## RESEARCH

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# Do we need a guideline for all: a qualitative study on the experiences of male athletes following anterior cruciate ligament reconstruction

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### Abstract

**Background** Considering the low rate of qualitative studies on athletes with anterior cruciate ligament reconstruction (ACLR), aiming to access in-depth data, we thought that the utilization of the qualitative method would allow us to collect the appropriate and sufficient data to yield novel findings and achieve sound conclusions. The study's aim was to investigate anterior cruciate ligament (ACL) injury experience processes in athletes who had undergone isolated ACLR, reveal the clinically related milestones, and highlight the necessary gaps.

**Methods** Semi-structured interview techniques, in-depth follow-up questions, and thematic analysis were used to explore the experiences of participants with isolated ACL injuries 1–3 years after surgical treatment. The study was conducted in the Orthopaedics and Traumatology outpatient clinic of the Adana City Training and Research Hospital and included 14 male athletes who had undergone isolated primary ACLR. The study group's demographic and qualitative data were collected in the first week of September 2023. The member checking process was completed in the third following week. A thematic analysis checklist was used to ensure the reliability of the thematic analysis. The Consolidated Criteria for Reporting of Qualitative Research (COREQ) guidelines were followed.

**Results** The experiences of 14 patients (22.78±3.76 years, all males) were summarized into four themes that emerged from the data analysis process: 'The Distinctions in the Participants' Experiences Regarding the Moment of Injury,''Gathering Information about the ACL Injury,''Factors That Facilitate The Treatment Process and Reinforce Positive Experiences,' and 'Desperate Plight: Main Points of Patients' Negative Experiences.' Based on the main themes, there were 14 subthemes.

**Conclusions** Our study revealed that varying perceptions of ACL injury presented by the participants, which were caused by all stakeholders, including themselves, the professional environment, family members, social network, and the healthcare staff, showed that the physical and psychological impacts of the injury were observed in different severity levels at each stage of the process. We believe that an extensive guide for athletes with ACL injuries that

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includes all components of well-being and displays the required details for the sports club/coach, family/companion, and physician.

Keywords Knee injury, Anterior cruciate ligament, Experiences, Patient perspective, Interview, Qualitative research

#### Introduction

A common sports injury, the anterior cruciate ligament (ACL) rupture, by developing an anterior instability of the knee joint, increases the risk for injuries of the cartilage and the menisci and, therefore, might cause severe and permanent loss of function of the knee [1]. In addition to physical and functional losses, ACL injuries are also linked to psychological and social consequences that raise the impairment in daily routines and work life [2]. Following an ACL injury, the treatment requires extensive rehabilitation for both surgical and nonsurgical modalities [3]. Surgical treatment, the option with relatively shorter treatment duration, includes preoperative, operative, physical therapy, and rehabilitation phases [4]. Not long ago, it was reported that following ACL reconstruction (ACLR), despite good and excellent subjective knee scores according to the International Knee Documentation Committee (IKDC) criteria, 37% of patients could not return to pre-injury physical activity levels [5]. Besides, following the ACLR, approximately 14% develop re-ruptured ACL [6]. In terms of gender, the results of the revision ratios in both genders were similar. However, reports indicate that in males, the postoperative IKDC scores were significantly higher in addition to the increased re-rupture rates [7]. The duration from injury to recovery usually takes up to six months, but recent reports suggest that the period should be extended to nine months to decrease the risk of re-injury and increase the level of adaptation of the athlete physically and psychologically [8]. The studies focused on athletes who had undergone ACLR indicate that fear of re-injury, loss of independence and competence in sports, changes in eating habits, increased tendency to risky and negative behaviors, mood and sleep problems, and finally, anxiety and depression were the major causes for inability to reach the potential [9, 10].

Studies researching the course of ACL injuries mostly used quantitative data collection tools, including subjective assessments, to address the effects of psychological processes from different perspectives [11–13]. On the other hand, a few qualitative studies have analyzed particularly the psychological factors related to the return to pre-injury levels of physical activity, revealing more comprehensive results, including the study reported by Vutescu et al. indicating that in addition to the restoration of functional strength and stability, psychological and social factors play an important role in the recovery and overall outcome of ACL injuries in young athletes [2]. Furthermore, another qualitative study focused on ACL injuries in athletes conducted by Tjong et al. stressed the value of the surgeon's awareness of the psychological factors and lifestyle changes that substantially affect the athletes' decision to return to sports following primary ACLR [14].

Considering the low rate of qualitative studies on athletes with ACLR, aiming to access in-depth data, the utilization of the qualitative method would allow us to collect the appropriate and sufficient data to yield novel findings and achieve sound conclusions. The study's aim was to investigate ACL injury experience processes in athletes who had undergone isolated ACLR, reveal the clinically related milestones, and highlight the necessary gaps.

### Materials and methods

#### Ethics

The ethical approval for the study was provided by the Scientific Ethics Review Board of Çukurova University (Approval number: 136-61-230901). Participants were given written information about the study's purpose and procedures, and detailed verbal explanations were provided before each interview. Participants were fully informed about their rights and told they could withdraw from the study anytime. All participants signed the informed consent forms. The patients' rights rules of the Declaration of Helsinki were followed.

