

# Rehabilitation and recovery after anterior cruciate ligament reconstruction: patients' experiences

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The aim was to explore patients' experiences of the rehabilitation process after anterior cruciate ligament (ACL) reconstruction. Ten participants were enrolled in the study. Semi-structured interviews were performed, focusing on challenges during the post-operative rehabilitation to 1 year after ACL reconstruction. The participants perceived no real choice between operative and non-operative treatment. Only surgery symbolized a full return to the pre-injury level of sports, and surgery was understood as the only way to become a completely restored "functional human being." A major source of frustration was that the meaning of and progress during the rehabilitation did not match their

expectations. Three different responses to the challenge of a prolonged rehabilitation were expressed: "going for it," "being ambivalent," and "giving in." Fear of re-injury was common; however, some participants decided not to return to their pre-injury level of sports due to reasons other than physical limitations or fear of re-injury. From a patient perspective, it seems important that the choice of operative or non-operative treatment should be discussed in terms of the meaning and extent of the post-operative rehabilitation and the expected outcomes. There also seems to be a need for more guidance in realistic goal setting and coaching throughout the rehabilitation process.

## Background

Anterior cruciate ligament (ACL) rupture is one of the most common traumatic injuries among physically active individuals (Kartus et al., 1999). Surprisingly, many patients who have had a surgical ACL reconstruction do not return to their previous level of sporting activity (Mikkelsen et al., 2000; Kvist et al., 2005). Other patients are not satisfied with the functional outcome of the surgical repair and/or the post-operative rehabilitation (Kocher et al., 2002; Nyland et al., 2002), despite good objective results such as normalized muscle strength, knee joint stability, and range of motion (Kocher et al., 2002; Kvist et al., 2005). Empirically, it has been recognized that some of these patients tend to avoid certain physical and social activities. A more specific fear of sport or physical activity, related to a feeling of a possible re-injury, has been noted (Kvist et al., 2005). This phenomenon has earlier been studied in patients with low back pain, and is called "fear of movement/(re)injury" (Vlaeyen et al., 1995).

Patient satisfaction after ACL reconstruction as a phenomenon *per se* has not been well studied. The main goals of rehabilitation after ACL reconstruction are to regain normal stability of the knee joint, good strength of the thigh muscles, and a normalized functional performance. The rehabilitation often follows a standardized rehabilitation protocol, whereas the reconstruction itself (e.g. graft choice) and the post-operative rehabilitation should be individualized (Johnson, 1997). In a recent literature review (Kvist, 2004), it was reported that return to contact sports generally takes place 6 months after ACL reconstruction, even though the criteria for a safe return to sports are still unknown.

Knowledge of the recovery processes and biomechanics of the knee joint after injury and reconstruction, together with the physiological aspects of training effects, should be emphasized when designing a rehabilitation program and its evaluation (Kvist, 2004). Most outcome assessment after ACL reconstruction has typically been focused on activity limitation (Lysholm & Gillquist, 1982; Hefti et al., 1993; Roos et al., 1998), but health-related measures

have also been developed, such as the Short-Form health survey (SF-36) (Shapiro et al., 1996). However, patient satisfaction in terms of rehabilitation or outcome of surgery is a complex phenomenon, and probably contains multiple dimensions. Some dimensions discussed are accessibility, functional health status, and quality of patient–professional relationship, but also outcome expectations as well as expectations for and attitudes to rehabilitation (Keith, 1998).

The focus on individual responsibility for one's own life or well-being is increasing in the public health service in general, as well as in injury rehabilitation. Individual goal setting in rehabilitation places high demands on both health professionals and individuals, for instance the patients' responsibility and capacity to adjust to and manage different situations. The capacity to manage stressful situations, such as injury or disease, and to handle different symptoms, is called "coping" (Lazarus, 1984). Several authors (Keefe et al., 1991; van Baar et al., 1998; Thomée et al., 2002) have studied coping strategies in patients with chronic knee pain, using different subjective scores such as the Coping Strategies Questionnaire (CSQ) and the Spielberger State-Trait Anxiety Inventory (STAI). Patients with ACL reconstructions do not usually experience chronic pain of the knee joint, and therefore other physical or psychological mechanisms may be of importance for avoidance of physical activity or sports (Thomée et al., 2006). Lazarus (1993) suggested that instruments for measuring coping strategies would be more meaningful and useful if we improved our knowledge and understanding regarding the thoughts and actions of a specific group of patients studied in a specific context. This is in accordance with the conclusions about patient satisfaction by Keith (1998), who suggested that "Methods of measuring satisfaction must reflect the patient's experiences in such settings," and "to understand the patients' subjective experiences it is necessary to use qualitative techniques to probe for the connections between that experiences and responses to satisfaction."

