

## INTRODUCTION

Anterior cruciate ligament (ACL) tears are common in young athletes, particularly females.<sup>1</sup> Injuries commonly occur with increased knee valgus and reduced knee flexion.<sup>2</sup> Knee braces are commonly worn after injury, and previous studies have analyzed wearing knee braces for injury prevention. However, none have investigated single leg movements while wearing braces.<sup>1</sup>

**The purpose of this project is to observe the effect of wearing different styles of knee braces on knee joint movement and loading during a single leg jump landing.**

I hypothesized that no significant differences between the two braces will be observed, and both knee braces will provide similar support on a single leg landing compared to a single leg landing with no knee brace.



Brace 1: McDavid 425

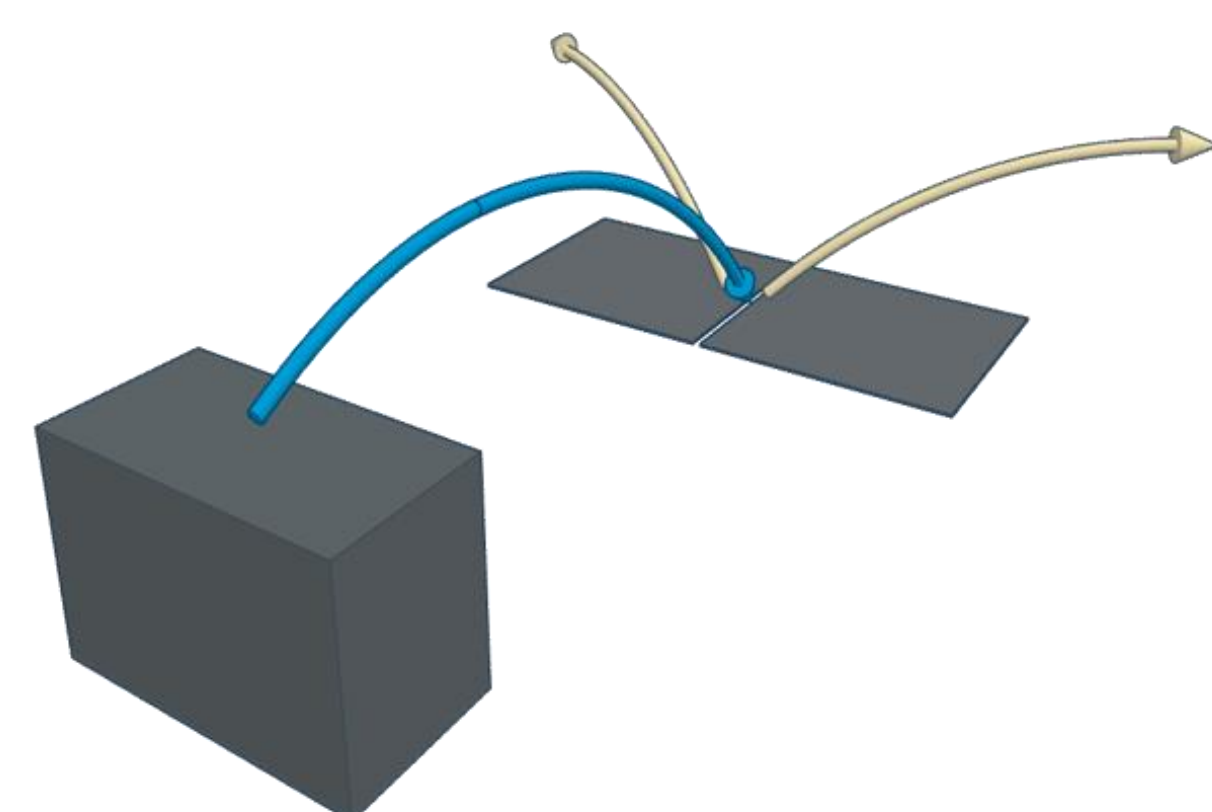