#### Research design, setting, and participants

The study followed a qualitative research design within the interpretive paradigm, utilizing the words, phrases, and sentences derived from the participant's perspective to explain the problem comprehensively, assuming that reality is subjective and socially constructed, and assessed the participants' self-reflections on their experiences [15]. In this study, semi-structured interview techniques, in-depth follow-up questions, and thematic analysis were used to explore the experiences and psychosocial processes of participants with isolated ACL injuries 1–3 years after surgical treatment. We used a thematic analysis checklist to ensure the reliability of the thematic analysis [16]. The Consolidated Criteria for Reporting of Qualitative Research (COREQ) guidelines were followed [17].

The study was conducted in the Orthopaedics and Traumatology outpatient clinic of the Adana City Training and Research Hospital and included 14 male patients who had undergone isolated ACLR. Participants were assigned to the study by two orthopedics and traumatology surgeons on the research team (MU and MYG), and purposive sampling was used to recruit the patients willing to express their experiences of isolated ACL injury and treatment.

The inclusion criteria were as follows: adult males actively engaged in sports and classified as level six or more in the Tegner activity scale before the isolated ACL injury, having undergone isolated primary ACLR performed within 1–3 years, having outpatient follow-up data for at least one year after surgery, and with no lower extremity injury requiring surgery during the follow-up.

The authors agreed to include only male participants in order to maximize the accuracy of the findings. Since the physiological, psychological, and social factors involved in the ACLR process vary greatly between the genders, the results and the debate about the findings might yield more unbiased conclusions by including only male athletes.

Exclusion criteria included non-communicable chronic diseases involving diabetes mellitus, hypertension, organ failures, obesity, psychiatric conditions related to sports activity and additional metabolic conditions, having lower extremity disorders such as genu valgus, genu varus, and pes planus, cases undergoing meniscal lesion repair and ACLR surgery in the same surgical session, and files missing follow-up records. There were 67 patients who met the criteria in the hospital medical records database. All potential participants were invited to the study by SMS and e-mail. The number of patients who responded to the invitation for participation was 19. The sample size was determined according to the point at which saturation of the qualitative data occurred [18, 19]. The saturation point was the number of interviews at which new themes were no longer discovered, and the same discourses began to be repeated. We agreed that saturation was reached at the end of the 12th interview, based on the consensus of our research team and peer debriefing. The following two additional interviews were then completed to test the accuracy of the saturation point, indicating that no new themes had emerged [20]. Fourteen athletes were interviewed to complete the interview phase.

#### Data collection and analysis

The demographic information of the study group and the first interviews were collected in the first week starting from September 1, 2023. The second interviews, which included a member checking process, were conducted in the third week of September 2023. All interviews in the first and third weeks were conducted in a quiet room using a digital voice recorder, which was later transcribed.

All interviews were conducted in Turkish. After the study was written, a professional translator translated

the participants' quotes and opinions into English. The resulting English text was translated back into Turkish by another translator. The new text, translated from English back to Turkish, was compared with the quotes in the original Turkish transcripts. The members of the research team and the translators all agreed on the accuracy of the English texts in the final paper.

The first (MYG), the third (MCB), the fourth (MU), and the eighth (EU) authors developed an interview guide (Appendix 1) exclusively for this study after discussions and screening of the literature regarding the subject. A draft of the items was then sent for affirmation to the second author (FÇ), also seasoned in qualitative research. The process was repeated until an agreement was reached among all the authors.

A semi-structured interview technique was used in the first interviews, and face-to-face in-depth interviews were conducted by EU, a research team member with previous training and experience in qualitative research and interviewing.

The main focus of the questions was to reveal the participants' experiences at the time of injury and during ACL surgery, their rehabilitation processes, and their experiences of returning to daily life in a psychosocial context. During the interviews, the interviewer encouraged the participants to talk freely about their experiences without interference and noted their non-verbal body language. The interviews lasted between 25 and 65 min. All audio recordings obtained from the first interviews were transcribed separately.

For each participant, general views and important points in their transcripts obtained from the first interviews were marked and prepared for the second interview, including the member-checking process. Then, second interviews were conducted with each participant, in which the member-checking process was performed. In member-checking, the transcript content obtained from the participants' first interview was presented to participants, and the accuracy of the content in their first interview was confirmed. During the member-checking process, the correction suggestions regarding the statements in the first transcript were noted by the participants on the second interview form (Appendix 2). All transcripts were prepared for qualitative analysis at the end of these processes.