The surgical procedures, such as the choice of graft material (Corry et al., 1999; Aglietti et al., 2004; Beynnon et al., 2005), and rehabilitation after ACL reconstruction (Mikkelsen et al., 2000; Beynnon et al., 2005), are relatively well developed. However, our understanding and knowledge of the factors that contribute to successful rehabilitation, outcome, and patient satisfaction are not yet well investigated. It therefore seems necessary to identify factors in the rehabilitation process such as individual challenges and personal decision making from a patient's perspective.

We have found no earlier publications on patients' knowledge and experiences of the rehabilitation

process after ACL reconstruction. Thus, the purpose of this study was to explore and describe patients' experiences of the rehabilitation process after ACL reconstruction.

## Materials and methods

The study was approved by the Ethics Committee at the Karolinska Institutet, Stockholm, Sweden.

### Participants

Fifteen patients, at their post-operative follow-up at one of two outpatient sports rehabilitation clinics in Stockholm, Sweden, were asked to participate. All patients had been involved in post-operative rehabilitation after ACL reconstruction (Appendix A). They were chosen strategically by a purposeful sampling from two different outpatient sports rehabilitation clinics, representing both gender and varying ages. Three patients declined participation, and two interviews were excluded due to technical problems. Finally, the study included 10 patients (nine males and one female), median age 29 (23–41) years, who agreed to participate and gave their informed consent before participation. Nine out of the 10 patients also participated in a larger study on clinical outcomes after ACL reconstruction. Eight orthopedic surgeons performed the ACL reconstruction at three different hospitals and five physiotherapists were involved in the patients' rehabilitation. The inclusion criteria were: (a) age between 16 and 50 years, (b) the same type of bone-patellar tendon-bone or hamstring ACL reconstruction, respectively, and (c) an asymptomatic contralateral knee. Patients with a medial or lateral meniscus tear and/or a medial collateral ligament injury grade I were also included. The exclusion criterion was inability to speak or understand the Swedish language.

All patients were interviewed; the median time from surgery to the interview session was 14 months (12–21). The median pre-operative activity level evaluated with the Tegner Activity Scale was 8 (7–10). The Tegner Activity Scale (Tegner and Lysholm, 1985) describes a patient's activity level; a high score means that the patient participates in sports such as soccer and floor ball, that is, sports that place high demands on knee joint stability. At the time of the interview, one patient (no. 10) was still involved in rehabilitation. For more detailed information, see Table 1.

### Data collection

Data collection was performed by semi-structured interviews conducted by one of the authors (K. A.). The interviewer was a physiotherapist with long clinical experience of rehabilitation after ACL reconstruction, and who was not involved in the interviewees' rehabilitation. Each interview lasted approximately 1 h, and took place in a location chosen by the participant. All interviews were audiotaped and transcribed verbatim. The interview guide was based on the clinical experiences of the authors (Table 2) and tested on three interviewees. The test interviews were carried out to inform on the process of interviewing and to provide feedback on the topics of the interviews. The three test interviews were not included in the current study.

### Data analysis

The transcribed interviews were analyzed using a qualitative thematic content-interpreted analysis, which could be

Table A1. Rehabilitation protocol after anterior cruciate ligament reconstruction

