

INTRODUCTION

Functional and isokinetic quadriceps strength testing is often used to evaluate an athlete's readiness to return to sport (RTS)¹⁻⁴. Limb symmetry indices (LSI) $\geq 90\%$ are considered adequate for RTS decision². Correlation between quadriceps strength assessments outlined in literature does not necessitate equality between these measures^{1,2}.

HYPOTHESIS

- We hypothesize that functional testing using LSI will be significantly greater than isokinetic quadriceps peak torque LSI at 60°/sec.

SUBJECTS

- 25 patient charts (16 males, 9 females, 22 \pm 8 years, 173 \pm 13cm, 75 \pm 15 kg) following ACL reconstruction (ACLR).
- Surgical procedures:
 - 18 autograph B-T-B ACLR with meniscus repair
 - 3 autograph B-T-B ACLR alone
 - 2 allograft B-T-B ACLR with meniscal repair
 - 1 autograph B-T-B ACLR with meniscus and collateral ligament repair
 - 1 autograph Hamstring ACLR alone.

METHODS

- Retrospective chart review of isokinetic strength testing and functional testing scores at 6 months post ACLR at University of Kentucky Sports Physical Therapy.
- Isokinetic testing assessed on Cybex Norm at 60°/sec bilaterally and reported in Newton meters. (Figure 2)
- Functional tests consisted of single leg vertical jump height, hop for distance, and triple hop. (Figure 3)
- Tests performed on each side with average of three trials representing scores, measured in centimeters (cm).
- Limb symmetry indices (LSI) were calculated as ratios of injured to non-injured all outcome measures at 6 months post ACLR.
- A repeated measure ANOVA was used to compare the four LSI outcome measures to determine if there was a difference and Bonferroni post-hoc analysis, if appropriate. All significance was set at an alpha level $p \leq 0.05$.

RESULTS

- There was a significant difference between outcome measures ($p \leq 0.001$)
- Post-hoc analysis revealed that isokinetic knee extension LSI was significantly lower than all functional test LSI ($p < 0.001$).
- Post-hoc analysis revealed that single leg vertical jump LSI was significantly lower than single leg triple hop ($p = 0.042$) and single leg hop for distance ($p < 0.001$).

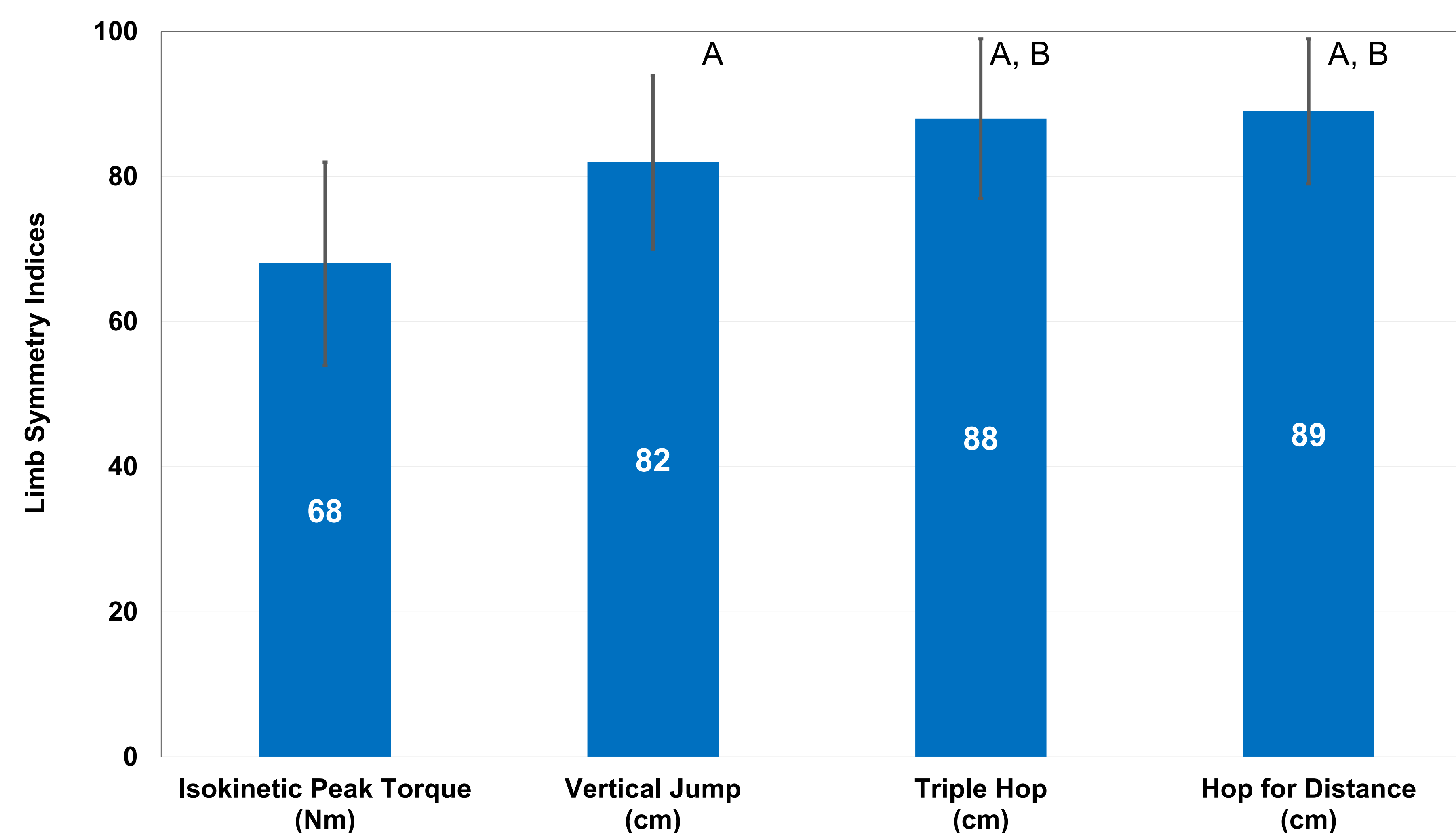


Figure 1. Mean LSI with error bars representing standard deviation.

- A. Represents that all functional test are significantly greater than isokinetic peak torque.
- B. Represents that single leg triple hop and hop for distance is greater than single leg vertical jump



Figure 2. Isokinetic strength assessment



Figure 3. Hop for distance assessment as part of functional battery of tests.

DISCUSSION

- Many studies have demonstrated a correlation between functional testing and isokinetic strength measures.
- However, there is limited evidence supporting that LSI comparisons are equal between functional hop tests and isokinetic strength measures.
- This study demonstrates that functional testing significantly overestimated quadriceps strength as LSI are not equivalent.
- Although single leg vertical jump showed lower degree of overestimation (14 \pm 14%) when compared to isokinetic strength testing at 60°/sec. Clinicians should utilize caution relying solely on functional testing for RTS decisions.

CONCLUSION

- Physical therapists need a valid, reliable, and affordable means of quadriceps strength assessment as part of RTS decisions.
- Many clinics lack necessary equipment to assess quadriceps strength due to associated expenses. Clinicians continue to rely on various functional test batteries that demonstrate high correlation with isokinetic strength testing but may be overestimating isolated quadricep strength.
- Incorporation of isolated quadricep strength testing such as isometric dynamometers or isotonic knee extension 10 rep maximums may provide an adequate surrogate to better inform clinical decisions.

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