Using these transcripts prepared for analysis, a word cloud was created to emphasize the intensity of the statements that the patients focused on (Fig. 1). In the first stage of the analysis process, the interview transcripts were read and cross-checked at least twice by the coders in the research team (M.T. and F.Ç., who have over ten years of experience in qualitative research). In order to reveal the verbal meaning in the interviews, the words, sentences, and paragraphs considered as contextual



Fig. 1 The word cloud was constructed using interview transcripts

units were examined in detail. Using Saldaña's The Coding Manual [21], the coders conducted a structured coding process independently, then discussed and synthesized their codes with each other to create a standard codebook. The coders then independently re-examined the codebook, which they synthesized together, and reapplied the codebook to all transcripts, focusing on identifying all quotes not covered by the existing codes. The edited codebook was then evaluated by EU (an academic with 21 years of experience in the field of Sport and Health Sciences and gualitative research). In the second stage of data analysis, the categorization and thematization phase was conducted using the agreed codes. The coders created the main themes and subthemes freely and independently of each other. The coders then came together and organized the main and subthemes they created, and this theming was sent to ÖB (an academic with 11 years of qualitative research experience) for secondary peer review. Then, MT, FÇ, EU, and ÖB came together, and a full agreement was reached on the main themes and subthemes.

#### Results

Fourteen athletes, with a mean age of  $22.78\pm3.76$  years, participated in this study. Table 1 presents the demographic characteristics of the participants.

A word cloud was created to highlight the intensity of the patients' statements from the interview transcripts (Fig. 1).

After the coding and thematization phase, four themes emerged: 'The Distinctions in the Participants' Experiences Regarding the Moment of Injury,' 'Gathering Information about the ACL Injury,' 'Factors That Facilitate The Treatment Process and Reinforce Positive Experiences,' and 'Desperate Plight: Main Points of Patients' Negative Experiences.' The frequency data of the themes and subthemes of the study participants are presented in Table 2.

## The Distinctions in the Participants' Experiences Regarding the Moment of Injury

In our study, participants reported varying degrees of variation in how they experienced common symptoms such as popping sound, immediate pain, and limitation of ambulation at the time of injury and immediately thereafter. The athletes in the study reported extreme physical and psychological distress in addition to much lower levels.

#### Differences in perceived injury severity and functionality

ACL injuries are often accompanied by a frightening popping sound, as well as severe pain that prevents the patient from walking. In the study, patients described a frightening pop, severe pain, and loss of function in the

Participant Number	Age (Years)	Height (m)	Weight (kg)	BMI (kg/m²)	Type of Sports Activity	Socioeconomic Status
1	22	1.95	84	22.09	Football, Fitness	Low
2	22	1.86	84	24.28	Football	Low
3	23	1.74	95	31.38	Football, Fitness	Medium
4	18	1.88	78	22.07	Football	High
5	18	1.80	64	19.75	Football	Medium
6	20	1.82	75	22.64	Football	High
7	22	1.85	68	19.87	Football	Low
8	25	1.90	92	25.48	Tennis, Basketball	Medium
9	33	1.68	70	24.80	Football, Swimming	Medium
10	22	1.86	90	26.01	Football	Medium
11	21	1.83	77	22.99	Football, Fitness	High
12	26	1.79	73	22.78	Football, Tennis	Medium
13	22	1,81	87	26.56	Football	High
14	25	1,77	80	25.54	Football	High

#### **Table 1** Demographic characteristics of participants (n = 14)

**Table 2** Themes and subthemes related to the experiences of patients undergoing isolated anterior cruciate ligament reconstruction surgery

Themes	Subthemes	Frequencies (Participant)	Participant Number
The Distinctions in the	Differences in Perceived Injury Severity and Functionality	14	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14
Participants' Experiences Regarding the Moment of Injury	Psychological Differences Regarding the Moment of Injury	14	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14
Gathering Information	Visits to Different Doctors	9	2, 4, 5, 6, 8, 9, 10, 12, 13
about the ACL Injury	Internet Research	11	2, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14
	Feedback from the Social Environment on Surgery Decision	10	4, 5, 6, 8, 9, 10, 11, 12, 13, 14
Factors That Facilitate	Surgery is My Salvation	6	2, 6, 8, 9, 13, 14
The Treatment Process and Reinforce Positive Experiences	Strong Will	10	1, 2, 4, 5, 7, 8, 9, 10, 11, 12
	The Role of Surgeons	12	1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13
	The Role of Physiotherapists	9	1, 2, 3, 4, 5, 6, 7, 9, 11,
	Family and Social Network Support	14	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14
Desperate Plight: Main Points of Patients' Negative Experiences	<ul> <li>Anxiety and fear regarding the success of the surgery</li> </ul>	10	1, 4, 5, 6, 7, 9, 11, 12, 13, 14
	Fear of Reinjury	11	1, 2, 3, 5, 6, 8, 9, 10, 11, 12, 14
	Dissatisfaction with doctors	7	5, 6, 7, 9, 11, 13, 14
	Dissatisfaction with Physiotherapy	6	1, 8, 10, 12, 13, 14

knee at the time of the injury and reported that they were unable to stand up for a long time due to severe pain immediately after the injury. They noted that they were sent directly to the hospital after receiving first aid.

"I was very afraid of the sound my knee made when it turned. When I tried to stand up, I fell again and realized that it was a serious situation ... It was almost impossible to move ... I was sent to the hospital before the game was over." (participant 3).

"I felt such a loud noise and pain that I thought a gun was fired... I fell to the ground and writhed in great pain ... When I tried to move my knee to understand the seriousness of the situation, I remember very clearly that I almost fainted from the intensity of the pain ... I think the only thing I wanted at that moment was to go to the hospital immediately and have my knee anesthetized." (participant 13).