Phases/Time	Goals	Exercises
<p><i>Phase 1</i> – Limited activities to prevent hemarthrosis/effusion Gradual return to daily activities Weight bearing as tolerated. Outclinic physical therapy two to three times a week</p> <p><i>Day 1:</i></p> <p><i>Day 2–2 weeks:</i></p> <p><i>2–5 weeks, add:</i></p>	<p>Promote early independent ambulating skills Reduce swelling and pain Improved range of motion Achieve full passive terminal extension Regain quadriceps and hamstrings control Improve knee joint proprioception Achieve normal gait without crutches (should use crutches for 4 weeks)</p>	<p>Pain control Instructions for home training Passive terminal knee extension Gait training in correct/normal pattern Balance and proprioception exercises Closed kinetic chain exercises Stationary bicycling when 110° knee joint flexion is Reached Calf raises on a step Leg press in a device Leg curl in a device</p>
<p><i>Phase 2</i> – If patients have achieved goals stated in phase 1</p> <p><i>6–8 weeks, add:</i></p> <p><i>9–11 weeks, add:</i></p>	<p>No swelling Full range of motion Improved strength in lower extremity Maintaining overall strength/aerobic capacity as able Improved knee proprioception and balance Control forces during walking</p>	<p>Active short arc, terminal knee joint extension (30–0°) Increased amount of closed kinetic chain exercises Two leg trampoline exercises Slide board Stair master Different movements on the trampoline Functional training; different jumps on the floor Begin running on even surface, straight line One-leg trampoline exercises</p>
<p><i>Phase 3</i> – If patients have achieved goals stated in phase 2</p> <p><i>3–4 month, add:</i></p>	<p>Improvement of strength, power, and endurance without pain Gradually return to functional activity and sport-specific training Normal running pattern</p>	<p>Quadricep straining open and closed kinetic chain, concentric and eccentric in full range of motion Initiated plyometric training Sport-specific training and activities individually adjusted to patient's capability outdoor bicycling</p>
<p><i>Phase 4</i> – If patients have achieved goals stated in phase 3</p> <p><i>4–6 months:</i></p>	<p>Full range of motion No pain or swelling during activity Maximal strength Maximal endurance Neuromuscular coordination</p>	<p>Gradually increased running program and cutting Acceleration–deceleration Sport-specific training</p>
<p><i>Phase 5</i> – If patients have achieved goals stated in phase 4</p> <p><i>5 or 7 months of follow-up</i></p>	<p>Full range of motion No pain or swelling during or after activities Good result in functional testing Isokinetic concentric and eccentric average and peak torque for quadriceps and hamstrings <math>\geq 90\%</math> compared with contralateral leg If the above goals are achieved → return to full activities If the above goals are not achieved → continue rehab</p>	

Table 1. Demographic data of the participants in the present study (N= 10)

Participants	Age (years)	Gender	Time between index injury and reconstructive surgery (months)	Time between reconstructive surgery and interview (months)	Pre-injury Tegner Activity Score	Postoperative Tegner Activity Score (1-year post-operative)	Postoperative rehabilitation (months)
1	23	M	1.5	14.0	8	8	10.0
2	34	M	6.0	13.0	8	7	6.0
3	29	M	5.0	13.0	8	8	9.0
4	30	M	63.0	14.0	10	3	6.0
5	24	M	3.5	17.0	9	7	4.0
6	34	M	4.0	16.0	9	7	5.5
7	26	F	5.5	17.0	8	9	10.0
8	29	M	6.0	12.5	10	4	12.0
9	41	M	8.0	12.0	8	7	5.5
10	23	M	13.0	21.0	7	7	21.0
Median (range)	29 (23–41)		5.8 (1.5–63)	14 (12.5–21)	8 (7–10)	7 (3–9)	7.5 (4–21)

The median and range are presented.  
M, male; F, female.

described as a systematic process of identifying, coding, and categorizing patterns of regularity in the data (Morgan, 1993). To begin with, the interviews were read several times as a whole, by two of the authors (K. A. and A. H.), in order to obtain an overall understanding of which topics of discussion were important to the patients. This was followed by identification of meaning units consistent with the aim of the study. The units were condensed and sorted into categories for each interview. Next, the categories were compared and related to each other, and summarized in overarching themes across all interviews, emphasizing the similarities and differences between the 10 interviews. This process was performed separately by two of the authors (K. A. and A. H.) and cross-checked for agreement. The interviews were re-read once more to refine and verify the overarching themes. Alternative interpretations were discussed. Three of the authors (K. A., A. H., and G. B.) took part in this process. Finally, each theme was labeled and specific quotations were chosen to illustrate the general implications.

**Results**

The patients’ experiences of the rehabilitation process after ACL reconstruction were grouped into four themes:

1. Choosing operative or non-operative treatment after injury – no personal dilemma.
2. Setting time – a source of frustration.
3. Struggling to attain goals – different responses.
4. Outlook for the future – an unavoidable task.

