

ASSESSING DIFFERENCES IN DROP JUMP PERFORMANCE BETWEEN CHRONIC ANKLE INSTABILITY AND HEALTHY ANKLE JOINTS



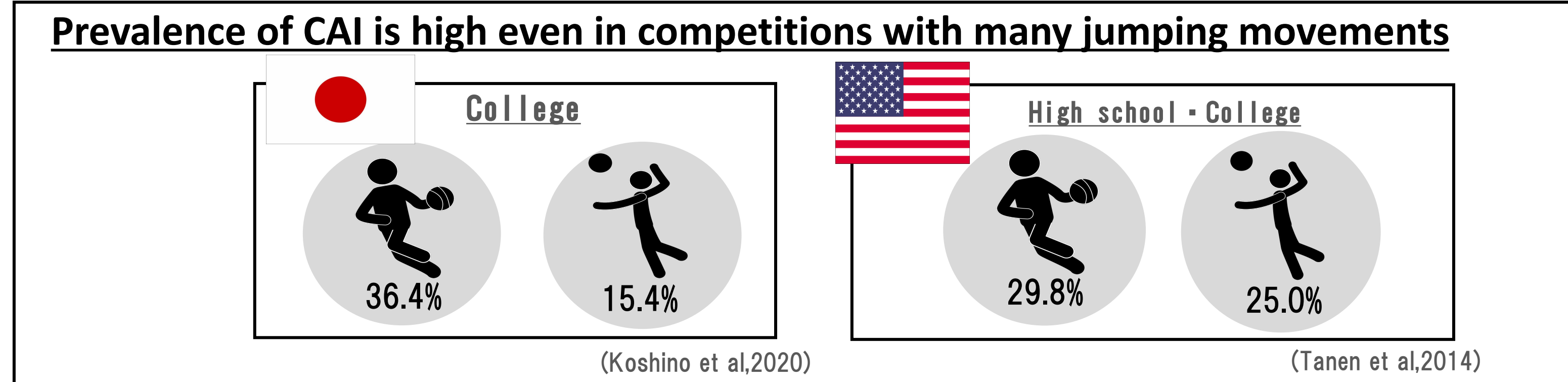
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Introduction

Chronic Ankle Instability (CAI) → sequela of ankle sprain

- Chronic recurrent ankle sprain
- Perceived ankle instability etc..



A study investigating the jumping ability of those with instability in the ankle joint (Yoshida et al, 2012)

Investigating the jumping ability of FAI and healthy leg using single leg drop jump (SLD)

➔ **Contact time** → healthy leg < FAI

CAI is highly affected by frontal plane movement (Docherly et al, 2005)

Purpose Investigate CAI's ability to jump from the sagittal and forehead planes using SLD

Method

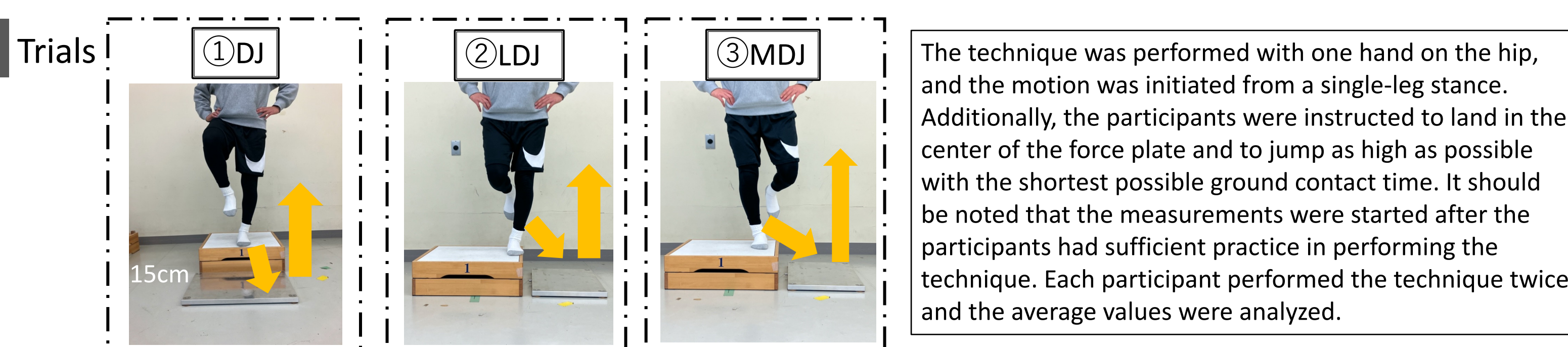
Participants College basketball player (Kanto Collegiate Basketball Federation Division I League)

CAI (n=12)