In contrast, there were participants reporting more optimistic thoughts and feelings about the severity of their trauma immediately after the injury, believing that they had a less severe injury, such as a meniscus tear. They reported being able to walk or continue their activities for a short period of time because of this perception difference.

"It never occurred to me that it could be a cruciate ligament injury, and I thought it was a meniscus injury. .... I could walk normally for 5 minutes after the injury." (participant 4). "The injury happened while I was playing football. I heard a loud noise, and it hurt a little, but I couldn't make sense of it in the heat of the moment. There wasn't much pain ... there were about 5–10 minutes left in the match. I continued playing, but I didn't run much because my knee was so tender." (participant 5).

#### Psychological differences regarding the moment of injury

The results show that participants had different descriptions of their psychological state at the time of injury. Patients reported feeling negative psychological emotions such as fear, anxiety, and worry very intensely at the time of injury.

"The moment of injury was so bad that I don't want to remember it... the moment of injury was a terrible event where I thought everything was over. I had never experienced that a knee injury could cause such great pain before, so I was struck by great anxiety and fear due to the pain I felt." (participant 1).

"... I was really struck by great anxiety and fear due to the pain I felt. I felt like my knee was shattered like the gears of a machine breaking down... the moment of injury was like a terrible nightmare that I had to wake up from immediately." (participant 2).

The transcripts showed that some patients were in a relatively stronger psychological state in the face of the injury event. These patients reported being in a more psychologically stable state than those who described the moment of injury as terribly chaotic.

"I had pain in my knee; it was like a tearing sensation; I felt something was wrong... I remembered football players rolling for meters due to small impacts and laughed; I am strong, and such pain was not a big problem for me." (participant 10).

Of course, I felt pain at the moment of injury. It was not nice to feel that something was damaged in my knee, but every athlete knows that injuries hurt more or less, and it is in the nature of this sport. A good athlete is an athlete who can stay mentally strong even when things do not go well... From the beginning, I knew I had to keep it strong." (participant 11).

#### Gathering Information about the ACL Injury

Following the initial shock of the injury, participants reported seeking the advice of multiple medical professionals and conducting online research. Additionally, they indicated that they had consulted with their social networks to gather information about ACL injuries and the decision to undergo surgery.

#### Visits to Different Doctors

After the injury, patients were examined by more than one doctor and received information about the ACLR surgery and treatment process during these visits. Lack of trust in the doctors, the need to confirm the necessity of surgery, and the effort to find the best doctor were reported as the main reasons for visiting different doctors.

"Let me put it this way: I went to three different doctors before I went to my surgeon. Those doctors did not give me confidence. "I couldn't feel trust." (participant 2).

"I went to four different doctors. because I needed to find the best doctor for a smooth recovery ... All the doctors said I needed surgery. I finally decided on the surgeon who performed my surgery. I thought he was more experienced." (participant 9).

#### Internet research

Participants reported that they often gathered information about their treatment processes using internet resources such as Facebook ACL injury groups in addition to YouTube and Instagram content, which was commonly shared by doctors and patients regarding ACLR and its treatment. Research on surgery and physical therapy processes has been conducted mostly by watching videos on the subject.

"There was a group on Facebook for ACL injury patients. I joined that group. I watched videos about the surgery." (participant 9).

"After I was diagnosed, I did a lot of research about this injury. I looked at doctors' posts and patients' experiences on Instagram. I also watched videos of the surgery on YouTube." (participant 14).

#### Feedback from the social environment on surgery decision

People with ACL injuries were another source of information for participants within their social networks. Injured athletes received information about the process from relatives, friends, and peers who had previously undergone ACL surgery. The participants' statements indicate that they received very different suggestions from their social environment, especially regarding the decision to undergo surgery. While some patients received very encouraging feedback from their peers about having surgery, especially regarding return to sport and full recovery, others were advised not to have surgery at all.

"I met with a friend of mine who had undergone surgery before. He was very helpful in terms of information. That friend of mine explained how all the processes related to surgery and treatment worked ... He explained that I could not continue sports with ruptured knee ligaments and encouraged me to have surgery." (participant 8).

It was observed that patients who had acquaintances in their social networks who had negative experiences with ACL surgery were advised not to undergo surgery for different reasons, such as the difficulty of surgery, risks of not recovering, and difficulties in returning to sports.

"I didn't want to have the operation. ... I had some friends who played at the club. They told me not to have an operation; It is very difficult to have an operation. For example, my other friends also had surgery. They have problems with their knees. For example, when they sit down, the knee goes forward. I think the repair was not done correctly. When I heard this, I became anxious. "I was worried if my knee would slip too." (participant 9).

## Factors That Facilitate the Treatment Process and Reinforce Positive Experiences

The fact that patients know that ACL injury is a ligament tear has helped them understand that they cannot continue sports without a ligament repair process. Such understanding has reinforced the patients' thoughts about seeing surgery as a way out. The perception of surgery as salvation, strong will, positive approaches from the surgeon in the process, positive contributions from physiotherapists to the recovery process, and positive contributions from the patient's relatives and social networks are the focal points of the factors that facilitate the treatment process and reinforce positive experiences.

