Expectations for Return to Preinjury Sport Before and After Anterior Cruciate Ligament Reconstruction

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Background: There is limited information about patient expectations regarding return to sport after anterior cruciate ligament reconstruction (ACLR). While it has generally been assumed that patients expect to return, it has also been acknowledged that expectations may change after surgery.

Purpose: To investigate return-to-sport expectations before and after ACLR and determine factors associated with changed expectations.

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

Methods: The study sample consisted of 675 eligible patients (437 male, 238 female). Return-to-sport expectations were recorded preoperatively. Primary ACLR was performed in 595 patients (of whom 81 had a prior contralateral ACLR) and revision ACLR in 80 patients. At 12 months after surgery, the return to preinjury sport status was assessed along with patients’ current sport expectations. The proportion of patients who expected to return to their preinjury level of sport was determined along with actual return rates. Logistic regression was performed to determine the factors associated with the decision to cease sport participation in patients who had expected to be able to return to their preinjury level of sport.

Results: Overall, 84% of patients expected to be able to return to their preinjury level of sport. Expectations were higher for patients about to undergo their first ACLR, with 88% expecting to return, than for those about to undergo revision surgery or second primary ACLR (63% and 80% expected to return, respectively; P < .001 and P = .08, respectively). At 12 months after surgery, 24% of patients who expected to return to their preinjury level of sport had actually returned, and 15% of all patients had already decided to give up sport. In the regression models, being female (P = .02) and having undergone previous ACLR (P < .0001) were factors significantly associated with the decision to give up sport participation.

Conclusion: Patients had high expectations for returning to their preinjury level of sport at the time of undergoing initial ACLR. Expectations were lower for those who had undergone previous ACLR. Female patients and patients who had undergone previous ACLR were more likely to change their expectations and cease sport participation. These data can be used to provide patients with realistic return-to-sport expectations in the first postoperative year and highlight the challenge for patients who aim to return from multiple ACL injuries.

Keywords: return to sport; expectations; athlete; ACL reconstruction

For patients facing orthopaedic surgery, their preoperative expectations regarding the outcome have been shown to have a significant effect on motivation during rehabilitation14 as well as overall satisfaction.11,13 It is therefore important that expectations are aligned with achievable outcomes, as expectations that are too high and are unmet can lead to postoperative dissatisfaction.7 Expectations that are too low may also lead to inferior outcomes, as greater preoperative expectations have been shown to lead to greater postoperative improvements.10,11,16

While patient expectations have received increasing attention in a variety of orthopaedic patient populations, there is relatively limited information about patient expectations regarding return to sport after anterior cruciate ligament (ACL) injuries and ACL reconstruction (ACLR). It is well known that ACLR achieves excellent
outcomes in terms of stability and function, but despite this, it is also well documented that many patients do not return to their preinjury level of sport.4 Many factors have been suggested to contribute to the modest rates of return to preinjury sport after ACLR,18 but it has generally been assumed that patients expect to be able to return. This is supported by the work of Feucht et al,8 who showed that when surveyed preoperatively, 91% of patients in their study expected to be able to return to their preinjury level of sport after ACLR.

It is also important to recognize that return-to-sport expectations may change after surgery.3 However, there is little available information about whether this occurs and, if expectations do change, what factors may influence such change. An understanding of what athletes expect to achieve before surgery and whether these expectations change after surgery is important for providing the patient with appropriate preoperative advice and facilitating an optimal outcome.

The purpose of this study was therefore to investigate return-to-sport expectations before and after ACLR and determine whether age, sex, number of previous ACLR procedures, preinjury level of activity, and sport participation frequency were associated with changed expectations.

METHODS

Patients

This prospective study included athletic patients who underwent primary or revision ACLR between May 2014 and August 2016 at a metropolitan private orthopaedic clinic. All patients who underwent ACLR during this time period indicated their sport participation status before their ACL injury as one of high-level competitive sports, frequent sports, sports sometimes, or nonsporting. Only those who reported their participation as high-level competitive or frequent sports were eligible for inclusion in the study. Patients who had already undergone ≥2 ACLR procedures (n = 8) were excluded, resulting in a total of 844 eligible patients.

Full data were obtained from 675 of these patients (80% follow-up). The reasons for missing data included patient loss to follow-up, incomplete data collection, and further ACL injuries. There were 437 male and 238 female patients with a mean age of 26 ± 9 years at the time of surgery (Table 1). Sports played by the participants mostly included Australian rules football (35%), netball (17%), soccer (11%), and basketball (10%). The project’s procedures were approved by the institutional ethics committee.

