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### **A Pilot Study Examining Y-balance Test Scores' Predictive Validity For Sports Injuries In High-intensity Trainees.**

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#### **Abstract:**

#### **PURPOSE :**

This study aimed to examine the relationship between Y-Balance Test (YBT) relative scores and lower-extremity range of motion (ROM) in individuals who regularly engage in high-intensity physical fitness training, and to explore the potential utility of YBT relative scores for predicting sports injuries.

**METHODS :** Eighty-two participants (29% female) were included: 60 high school students (age =  $17.27 \pm 0.79$  years, BMI =  $23.12 \pm 2.45$ ) who performed high-intensity exercise for more than 120 min per session weekly, and 22 young adults (age =  $29.36 \pm 4.80$  years, BMI =  $22.52 \pm 3.29$ ) who regularly participated in CrossFit training. Lower-extremity ROM (knee, ankle, hip) was measured by a physical therapist with 20 years of clinical experience using a goniometer and classified as normal or below normal according to age- and gender-specific CDC standards (Soucie et al., 2010). The YBT assessed anterior, posteromedial, and posterolateral reach distances, normalized to leg length to obtain relative scores (RS). Independent t-tests compared YBT performance between ROM categories, and logistic regression analyses estimated odds ratios (ORs) for limited ROM based on directional reach. Analyses were performed using Python ( $\alpha = .05$ ).

**RESULTS :** Among high school students, significant differences were found in anterior reach between ROM categories for left ( $t = 3.684$ ) and right ( $t = 2.405$ ) ankle dorsiflexion ( $p < .05$ ). Logistic regression showed that reduced left YBT anterior RS predicted limited left ( $b = -0.151$ , OR = 0.897) and right ( $b = -0.116$ , OR = 0.891) dorsiflexion ( $p < .05$ ). In CrossFit participants, right hip flexion differed significantly between ROM groups for posteromedial ( $t = 2.622$ ) and posterolateral ( $t = 4.628$ ) RS ( $p < .05$ ). Higher posteromedial ( $b = -0.205$ , OR = 0.815) and posterolateral ( $b = -0.294$ , OR = 0.745) RS values were associated with lower odds of limited hip flexion ( $p < .05$ ).

**CONCLUSIONS :** YBT relative scores appear to be valid indicators of ankle dorsiflexion and hip flexion limitations among youth and young adults engaged in regular high-intensity training. Future research should employ ROC curve analyses to determine optimal YBT cut-off points for identifying injury risks associated with restricted ROM.

Author Disclosure Information:

**I. Jeong:** None.

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