#### Surgery is my salvation

Participants with high financial expectations from sports described the surgery as a positive start to overcoming the difficult situation they were in. These patients reported that they felt peaceful rather than anxious or fearful about undergoing surgery. They also emphasized the increasing competition in sports and stated that they would inevitably lose their financial earnings if they did not fully recover. "I accepted the surgery immediately because I needed it. I thought that this disease could not be treated in any other way ... when I saw the animations and videos on the internet, I understood that this was the only salvation because it was clear that it was impossible to continue sports without repairing a torn ligament." (participant 6).

"I was relieved after the surgery because theoretically, I was free from the injury, but at least now I said, "OK!" I had the surgery done. From that moment on, I said I needed to adapt myself for recovery ... it was impossible for me to reach my old performance without surgery, and I would not continue to earn money without a full recovery in a sports branch where competition has increased so much." (participant 8).

#### Strong will

Participants talked about strong personality traits such as self-confidence, powerful coping mechanisms, and mental resilience to overcome difficulties at the time of injury and during the treatment process, underlining the importance of having a strong will. Besides, it was observed that participants who had experienced more severe traumas in their lives displayed a stronger will to overcome problems related to the injury.

"I am cool-headed. I don't panic easily ... I didn't have any serious trauma or psychological trauma related to the injury ... I didn't feel any psychological pressure on me. I had lost my mother and father in a traffic accident a few years ago; how much could a reconstructed knee ligament destroy me... Of course, I didn't go through the process laughing, but the previous pain must have strengthened me because I didn't experience any major psychological problems." (participant 7).

"I am an athlete who tries to keep my self-confidence high ... I was not the only athlete in the world who was injured; I thought it was pointless to mourn for this; I had to be strong and continue on my way ... I chose to fight instead of running away from all the problems I encountered in life, this is a power in my soul ... postoperative pain and pain in physical therapy were difficulties I overcame by strong will." (participant 11).

#### The role of surgeons

The results showed that the surgeon played an important role in the positive experiences of ACL injury patients. Providing detailed information about the treatment process, caring for the patient during the treatment stages, and being available to the surgeon, especially after the surgery, were the main components explaining the positive role of surgeons. In addition, it was seen that a surgeon who encouraged the patients, provided psychological support, and successfully performed the surgery was then called a good surgeon.

"From the first moment we talked to the doctor, he gave me confidence. He informed me about the surgery and the few days after the surgery. A few days later, he informed me about physiotherapy. The surgeon informed me about the next six months. He told me when I would return to my old self." (participant 3).

"If I remember correctly, I met with five different doctors to decide on surgery. The doctor who performed my surgery was the sixth doctor. He had eliminated all the shortcomings of the doctors I had visited before. ... One of the basic criteria for me was being able to reach my doctor when necessary. He supported me psychologically during all the processes before and after the surgery, and I always received satisfactory answers to all the questions I asked ... (participant 12).

#### The role of physiotherapists

Patients reported that successful physical therapy in the postoperative period was one of their positive experiences in the process. The empathic approach of the physiotherapists and their psychological support to the patient formed the basis of patient satisfaction. In addition, the patients also reported that the physiotherapists' experience and consideration of the patient's feedback, especially during painful processes, made them feel good during the recovery process.

"My physiotherapist was experienced in treating patients with ACL injuries before ... he would chat with me during the physiotherapy sessions, and this made me feel very comfortable ... of course, there would be no physiotherapy without pain, but I think I was one of the luckiest patients in the hospital who suffered the least ... I recommended him to other friends who had injuries because of my satisfaction." (participant 5).

"I was quite scared of the physiotherapy process in some videos I watched on the internet, but my physiotherapist gave me a lot of psychological support before and during the physiotherapy ... I had heard that some physiotherapists are insensitive to the patient's pain, so I was a little scared, but he treated me very well with an empathetic approach, and I can say that he was the main actor in my process of returning to sports." (participant 14).

#### Family and social network support

There was also a strong connection between the participants' positive experiences and the physical, psychological, and social support they received from their families and social networks. In particular, single participants emphasized that their family members, especially their mothers, played an important role in overcoming the difficulties in the treatment process. Participants highlighted the importance of the support they received from their family members during the surgery and the physical therapy process. The doctor informing the family was also reported as another positive experience.

"Psychologically, my family was very supportive. My friends also supported me. My doctor trusted me, and I had nothing to worry about ... my doctor gave a lot of information to my family in the hospital, and this information made it easier for my family to help me ..." (participant 2).

"My mother was always with me, and my brother constantly transported me to the hospital. They were very interested during the physiotherapy period. My other brothers and sisters were also very interested in the operation and the following process and supported me." (participant 3).

## Desperate Plight: Main Points of Patients' Negative Experiences

Negative experiences that caused the athletes to feel helpless related to the ACLR treatment process were concentrated on dissatisfaction with doctors, problems originating from physiotherapists, anxiety and fear regarding the success of the surgery, and fear of re-injury, in general, were the negative factors.

