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### Original Research

## Ankle Bracing, Plantar-Flexion Angle, and Ankle Muscle Latencies During Inversion Stress in Healthy Participants

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### Abstract

**Context:** Ankle braces may enhance ankle joint proprioception, which in turn may affect reflexive ankle muscle activity during a perturbation. Despite the common occurrence of plantar-flexion inversion ankle injuries, authors of previous studies of ankle muscle latencies have focused on inversion stresses only.

**Objective:** To examine the latency of the peroneus longus (PL), peroneus brevis (PB), and tibialis anterior (TA) muscles in response to various degrees of combined plantar-flexion and inversion stresses in braced and unbraced asymptomatic ankles.

**Design:** Repeated measures.

**Setting:** University biomechanics laboratory.

**Patients or Other Participants:** Twenty-eight healthy females and 12 healthy males (n = 40; mean age = 23.63 years, range = 19 to 30 years; height = 172.75 ± 7.96 cm; mass = 65.53 ± 12.0 kg).

**Intervention(s):** Participants were tested under 2 conditions: wearing and not wearing an Active Ankle T1 brace while dropping from a custom-made platform into 10°, 20°, and 30° of plantar flexion and 30° of inversion.

**Main Outcome Measure(s):** The time between platform drop and the onset of PL, PB, and TA electromyographic activity was measured to determine latencies. We calculated a series of 2-way analyses of variance to determine if latencies were different between the conditions (braced and unbraced) and among the plantar-flexion angles ( $\alpha = .05$ ).

**Results:** No interaction was found between condition and plantar-flexion angle. No

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significant main effects were found for condition or plantar-flexion angle. Overall means for braced and unbraced conditions were not significantly different for each muscle tested. Overall means for angle for the PL, PB, and TA were not significantly different.

**Conclusions:** Reflexive activity of the PL, PB, or TA was unaffected by the amount of plantar flexion or by wearing an Active Ankle T1 brace during an unanticipated plantar-flexion inversion perturbation.

**Keywords:** [ankle injuries](#), [lower extremity](#), [biomechanics](#), [orthoses](#), [reaction time](#)

Thomas Kernozek, PhD, contributed to conception and design; acquisition and analysis and interpretation of the data; and drafting, critical revision, and final approval of the article. Christopher J. Durall, DPT, LAT, SCS, CSCS, contributed to analysis and interpretation of the data and drafting, critical revision, and final approval of the article. Allison Friske, MSPT, and Matthew Mussallem, MSPT, LAT, contributed to conception and design; acquisition and analysis and interpretation of the data; and drafting, critical revision, and final approval of the article.

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