ACHILLES TENDON STIFFNESS OF DIVISION 1 CROSS COUNTRY Runners: Is Symmetry The Goal?

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Background: There is conflicting data on the influence of Achilles tendon (AT) stiffness on performance and injuries in athletes. Recently the assumption of symmetry has been questioned as well. For example, the greatest sprinter in history has 14% asymmetry. Should coaches and clinicians aim for symmetry or is asymmetry the norm?

Purpose: The purpose of this study is to identify if there is a relationship between AT stiffness asymmetry and performance or injuries in division 1 (D1) cross country (XC) runners.

Study Design: Case-control Study.

Methods: Twenty-six (20 female) D1 XC runners volunteered from a midwestern university to participate in the study at the beginning of their XC season. The means of 3 AT biomechanical measurements were collected bilaterally with the MyotonPro, a myotonometer, at the beginning of their XC season. The MyotonPro has been shown to have good to excellent intra-rater reliability and inter-rater reliability. Validity has been established against shear wave ultrasound elastography with construct validity being demonstrated as well. Per the manufacturer’s recommendations, the subjects were positioned prone with a bolster positioned anterior to their distal lower leg to allow a relaxed position for tendon measurements. The measurements were completed at the midline of the AT between the medial and lateral malleoli. Historical data on injuries and performances were collected with subjective history and surveys during data collection.

Results: There was no correlation in AT stiffness asymmetry and performance (r = -0.01). There was no difference (p = .71) in AT stiffness asymmetry of those with a history of injury (n = 14, 4.9%) in the last year to those who were injury free (n = 12, 5.8%). There was a significant difference in mean AT stiffness between the high (726 N/m) and low (688 N/m) stiffness AT within runners (p < .01) with the mean AT stiffness asymmetries being 5.3%.

Discussion/Conclusion: Challenging the assumptions of symmetry, there was no meaningful relationships between AT stiffness asymmetry and performance or injuries. In fact, there was 5.3% asymmetry in AT stiffness between D1 XC runners included in this study. Asymmetry may have evolved, developed, or been trained to its current state with good reason. Aiming to control asymmetry of a single or a few variables without a comprehensive understanding of its impact may be a shortsighted practice.

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