#### Anxiety and fear regarding the success of the surgery

It was observed that patients mentioned negative psychological feelings such as fear, anxiety, and uncertainty regarding the success of the surgery. These negative psychological feelings were seen based on concerns about returning to sports. In particular, participants who had people with unsuccessful ACL injury experiences in their social circles and ones negatively affected by the results of internet research were more anxious and reluctant to undergo surgery. "I was very anxious. I was thinking about my current transfer (contract with a new club). At the same time, I was worried about how my surgery would go. I was worried about how my career would progress since I could not play football for a long time. Many people said that I would not be able to return to football." (participant 4).

"The possibility that this surgery could cost me my sports career was a nightmare for me every night from the moment of the injury until the day of the surgery. Maybe because of the videos I watched, I was very afraid that the surgery would fail... Despite knowing the stories of athletes who had terrible surgeries, I desperately had to undergo the surgery." (participant 14).

#### Fear of reinjury

Participants reported varying levels of fear of re-injury due to physical sensations and psychosomatic reactions. It was observed that the pain felt while playing sports triggered the fear of re-injury. Situations that reminded them of the injury caused the athlete to recall the difficult experiences he had during the treatment process and increased his fear of re-injury. Another notable finding was that athletes could not eliminate their fear of re-injury even when doing less risky activities and just watching the sporting activity from the outside.

"I went to the mini football court again. I slipped while playing. I felt pain. It felt like a warning. Of course, I was scared. I was afraid that my knee might break again." (participant 1).

"Even in sporting activities that involve less risk of injury, I can't get rid of my fear of re-injury ... The same scene again and again and again the operation scenes, again and again! Those situations were difficult. Suffering the same injury again would be a psychologically devastating experience." (participant 3).

"I'm coaching now. Even when a player runs or makes a sudden movement, I get chills inside. "As soon as my athlete falls to the ground, my injury immediately comes to my mind, and I am afraid that he/she will get injured." (participant 6).

#### Dissatisfaction with doctors

Dissatisfaction with surgeons was characterized by not receiving enough trust from the different doctors visited. In addition, poor information about the surgery, patients hearing voices and dialogues during the surgery, and the resulting anxiety and fears regarding the surgery (possibility of a revision surgery) were the focal points of dissatisfaction with the surgeon.

"Why did I have to go to so many doctors? ... they all said I had to have surgery, but giving the patient confidence is as important as performing the surgery, and since I could not trust them, I had to have the sixth doctor I visited to perform the surgery. It was annoying and painful to have so many doctor visits with a knee with torn ligaments." (participant 7).

"I don't think the doctor who performed my surgery informed me enough. I don't know how it happened during the surgery, but I woke up during the operation. I still remember the moments of the operation. There was a screen across the operating room. The operation team was watching the inside of my knee on the screen. Would I want to be operated again right now? I think I would not have surgery again because I am very afraid of surgery." (participant 11).

#### Dissatisfaction with physiotherapy

Participants who reported dissatisfaction with physiotherapy received a second course because they felt they had not achieved sufficient improvement despite completing the recommended physiotherapy course. The focus of the patients' negative experiences regarding the physiotherapy process was their concerns about the poor knowledge and experience of the physiotherapy team, their lack of an empathic approach, and the physiotherapists' ignoring the complaints about the pain.

"The physiotherapy team and the center were terrible; they seemed to have learned physiotherapy techniques by watching a few movies rather than through medical training... they almost ignored all my complaints and ignored my warnings about pain. Because of them, I could not walk properly for almost two months ... it was awful to have to look for a new physiotherapist." (participant 10).

"The physiotherapist's approach in physiotherapy affected me badly psychologically. The fact that they pushed my knee too much from the first day had a bad effect on me. I developed swelling in my foot again." (participant 12). In this study, the statements of male athletes regarding their experiences at the time of ACL injury and their experiences regarding the process after ligament reconstruction surgery were explored and summarized. The analysis of the statements revealed four main themes: 'The Distinctions in the Participants' Experiences Regarding the Moment of Injury,' 'Gathering Information about the ACL Injury,' 'Factors That Facilitate The Treatment Process and Reinforce Positive Experiences,' and 'Desperate Plight: Main Points of Patients' Negative Experiences.'

The participants' expressions about physical complaints in our study were in parallel with the literature indicating that "popping sound at the time of injury," "effusion," "pain," "giving out," and "no ability to continue activity" were reported as common findings of ACL injuries [22]. Nevertheless, the few lower-intensity pain expressions at the moment of injury and resuming activity or walking following the injury were noteworthy. The distinct perception of a similar injury was reported in other studies and linked to recovery progress. Although the continuation of physical activity after an ACL rupture increases the risk of causing additional complications, interestingly, athletes with positive psychological traits who define the moment of injury using less agitated and anxious words and expressions and prone to continue the physical activity following an injury, were linked to higher and quicker recovery rates [23, 24].

