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The Effect of Carbon Composite Dynamic Response Ankle Foot Orthotics on Collegiate Athlete's Sprint Performance

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Carbon composite dynamic response ankle foot orthotics (CCDRAFOs) are lightweight ankle braces originally made to help pathologically involved legs walk more efficiently by helping increase walking speed. No known literature exists evaluating CCDRAFOs effects on healthy athletes' running performance. Therefore, no evidence exists to determine if CCDRAFOs help or hinder able-bodied individuals. **PURPOSE:** The purpose of this study was to evaluate the effects of CCDRAFOs on collegiate athlete sprinting performance. **METHODS:** Twenty-eight Gannon University baseball (N=19; M=19.11 ± 1.05 years) and softball (N=9; M=20.11 ± 1.27 years) players participated in this study with coaches' permission. Each athlete ran four, 20-yard sprints in an indoor fieldhouse. The athletes sprinted under the following four conditions: 1) no CCDRAFOs on, 2) a left leg CCDRAFO on, 3) a right leg CCDRAFO on, and 4) both left leg and right leg CCDRAFOs on. The variables measured included sprint time, number of strides, stride lengths, average sprint velocity, and ankle and knee joint angles. Multi- and univariate ANOVA's were used to analyze the interactions between variables. A post hoc analysis using Tukey test was completed, as well. **RESULTS:** Wearing bilateral CCDRAFOs significantly increased sprint times by 7% compared to not wearing CCDRAFOs ($F(3,93) = 2.82, p = 0.04$). Wearing a right CCDRAFO only and wearing bilateral CCDRAFOs both significantly decreased average sprinting velocities compared to not wearing CCDRAFOs ($M = 0.258, p = 0.039, 95\% \text{ CI } [0.009, 0.507]$ and $M = 0.365, p = 0.001, 95\% \text{ CI } [0.116, 0.614]$) respectively. **CONCLUSION:** Wearing CCDRAFOs hindered able-bodied athletes' sprinting performance by increasing their sprinting times and decreasing their average sprinting velocities. Therefore, short-term use of CCDRAFOs do not help able-bodied individuals sprint performance.