Brace 2: DonJoy Performance

## METHODOLOGY

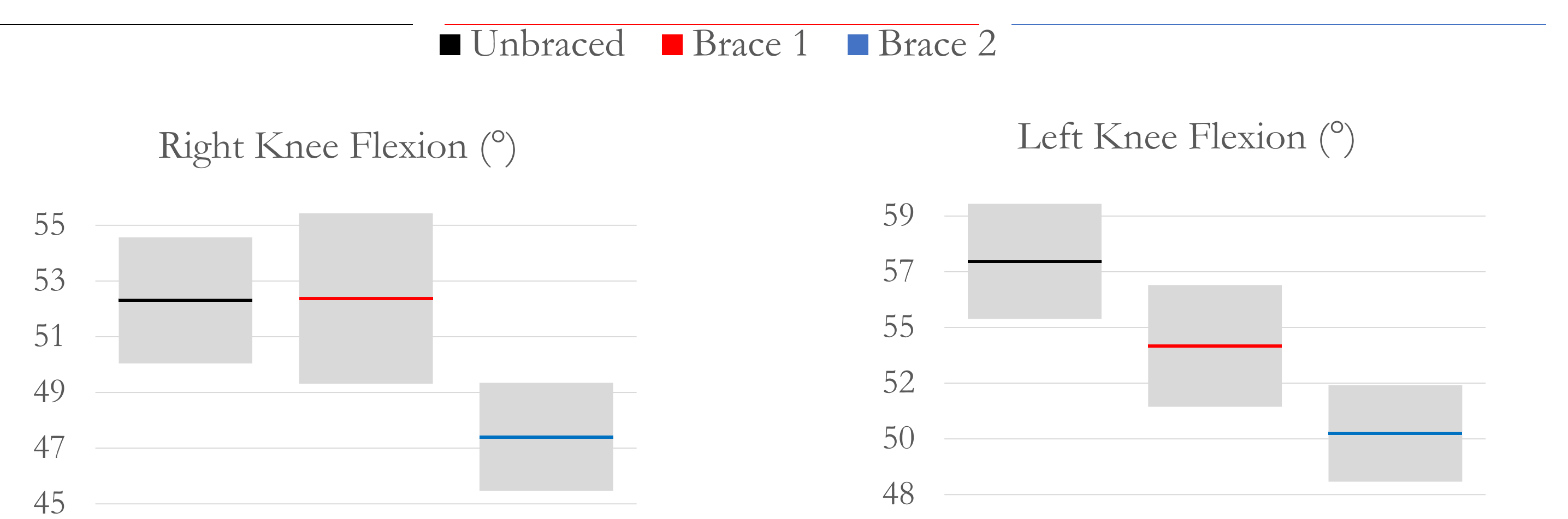
Eight uninjured, physically-active females participated in this study. Participants performed a single leg hop off a 30 cm block, landed on one leg and hopped off to the right or left at a 60 degree angle. The block was placed 50% of their height away from the force platforms. Three different conditions were tested: **No Brace, McDavid 425 Brace, and DonJoy Performance Brace.** Participants performed 10 jumps in each condition, 5 to the right and 5 to the left in a random order. The knee braces were worn on the right leg, so all single leg jump landings occurred on the right leg.

Kinematics were monitored via 21 reflective markers on the right leg, pelvis, shoulder, and spine by 8 infrared cameras at 160 Hz through Vicon Nexus (Vicon Corp, Oxford, UK).



