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Health and Human Kinetics

INTRODUCTION & PURPOSE

Anterior cruciate ligament (ACL) injury rates among collegiate athletes continue to rise across 15 different men's and women's sports [1]. After undergoing reconstructive surgery (ACLR), whether that be with donor tissue, the patient's own hamstring or patellar tendon, or a combination of such, a rigorous physical therapy program is warranted. The goal of the rehabilitation program is to regain mobility and muscle function, and ultimately to return to sport [2].

In order to be cleared to return to sport, athletes must pass a variety of tests, ranging from the use of isokinetic machinery to examine the relationship between quad and hamstring strength to speed, agility and balance tests. Athletes may meet the current requirements to return to sport, but often there are still decrements in performance in the reconstructed leg. Despite the rigorous postoperative rehabilitation program, athletes can still experience deficits in muscle function for several years after surgery [2].

The objective of this project is to investigate bilateral differences in performance tests among collegiate athletes who have experienced an ACL tear, and are cleared by a medical professional. Single leg assessments will be used to assess the bilateral differences, or lack of, in male and female athletes. The hypothesis is that there will be significant differences in performance outcomes in the areas of strength, power, balance, and speed when examining the athlete's non-reconstructed leg in comparison with the ACL reconstructed leg. Results can be used to prevent re-injury in collegiate athletes.
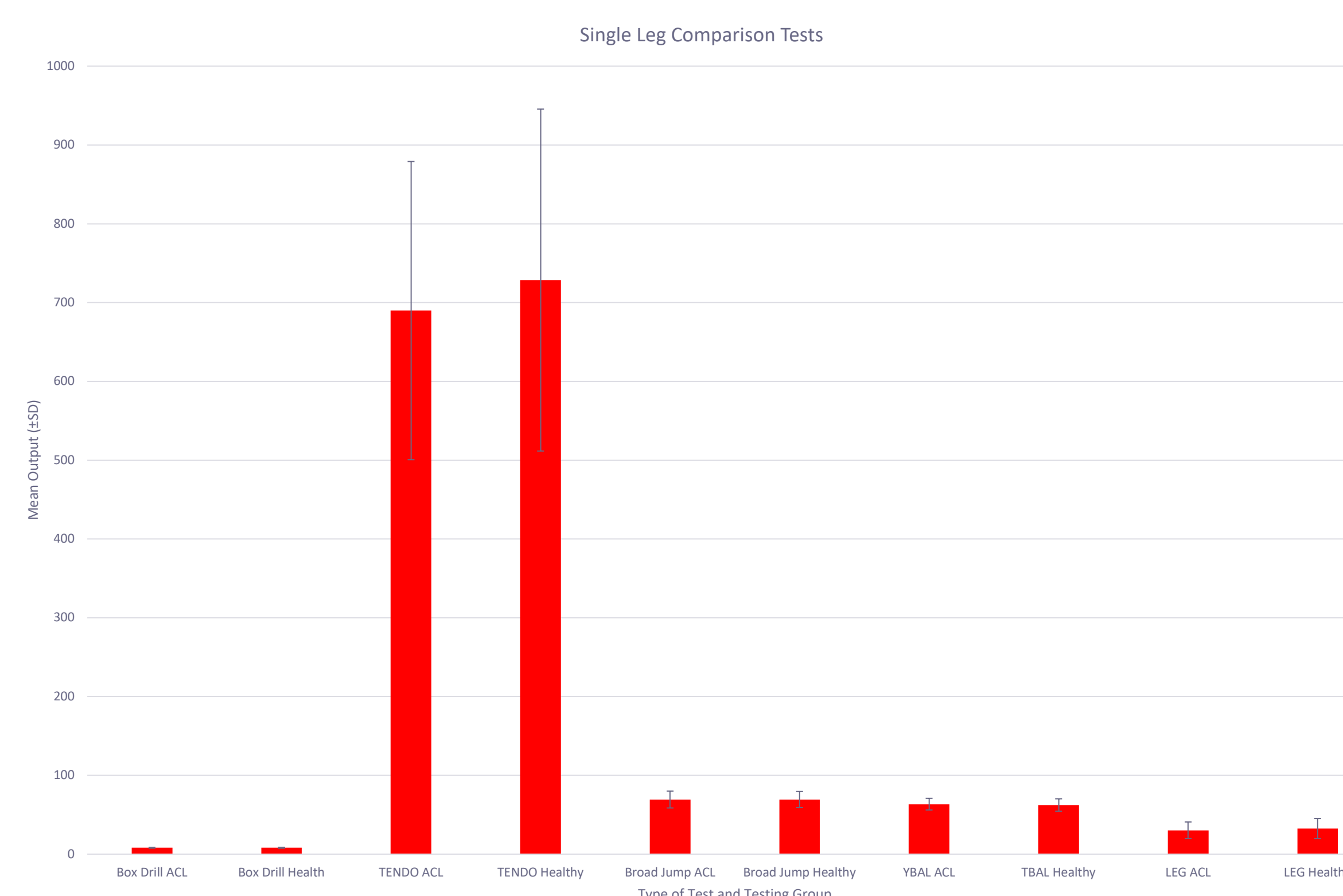
METHODS

