Who Passes Return-to-Sport Tests, and Which Tests Are Most Strongly Associated With Return to Play After Anterior Cruciate Ligament Reconstruction?

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Background: Return-to-sport (RTS) testing after anterior cruciate ligament (ACL) reconstruction (ACLR) surgery has become popular. It has been recommended that such testing should incorporate several domains, or set of tests, but it is unclear which are most associated with a successful RTS.

Purpose: To determine (1) the proportion of patients who can pass a set of self-report and functional tests at 6 months after ACLR; (2) age, sex, and activity level differences between patients who pass and those who do not; and (3) whether specific types of tests are associated with a return to competitive sport at 12 months.

Study Design: Cohort study; Level of evidence, 2.

Methods: This was a prospective longitudinal study of 450 patients who had primary ACLR. At 6 months postoperatively, patients completed 2 self-report measures, the International Knee Documentation Committee (IKDC) subjective knee form and ACL–Return to Sport after Injury (ACL-RSI) scale, and 3 functional measures: single hop and triple crossover hop for distance and isokinetic quadriceps strength. Limb symmetry index scores of $\geq$90 for functional tests, IKDC scores $\geq$85, and ACL-RSI scores $\geq$65 were considered indicators of satisfactory recovery. Proportional statistics and contingency analysis were used to determine associations between age, sex, preinjury sports level, and (1) meeting test thresholds and (2) RTS at 12 months.

Results: Only 17 (3.8%) patients met all 5 test criteria at 6 months, and 95 (21%) patients did not pass any test. More of the younger patients (<21 years) passed all of the functional tests ($P < .01$), and more male patients met the IKDC threshold ($P = .03$). Patients who played level I sports before injury had the same pass rates as those who played level II/III sports. Patients who passed the thresholds for the ACL-RSI and IKDC scales had 4 and 3 times the odds, respectively, of RTS at 12 months (both $P < .0001$). Meeting the threshold for quadriceps strength or either of the hop tests at 6 months was not associated with RTS.

Conclusion: At 6 months after ACLR, few patients met all of the thresholds of the common tests used to assess RTS ability, although younger patients had higher rates of passing the functional tests. Self-perceived symptoms/function and psychological readiness were associated with a return at 12 months.

Keywords: return to play; return to sport; ACL; test battery; sports injury

Significant interest has arisen in the use of return-to-sport (RTS) testing after anterior cruciate ligament (ACL) reconstruction surgery. Published consensus statements and clinical practice guidelines have recommended that decision making regarding RTS entail information gained from such tests and that several domains, including functional and psychological domains, be incorporated.[2,32] However, there is considerable variation in the composition of RTS test batteries, and it is not uncommon for studies to report having used 15 to 20 different RTS tests.[11,29] This may be attributable to a lack of clear evidence regarding which criteria are most associated with important outcomes, such as a successful RTS or, reinjury.[35]

Nawasreh et al[27] previously showed that patients who passed return-to-activity criteria testing at 6 months after ACL reconstruction surgery had significantly higher rates of return to preinjury activity at both 12 and 24 months than did patients who did not meet the selected criteria. In their study, hop tests were the most consistent predictor of a subsequent RTS. Interestingly, although a higher proportion of male patients passed the tests at 6 months, neither sex nor age predicted an RTS at 12 or 24 months. This is contrary to the findings of both meta-analyses and larger cohort studies, which showed that both male participants and younger athletes were more likely to return to play.[3,41]

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It has been suggested that when test designers set the thresholds for RTS tests, factors such as the type of sport to which the patient is aiming to return should be considered, and the threshold potentially should be increased if a return to pivoting or contact sports is planned.[32] Determining whether there are differences in pass rates for patients who undertake different levels of sport activity would provide empirical data on which to base such decisions. Further work to confirm which domains, or set of tests, are most associated with a subsequent RTS may also help to better guide test selection.

In the current study, we sought to (1) determine the proportion of patients who passed a battery of self-report and functional tests at 6 months after surgery; (2) examine age, sex, and activity level differences between patients who passed compared with those who did not pass; and (3) determine whether passing specific types of tests was associated with a return to competitive sport at 12 months.

METHODS

Study Design

This was a prospective longitudinal study with assessments at 6 and 12 months after ACL reconstruction surgery. The project procedures were approved by an institutional ethics committee.