**Choosing operative or non-operative treatment after injury – no personal dilemma**

All the participants mentioned that there was no real choice between operative and non-operative treatment; that is, due to the certainty of choosing, no personal dilemma arose. Although some of the surgeons did provide information about the option of non-operative treatment, yet in the context of their

Table 2. The interview guide

The occasion of the injury (Why? Other choices?)
The operation/surgery (Expectations? Challenges?)
The rehabilitation process (Expectations? Challenges? Advantages and disadvantages? Advice to caregivers/other patients?)
The present situation (Expectations? Challenges? Function? Activity level?)
The future (Expectations? Challenges? Function? Activity level?)

lives and in their frame of reference it appeared impossible to continue with sports or even to function in normal daily life without an ACL reconstruction. Additionally, an ACL reconstruction was perceived as the only choice for a possible return to sports at the pre-injury activity level.

In contrast, non-operative treatment was understood as requiring one to accept the loss of normal functioning. At this stage of the process, that is, soon after injury, this was not acceptable, and for some was seen as a loss of personal self-value and self-respect.

- “Of course you had a choice, either forget about having the operation ... but then I couldn’t play floor hockey.”
- “I wanted to have surgery. I can’t imagine not being able to play soccer, that’s just impossible. I can’t imagine having a life that isn’t active, it’s just impossible.”
- “Now, it was more like I had the surgery because I wanted to become a ‘whole’ person.”

The participants clarified that different health professionals gave different amounts of information about whether non-operative treatment was a relevant choice or not, even though some surgeons told the patients that there was an alternative choice to reconstruction, that is, non-operative treatment

meaning *not* continuing with sports at the present activity level. In some cases, the participants' surroundings – in terms of friends from their sports team, trainers, or even other patients at the rehabilitation clinics – further convinced them of the necessity of having an ACL reconstruction.

- “But since I know some people who are doctors and physical therapists, they said that you won't be able to play soccer if it's torn, essentially you won't be able to go skiing.”
- “There was a guy, could have been after (my) operation, and a doctor had said that he didn't recommend it to him, that the doctor didn't think he should. But I said that I recommended to him that he should do it.”

### Setting time – a source of frustration

Referring to their thoughts directly after surgery, all participants expressed somewhat unrealistic expectations concerning the time frame as well as the content of rehabilitation. They all agreed that the rehabilitation period lasted much longer than anyone pre-surgery could possibly understand. The implications and meaning of the rehabilitation process, and their progress during rehabilitation, did not match their expectations. All participants mentioned that they considered themselves not to be mentally prepared.

- “It was difficult for me to understand that it was so big, if you know what I mean. And that it would take such a long time.”

All participants had a more or less unreflective idea that the post-operative rehabilitation period would last approximately 6 months. Even so, before surgery and early in the rehabilitation, they considered themselves to be able to recover faster than this.

- “You think the entire time, that I'll fix this faster, more or less, it's cool.”
- “. . . first I was kind of, that this is going to go really fast and I'm going to become healthy in record time.”

However, due to pain, strength deficits, and other limitations of normal functioning, none of the participants perceived themselves as being fully recovered at 6 months. When it became clear that the goal of complete recovery would not be attained after 6 months, the patients became frustrated, and lost confidence in the rehabilitation process and to some degree even their self-esteem. Some of the participants also described a sense of guilt or shame at not managing to live up to the demands of taking charge of the rehabilitation process.

- “But much of it is up to you, or much, everything is up to you. You're the one who decides how well you are going to become.”

### Struggling to attain goals – different responses

The challenges perceived early in the rehabilitation lay in accomplishing the most outstanding or groundbreaking sporting achievements, and in conceiving and acting upon the pain and the fear avoidance beliefs that could arise from just performing simple exercises, like walking and bicycling. In the later phase of the rehabilitation, the participants described challenges such as being able to *continue* struggling and keep one's motivation high.

The nine participants who were involved in the study on clinical outcomes, and were thus receiving assessment of physical parameters, found this positive and motivating. They experienced confirmation of reaching or becoming closer to their goals, but also felt that it was easier to continue struggling with their rehabilitation.

- “Then I've been doing the knee test the entire time. I think that's been very good. I'm glad that I was in this study, then, you know. You really got answers there, about how things were. How strong you are, and checking the cruciate ligament.”

However, to be able to handle the situation of what, from the participants' point of view was perceived as a prolonged and drawn-out rehabilitation, they had to face the challenge to continue to remain active and goal oriented; the only other option was to remain in that unpleasant situation and feel passive and powerless. Different responses to this challenge were described. These responses could be divided into three subthemes in terms of those who (a) *accepted the challenge*, (b) *did not accept the challenge*, and (c) *were ambivalent*.

