

'Super' Shoes Do Not Affect Jump Performance

MARSHALL D. TOUSANT, FRANCESCA AQUILINO, ERNESTO BALDERRAMA, CHAEHYUN BYUN, RAQUEL CARVAZOS, SHELBY GERNER, CHEYENNE MARTINEZ, AUSTIN RIFFE, MICHAEL OLDHAM, & VIPA BERNHARDT

ROAR-HP Lab, Health and Human Performance; Texas A&M University-Commerce; Commerce, TX

Category: Masters

Advisor / Mentor: Advisor / Mentor: Bernhardt, Vipa (Vipa.Bernhardt@tamuc.edu)

ABSTRACT

Marathon run times have been dropping rapidly in recent years and many believe that 'super' shoes are the reason. 'Super' shoes are made with light-weight, highly compliant and resilient midsole foam and a rigid carbon fiber plate. The material used for the foam can store mechanical energy, i.e., compliance, and return the energy, i.e., resilience (Worobets et al, 2014). The carbon fiber plates increase bending stiffness and changes the leverage of the ankle and metatarsophalangeal point, such that the body is propelled upward and forward (Roy & Stefanyshyn, 2006). Indeed, there is evidence that 'super' shoes can improve running economy and thus performance in endurance running events, at least for those running at faster pace (Hoogkamer et al, 2018; Joubert & Jones, 2022). However, it is unknown if 'super' shoes can improve jump performance. **PURPOSE:** The purpose of this study was to examine if 'super' shoes affect jump performance, balance, and kinematics in NCAA Division 1 athletes. **METHODS:** Twenty-two varsity athletes (10W/12M, 178.5 ± 7.0 cm, 73.2 ± 11.3 kg) performed six movements within the DARI Motion system: 1) Vertical jump; 2) Unilateral vertical jump, left and right (L and R); 3) Drop jump; 4) Five hop, L and R; 5) Lateral bound, L and R; and 6) Stork balance with eyes open, L and R. Four racing shoes (three 'super' shoes and one traditional control shoe) were tested. Following a familiarization trial in the participant's own shoes, they then completed four more trials, one in each shoe in randomized order. Data were analyzed using one-way ANOVA, $p < 0.05$. **RESULTS:** No significant differences were found between shoes in the jump variables jump height, flight time, distance, or ground reaction force ($p > 0.05$). For example, absolute mean values for jump height during vertical jump for the Asics Metaspeed Edge, Nike ZoomX Vaporfly Next% 2, Saucony Endorphin Pro 2, & Under Armour Charged Pursuit 3 (control shoe) were 0.588 ± 0.09m, 0.586 ± 0.10m, 0.578 ± 0.11m, and 0.575 ± 0.10m respectively. Also, no significant differences were found in kinematic data such as dynamic knee valgus, absorption depth, or anterior/posterior and medial/lateral sway during stork balance (all $p > 0.05$). **CONCLUSION:** Although 'super' shoes have been shown to improve running economy and running performance; however, jump performance, balance, and or kinetic variables are not significantly better than traditional shoes. Further research is needed to explore if gender, body weight, or individual biomechanical characteristics could affect sport performance in 'super' shoes.