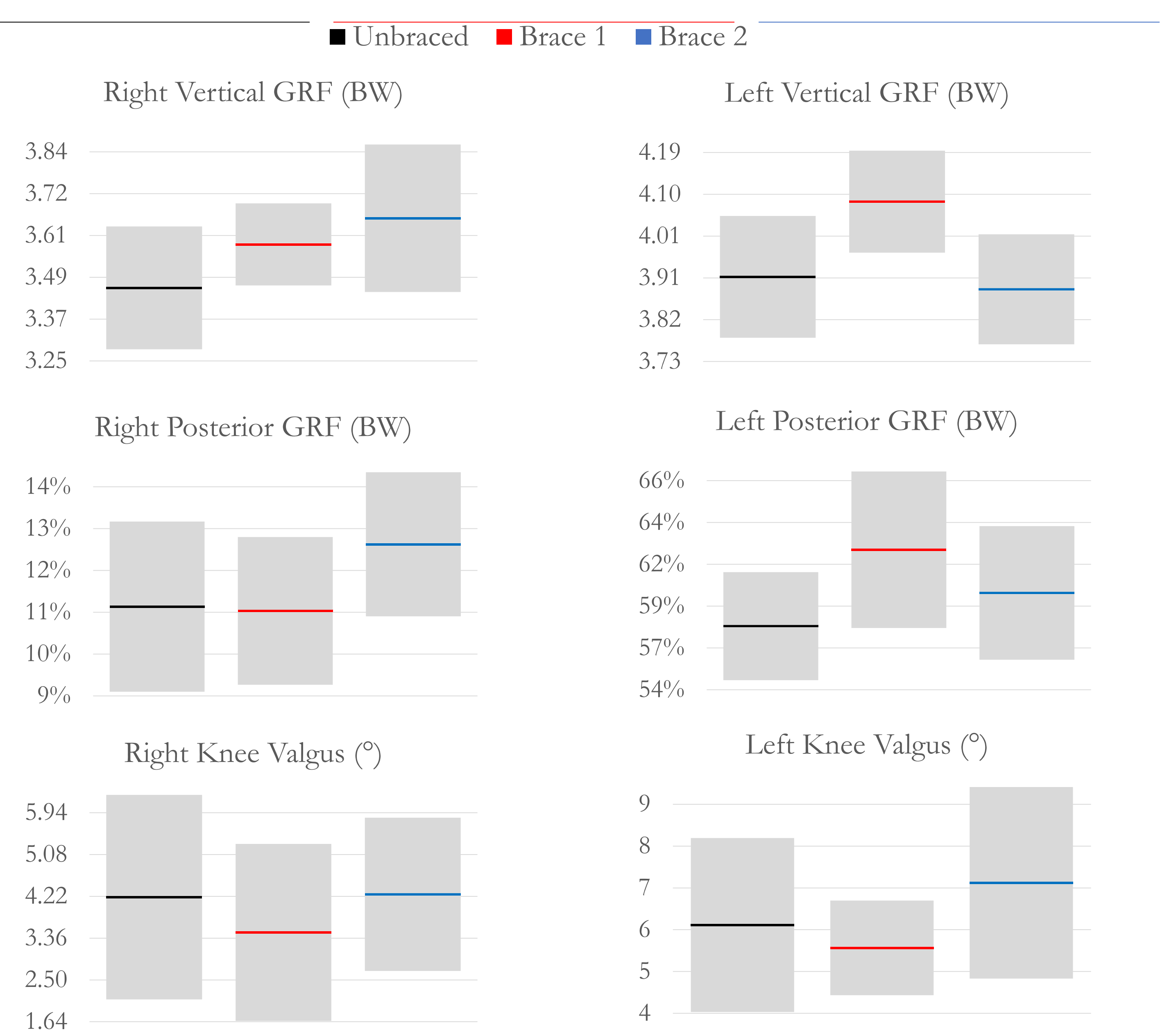
Knee valgus angles and ground reaction forces during the first 100ms of the jump landing were calculated and averaged across the five trials for each condition. A repeated-measures ANOVA was used to compare bracing effects on peak knee angles and ground reaction forces.

## RESULTS & DISCUSSION



**The DonJoy Performance brace decreased knee flexion (right: 47.55° ± 4.46°, left: 50.49° ± 4.16°) compared to the no brace (right: 52.38° ± 5.21°, left: 57.01° ± 4.96°) and McDavid 425 brace (right: 52.45° ± 7.04°, left: 53.81° ± 5.25°).**

**The DonJoy Performance knee brace reduced knee flexion angles, which is associated with increased ACL injury risk.**



Vertical ground reaction force, posterior ground reaction force, and knee valgus for both the right and left directions were found to be not significant.

## CONCLUSION

**Wearing a bulkier, more rigid knee brace, such as the DonJoy Performance brace, does not reduce ACL injury risk in healthy athletes.**

The results of this study do not support having uninjured athletes wear knee braces to prevent ACL injuries. Future studies should investigate participants who have suffered ACL injuries to test whether or not knee braces reduce injury risk.

## REFERENCES

1. Moon J, et al. *Science Direct*, **25**, 1009-1015, 2018
2. Gillette J, Stephenson M, 2016