Those who predominantly *accepted the challenge* (“*going for it*”) were convinced that they would succeed in returning to sports at their pre-injury level. Despite adversity, they stated that they had to remain active and goal oriented. They seemed to be competitive and had a “fighting spirit,” and never lost belief in the idea that they would be totally recovered. They also perceived themselves as capable of deciding whether or not they wanted to return to sport at the same activity level as before injury.

- “Though I'd decided that if I couldn't do multi-discipline, I'd do some other event.”
- “I always believed it would go well, and that's just as well.”

Those who predominantly *did not accept the challenge* (“*giving in*”) expressed thoughts of hopelessness or not having enough time or personal engagement. When evaluating and rethinking what was at stake, some of the participants experienced the feeling that it was not worth fighting for. Furthermore, recovery could also be experienced as being out of their control.

- “It is never going to be over.”
- “But I understand that this is what it’s going to be like for the rest of . . . everyone I’ve talked to who’s had the same operation, says that the scars don’t go away. So I’m OK with that” (The participant is referring to the question why he/she had neglected offered rehabilitation).
- “. . . but for my part, I felt there wasn’t any time for rehabilitation.”
- “Yes, I think much of it was also because I just didn’t feel like it.”

Those who predominantly were *ambivalent* (“*being ambivalent*”) seemed to lack goals, or had diffuse goals in terms of future sporting activity. On the other hand, ambivalence could also be related to re-evaluation of personal goals, personal identities, and social roles during the post-operative rehabilitation process. The participants in this group described a loss of motivation and referred to not having given themselves an honest chance.

- “Now I don’t really feel like I really gave myself an honest chance, since I had other priorities.”
- “Soccer wasn’t so important since I had taken a long break. I’d almost quit.”
- “But I’m 35 now, time to cut back. Better to spend time with your daughter.”

In this group, the participants expressed a desire for more support regarding personal goal setting and motivation during rehabilitation. Furthermore, they expressed the need for an individually tailored rehabilitation program, taking into account their psychosocial situation and socioenvironmental circumstances.

- “That they may not let me as a patient take up the (individually adapted training), but that at an early stage, in other words even before the first time I came to you (the participant refer to the outpatient clinic) after the operation, ask a bit about how things are on the home front. Does it fit? Do communications work? Should we do this instead? You give the suggestions, so that a person can choose a bit about how to have things.”

#### Outlook for the future – an unavoidable task

A majority of the participants considered themselves as still not completely recovered 1 year after surgery. However, all participants perceived at this time a need for renewed emphasis on choices in one’s life; for example, whether or not one feels satisfied with the rehabilitation, and of one’s future level of sporting activity. The participants emphasized a decreased confidence in knee-joint stability and most often expressed ideas about how to reach future goals and that each individual is responsible for their own complete recovery.

- “I would like to give myself the time (to practice soccer), because otherwise I’ll always go around and not really know.”
- “So that I won’t do the same thing again, I’ve changed my leading leg, and it’s gone pretty well (400 m hurdles).”
- “So I can’t blame anyone but myself. I’m still rather satisfied. I mean, it’s just the final element there that . . . .”

Apart from reasons like pain or strength deficits, all participants expressed a sense of fear and uncertainty when going back to the same sport that they were engaged in when they had their ACL rupture.

- “But the problem isn’t that it’s the knee that . . . the problem is psychological, that my mind says stop, that’s what does it.”
- “All I notice is that I’ve had to cut back on training. It’s probably mostly that I don’t dare, I think.”

#### Discussion

Our interviewees emphasized that they did not experience any personal dilemma when choosing surgery – reconstruction of the ruptured ACL instead of non-operative treatment. All participants wanted to undergo an ACL reconstruction. They expressed an inability to accept and face the consequences of the injury, and the surgery symbolized not only a full return to pre-injury level of sport but also becoming a “completely restored functional human being.” For instance, the interviewees felt that it was totally impossible to accept any activity restrictions and the feeling of losing their social identity/value. This is in accordance with a recent study on female handball players, where it was found that bodily competencies and physical exercises were important for the players’ social identity, and the reduction of their self-expression in relation to sport left its mark on their personal life story (Thing, 2005). Johnson (1997) pointed out that few or no athletes prepare themselves psychologically for a possible injury situation,

and therefore presumably lack mental strategies to cope with a major sporting injury (Johnson, 1997). Therefore, when such injury occurs, causing an abrupt interruption of physical activities and loss of bodily competencies important for social identity, it seems reasonable that surgery is perceived as the one and only solution to these problems.