Participants

Beginning in December 2013, a total of 683 patients who were scheduled for primary ACL reconstruction surgery within 1 clinic were enrolled in a prospective longitudinal study. Patients were consecutively invited to participate, and 165 patients declined. Of the enrolled cohort, 563 patients satisfied the following eligibility criteria for the current study: no prior contralateral ACL reconstruction, participated in sport on a weekly basis before injury and intended to RTS after surgery, and ACL reconstruction performed using an autograft. A total of 12 of these patients were subsequently not scheduled for 6-month review due to further surgery or injury. The remaining 551 patients were scheduled for 6-month review, and full follow-up data were obtained from 450 patients. These patients were then followed out to 12 months, when RTS data were obtained from 403 patients. A flowchart of the study patients is shown in Figure 1.

Of the 450 patients who had complete 6-month follow-up, there were 176 female patients and 274 male patients with a mean ± SD age of 24 ± 7 years (range, 14-45 years). The mean time after surgery for the 6-month assessment was 6.5 ± 0.6 months (range, 5-9 months). Most patients (85%) participated in level I sports (ie, those involving cutting- and pivoting-type activities) before their injury.[28]

Surgical and Rehabilitation Details

ACL reconstruction surgery was performed arthroscopically using either a hamstring tendon (semitendinosus and gracilis) (n = 391), quadriceps tendon (n = 47), or patellar tendon (n = 12) autograft. For all graft types, suspensory fixation was used on the femoral side and interference screw fixation on the tibial side. In addition, 2 patients had lateral extra-articular tenodesis procedures. Medial meniscal tears were present in 116 (26%) patients. Of these tears, 40 were repaired, 57 were partially resected (5 in a previous surgery), and 19 were stable and not addressed surgically. Lateral meniscal tears were present in 156 (35%) patients. Of these, 16 were repaired, 75 were partially resected, and 65 were not addressed surgically. Chondral damage was present in 101 patients (International Cartilage Repair Society grade 1, n = 11; grade 2, n = 48; grade 3, n = 29; grade 4, n = 13). Treatment was performed in 39% of cases of chondral damage (all debrided with an arthroscopic shaver and 2 microfracture procedures).

Postoperatively, all patients followed the same previously described rehabilitation protocol,[5,6] which encouraged immediate, full knee extension and the restoration of quadriceps function as soon as possible. Weightbearing was allowed as tolerated from the first postoperative day. No braces or splints were used. Progression was guided by the presence and degree of pain and swelling. The minimum requirements for RTS were no effusion, an essentially full range of motion (passive extension deficit and flexion deficits $<5^\circ$ compared with the contralateral knee), good quadriceps strength, and control during a single-leg squat (all of the preceding was determined by the treating surgeon in the clinic), unrestricted running and landing, and at least 4 weeks of full and unrestricted training. All included patients had been cleared for RTS between 9 and 12 months.

Data Collection and Procedures

At 6 months postoperatively, patients were scheduled for a clinical follow-up appointment; 5 measures that were part of a larger set of measurements were selected and used in the current study as potential "return-to-sport" parameters, although the results were not used when counseling patients about timing of RTS. All of these measures have been suggested and/or used previously in studies that

