

## SWACSM Abstract

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### The Effects of Chronic Pain Levels on Lower Extremity Muscle Activation During Jump Landing/Cutting in Individuals with Chronic Ankle Instability

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#### ABSTRACT

Lateral ankle sprains (LASs) are the most common injury in sports. Up to 74% of individuals with an initial LAS develop chronic ankle instability (CAI) with chronic ankle pain being one of the residual symptoms. **PURPOSE:** To identify the effects of chronic pain levels on lower extremity muscle activation during a maximal jump landing/cutting in CAI individuals. **METHODS:** This study was a cross-sectional study. Twenty CAI individuals with high pain (High pain) (9M, 11F; age=22±2year; height= 1.74±0.10m; mass=79.4±14.6kg, pain=67.4±7.7), 20 CAI individuals with low pain (Low pain) (9M, 11F; age=21±3year; height=1.73±0.08m; mass=74.2±12.7kg, pain=91.7±3.9), and 20 healthy controls (Control) (9M, 11F; age=22±1year; height=1.74±0.09m; mass=68.2±10.2kg, pain=100±0). We followed the International Ankle Consortium and Foot and Ankle Outcome Scores for classification of CAI and chronic pain. Electromyography (EMG) data were collected using wireless surface electrodes (2,000 Hz) during 5 trials of maximal jump landing/cutting from initial contact to toe-off (0-100% of stance). Reference EMG data were collected standing position for 3 seconds. EMG data were normalized to the reference EMG data. The electrodes were placed over the tibialis anterior (TA), peroneus longus (PL), medial gastrocnemius (MG), vastus lateralis (VL), gluteus medius (Gmed), and gluteus maximus (Gmax). Functional analyses of variance were used to evaluate between-group differences for kinematics outcomes. **RESULTS:** The high pain showed 3.3%, 16%, and 14% less activation in TA, PL, and MG, and 16% and 14% more activation in the VL and Gmed than the low pain. The high pain displayed 26%, 11.1%, 15%, 8.2%, 25.4%, and 11.5% less activation in the TA, PL, MG, VL, Gmed, and Gmax than the control. The low pain showed 14.9%, 18.7%, and 11.2% less activation in the TA, VL, and Gmed, and 8.7% more activation in the PL during the landing/cutting than the control. **CONCLUSION:** Chronic pain levels appear to impact muscle activation in CAI individuals. Both the high and low pain demonstrate altered muscle activation patterns in distal and proximal joints. The high pain prompts a hip-dominant strategy, compensating for deactivated distal muscles. The lower the level of chronic pain, the more active the PL muscles that contribute to ankle stability.