On the other hand, it is neither empirically proven nor verified in the literature (Eastlack et al., 1999) that one has to stop participating in sports after ACL injury. However, in the present study all participants expressed the idea that a future without an ACL reconstruction was a future without sporting activities. If the participants' idea about the necessity of a surgery is related to a lack of pre-operative information from health professionals, or if it is influenced by other internal and external factors, e.g. advices from other sports colleagues could not be commented on in this study. However, clinically it has been recognized over the past decade that surgery has been performed earlier post-injury than was the case some 10–15 years ago. Non-operative treatment that is in the form of physiotherapy was, at that time, “the gold standard” for selecting between those patients who needed surgical reconstruction and those who did not. During the pre-operative rehabilitation period, one can presume that questions concerning the pros and cons of surgery, rehabilitation, and future activities could be highlighted and discussed with the physiotherapists. Christman et al. (1988) suggested that diagnoses must be presented and the treatment explained by the physician. The authors stated that when both operative and non-operative options exist for the same injury, explanation of procedures and outcomes helps the injured athlete to make informed decisions. Clarity alleviates the unnecessary uncertainty that can surround loss of health and augment stress. In the case of the choice regarding ACL reconstruction, it seems important that the patient is informed not only about the surgery itself but also about the content and the meaning of the rehabilitation process. Thing (2005) concluded that individual responsibility for personal well-being is a recurrent phenomenon in public health service in general, and one that is particularly prominent in the rehabilitation of sport injuries. The participants in the present study expressed their sense of not being mentally prepared, and the feeling that their progress during the rehabilitation period did not match their expectations.

In a review study by Kvist (2004), the recommended time for return to pre-injury level of sports after ACL reconstruction is suggested as approximately 6 months post-operatively. This was also the length of the rehabilitation understood by the participants in the present study. Some of the participants, surprisingly enough, explained that when they

received this information, their thoughts were that they would definitely return earlier than 6 months. One can only speculate on what processes are involved in this belief in, or rather superstition of, a faster recovery.

None of the participants in the present study stated that he/she was ready to return to sports at their pre-injury level after 6 months of rehabilitation. This was expressed as a source of frustration, but also a reason for questioning one's individual effort. In some cases, this led to a sense of guilt, which was perceived as a hindrance to the rehabilitation process. It has been shown that athletes experience significant mood changes throughout rehabilitation, which may negatively influence their rehabilitation (Morrey et al., 1999). Frustration, defined as the failure to meet a goal due to obstruction, is a feeling commonly experienced by injured athletes (Smith et al., 1990).

A re-evaluation of the situation at about 6 months and often also approximately 1 year post-operatively, especially regarding the effort needed to reach future goals, was mentioned through the interviews. Rehabilitation after ACL reconstruction is often long and time consuming, which places high demands on one's ability to meet different challenges throughout the entire rehabilitation, for example to remain goal oriented. In the present study, the participants' responses to the challenges could be divided into three different subthemes. A major difference between those who predominantly accepted the challenges and those who did not appeared to be the ability to maintain high motivation and to never stop believing in a full recovery, that is, attaining the main goal of returning to a pre-injury sports level. In a study by Taylor and May (1996) concerning threats and coping appraisal and compliance during rehabilitation, it was shown that more than 50% of the athletes were non-compliant to some degree. Greater self-efficacy in the ability to perform prescribed rehabilitation modalities, and stronger beliefs in the treatment efficacy, were all related to compliant behavior.

Self-efficacy, that is, the belief about one's personal ability to perform a task or a specific behavior successfully, has been suggested to play a major role in the outcome of rehabilitation (Bandura & Locke, 2003; Thomée et al., 2007). Tailored instruments to assess self-efficacy in patients with ACL injuries have recently been developed (Thomée et al., 2006). Furthermore, the health locus of control has also been shown to influence the recovery process after injury and surgery (Miller et al., 1990) as well as coping strategies (Johnson, 1997). Nyland et al. (2002) reported that the health locus of control has an important influence on the recovery process after injury and surgery among patients with an ACL injury. Patients with a high internal health locus of

control perceived fewer functional limitations, measured with SF-36, than those with a high degree of external locus of control. A high *internal* locus of control can be explained as believing that the progress and the results are directly related to individual factors, and a high *external* locus of control as believing that the progress and results are controlled by other powerful factors such as luck, chance, or faith. Thus, even though no individual psychological strategies or actions have been specifically investigated in the present study, it is of great interest whether a high self-efficacy or high internal health locus of control would have contributed to maintaining high motivation and belief in full recovery seen in the group of individuals who accepted the challenge of prolonged rehabilitation. On the other hand, there is still a need to find out how patient's self-efficacy could be supported in rehabilitation after sports injury as well as to increase the knowledge about which personal resources and self-regulatory skills are necessary to remain goal oriented and motivated over a long time. Longitudinal studies with repeated interviews and analysis of diaries could be helpful to clarify these questions.

