SWACSM Abstract

Effects of Anticipation on Energy Dissipation Patterns among Chronic Ankle Instability Patients

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ABSTRACT

Ankle inversion injuries often lead to chronic ankle instability (CAI). CAI patients use altered energy dissipation patterns during jump-landing, but most studies have been limited to tasks performed under anticipated conditions. It is unclear how the anticipatory condition affects joint energetics in CAI patients. **PURPOSE**: To identify the effects of anticipation on energy dissipation during jump-landing among CAI, coper, and control subjects. **METHODS**: 60 subjects were categorized according to the Foot and Ankle Ability Measure and Ankle Instability Index. 20 CAI patients (10males, 10females, 1.74±0.1m, 69.1±10.2kg), 20 Copers (10males, 10females, 1.76±0.1m, 70.9±11.1kg), and 20 Controls (10males, 10females, 1.74±0.1m, 66.0±10.7kg) participated. Participants completed 3 trials of maximal jump-landing tasks (via arrows shown on a screen) performed under anticipated/unanticipated conditions. Energy dissipation by the ankle, knee, and hip joints was calculated by integrating regions of the joint power curve during the task. Lower extremity joint energy dissipation was calculated for the hip, knee, and ankle in the sagittal plane during 50, 100, 150, and 200 ms after initial contact with the force plate. Two-way repeated measures ANOVAs (group × condition) were used to examine the differences between condition (Anticipated, Unanticipated) and group (CAI, coper, control). **RESULTS**: In the unanticipated condition, copers displayed reduced ankle/hip energy dissipation and increased knee energy dissipation compared to the anticipated condition, while the CAI and Control groups demonstrated no change in energy dissipation between the two conditions. **CONCLUSION**: CAI patients were unable to change energy dissipation patterns between the two conditions. This finding may represent an apprehension for extra ankle strain compared to the copers. In the earliest stages of jump-landing, copers displayed the most altered energy dissipation patterns, shifting from heavily favoring the ankle during anticipated movement to dissipating much more energy into the knee while reducing the load on the ankle. These energy patterns may indicate a coping mechanism and increased knee energy dissipation in copers may be an effort to attenuate load during landing as a strategy to lessen the load absorbed by the ankle.