Most patients were examined by more than one doctor before taking action for surgery. Similar findings were observed in other studies highlighting that inadequate or misdiagnoses were common, stating that approximately 30% of the athletes were diagnosed correctly [25, 26]. The risk of increasing the severity of the physical and psychological trauma of the injured athlete may rise as the diagnosis of the injury is delayed.

The study participants, similar to the reports, expressed that they have gathered information about ACL injury from YouTube videos, Instagram content, and Facebook ACL injury groups [27]. Studies have assessed the reliability of publicly available websites and reported that many of these websites lacked high-quality and accurate medical information [28, 29]. Inaccurate information could have caused an injured athlete to take a different course of treatment and compromised the treatment process. In parallel, in their systematic review, Schwarz et al. analyzed the medical information on the Internet for safety and accuracy and emphasized that despite the growing awareness and popularity of using the Internet for health purposes, the low medical literacy of the general public about the reliability of sources proposes a great risk in leading to treatment delays and adverse health outcomes [29].

The feedback from the social environment regarding the decision to undergo surgery content in our study varied greatly. The studies indicate that although the patients comparing themselves with their peers who had ACL injuries were reported to develop negative opinions, hearing about positive experiences of ACL injuries from more experienced athletes they took as role models contributed positively to their recovery process [30, 31].

Our findings indicate that athletes with higher financial expectations from sports described undergoing surgery as a positive start to overcoming this difficult situation. In recent studies, it has been observed that participants with professional and financial expectations from sports defined surgery as a way to overcome the current difficult situation, unlike the general patient approach. These patients reported feeling a sense of peace more intensely than the fear and anxiety associated with surgery [31, 32]. Regarding surgery, early treatment is the gold standard for restoring knee stability, preventing further meniscal and cartilage damage, and shortening the time to return to active sports [33–35]. Besides, one of the recent studies states that conservative treatments yield similar improved results to surgical modalities [4]. Regardless of the method, in the management of physically and psychologically traumatized athletes, beginning the treatment of ACL as soon as possible is important, and in the process of choosing the appropriate treatment method, the closest contact people, in particular the coaching staff, have significant roles to play.

High psychological resilience helps the individual overcome the stress and the pressure of daily life, recover from traumas, set realistic and achievable goals, and establish healthy relationships with his or her environment [36]. In our study, athletes with strong personality traits and who showed strong will against the injury and the difficulties of the treatment expressed more positive attitudes about the injury, ACLR surgery, and the treatment period. Various reports indicate that seasoned athletes were highly motivated to recover from injuries, including ACL ruptures [2]. Moreover, Everhart et al. reported that internal motives were predictive of ACLR surgery results [23]. Therefore, the assessment of the psychological stamina of athletes with ACLR injuries will reveal the ones in need of psychological support and facilitate the required recovery.

Our study showed that the operating surgeon is one of the crucial determinants in the course of ACL injury, including the subfactors of "providing detailed information about the treatment process," "taking care of the patient during the treatment stages," and "easy accessibility to the surgeon, especially after surgery." Chapon et al. stated that although the selection criteria for the physician who will perform ACLR surgery are not fully described, the possible reason for choosing a particular physician was the quality of the verbal information provided by the physician during the consultation. The sense of trust lies at the heart of the agreement between surgeon and patient. The quality of verbal information given during consultation motivated the final choice more than the rankings of the physician or the hospital rated by social media or the press [37].

Regarding physical therapy, our participants reported that successful sessions were one of their positive experiences in the postoperative period. The importance of the quality of the physiotherapy service was highlighted in the participants' reports. Similarly, Lisse et al. stated that in patients treated by more seasoned physiotherapists, the patient motivation levels were increased, and the pace of progress was reported as good [31]. The patients' difficult conditions, including pain and negative psychological states that occur at the beginning of the rehabilitation process, were reported to be overcome relatively more easily when managed by more experienced physiotherapists [38]. Moreover, recent studies show that the majority of physiotherapists express low awareness regarding their roles in motivating ACLR cases during rehabilitation [39]. Including the missing but much-required roles discussed above in future physiotherapy guides designed for ACLR rehabilitation might help improve the quality of the delivery of care.

The participants expressed that their core daily life routines, including ambulation and restroom activities, have become more difficult. Similar to our findings, previous research indicates that family and friends greatly support overcoming such difficulties during the injury and treatment process [32]. However, the accompanying person may harm the joint by wrong moves or interventions, and in order to prevent the athletes from undesirable situations, written and visual materials involving specifics of care should be provided to the athlete and the caregivers.

Negative psychological feelings such as worry, anxiety, fear, and uncertainty were observed in most of the patients. In some studies, it has been reported that the fear of surgery was intense enough to cause the decision to cancel the surgery. Petrone et al. found that most orthopedic surgery cancellations are patient-related; socioeconomic concerns, fear of surgery, economic burden, and concerns about the post-operative recovery process were among the most common reasons [40].