The participants in the present study who did not accept the demands and the challenges of what, from their point of view, was a prolonged, drawn-out, and tough rehabilitation, expressed a feeling of things *not being worth fighting for*. This was even though nine out of 10 participants were involved in a larger study on clinical assessments, which to some extent could have motivated the patients to continue struggling as shown in the group of individuals who accepted the challenge. Some of these participants mentioned that they were not able to motivate and guide themselves by self-regulatory skills, for example by setting realistic goals, or by mobilization of personal resources. This could be related to the coping theory (Tunks & Bellissimo, 1988). Coping skills can be organized in domains, evaluating what is at stake (primary appraisal) and what coping resources that are available (secondary appraisal). Johnson (1997) found when studying coping strategies among long-term injured athletes that team-sport athletes coped more in terms of "passive acceptance" of help from others, whereas individual athletes actualized more "problem-solving" strategies in the face of a stressor. This is in contrast to the results of the present study, where nine out of 10 participants who were team athletes were equally spread over the three sub-groups.

The participants who were ambivalent when confronted with demands and challenges in their rehabilitation explicitly asked for more help with setting and attaining reasonable rehabilitation goals. The need for goal setting has been studied previously (Evans & Hardy, 2002; Driediger et al., 2006) with

regard to rehabilitation. Evans and Hardy (2002) showed that a goal-setting group adhered significantly more to the rehabilitation program, and that goal-setting intervention resulted in a high level of self-efficacy compared with other groups. Helping the patients to regain control may be facilitated by collaborative goal setting and planning of the rehabilitation program. Similarly, Thing (2006) concluded in a recent study that there is a need for more guidance during the entire process after ACL injury.

In the theme "Outlook for the future – an unavoidable task," similar experiences among the participants were surprisingly dominant. They all expressed a feeling of fear and uncertainty over returning to pre-injury sport/activity levels or returning to sports in general. The individual reasons for not returning to sport are sparsely reported in the literature. However, fear of re-injury, or fear-avoidance, is one phenomenon that has been highlighted in the psychological literature with regard to overuse injuries (Vlaeyen et al., 1995) and traumatic sport injuries (Smith et al., 1990; Mikkelsen et al., 2000; Kvist et al., 2005). In a recent study (Kvist et al., 2005), conducted on patients 3–4 years after ACL reconstruction, it was reported that patients who did not return to their pre-injury level of activity reported fear of re-injury, and that a high fear of re-injury was correlated with a low quality of life. Moreover, Rollne et al. (unpublished data) argue that return to sport might be more related to personality characteristics than to instrumented anterior knee joint laxity. This is in agreement with the findings in a study of Eastlack et al. (1999), where "copers," defined as those who returned to sport after ACL injury, did not differ in terms of laxity, from "non-copers" who did not return to sport. The authors concluded that clinical outcome scales based on patient self-report are better indicators of the degree of dysfunction associated with ACL rupture than laxity measures. However, using a two-dimensional inverse dynamics method, Alkjaer et al. (2002) found that non-copers moved more slowly and loaded the knee joint less during a forward lunge than copers and controls. It is not yet known whether these observations also apply to patients who have undergone ACL reconstruction.

