Athletic Performance at the NFL Scouting Combine After Anterior Cruciate Ligament Reconstruction

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Introduction

- ACL tears represent one of the most common injuries in sport, estimated incidence of 250,000 ACL injuries per year in the US.
- Reported incidence of 0.11 per 1000 high school football players and 0.7 per 1000 NFL players.
- NFL return to play as high as 92%, most players return to previous statistical in-game performance.
- No study has quantified NFL athletic performance in terms of function including running speed, jumping ability, and agility/quickness after ACL reconstruction

Purpose

- Evaluate athletic performance at the NFL scouting combine of NFL-caliber athletes who had undergone ACL reconstruction.
- Hypothesized that players that underwent ACL reconstruction would have no difference in running speed, jumping ability, or agility and quickness when compared to matched controls

Methods

- Retrospective, case control study
- 98 football players with history of ACL reonstruction identified, all participated in NFL scouting combine between 2010 and 2014
- All had reconstruction prior to combine
- Demographic data including college, position and years from injury to combine recorded
- Combine performance statistics collected (Figure 1): 40-yard dash, Vertical leap, Broad jump, Shuttle drill, 3-cone drill
- Control group was age-, size- and position matched

	ACL Reconstruction Group (n = 98)	Control Group (n = 98)	*P* Value
Age, mean ± SD (range), y	22.42 ± 1.00 (20-26)	22.27 ± 0.75 (20-24)	.23
Height, mean ± SD (range), inches	73.46 ± 2.89 (67-80)	73.47 ± 2.74 (65-79)	.98
Weight, mean ± SD (range), lb	241.06 ± 39.95 (175-338)	241.05 ± 40.02 (180-345)	.99
Year, n (%)			>.99
2010	19 (19)	19 (19)	
2011	14 (14)	14 (14)	
2012	24 (24)	24 (24)	
2013	19 (19)	19 (19)	
2014	22 (22)	22 (22)	
Position, n (%)			>.99
Quarterback	5 (5)	5 (5)	
Running back	19 (19)	18 (18)	
Wide receiver	10 (10)	11 (11)	
Tight end	5 (5)	5 (5)	
Full back	3 (3)	3 (3)	
Center	3 (3)	3 (3)	
Offensive guard	2 (2)	2 (2)	
Offensive tackle	5 (5)	5 (5)	
Free safety	3 (3)	3 (3)	
Strong safety	2 (2)	2 (2)	
Cornerback	7 (7)	7 (7)	
Outside linebacker	10 (10)	10 (10)	
Inside linebacker	8 (8)	8 (8)	
Defensive tackle	8 (8)	8 (8)	
Defensive end	8 (8)	8 (8)	

Results

- 98 ACL reconstructed players evaluated vs. 98 controls
- Demographics: no difference from controls (Table 1)
- All players from D-I or I-AA schools
- Athletic performance almost identical (Table 2):
  40-yard dash: 4.74 (ACL recon) vs 4.74 sec
  Vertical leap: 33.35 vs 33.22 inches
  Broad jump: 113.9 vs 113.9 inches
  Shuttle drill: 4.37 vs 4.37 sec
  3-cone drill: 7.16 vs 7.18 sec

Performance Measure	ACL Reconstruction Group (n = 98)	Control Group (n = 98)	*P* Value
40-yard dash, s	4.74 ± 0.26 (4.33-5.55)	4.74 ± 0.25 (4.34-5.38)	.96
Vertical leap, inches	33.35 ± 3.89 (23-43)	33.22 ± 4.18 (23.5-43.5)	.84
Broad jump, inches	113.90 ± 7.87 (96-136)	113.91 ± 8.35 (92-134)	.99
Shuttle drill, s	4.37 ± 0.21 (4.02-4.84)	4.37 ± 0.23 (3.96-5.00)	.91
3-cone drill, s	7.16 ± 0.34 (6.45-8.14)	7.18 ± 0.37 (6.64-8.24)	.75

- Years from ACL reconstruction to combine performance showed no correlation (Table 3)

Performance Measure	Correlation Coefficient	*P* Value
40-yard dash	0.173	.09
Vertical leap	–0.214	.07
Broad jump	–0.149	.21
Shuttle drill	0.147	.27
3-cone drill	0.183	.18

- Age at time of combine also showed no significant correlation with combine performance (Table 4)

	All Players		ACL Reconstruction Group		Control Group	
	Correlation Coefficient	*P* Value	Correlation Coefficient	*P* Value	Correlation Coefficient	*P* Value
40-yard dash	0.109	.13	0.098	.33	0.128	.21
Vertical leap	–0.025	.75	–0.087	.46	0.028	.79
Broad jump	–0.151	.06	–0.171	.16	–0.138	.19
Shuttle drill	–0.051	.55	–0.081	.54	–0.028	.80
3-cone drill	0.031	.72	0.052	.70	0.011	.92

Discussion

- Not only return to play, but also functional performance including speed, agility/quickness and jumping ability are ideal to evaluate athletic performance after ACL reconstruction
- Previous studies have shown good return to play as well as similar post injury performance
- We found that high-caliber athletes have equivalent levels of physical performance after ACL reconstruction vs. non-injured controls.
- This study provides unique information that NFL-caliber athletes who are able to fully recover and play at the highest level do not have diminished functional athletic performance