Background Upright single-limb stance (SLS) is maintained via integration of visual, vestibular and somatosensory afferents. The presence of redundancies between these afferents allows the sensorimotor system to simplify a specific task within a number of strategies. Musculoskeletal injury challenges the somatosensory system to reweight distorted sensory afferents. No current investigation has supplemented kinetic analysis of eyes-open and eyes-closed SLS tasks with a kinematic profile of lower limb postural orientation in an acute lateral ankle sprain (LAS) group to assess the adaptive capacity of the sensorimotor system to injury.
Objective To compare centre of pressure (COP) and lower limb postural orientation characteristics of participants with acute LAS to non-injured participants during a SLS task.
Design Cross-sectional.
Setting University biomechanics laboratory.
Participants 66 participants with acute LAS completed a task of eyes-open SLS on their injured and non-injured limbs (task 1). 23 of these participants successfully completed the SLS task with their eyes closed (task 2). A non-injured control group of nineteen participants completed task 1, with 16 completing task 2.
Main outcome measures 3D kinematics of the hip, knee and ankle joints as well as associated fractal dimension (FD) of the COP path.
Results Between trial analyses of groups revealed significant differences in lower limb kinematics and FD of the COP path for task 2. Post-hoc testing revealed that non-injured control group bilaterally assumed a position of greater hip flexion compared to LAS participants (injured limb=7.41±6.1° vs 1.44±4.8°; non-injured limb=9.59±8.5° vs 2.16±5.6°), with a corollary of greater FD of the COP path (injured limb=1.39±0.16 vs 1.25 ±0.14; non-injured limb=1.37±0.21 vs 1.23±0.14).
Conclusion Acute LAS causes bilateral impairment in postural control strategies.

72 ACUTE ANKLE SPRAIN INJURY ALTERS KINEMATIC AND CENTRE OF PRESSURE MEASURES OF POSTURAL CONTROL DURING SINGLE LIMB STANCE

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