### Methodological considerations

Investigating patient satisfaction and psychosocial outcomes concerning injury, recovery, and rehabilitation includes entering the field of perception of the individuals, elucidating what really matters for an individual or a group of individuals with a certain injury. Thus, in the present study, the intention was

to highlight the patients' experiences, choices, and challenges. The current study was conducted with a small sample of 10 patients, which allowed focusing on detailed descriptions and their meanings; however, caution in interpreting the findings is essential as the study is exploratory and not necessarily generalizable. Thus, an important question in qualitative research concerns the determination of an adequate sample size in connection with data saturation. In the present study, the decisive criterion was the point where variation ceases. The inclusion of participants continued until the authors considered that they had "heard the story before," and the emerging themes could be described in a meaningful way. However, the sample size is considered less important than the variation in data generated by the sample (Graneheim & Lundman, 2004). The sample was chosen to cover a relatively heterogeneous group; however, a limitation of the present study is that only one woman participated. Further studies should address gender differences in patients' experiences of and responses to challenges in the rehabilitation process after ACL reconstruction, particularly as the literature on coping strategies has shown that gender differences could be anticipated (Johnson, 1997). Several orthopedic surgeons and physiotherapists were involved in the treatment and rehabilitation, which can be considered as a strength. Nevertheless, different approaches and encounters in the health care system have not been in focus in the present study.

The result may be influenced by the fact that some participants were interviewed a relatively long time after the injury. The time between injury and surgery and/or the extent of osteoarthritis in the knee joint have been reported to not correlate with patient satisfaction (Kocher et al., 2002). However, the main focus in the interview was on the experiences of the post-operative rehabilitation process from surgery to 1 year after surgery.

Another important issue in qualitative studies is credibility. No participant check was performed to judge the credibility of the findings. On the other hand, considerable importance was placed on the validation among the co-researchers. However, there are various opinions about the appropriateness of seeking agreement (Graneheim & Lundman, 2004). Sandelowski (1998) argues that because multiple realities exist that are dependent on subjective interpretation, validation among co-researchers and participants is questionable. Even though we agree that reality is subjective, we still defend the value of dialog among co-researchers, especially as in the present study at least one researcher had a background different from the others, that is, no clinical experience of working as a physiotherapist with the current patient group. The intent was not merely to verify that data are labeled or categorized in exactly the

same way, but to determine whether or not the co-researchers agreed with the way the data were labeled and sorted. In general, a qualitative approach does not attempt to generalize the findings to the whole population group. Nevertheless, it is likely that the different themes that emerged and were described could be identified in other patients with ACL reconstruction, similar to those participating in the present study. To facilitate transferability, we have provided clear characteristics of the participants and the rehabilitation protocols.

To conclude, despite the limitation regarding gender differences, the findings in the present study shed light on patients' experiences of the post-operative rehabilitation after ACL reconstruction. All participants in the present study mentioned that there was no real choice between surgery and non-operative treatment. The surgery seemed to symbolize not only a full return to pre-injury sport level but also to become a *completely restored functional human being*. All participants agreed that the rehabilitation period lasted much longer than anyone understood before surgery. They said that they considered themselves as not being mentally prepared. They expressed thoughts that implications of and the progress during the rehabilitation process did not match their expectations. Three different approaches were there in terms of meeting the challenge of what from the participants' point of view was a prolonged rehabilitation. Those who accepted the challenge were able to continue struggling; they remained active and goal oriented. They seemed to be competitive and had a "fighting spirit," and never lost belief in a total recovery. They also perceived themselves as capable of deciding whether or not they wanted to return to sport at the same activity level as before injury.

Those participants who did not accept the challenge or were ambivalent had difficulties in motivating and guiding themselves by self-regulatory skills, for example by setting realistic goals, or mobilization of personal resources. Some individuals desired more support in terms of motivation and setting of realistic goals. However, some individuals in this category decided not to return to their pre-injury level of sporting activity due to other reasons, which raises the question of whether these patients would at all benefit from surgical reconstruction, and whether successful surgery and rehabilitation should be measured by rate of return to sport.

### Perspectives

What psychological reactions, strategies, and challenges that occur during the post-operative rehabilitation after sports injuries are sparsely documented. From a patient perspective, it seems important that

the choice of operative or non-operative treatment should be discussed in terms of the meaning and extent of the post-operative rehabilitation, and the expected outcomes. There also seems to be a need for more guidance and goal setting throughout the entire rehabilitation process. More attention should be focused on how to identify patients with extra need for support as early as possible as well as how to best support these individuals.

The findings in the present study could hopefully constitute a knowledge base and an aid for health professionals especially physical therapists to be sensitive to patient challenges in the post-operative rehabilitation after ACL reconstruction. The findings indicate that health professionals should keep in

mind that patients could re-evaluate their goals during the rehabilitation period, for example not returning to their pre-injury level of sport. Whether this is due to fear of re-injury or other factors should be addressed explicitly.

**Key words:** ACL injury, coping, fear of re-injury, goal setting, interviews, patient's satisfaction.

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