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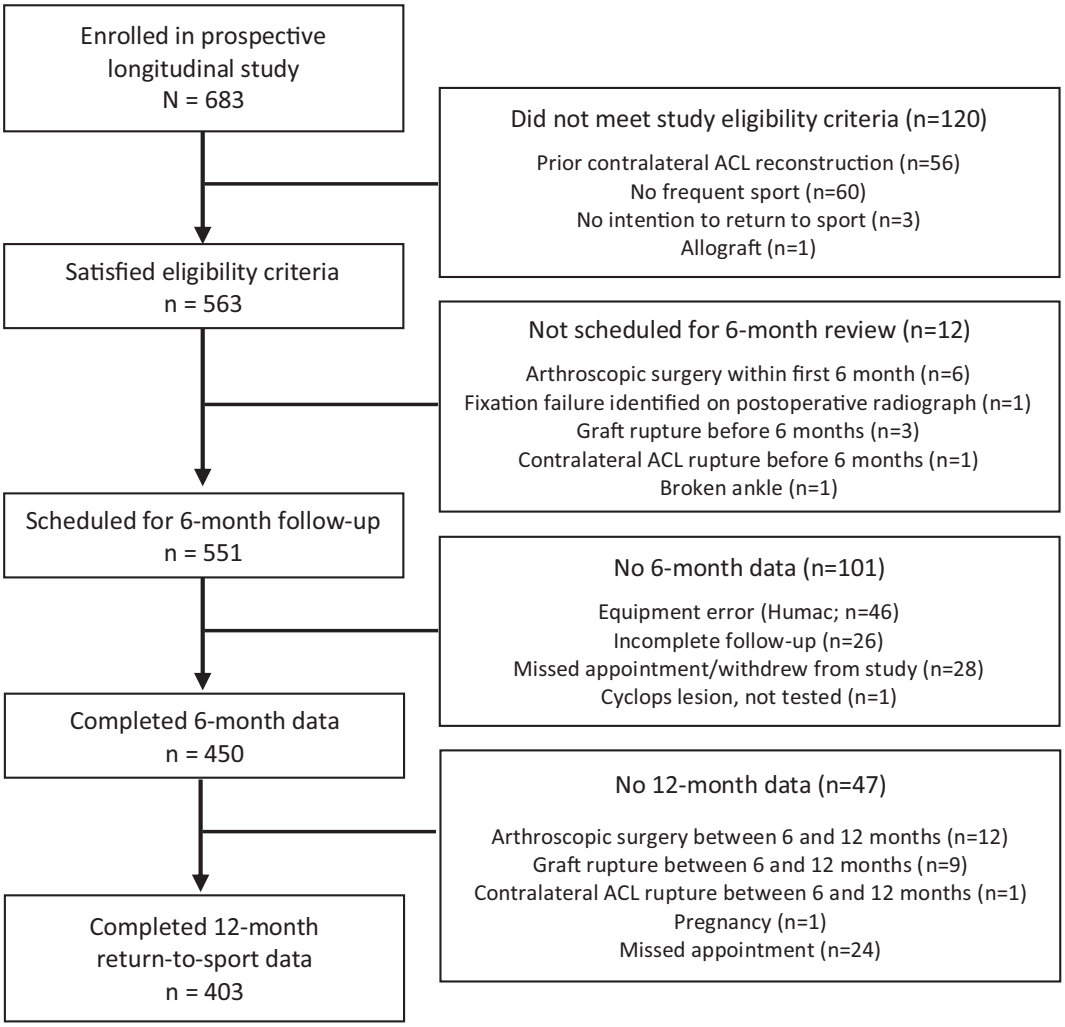

Figure 1. Flowchart of study patients. ACL, anterior cruciate ligament.

recommended RTS tests as well as in clinical practice guidelines and reviews.[2,13,14,32]

The International Knee Documentation Committee (IKDC) 2000 subjective knee evaluation score was used to measure current symptoms and function[18] and the ACL–Return to Sport after Injury (ACL-RSI) scale[37] to measure psychological readiness to RTS. Both these measures were self-administered and formed part of a larger electronic questionnaire. Patients completed this questionnaire before any functional measures were taken and before routine consultation with their treating surgeon. Both measures have satisfactory reliability and validity.[17,31,37]

In addition, 3 functional measures were recorded. They were the single hop and the triple crossover hop for distance and isokinetic quadriceps strength. These assessments were made by several trained clinical assessors.[36] For hop testing, patients were instructed that they must hop as far as possible but control their landing. Hop tests have been used extensively for the assessment of ACL outcomes and have good reliability.[26] For all patients, a familiarization trial was permitted, and any trial where the landing was not controlled (eg, touch down with the opposite foot) was excluded. A total of 2 successful trials from both limbs were recorded, and the average of the 2 trials was used to calculate a limb symmetry index ([Operated Side Score ÷ Contralateral Side Score] × 100%). A limb symmetry index of <100 indicates a deficit in the operated limb.

Quadriceps strength testing was performed using a Humac Norm dynamometer (CSMi Solutions). The seat back was set at an angle of 85° and the seat adjusted to the length of the patient's thigh. The patient's thigh was strapped to the seat, and the center of rotation of the dynamometer was aligned with the knee axis of rotation, which the examiner determined by palpating for the lateral and medial femoral epicondyles and asking the patient to flex and extend the knee for visual confirmation. Full range of motion of the knee and the weight of the leg at 60° of flexion were entered in the dynamometer. The nonoperated leg was tested first, followed by the operated leg. An isokinetic concentric maximum contraction from full flexion to full extension was performed at 60 and 180 deg/s. The 60-deg/s testing speed was selected for further use, as previous

