

COMPARISON OF SHOCK ABSORPTION STRATEGY DURING DOUBLE-LEG DROP LANDING WITH OR WITHOUT CHRONIC ANKLE INSTABILITY

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INTRODUCTION

Chronic Ankle Instability (CAI) is defined as a subjective feeling of “giving way” and repetitive occurrence of ankle sprain (Hertel, 2002). CAI has been reported to have different strategies during landing tasks that occur frequently in sports situations and daily lives (Doherty et al., 2016).

PURPOSE

The purpose of this study was to compare ankle joint angle and loading rate and to provide basic understanding of the shock absorption strategy during double-leg drop landing in patients with CAI and controls.

METHODS

Participants

44 male adults with right dominant limb were recruited in this study. They were classified into the CAI group (n=21, Age; 20.14±1.42 yrs, Height; 179.60±4.60 cm, Weight; 75.33±6.37 kg) and Control group (n=23, Age: 20.13±2.56 yrs, Height: 175.20±5.80 cm, Weight: 70.21±10.39 kg) according to orthopedic diagnosis.

Double-Leg drop landing task

The participants performed the double-leg drop landing task on a 20 cm horizontal distance and 30 cm height from the force plate.

Data Processing

Kinetic and kinematic data were obtained using 8 motion analysis cameras (6 Eagle Camera and 2 Raptor System, Motion Analysis Corp., USA) and 2 force plates (OR6-5-2000, AMTI Inc., USA) during the maximum vertical ground reaction force after landing, and the loading rate was calculated.

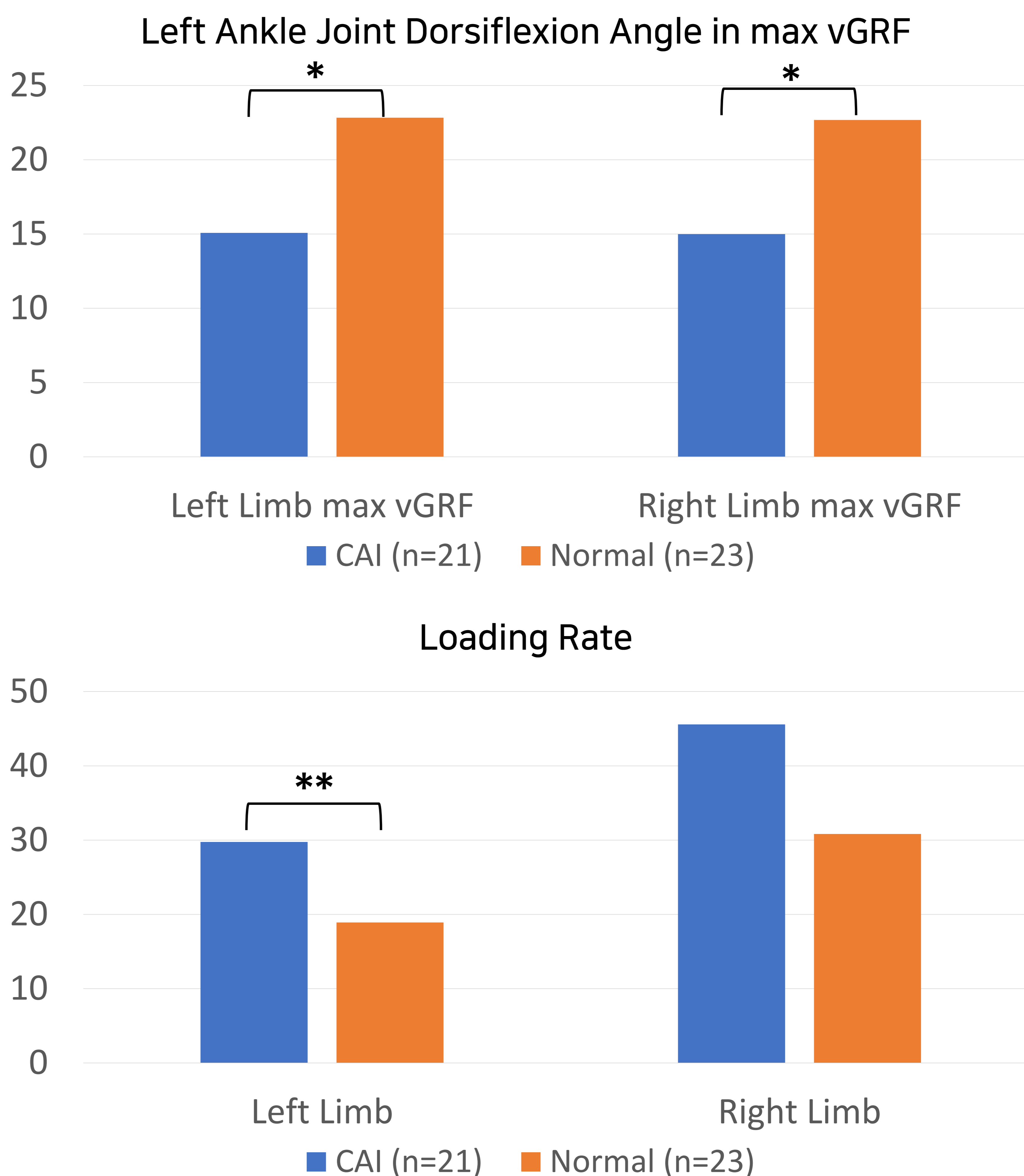
$$\text{Loading Rate} = \frac{\text{Normalized Peak Force}}{\text{Time to Peak Force}}$$

Statistical analysis

Data were analyzed using SPSS ver. 25.0. To identify group differences, an independent samples *t*-test was used for the statistical analysis. The significance level was set at a corresponding *p* value of <0.05.

RESULTS

The maximum ankle dorsiflexion angle in the sagittal plane was significantly smaller in the CAI group than in the control group when each Limb maximum vertical Ground Reaction Force occurs (CAI: -14.96±8.47, Normal: -22.68±11.35, *p* < 0.05, CAI: -15.08±8.67, Normal: -22.83±10.63, *p* < 0.05). The loading rate was significantly higher in the CAI group than in the control group in the left foot (CAI: 29.76±11.25, Normal: 18.92±10.51, *p* < 0.01). No significant differences were found in the frontal and transverse plane ankle joint angle and right foot loading rate.



CONCLUSION

The CAI group showed a more erect landing strategy and decreased shock absorption ability as compared with the control group.

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