

# ADOLESCENT ATHLETES WITH A HISTORY OF ACL RECONSTRUCTION EXHIBIT PERSISTENT DEFICITS IN JUMP PERFORMANCE AND REACTIVE STRENGTH

Adam VanZile<sup>1</sup> (Presenter), Daniel Jones<sup>2</sup>, & Thomas Gus Almonroeder<sup>3</sup>

<sup>1</sup>Optimum Performance Therapy, <sup>2</sup>Carroll High School, <sup>3</sup>Trine University



## Purpose

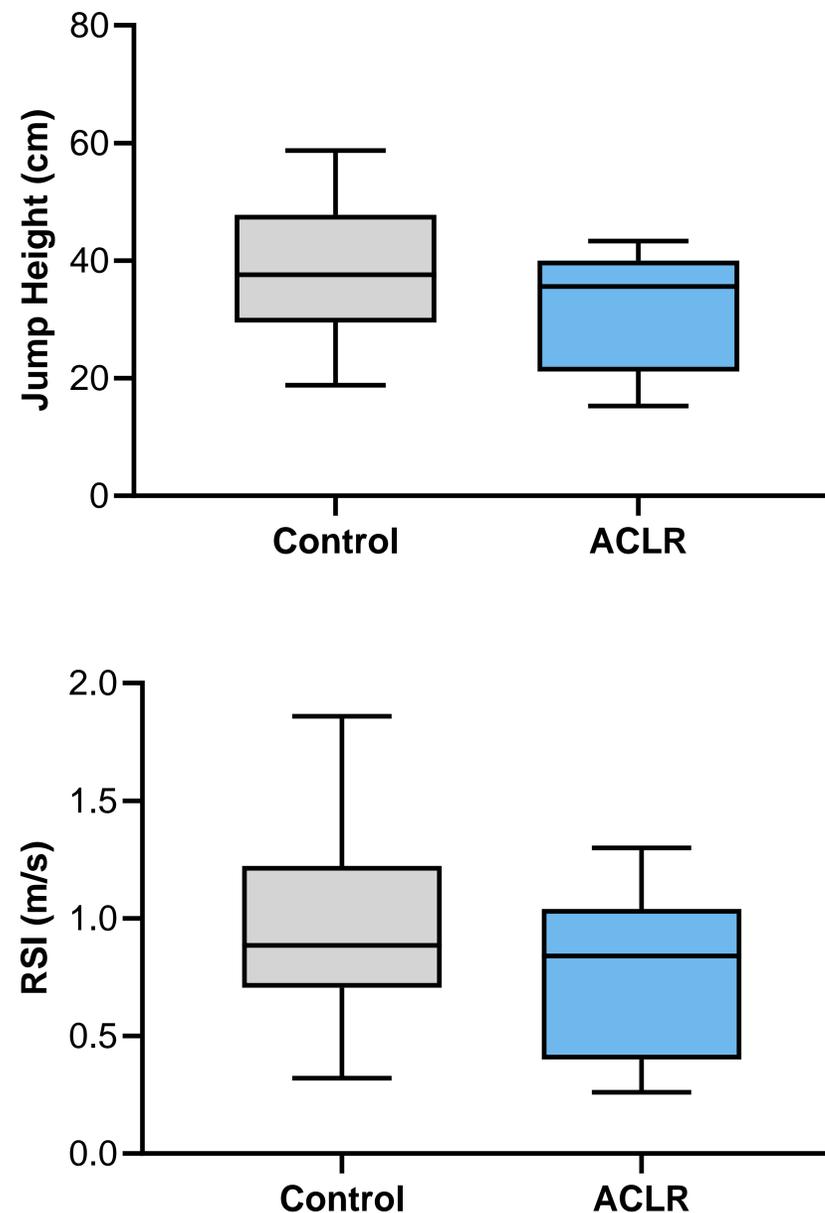
- **Purpose:** compare jump performance and reactive strength during a depth jump (DJ) for adolescent athletes with a history of anterior cruciate ligament (ACL) reconstruction vs. adolescent athletes without a history of ACL injury

## Methods

- **Subjects:** 15 adolescent athletes (8 m, 7 f) with a history of ACL reconstruction (ACLR group); 30 adolescent athletes (16 m, 14 f) without a history of ACL injury (control group)
- Athletes in the ACLR group had undergone ACL reconstruction 6-8 months prior and planned to return to competitive sports
- Data collected during standardized return-to-sport testing (ACLR group)
- Athletes performed 3 DJ trials where they dropped from a 30 cm high box, landed, and immediately performed a maximal vertical jump
- Force platform recorded ground reaction force (GRF) data during DJ trials

## Statistical Analysis

- **Dependent variables:** jump height, ground contact time, peak propulsive force (normalized by body weight), and the reactive strength index (RSI)
- Two-tailed, independent t-tests to compare ACLR and control groups for each dependent variable (alpha level = 0.05)
- Cohen's d effect size (ES) statistics to quantify magnitude of the group differences; 0.2 = small effect, 0.5 = medium effect, 0.8 = large effect



**Figure 1.** Box plots of jump heights (top) and reactive strength index values (RSI) for the control group and ACLR group

Scan QR code to access abstract



## Results

- Differences in jump height ( $p=0.04$ ;  $ES = 0.67$ ) and RSI values ( $p=0.04$ ;  $ES = 0.68$ ) between the groups
- ACLR group exhibited lower jump height ( $31.4 \pm 10.1$  cm vs.  $38.3 \pm 10.5$  cm) and RSI values ( $0.74 \pm 0.34$  m/s vs.  $1.02 \pm 0.45$  m/s) (Figure 1)
- Ground contact time ( $p=0.15$ ;  $ES = 0.47$ ) and peak propulsive force ( $p=0.16$ ;  $ES = 0.46$ ) were not significantly different

## Conclusions

- Despite completing rehabilitation and preparing to return to sport, athletes with a history of ACL reconstruction exhibited persistent deficits in jump height and lower body reactive strength, compared to athletes without a history of ACL injury

## Practical Applications

- Rehabilitation and strength and conditioning professionals should be aware that athletes who have undergone ACL reconstruction often continue to exhibit neuromuscular performance deficits, even as they transition back to sport
- It may be beneficial for these athletes to work with a strength and conditioning coach or athletic trainer to facilitate continued neuromuscular recovery/gains, after formal rehabilitation has ended
- Our findings highlight importance of emphasizing a “return to performance” after ACL reconstruction

## Acknowledgements

- Thank you to the students and staff at Carroll High School (Fort Wayne, IN) for supporting this project