TABLE 1
Patients Who Met the Defined Threshold Value for the 5 Tests[a]

		Sex		Age		Sport Level	
No. of tests passed	All (N = 450)	Male (n = 274)	Female (n = 176)	<21 y (n = 178)	≥21 y (n = 272)	Level I (n = 381)	Level II/III (n = 69)
0	95 (21)	60 (22)	35 (20)	25 (14)	70[b] (26)	83 (22)	12 (17)
1	82 (18)	44 (16)	38 (22)	23 (13)	59[c] (22)	69 (18)	13 (19)
2	101 (22)	53 (19)	48 (27)	47 (26)	54 (20)	80 (21)	21 (30)
3	92 (20)	61 (22)	31 (18)	45 (25)	47[c] (17)	77 (20)	15 (22)
4	63 (14)	42 (15)	21 (12)	28 (16)	35 (13)	57 (15)	8 (9)
5	17 (4)	14 (5)	3 (2)	10 (6)	7 (3)	15 (4)	2 (3)

[a]Data are reported as n (%). Level I, jumping, hard pivoting; level II, running, twisting; level III, no turning or jumping.
[b]Statistically significant difference between age <21 years and age ≥21 years ($P < .01$).
[c]Statistically significant difference between age <21 years and age ≥21 years ($P < .05$).

investigation has used this speed when establishing criteria for clearing patients for RTS, and considerable overlap has also been shown between 60 and 180 deg/s peak torque values at 6 months after ACL reconstruction surgery.[4,20] Patients performed 2 warm-up trials, followed by 3 maximum contractions. Peak torque was recorded and expressed as a limb symmetry index.

Patients were encouraged to complete all testing but were permitted to decline if they believed that it would not be "safe" for them to do so. One patient declined to complete the hop tests.

Patients were scheduled for 12-month follow-up, and as part of this follow-up they responded to structured questions regarding the level of sport to which they had returned based on the following categories: no return, return to training, return to lower level of competition, return to same level of competition.

Data and Statistical Analysis

Commonly used threshold values for the 5 tests were used to indicate a satisfactory result. For all 3 functional tests (single hop for distance, triple crossover hop for distance, and quadriceps strength), a limb symmetry index score of ≥90 was considered an indicator of satisfactory recovery as currently recommended by RTS clinical practice guidelines and reviews.[9,32] For the self-report measures, an IKDC score ≥85 and ACL-RSI score ≥65 were considered indicators of satisfactory recovery. These scores were chosen for 2 reasons. First, a mean IKDC score of 85 points has previously been associated with patients who report "yes" to the Patient Acceptable Symptom State.[25] Second, receiver operating characteristic curve statistics for the ACL-RSI score at 6 months after ACL reconstruction determined that a score of 65 corresponded to an 80% specificity for RTS at 12 months (calculated using data from Langford et al[21] and Webster and Feller[33]).

The number of patients meeting criteria thresholds was calculated, and frequency distributions were determined. Proportional statistics and contingency analysis were used to determine associations between passing the thresholds according to age (<21 vs ≥21 years), sex, and sport level (level I vs level II/III sports). For each of the 5 criteria, contingency analysis with odds ratios was also used to determine whether there was an association between meeting criteria and return to competitive sport at 12 months.

All data were analyzed using SPSS statistics (Version 25; IBM Corp) software. $P < .05$ was used to indicate statistical significance.

RESULTS

Only 17 (3.8%) of the 450 patients met the defined thresholds for all 5 tests, and 95 (21%) patients did not meet any of the set thresholds at 6 months after ACL reconstruction surgery. Fewer than half (38%) of the patient group met the thresholds for at least 3 of the tests. Patients who were ≥21 years of age were significantly more likely to not meet any of the thresholds or meet only 1 threshold compared with patients who were younger than 21 years (Table 1). No differences were seen in the number of tests passed according to sex or preinjury sport level.

Regarding the specific tests, fewer than a third of patients met the defined thresholds for IKDC (26%), ACL-RSI (32%), and quadriceps strength (26%), whereas more than half met the thresholds for both hop tests (Table 2). A significantly greater proportion of younger patients met the thresholds for all of the functional tests ($P < .01$), and a higher proportion of male patients met the threshold for the IKDC subjective measure of symptoms and function. No other significant sex, age, or sport level differences were seen.