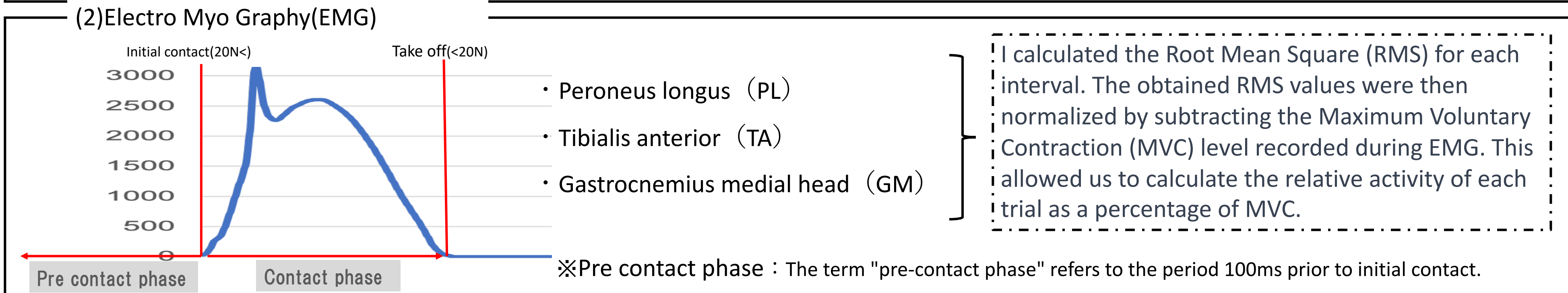
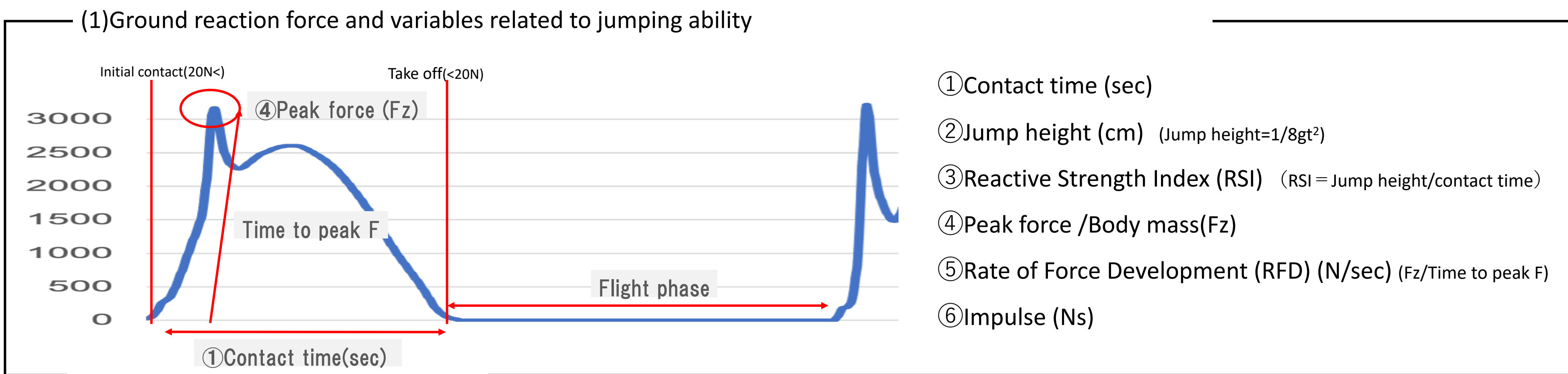
- Experienced ankle sprain.
- Experience recurrent ankle sprains and have instability in the ankle joint
- Instability Questionnaire (IdFAI) score of 11 or more

Control (n=12)

- No history of ankle sprain



Measurements



Statistical Analyses

(1) Ground reaction force and variables related to jumping ability
 (2) Electro Myo Graphy (EMG)

Two-Way Analysis of Variance on CAI vs Control (No Intervention) and Experimental Technique (Intervention) Factors (2 × 3)