Surgical Procedure and Rehabilitation

All ACLR procedures were performed arthroscopically. There were 595 primary reconstruction procedures and 80 revision procedures. Postoperatively, all patients underwent the same rehabilitation protocol, with an early focus on the recovery of full, active knee extension and quadriceps function as soon as possible. Weightbearing was allowed on an as-tolerated basis from the first postoperative day. The minimum requirements for return to sport were no effusion, essentially full range of motion, good quadriceps strength and control of a single-leg squat, normal running and landing, and at least 4 weeks of unrestricted training. Formalized testing was not undertaken for return-to-sport clearance.

Return-to-Sport Expectations

Before surgery, all patients completed a short survey regarding their return-to-sport expectations. This consisted of 4 questions: (1) “Do you expect to return to your main sport?” (2) “Do you expect to return to the same level of sport?” (3) “Do you intend to return to or take up a different sport?” and (4) “Do you intend to give up sport?” All 4 questions had a yes/no response option. Preoperatively, patients also completed the Marx activity scale (based on their preinjury status) and reported the frequency of their preinjury sport participation as being either 4-7 days per week or 1-3 days per week.

Return-to-Sport Outcomes

At 12 months after surgery, all patients reported whether they had returned to their sport as well as the level of

| TABLE 1
<table>
<thead>
<tr>
<th>Patient Characteristics</th>
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<tbody>
<tr>
<td>All (n = 675)</td>
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<tr>
<td>Age at surgery, mean ± SD, y</td>
</tr>
<tr>
<td>Time from injury to surgery, mo</td>
</tr>
<tr>
<td>Mean</td>
</tr>
<tr>
<td>Median</td>
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<tr>
<td>Graft type, n</td>
</tr>
<tr>
<td>Hamstring tendon</td>
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<tr>
<td>Patellar tendon</td>
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<tr>
<td>Quadriceps tendon</td>
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<tr>
<td>Contralateral</td>
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<tr>
<td>Hamstring tendon</td>
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<td>Patellar tendon</td>
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Return: no return, return to training, return to lower level, and return to same level. Those who had not returned were also asked to indicate whether they still planned to return and, if not, the reason why.

Statistical Analysis

Descriptive statistics were calculated for all 4 patient expectation categories for the whole cohort and then separately for those who were about to undergo their first ACLR, second primary (contralateral) ACLR, or revision ACLR. The proportion of patients who expected to return to their preinjury level of sport was determined along with actual return rates. Contingency tables were used to determine whether expectations differed depending on whether the patient was about to undergo his or her first or second primary reconstruction or a revision procedure, with odds ratios calculated. Subgroup analysis was also performed for preinjury sport, age, and sex in the group about to undergo their first reconstruction.

The number of patients who changed their return-to-sport expectations was calculated. Logistic regression analysis was then performed to determine the factors associated with the decision to cease sport participation in patients who had expected to be able to return to their preinjury level of sport. For this analysis, the independent factors included age, sex, number of previous ACLR procedures (dichotomized as 0 or 1), preinjury Marx activity score, and preinjury sport participation frequency (dichotomized as 1-3 or 4-7 d/wk). The dependent factor was whether patients had changed their return-to-sport expectations after surgery.

All data were analyzed using SPSS software (version 23; IBM). $P < .05$ was used to indicate statistical significance.

RESULTS

Return-to-Sport Expectations

Return-to-sport expectations recorded preoperatively are shown in Table 2. Overall, 91% of the cohort expected to return to sport, and 84% expected to return to their same preinjury level. Expectations for returning to the preinjury level were higher for patients about to undergo their first ACLR compared with those about to undergo a second primary procedure ($P = .08$) or revision surgery ($P < .001$). Compared with those undergoing primary reconstruction, significantly more patients who were about to undergo revision surgery were considering changing their sport (9% vs 25%, respectively). Only 5 patients reported that they planned to give up sport after their surgery.

Expectations for returning to the preinjury level of sport for patients undergoing their first primary reconstruction were highest for Australian rules football (92% expected to return; 93% of cohort male), followed by soccer (90% expected to return; 82% of cohort male). They were lowest for netball (83% expected to return; 99% of cohort female) and the same as the overall rate for basketball (88% expected to return; 59% of cohort male). Male patients had higher expectations than female patients (90% vs 84%, respectively; $P = .09$). Expectations were also higher for younger patients (<20 years), in which 92% expected to return to their preinjury level of sport compared with 86% for those aged >20 years ($P = .05$).