At 12 months, 163 of the 403 (40%) patients who were reviewed had returned to competitive sports. No age or sex differences were seen in the percentage of patients who had returned at 12 months (male, 44%; female, 36%; <21 years, 39%; ≥21 years, 41%). We found an increase in the proportion of patients who had returned based on the number of tests passed at 6 months (Figure 2). Achieving the threshold for both of the self-report measures was significantly associated with a return to competitive sport at 12 months ($P < .001$) (Table 3). Conversely, meeting the threshold for

TABLE 2
Patients Who Met the Defined Threshold Values for the 5 Return-to-Sport Tests[a]

		Sex		Age		Sport Level	
	All (N = 450)	Male (n = 274)	Female (n = 176)	<21 y (n = 178)	≥21 y (n = 272)	Level I (n = 381)	Level II/III (n = 69)
IKDC	117 (26)	81 (30)	36[b] (21)	55 (31)	62 (23)	102 (25)	15 (31)
ACL-RSI	146 (32)	96 (35)	50 (28)	63 (35)	83 (31)	125 (31)	21 (42)
Single hop	258 (57)	157 (57)	101 (57)	118 (66)	140[c] (52)	236 (59)	22 (45)
Triple hop	260 (58)	165 (60)	95 (54)	119 (67)	141[c] (52)	236 (59)	24 (59)
Quadriceps strength	116 (26)	72 (26)	44 (25)	59 (33)	57[c] (21)	107 (27)	9 (18)

[a]Data are reported as n (%). ACL-RSI, ACL–Return to Sport after Injury; IKDC, International Knee Documentation Committee; level I, jumping, hard pivoting; level II, running, twisting; level III, no turning or jumping.
[b]Statistically significant difference between male and female sex ($P < .05$).
[c]Statistically significant difference between age <21 years and age ≥21 years ($P < .01$).

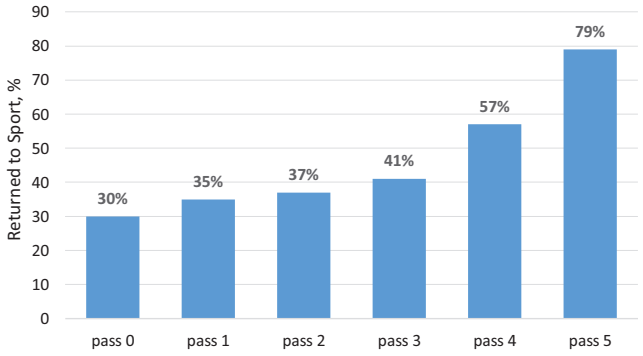

Figure 2. Return-to-sport rates at 12 months according to the number of tests passed at 6 months.

quadriceps strength or for either of the hop tests at 6 months was not associated with an RTS at 12 months. Patients who passed the threshold for the ACL-RSI scale had 4 (95% CI, 2-6) times the odds of returning to competitive sport at 12 months ($P < .0001$), and those who passed the threshold for the IKDC scale had 2.6 (95% CI, 2-4) times the odds ($P < .0001$).

TABLE 3
Association Between Passing Threshold Criteria at 6 Months and Returning to Competitive Sport at 12 Months[a]

	Returned to Sport		Did Not Return To Sport	
	Passed Threshold	Failed	Passed Threshold	Failed
IKDC[b]	58 (60/104)	35 (103/299)	42 (44/104)	66 (196/299)
ACL-RSI[b]	61 (80/131)	31 (83/272)	39 (51/131)	70 (189/272)
Single hop	42 (96/229)	39 (67/174)	58 (133/229)	62 (107/174)
Triple hop	42 (97/233)	39 (66/170)	58 (136/233)	61 (104/170)
Quadriceps strength	46 (47/102)	39 (116/301)	54 (55/102)	62 (185/301)

[a]Values are expressed as % (n). ACL-RSI, ACL–Return to Sport after Injury; IKDC, International Knee Documentation Committee.
[b]Statistically significant ($P < .001$).

DISCUSSION

RTS testing after ACL reconstruction has increased in popularity over recent years and is often used to guide decision making regarding RTS. In this study, several tests that are used as part of RTS testing were measured at 6 months and evaluated in terms of their prospective association with RTS at 12 months. We included self-report measures of symptoms, function, and psychological readiness to RTS as well as commonly used measures of function (hop tests and quadriceps strength). Overall, results showed that self-report measures were associated with a return to competitive sport at 12 months, although few patients passed all 5 tests at 6 months.