- This cross-sectional study design will be used to assess relationships between strength, power, speed, and balance in an athlete's leg, which has undergone anterior cruciate ligament (ACL) reconstruction in comparison to the leg that has not been surgically reconstructed.

- A control group of athletes who have not torn their ACL underwent the same testing within each of the four arenas.

- The testing was completed on two different days to ensure the athletes did not get fatigued and lead to skewed results.

- LE muscular strength was assessed using a leg press machine. Female athletes completed a maximum number of repetitions for each leg at 45% of their body weight, whereas male athletes completed a maximum number of repetitions at 60% of their body weight.

- LE power was assessed using a SL broad jump and a SL vertical jump. The power generated by the athlete in the SL vertical jump was measured using a Tendo unit linear transducer.

- Speed was assessed using a box drill. The box is set up 10 yards by 10 yards. The athlete made 3 cuts all to the right and the time it took to complete the box was recorded. In addition, the athlete made 3 cuts to the left and the time was recorded. The aim is to identify differences in speed that may arise from cutting.

- Balance was assessed using anterior Y-balance reach. The Y-balance test is an emerging screening test used to objectively assess functional movement and dynamic balance.

TESTING
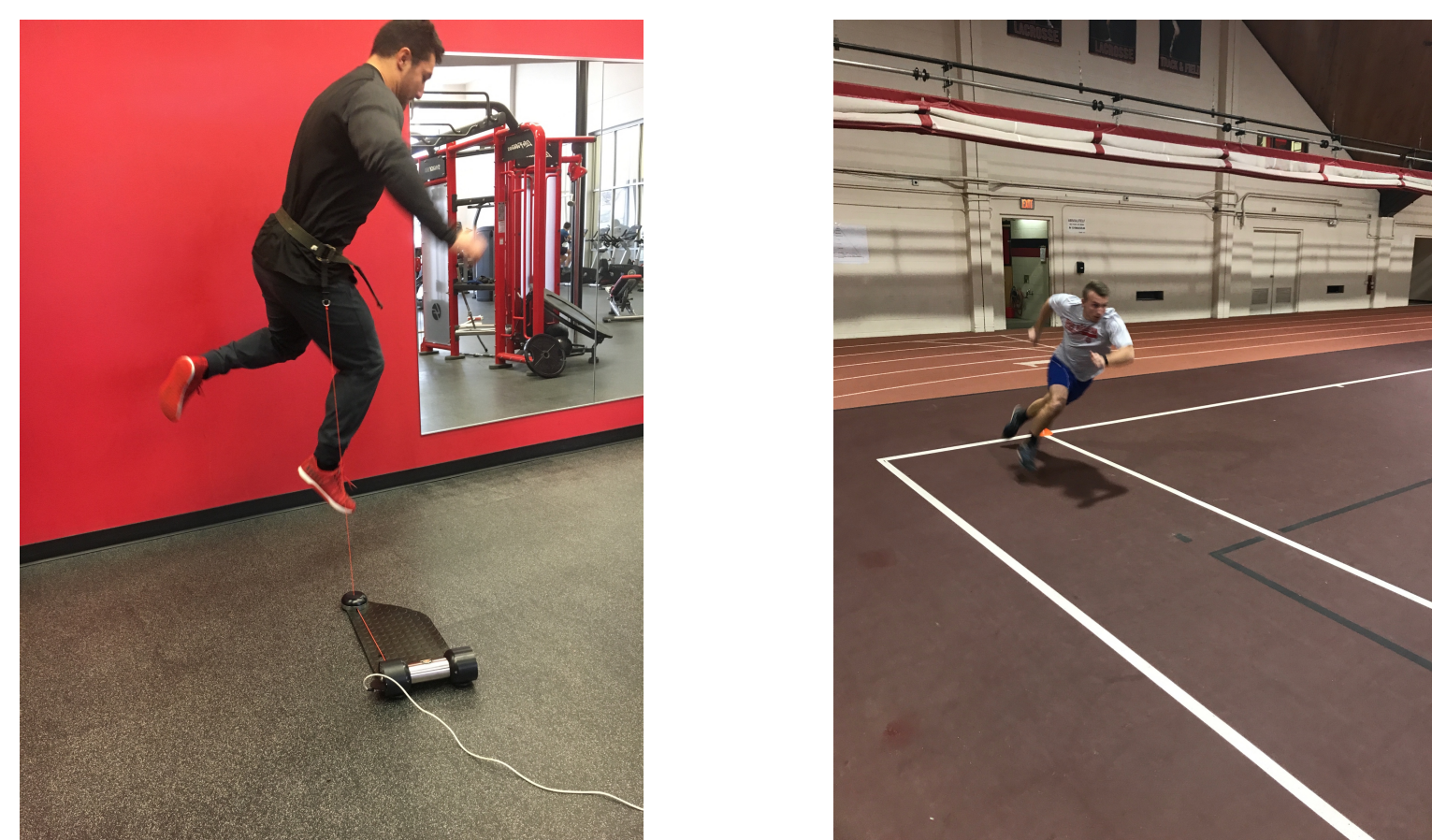
RESULTS

Test and Test Group 1=ACL 0=Healthy		N	Mean	Standard Deviation	Significance
Box Drill ACL	1	7	8.17	0.34	
	0	7	8.06	0.59	0.684
Box Drill Healthy	1	7	8.16	0.47	
	0	7	8.11	0.63	0.885
TENDO ACL	1	7	717.04	180.41	
	0	7	662.61	224.81	0.61
TENDO Healthy	1	7	746.76	225.21	
	0	7	710.24	12.43	0.767
Broad ACL	1	7	70.79	12.42	
	0	7	67.85	9.37	0.628
Broad Healthy	1	7	72.64	12.84	
	0	7	65.93	6.14	0.236
YBAL ACL	1	7	66.86	8.88	
	0	7	60	3.5	0.082
YBAL Healthy	1	7	64.21	9.82	
	0	7	60.57	5.44	0.408
Leg Press ACL	1	7	32.43	7.84	
	0	7	28.14	13.05	0.471
Leg Press Healthy	1	7	35.57	14.175	
	0	7	29.29	11.25	0.376

Single Leg Comparison Tests

