Immediate Joint Angle Transitions from Shod to Barefoot Running: Preliminary Findings

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Context: Track athletes are prone to exertional compartment syndrome, therefore we are looking at trends in how footwear may affect the occurrence of this condition. Objective: Our objective was to see the potential of using barefoot running as a means to force a greater plantar flexion angle at contact. We videotaped subjects while running shod and then barefoot. We then compared the joint angles of the hip, knee, and foot during foot contact and at toe off. Design: This is a descriptive study using repeated measures on a single cohort. Setting: We conducted our study on an indoor NCAA regulation basketball court at the Tinsley Center gymnasium at Bridgewater State University (BSU). Participants: We had 6 participants who are currently track athletes. The mean age of participants is 20.83±0.408 years. The mean height is 1.72±0.123 meters, and the mean weight of 70.47±9.49 kg.

Interventions: The independent variable of our study is footwear (shod and barefoot) conditions. Main Outcome Measures: We used the Dartfish software program to determine the hip, knee, and ankle joint angles of each subject’s dominant leg at touchdown and toe off over 3 trials of each condition. Results: Mean ankle angles at touchdown for shod and barefoot conditions were 121.52±17.21 and 121.88±6.78, respectively. Paired student t-tests indicated these were nearly significantly different (p=.054). These ankle angle findings were similar to those of Diebal et al. which examines the stress of dorsiflexion at foot contact in relation to compartment syndrome. Our data also shows a significant difference (p=.026) in hip flexion at toe off, with more flexion in the barefoot condition (177.16±22.71) then in the shod condition (189.77±7.73). Conclusions: As athletic trainers these findings can help us to better understand compartment syndrome in relation to running mechanics. If a track athlete presents with compartment syndrome we might try a barefoot running program to decrease touchdown dorsiflexion, which could help to alleviate the symptoms.

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