Return-to-Sport Rate Compared With Expectations

At 12 months after surgery, 24% of patients who expected to return to their previous level of sport had actually returned (Table 3). There were a further 7 patients who had returned, despite having reported that they did not expect to return preoperatively. In total, 15% of the overall cohort had decided to give up sport by 12 months after surgery, and 9% of those who had expected to return gave up. Patients who had undergone their first primary ACLR were significantly less likely to have given up sport by 12 months compared with those who underwent a second primary procedure ($P = .002$) or revision procedure ($P < .0001$ (Table 3).

For the patients who had changed their expectations and decided to give up sport, 71% (35/49) were fearful of a reinjury, 18% (9/49) did not feel that their knee was ready, and 10% (5/49) noted other reasons (such as being too busy, no longer interested, and not being able to afford a further reconstruction procedure).

### Table 2

<table>
<thead>
<tr>
<th></th>
<th>Expect to Return to Main Sport</th>
<th>Expect to Return to Sport at Preinjury Level</th>
<th>Expect to Change to Different Sport</th>
<th>Expect to Give Up Sport</th>
</tr>
</thead>
<tbody>
<tr>
<td>All (n = 675)</td>
<td>613 (91)</td>
<td>566 (84)</td>
<td>78 (12)</td>
<td>5 (1)</td>
</tr>
<tr>
<td>Primary (n = 514)</td>
<td>483 (94)</td>
<td>451 (88)</td>
<td>48 (9)</td>
<td>2 (0.4)</td>
</tr>
<tr>
<td>Second primary (n = 81)</td>
<td>72 (89)</td>
<td>65 (80)</td>
<td>11 (14)</td>
<td>1 (1)</td>
</tr>
<tr>
<td>Revision (n = 80)</td>
<td>58 (73)</td>
<td>50 (63)</td>
<td>20 (25)</td>
<td>2 (3)</td>
</tr>
<tr>
<td>Odds ratio (95% CI)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary vs second primary</td>
<td>2.0 (0.9-4.3)</td>
<td>1.8 (1.0-3.2)</td>
<td>0.7 (0.3-1.3)</td>
<td></td>
</tr>
<tr>
<td>Primary vs revision</td>
<td>5.9 (3.2-10.9)$^b$</td>
<td>4.3 (2.5-7.3)$^b$</td>
<td>0.3 (0.2-0.6)$^b$</td>
<td></td>
</tr>
</tbody>
</table>

$^a$Data are presented as n (%) unless otherwise specified.

$^bP < .001$. 

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Factors Associated With the Decision to Give Up Sport

Univariate logistic regression showed that female sex and having undergone previous ACLR were factors significantly associated with the decision to give up sport at the 12-month time point in patients who had initially expected to return to their preinjury level. Specifically, female patients had 2 times the odds of giving up, and patients who had undergone previous ACLR had almost 3 times the odds (Table 4). Age, preinjury sport participation frequency, and Marx activity score were not associated with changed expectations (Table 4).

DISCUSSION

The results of this study showed that patients who were about to undergo their first ACLR had high expectations for returning to their preinjury level of sport, with 88% expecting to achieve this outcome. Expectations were more modest for patients who had undergone previous ACLR, with 80% and 63% expecting to return to their preinjury level if undergoing a second primary or revision procedure, respectively. It was further shown that, despite their preoperative expectations of returning to sport, 9% of patients had in fact given up sport as early as 1 year after surgery, with female sex and having undergone previous ACLR being factors significantly associated with the decision to cease sport participation.

The number of patients who expected to return to their preinjury level of sport in the current study was generally similar to that reported in limited research on this topic.8,14 Feucht et al8 studied a group of 181 patients and found that while 91% of the overall cohort expected to return to their preinjury sport level, the expectations were greater for those undergoing their first ACLR, with 94% expecting to return, compared with those undergoing revision surgery, with only 84% expecting to return. A similar discrepancy was found in this study, although the expectations reported by Feucht et al8 were notably higher than those reported the current study. There are 2 potential sources for this discrepancy. First, the current study had a much larger patient sample, and the estimates may therefore be more precise. Second, there are differences in the patient demographics between the 2 studies. In the current study, patients who did not participate in sport were excluded, whereas such patients were included in the Feucht et al8 study.

In the only other published study to report return-to-sport expectations after ACL injuries, Sonesson et al14 found that 86% of their cohort of 65 patients who underwent primary reconstruction and had mostly participated in competitive-level sport indicated that their goal was to return to their preinjury sport activity, which is very consistent with the current data. Previous studies did not determine whether expectations varied according to patient age, and the current study showed that a higher percentage of younger patients expected to return to their preinjury level. However, it should be noted that return-to-sport expectations were still high for the older patient group. Male patients also had slightly higher expectations than female patients. This was reflected in the different expectations between some sports. Expectations were higher for Australian rules football, which was played mostly by male patients, compared with netball, which was played mostly by female patients.