SUBJECTS

- The subjects selected to participate in the study were 14 NCAA Division III collegiate athletes.

- 7 athletes were chosen based on their previous injury history. They had underwent ACL reconstruction surgery and have been cleared for return to sport by a medical professional.

- The remaining 7 athletes were used as controls in the study.

- The athletes who have reconstructed ACL's and the corresponding sport that they play are mirrored in the control group.

CONCLUSIONS

It can be concluded that there are no significant differences between the group with reconstructed ACL's and the control group without reconstructed ACL's. Using this data it may be suggested that post-operative rehabilitation programs are successful in the methods they utilize before clearing an athlete for return to sport. However, this study has a very small sample size. Control groups and experimental groups containing 7 athletes each is not large enough to make a sound conclusion. There was a p value of 0.082 when examining differences in Y-Balance scores. It may be beneficial to do a separate study solely examining balance in athletes. With a larger sample size the results collected will be more accurate and a better predictor of re-injury in the future.

PRACTICAL APPLICATIONS

This study will help develop a better understanding of the differences in strength, power, speed, and balance among athletes who have had reconstructive ACL surgery. It helps develop a better understanding of how strength, power, speed, and balance vary bilaterally in an athlete who has underwent anterior cruciate ligament reconstruction. The study helps explain the relationship between previous ACL injury and re-injury in the future. Such findings may suggest that postoperative rehabilitation programs are not long enough or challenging enough to help the athlete meet pre-anterior cruciate ligament tear standards. These results may be used to prevent future re-injury in collegiate athletes and make them aware of lower extremity deficits to help increase performance in the future.

REFERENCES

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