➔ Multiple comparison test using the Bonferroni

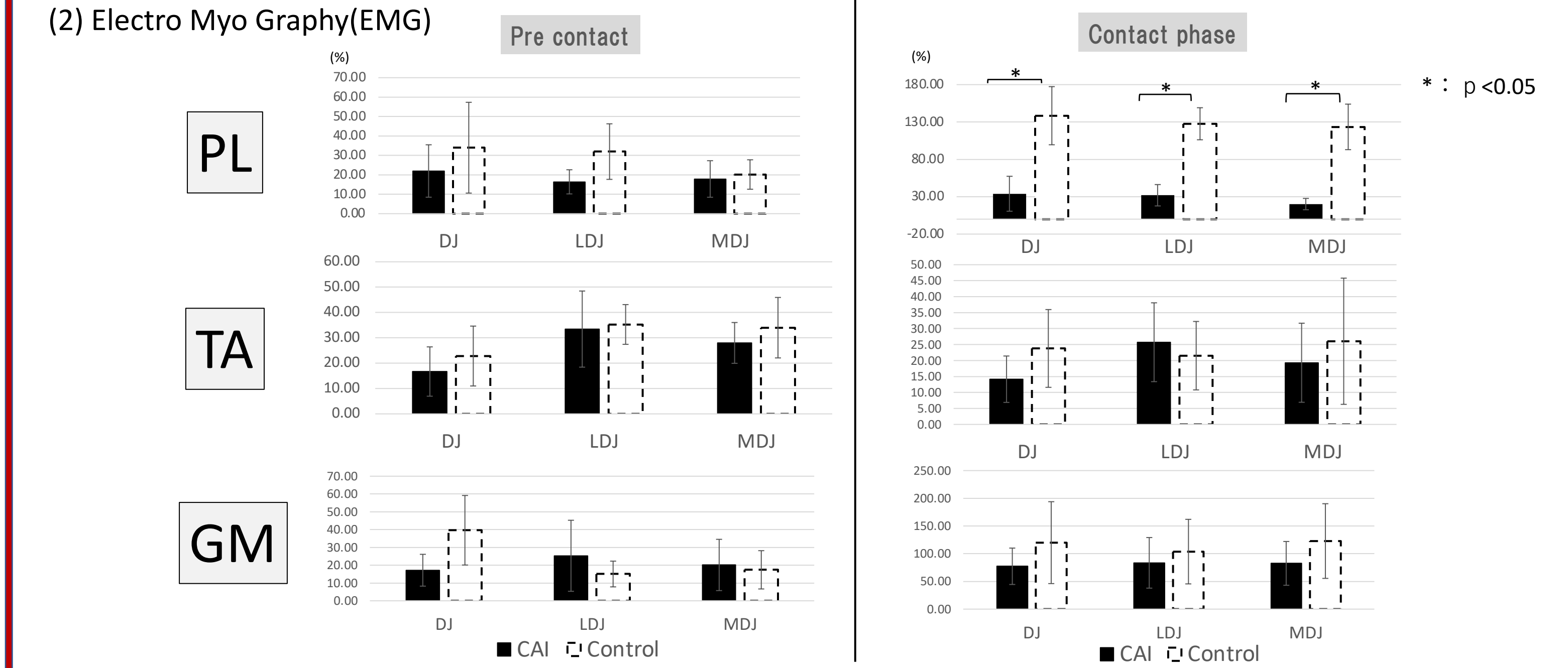
All statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS for Windows, version 11.0; SPSS, Inc., Chicago, IL, USA)