That so few patients passed all of the RTS tests in the current study is consistent with previous research. Welling et al[40] reported that only 2 of 62 (3.2%) patients passed an RTS test battery at 6 months, which is very similar to the 3.8% (17/450) reported here. A meta-analysis of 8 studies with 876 patients who were tested between 5 and 10 months after surgery showed that only 23% of patients passed RTS test batteries before returning to sport.[39] This may suggest that testing at 6 months is not worthwhile. However, this is a time point when many patients are resuming higher demand sport drills and dynamic training before resuming full competitive sport. Therefore, 6 months has been the most commonly used postoperative time point for RTS testing, even if it is not anticipated that the athlete will make an immediate return to participation.[39] Ideally, a patient would receive multiple types of RTS tests at different time points during rehabilitation and would be provided with feedback regarding areas for improvement. However, this process is resource intensive, and testing at 6 months may provide patients with relevant feedback regarding their overall progress and RTS planning. It is reasonable to hypothesize that RTS testing at 9 months may be more predictive; however, only small changes in pass rates have previously been reported between 6-month tests and 8-month test repeats.[15]

A problem with test batteries that has been raised previously is the "penalty" of multiple tests, as the overall pass

rate for the test battery will depend on the total number of tests used and likely will be reduced as more tests are added.[39] With an increasing tendency to include many RTS tests, it is therefore perhaps not surprising that such low overall pass rates are being reported; perhaps the focus should instead be on the identification of fewer but more predictive tests.[16] Even so, in the current study, only 5 tests were used and a third of patients did not pass any test or passed only 1 of the tests, and reasons for this seemingly poor performance and its implications need to be further investigated.

In the current study, the single and triple crossover hop for distance tests had the highest pass percentages, which is in keeping with findings from previous studies.[40] Younger patients had significantly higher pass rates for hop tests and for quadriceps strength symmetry. Overall, this shows that younger patients perform better on RTS tests that involve physical activities. If such tests are used to indicate when a patient is capable of an RTS, this age group could potentially receive an earlier clearance to RTS. However, because high rates of second ACL injury are common in younger athletes,[24,30,34,41] it is important to put the results of such testing into context and balance the desire to RTS against the risk of reinjury. In this regard, it has been suggested that a return to play should be delayed until at least 9 months postoperatively.[14] It is also important to identify whether a test is being used to determine the patient's safety regarding RTS (from the perspective of reinjury) or the patient's capability of returning to a sporting activity, preferably at the preinjury level. These outcomes are often used interchangeably, and recent review studies have suggested that caution should be exercised in using the information gained from current RTS testing to advise individual patients about their risk for further injury.[22,38,39]

In the current study, the level of sport the patient played before injury (level I vs level II/III) was not associated with the number of tests passed or which test was passed. Although this may indicate that RTS tests do not need to be specifically tailored for preinjury sport level, it also may show that the tests currently used are not sensitive enough to discriminate between the different demands of sports that involve pivoting and cutting movements compared with sports that do not. However, because only 15% of patients in the current study participated in level II or III sports before injury, the generalizability of the findings in this group may be limited, and additional work is required to further explore and confirm whether preinjury level of sport should be considered in the design of RTS testing.

The only sex-based difference we found was that male patients were more likely to meet the threshold value for the IKDC subjective knee scale. This is consistent with previous work showing that women without ACL injury tended to score lower than men on this scale.[1] Aside from this, outcomes were highly similar between sexes, and similar numbers of male and female patients had returned to competitive sport at 12 months. This is in contrast to previous work showing that men had higher rates of RTS at multiple postoperative time points and better clinical outcomes at 12 months.[3,36] The greater similarity in the current study between male and female patients could be due to our selection criteria. We included only patients who participated regularly in sport before injury and intended to return to their preinjury level of play after surgery. This may have resulted in a highly motivated group of patients who were invested in their RTS outcome.

Although few patients passed all of the RTS tests at 6 months, the rate of RTS at 12 months for those who did pass these tests was high (79%) and, overall, RTS rates decreased as fewer tests were passed. This is consistent with the findings of Nawasreh et al,[27] who showed a return rate of 81% at 12 months and 84% at 24 months for patients who passed all 6-month RTS tests. Those investigators also showed that performance-based measures were the most consistent predictors of a subsequent RTS, with the 6-m timed hop being the strongest predictor at both time points. The association between quadriceps strength and RTS was not analyzed, as patients were permitted to perform the hop tests only if they had >80% quadriceps limb symmetry measured using a maximal voluntary isometric contraction. These results differ from those of the current study, in which we found no association between single hop for distance, triple crossover hop for distance, or quadriceps strength and subsequent return to competitive sport. We did not use the timed hop. However, we did find strong associations between self-report measures of symptoms and function (IKDC subjective) and psychological readiness (ACL-RSI scale) and RTS at 12 months.