Of the patients who expected to return to their preinjury level of sport, only 24% had achieved this goal at 12 months after surgery. This low rate of return is not unexpected, as it has been well documented that return-to-sport rates are often modest at this time point,6 and many patients continue to return to sport after the first 12 months.3 In this study, patients reported whether they expected to return to their preinjury level and not how long they thought that this would take. Previous data have shown that patients’ preoperative expectations regarding the number of months that they think it will take them to return to their preinjury level of sport are predictive of the actual timing of return to sport.5

An interesting finding in the current study was that 9% had decided to cease or “give up” sport at 12 months after their reconstruction, despite having indicated preoperatively that they expected to return to their preinjury sport after surgery. These patients may have elected not to have undergone surgery if they had known they would change
their goals in this way over a relatively short time frame. As such, they may be less likely to feel satisfied with their outcome. Several patients also chose to change their sport. It will be of interest if future studies find that those who choose to give up or change sports have similar levels of postoperative satisfaction compared with those who are able to resume their preinjury sport.

The 2 factors that were significantly associated with changing from “expecting to return” to sport to “giving up” sport were female sex and having undergone previous ACLR. There are, of course, many other factors not measured in the current study that could contribute to the decision to no longer pursue a sporting goal after ACLR. Work or study commitments have been cited as common factors among patients who elect to give up sport participation in both ACLR and other orthopaedic cohorts. Nonetheless, the current data indicate the potential return-to-sport challenges for female patients and those who underwent previous ACLR and provide new knowledge that may assist in helping patients with appropriate preoperative advice. These findings are also consistent with previous research that showed lower return-to-sport rates in female patients and those undergoing revision and bilateral ACLR procedures but that did not evaluate the potential reasons for these lower rates. The most common reason cited for giving up sport in the current study was a fear of further injuries.

The importance of understanding patient expectations has become recognized in the orthopaedic literature. While expectations and other patient-centric quality measures are not the only determinant of outcomes, they are now viewed by many as an important part of the decision-making process and are increasingly being used to facilitate an optimal outcome. Although there is limited information regarding how expectations affect outcomes for the ACL-injured athlete, it is clear that expectations influence both the goals and motivation of the athlete, and more work could be done in this area. It has been suggested that educational resources can also play a role in better informing patients about what to expect in relation to their surgery, and it is feasible to target such materials toward return-to-sport expectations and outcomes. Rehabilitation programs are another way for the clinician to have a positive effect by spending time with their patient to ensure that they feel fully informed about what to expect during the return-to-sport phase and therefore be able to set realistic goals. It is recognized that clinicians can influence both the physical and psychological recovery of the athlete. Future research should address both these avenues to see if they can enhance patient outcomes and satisfaction after this type of surgery.

There are a number of strengths of the current study, which include the large cohort of athletes who were regularly engaged in sport before their initial ACL injury. It is reasonable to suggest that this group should be a focus for return-to-sport management, as they have high expectations for returning to their preinjury sport, as shown by the current results. The inclusion of both first-time and previously injured athletes enhances the external generalizability of the results and provides a comprehensive picture of return-to-sport expectations for most patients who undergo ACLR. The data were, however, collected from 1 specialist metropolitan orthopaedic clinic, and this may limit the external validity of the data. The prospective longitudinal design, with 80% follow-up, minimizes bias and patient recall. We did not, however, measure patient satisfaction to evaluate the relationship between expectations, outcomes, and satisfaction. We were also only able to investigate a limited number of factors that may have been associated with the decision to cease sport participation. We did not formally measure other psychological variables, such as reinjury anxiety or psychological readiness to return to sport, but did record the self-reported reason for giving up sport, which for most patients was the fear of reinjuries. Follow-up was also limited to 1 year, and while it will be of interest to look at changed expectations over the longer term, in this initial report, we were interested in short-term changes and factors associated with these, as they may be best addressed before surgery or in the early rehabilitation stage. Overall, this is a novel study in an area that has been underresearched, despite having relevance for the clinician when discussing patient expectations and setting postoperative goals.

In summary, the current data show that patients had high preoperative expectations for returning to their preinjury level of sport before undergoing ACLR, but 9% who had expected to return gave up sport in the first postoperative year. Return-to-sport expectations were lower for those who had undergone previous ACLR. Factors associated with reduced expectations or subsequently giving up sport included being female and having undergone previous ACLR. These data serve to provide patients with realistic return-to-sport expectations and can aid the clinician in offering appropriate preoperative advice. They also highlight the challenge for patients who aim to return to sport after previous ACLR.

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REFERENCES


