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Title: Influence of fatigue on turning characteristics in those with chronic ankle instability

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Background: Ankle sprains are typically sustained during change of direction tasks and often occur during the latter thirds of both halves of matches. The effects of fatigue on turning kinematic characteristics has not been studied in a chronic ankle instability population.

Objective: To analyse the effects of fatigue on lower limb movement during a change of direction task in those with chronic ankle instability.

Design: Case-controlled study.

Setting: University sports hall.

Patients (or Participants): Twelve athletes with CAI and 11 athletes with no previous ankle sprain history participated. Inclusion criteria for the CAI group were based on previous published recommendations. All athletes were currently playing sport and free from current acute lower limb injuries. Only data from athletes who turned consistently on the same foot in controls and on the same unstable ankle in the CAI group were included in analysis (4 CAI, 5 controls).

Interventions (or Assessment of Risk Factors): Participants performed the Yo-Yo Intermittent Recovery Test level 1 (Yo-Yo IR1), which was used as the fatiguing protocol to allow for comparison of turning characteristics prior to and up to the point of maximal exhaustion.

Main Outcome Measurements: Shimmer 3D inertial sensors attached to each thigh, shank, and foot were used to record gyroscopic and associated accelerometer signals whilst participants performed the Yo-Yo IR1. Angular rate of rotation of the foot in the sagittal plane was analysed from 400 ms before and after initial contact during the turn of each level of the Yo-Yo IR1 test.

Results: Preliminary analysis has observed a trend towards a change of sagittal plane foot movement in the CAI group throughout the completion of the Yo-Yo IR1 test which may signify a change in control of movement with the onset of fatigue.

Conclusions: Additional analysis is required. The identification of improper movements influenced by fatigue during a turning task in a CAI population may provide better insight into movement control deficiencies that may exist in CAI populations during sports related activities.