity Accommodation during LBPPT Submaximal Running

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ABSTRACT

Running is a popular sport but often leads to overuse injuries due to the combination of repetitive ground reaction forces (GRF) impacting the lower extremities and factors such as biomechanics and training. Lower Body Positive Pressure Treadmills (LBPPT) have gained popularity in clinical and research environments for their ability to reduce the runners' bodyweight, consequently lowering the GRFs. Running in a LBPPT is novel to most runners and it is not yet known if time is needed to adapt to this new running experience. **PURPOSE:** Therefore, the purpose of this study was to investigate whether there is an accommodation period present during LBPPT submaximal running in vertical GRF. **METHODS:** Participants (n =3; 1 male, 2 females; age: 26 ± 1.63 years; mass: 63.73 ± 7.77 kg; height: 1.64 ± 0.11 m) were recruited to complete three 15-minute bodyweight support (BWS) conditions at 100%, 80%, and 60% of their total bodyweight. Loadsol force measuring insoles were inserted into the participant's preferred footwear, and ground reaction force data was collected during running and exported to a custom MATLAB script. Peak vGRF, and stance time were compared using Cohen's d effect size for BWS conditions and for minutes 1, 7 and 15 of running. **RESULTS:** Peak GRF, was higher for 100% (1444.72 ± 16.71 N) than 80% (1374.66 ± 37.63 N, $d = 0.32$) and 60% (1091.65 ± 46.62 N, $d = 1.37$). Mean stance time was higher for 100% ($0.31 \pm .002$ s) than 80% ($0.30 \pm .004$ s, $d = 0.75$) and 60% (0.29 ± 0.003 s, $d = 0.53$). Peak vGRF was compared between minute 1 and minute 15; 80% ($d = 0.13$) and 60% ($d = .14$) with minute one having a marginally higher peak. Peak force when comparing minute 1 to minute 7 was not different ($d < 0.1$). Stance time was marginally longer at minute 1 than minute 15 for 80% ($d = 0.16$) and 60% ($d = 0.20$). Stance time was shorter comparing minute 1 to minute 7 ($d = 0.43$) for 100% and 80% ($d = .35$) with a moderate effect size, and marginally longer for 60% ($d = 0.20$). **CONCLUSION:** It appears that runners change their running patterns with lower levels of BWS and do not accommodate to LBPPT running immediately. Nevertheless, given the limited sample size, further research is warranted to thoroughly explore the implications of accommodation in LBPPT running.