It is challenging to reconcile these disparate results. There are, however, a few notable differences between the studies. First, all patients in the current study had an autograft, whereas more than half (62%) of the patient group reported by Nawasreh et al[27] had allografts. As such, there may have been differences related to graft harvest morbidity, which in turn could affect the speed of progression through rehabilitation and recovery of function after surgery. Although similar measures of performance were used, patients in the current study did not wear a brace, whereas all hop tests in the Nawasreh et al study were performed with the patients wearing a functional brace. We also did not use quadriceps strength results to clear patients to perform the hop tests. As long as patients felt comfortable, they were permitted to attempt all tests. Interestingly, recent work has shown a lack of association between the single-leg hop test and quadriceps strength at 6 and 12 months after ACL reconstruction.[5] Finally, different self-report measures were used in the 2 studies. In the current study, we used the IKDC scale, which measures symptoms and function, and the ACL-RSI, which measures psychological readiness to RTS. Nawasreh et al used the Knee Outcome Survey–Activity of Daily Living scale,[19] which is a measure of symptoms and function and how these affect the ability to perform daily activities, and the Global Rating Score, a single-item question that assesses current knee functional performance. It is possible that the self-report measures used in the current study were more relevant in relation to RTS, which is why we found significant associations and Nawasreh et al did not. Also, we instructed patients to complete self-report measures before functional testing so that the results of performance tests did not inform or bias the

patients' self-report data. The patients studied by Nawasreh et al completed the self-report measures after the performance tests and, as such, may have responded based on how they had just performed, which may have reduced the unique contribution of the self-report measures.

The current results show that self-perceived symptoms and function measured at 6 months postoperatively, as well as psychological readiness, are strongly associated with RTS at 12 months after ACL reconstruction. This is interesting, as it highlights the importance of taking a whole-person approach to decision making regarding RTS. However, this does not mean that functional tests are not important. Indeed, low scores on both physical and psychological measures have been shown to be associated with further knee or ACL injury,[14,20,23] and both provide important feedback regarding progress and restoration of functional capability after surgery.

A further finding was that 30% of patients who did not pass any of the RTS tests were able to return to play at 12 months, although in absolute numbers this group was small (n = 24). A number of previous studies have shown that patients can actively participate in high-demand sports, despite low overall pass rates of between 18% and 26% for RTS test measures.[7,10,12] This may indicate that RTS testing provides limited relevant information for some patients who undergo ACL reconstruction surgery or that the types of test used do not have adequate sensitivity and different tests may be more appropriate. For example, reactive tests and sport-specific testing have been suggested but not yet empirically evaluated, and this is an avenue for future research.

There are a number of strengths of the current study, which include the large cohort of athletes and the prospective study design. This allowed for a detailed analysis of various patient subgroupings including age and sex. Equipment malfunction toward the start of the study unfortunately meant that strength outcomes were not correctly saved for 46 patients. Aside from this, follow-up rates were satisfactory.

A number of limitations should be considered. Although we included commonly used RTS tests, there is a large choice of possible tests to include; future studies may show other tests that we did not evaluate to be of greater value. How many times patients should be tested as well as how much time to allow for meaningful clinical changes to occur between assessments is also debated, with a recent study suggesting that a 2-month period is necessary for clinically relevant changes in knee muscle strength.[8] The current study used only 1 assessment time point at 6 months and followed patients out to 12 months. The low pass rate at 6 months may suggest that testing should be delayed to a later time point or perhaps that the criteria at this time point are too stringent. However, 6 months after surgery has been identified as the most common time point at which this type of testing is typically undertaken.[39]

CONCLUSION

The current data showed that at 6 months after ACL reconstruction surgery, few patients met all thresholds of tests that are commonly used to assess the ability to RTS. Younger patients had higher rates of passing performance-based tests. Self-perceived symptoms/function and psychological readiness were more associated with a subsequent RTS than were physical performance and muscle strength. These findings have implications for how various RTS tests may be of use to facilitate an RTS after this surgery.

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