The participants in our study reported different levels of fear of re-injury. The expressions of fear of re-injury while doing less risky activities, when mild pain was felt while playing sports and even while watching sports activities, were noteworthy. Previous studies examining re-injury after ACL surgery state that the fear of reinjury appears to be multifaceted and complex [41]. The exact construct underpinning this reaction seems to be underexplored, with only a few qualitative studies having reported emotional reactions [42, 43]. Issues such as the nature of the sport as a risk of re-injury, the urge to avoid the next surgery, not wanting to go through another long rehabilitation period, social considerations such as reprioritization of sporting commitment or loss of income, and concerns over a decline in sporting competency were the factors contributing to the fear.

Quantitative studies on re-injury rates of patients undergoing ACLR showed that ACLR cases had a higher risk of re-injury than ones who have never been injured [44, 45]. Mir et al. stated that high levels of re-injury anxiety before and after ACLR surgery increased the risk of future contralateral ACL injury [46]. Ensuring that the people who would take part in the process of managing the condition following the declaration of the ACL rupture diagnosis to the athlete are aware of the importance of mental support concerning the fear of re-injury should facilitate the treatment and the recovery process.

The participants stated that the primary issues regarding multiple doctor visits were due to inexperience, uninformative, and vague statements expressed by the previous doctors, which prevented the establishment of trust. In parallel, studies reported the incidences of multiple visits to the physicians for the diagnosis of an ACL rupture and highlighted that the diagnosis was often delayed [25, 26]. Moreover, the expressions of the participants underlining the unpleasant auditory factors, including the sound made by the surgical tools and the dialogues of the staff, contributed to the negative psychological outcome. The use of additional apparatus, such as ear plugs or headphones with music playing, may block the discomforting audio developed during the surgery and help the patient get through the surgery process with less psychological trauma.

The quality of the physiotherapy service was highlighted in the participants' reports. The athletes stated that they could not achieve sufficient improvement despite completing the recommended physiotherapy process and chose to receive secondary treatment from a different physiotherapy center. In parallel with the literature, the causes of dissatisfaction were mainly unsuccessful treatment outcomes, insufficient information about the treatment, and the negative attitude of the physiotherapist [47, 48]. The communication between the patient and the physiotherapist is crucial for optimal treatment, and it is mainly the responsibility of the latter to provide perspective-taking and empathic concern, as highlighted in a novel study by Rodríguez-Nogueira et al., which suggested that the utilization of both dimensions assist effective shared-decision making, an important treatment goal [49].

Finally, additional troublesome physiotherapy processes were reported in our study, underlining the transportation difficulties. Physiotherapy at home or virtual reality-assisted therapy could provide the required improvement in a more convenient and accessible setting [50, 51]. Furthermore, Wang et al. emphasized that multicomponent supervised telerehabilitation can accelerate recovery after ACLR compared to traditional home-based self-rehabilitation and is more successful in terms of pain relief, range of motion, muscle strength, and function [52].

#### Limitations

Firstly, all participants were male active sportsmen, which presents the expressions of athletes of a single gender. Another important limitation was that the study involved participants from the same geographic region. Such grouping might blur the overall interpretation of the findings for other sports people living in different regions of the globe. Besides, our study included only athletes with isolated ACLR; the perspectives of ones with accompanying trauma are missing. Moreover, the participants involved in the study had up to three years of history of injury, and the long period may have caused a lack of complete recall of events in detail. Finally, the distribution of the types of sports was not homogenous. Overall, the study results have limited transferability and require careful interpretation.

#### Conclusions

The study aimed to present the experiences and expressions of male athletes who had undergone isolated ACL surgery beginning from the moment of injury. Our study revealed that varying perceptions of ACL injury presented by the participants, which were caused by all stakeholders, including themselves, the professional environment, social network, and the healthcare staff, showed that the physical and psychological impacts of the injury were observed in different severity levels at each stage of the process. Currently, there seems to be a lack of comprehensive guidelines that attend to critical steps and subjects, from injury to return to sports. Besides, a guideline aiming to bring the athlete back to the field as soon as possible and addressing all the major phases of the process, which includes the medical and mental instructions and warnings for the injured, the professional environment, social network, and the healthcare staff would be incomplete if it were based on solely quantitative data. Therefore, we believe that an extensive guide for athletes with ACL injuries that includes all components of well-being and displays the required details for the sports club/coach, family/companion, physician/surgeon, physiotherapist, hospital, and local health services might improve the recovery process.

#### Supplementary Information

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Supplementary Material 1

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Not applicable.

#### Author contributions

All authors contributed to the design of the study. MYG, MCB, MU, and EU designed the interview guide, conducted the analyses of the data, and in the drafting of the manuscript. EU conducted and transcribed the interviews. All authors contributed to the revision of the manuscript.

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#### Data availability

The data supporting this study's findings are available from the FÇ, EU, and MYG upon request.

#### Declarations

#### Ethics approval and consent to participate

The ethical approval for the study was provided by the Scientific Ethics Review Board of Çukurova University (Approval number: 136-61-230901). Participants were given written information about the study's purpose and procedures, and detailed verbal explanations were provided before each interview. Participants were fully informed about their rights and told they could withdraw from the study anytime. All participants signed the informed consent forms. The patients' rights rules of the Declaration of Helsinki were followed.

#### **Consent for publication**

Not applicable.

#### **Competing interests**

The authors declare no competing interests.

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