Results

(1) Ground reaction force and variables related to jumping ability

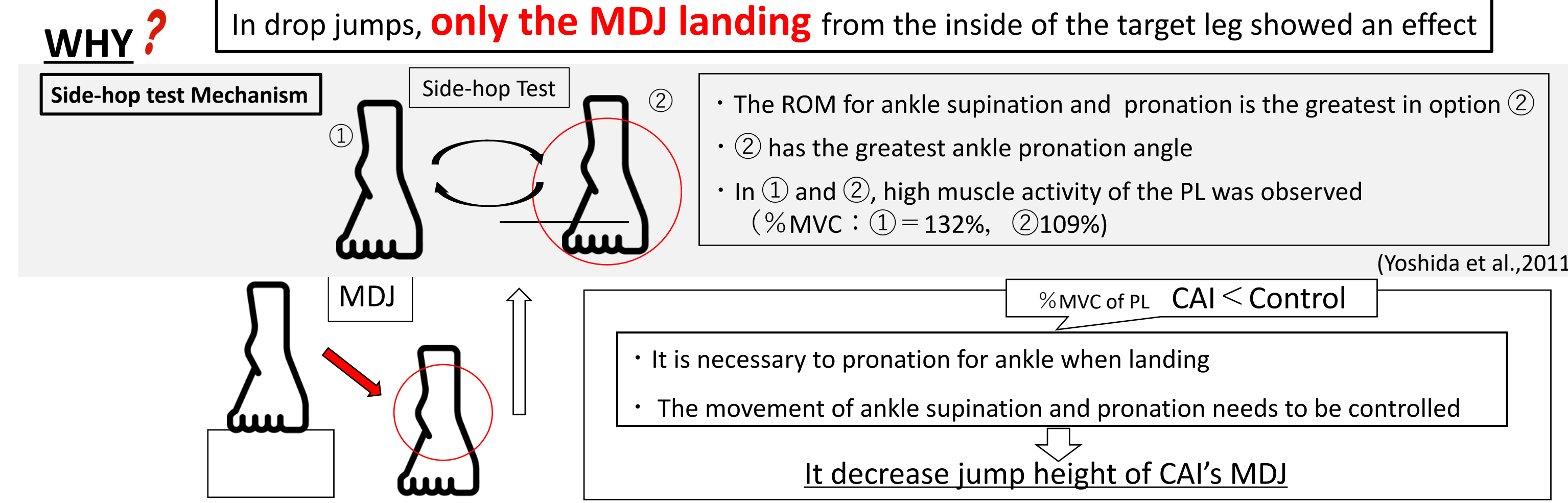
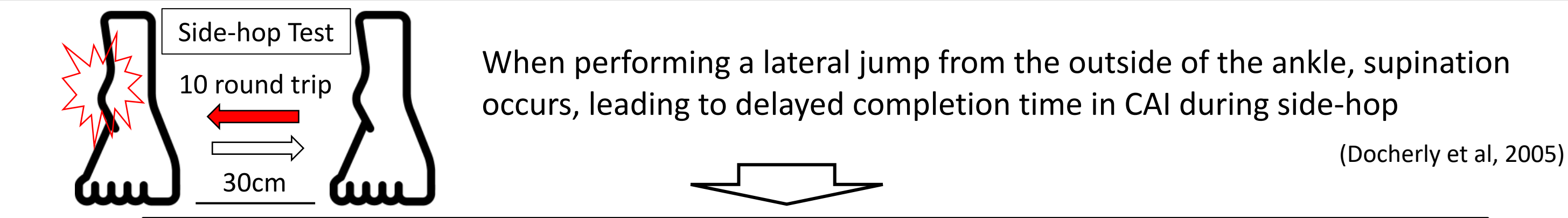
	JH(m)	CT(sec)	RSI	PF(N/BW)	RFD(N/sec)	Impulse(Ns)
①DJ						
CAI	0.142 ± 0.03	0.294 ± 0.02	0.489 ± 0.11	37.49 ± 4.88	535.91 ± 237.41	6.06 ± 0.55
Control	0.151 ± 0.03	0.297 ± 0.05	0.525 ± 0.12	36.14 ± 7.42	541.55 ± 327.57	6.29 ± 0.72
②LDJ						
CAI	0.133 ± 0.03	0.300 ± 0.03	0.466 ± 0.11	36.67 ± 4.15	473.96 ± 135.57	6.07 ± 0.55
Control	0.155 ± 0.04	0.283 ± 0.04	0.531 ± 0.16	38.45 ± 4.29	528.61 ± 212.27	6.15 ± 0.53
③MDJ						
CAI	0.138 ± 0.03*	0.299 ± 0.04	0.474 ± 0.14*	35.86 ± 5.11	440.58 ± 186.13	6.27 ± 0.55
Control	0.171 ± 0.04*	0.290 ± 0.05	0.631 ± 0.16*	37.43 ± 4.12	499.97 ± 183.20	6.41 ± 0.77

According to the results of a two-way analysis of variance (ANOVA) for JH, no interaction effect was observed (F(2,44) = 1.43, p = 0.25, partial η² = 0.61). However, a significant main effect was found between the CAI group and the healthy group (F(1,66) = 7.48, p < 0.01, partial η² = 0.10). On the other hand, there was no significant main effect observed across the experimental trials (F(2,66) = 0.70, p = 0.49, partial η² = 0.02). Post-hoc tests revealed that in the MDJ condition, the CAI group exhibited significantly lower values compared to the healthy group (p = 0.02). Similarly, for RSI, the two-way ANOVA did not indicate an interaction effect (F(2,44) = 2.09, p = 0.14, partial η² = 0.87). There was a significant main effect observed between the CAI group and the healthy group (F(1,66) = 6.71, p = 0.01, partial η² = 0.92), but no significant main effect was found across the experimental trials (F(2,66) = 0.86, p = 0.43, partial η² = 0.03). Post-hoc tests indicated that in the MDJ condition, the CAI group showed significantly lower values compared to the healthy group (p = 0.04). The interaction and main effects were not observed.



In the %MVC analysis, the results of the two-way analysis of variance revealed no significant interaction in the three muscles. However, a main effect was observed in the PL muscle during the Contact phase, indicating significant differences between the CAI group and the healthy control group (F(1,57) = 18.754, p < 0.001, partial η² = 0.248). Post-hoc tests indicated that the CAI group exhibited significantly lower values compared to the healthy control group in DJ (p = 0.013), LDJ (p = 0.017), and MDJ (p = 0.016).

Conclusion



CAI may affect the muscle function of the peroneus longus and potentially influence the jump height and RSI in drop jumps with inward landing

Practical Applications

- As conditioning for CAI, it carry out Djs land in the medial direction of the foot
- MDJ jumping height can be adopted as a criterion for RTP after an ankle sprain