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'Going through the motions'; a rich account of the complexity of the anterior cruciate ligament reconstruction pathway, a UK qualitative study

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ABSTRACT

Objectives This study aimed to understand the lived experiences of patients on the anterior cruciate ligament reconstruction (ACLR) pathway up to 3 months before, 3 months after and 1 year after surgery. Study objectives were to explore (1) patient experiences of preoperative and postoperative treatment, (2) views of/involvement in prehabilitation and (3) sources and consistency of healthcare advice.

Design Semi-structured interviews analysed using reflexive thematic analysis.

Setting Midlands, England.

Participants Purposive sample of 18 participants aged 18–45. Three identified as female and 15 as male. Participants' ethnic origin was white (n=14), Indian (n=2), British Asian (n=1) and Pakistani (n=1). 10 participants were awaiting ACLR, six were 3months postsurgery and two were 1 year postsurgery.

Results Participants gave a rich account of ACLR pathway experiences discussing negative impacts of the injury, difficulties with navigating the pathway and making decisions about surgery. Interacting with healthcare professionals and managing the variety of resources, advice and opinions were also highlighted as challenges. Participants reflected on their preoperative journey accounting a wide spectrum of expectations and realities of returning to work and physical activity postoperatively. Prehabilitation was perceived to offer an advantage to recovery, mental well-being, injury knowledge, postoperative rehabilitation and supports a faster return to physical activity. Five themes were identified:

1. Injury experience, impact and support.
2. Navigating the treatment pathway.
3. Sense making in the preoperative period.
4. Uncertainty, expectations and reality of the postsurgical period.
5. Balancing resources, advice and opinions.

Conclusion This study has illuminated patient experiences of the National Health Service (NHS) ACLR pathway, novel to the evidence base.
The results highlight the perceived shortcomings in patient support. They also demonstrate the difficulty patients face when navigating the NHS system, communicating with clinicians, making decisions about treatment and managing conflicting sources of healthcare advice. These problems are more prominent than previously recognised in the literature.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ In terms of strengths, this qualitative interview study gives voice to the experiences of adults who have had or are awaiting anterior cruciate ligament reconstruction in the National Health Service (NHS) in England. The reflexive thematic analysis approach facilitated rich engagement with the data to produce detailed accounts of participant experiences.
⇒ A further strength of the study was the collaboration with the trial steering committee, including patients and stakeholders, during data analysis.
⇒ With regard to limitations, the interview medium varied across participants (face-to-face or virtual) which may have resulted in differing relationships between the participant and researcher which may have impacted on interview data.
⇒ There were a greater number of participants at the preoperative time point which is likely to have resulted in a greater richness of data regarding the preoperative pathway than that of the postoperative pathway (particularly at the 1-year time point where only two participants were interviewed).
⇒ The study population were treated within hospitals in one region of the UK (Midlands), and while it is not the aim of qualitative research to be generalisable, these findings may not represent the experiences of those treated in other UK regions and outside of an NHS setting.

Registration ClinicalTrials.gov Identifier: NCT05529511.

INTRODUCTION

The median annual incidence of anterior cruciate ligament (ACL) rupture in the general population is 0.03%, equating to approximately 20 200 ruptures each year in the UK.[1] Once diagnosed, treatment may follow a non-surgical or surgical approach. Surgery rates for ACL injuries increased 12-fold in the UK between 1997 and 2017, with a rate of 24.2 ACL reconstructions (ACLR) per 100 000 of the population.[2] Rehabilitation prior to surgery is recommended;[3]

however, guidance supporting clinicians in delivering evidence-based practice is limited and thus clinical practice varies widely.[4] Rehabilitation is also completed postsurgery, although the breadth of research in this area is vast and protocols are consistently reported to be heterogeneous with no consensus on the most clinically effective approach.[5 6]

Patient-centred care is a core ethos of the National Health Service (NHS), outlined in the long-term plan as a key deliverable.[7] Limited research exists to describe the patient experience of sustaining an ACL injury and navigating the ACLR pathway, and so our ability to deliver patient-centred care is suboptimal. To date, only quantitative measures collected from cohort studies have reported patients' preoperative expectations of return to sport (RTS) following ACLR.[8 9] Postoperative perspectives from 6 months to 10 years postsurgery have, however, been explored through semistructured interviews.[10–12] Collectively, these studies reveal that patients have unrealistic preoperative expectations of returning to physical activity postsurgery and are faced with a postoperative rehabilitation burden that requires an unexpected level of commitment, with participants describing a lack of mental preparation for the rehabilitation process that was longer and more intense than expected.[9 11 12] There is an absence of knowledge to understand participants' lived experience of this phenomena, particularly prior to surgical intervention. Further, there is a paucity of evidence to understand where patients seek healthcare advice following an ACL rupture diagnosis.

The aim of the study was to understand the patients' lived experiences of the treatment pathway following a diagnosis of an ACL rupture and agreed surgical management. Study objectives were (1) to explore lived experiences at preoperative and postoperative time points, (2) to explore patients' views and involvement in prehabilitation and (3) to understand patients' sources and consistency of healthcare advice prior to surgery.

METHOD

Reflexive thematic analysis was chosen to analyse the data, aligning to the lead researchers' philosophical underpinnings of pragmatism. The text offered by Braun and Clarke[13] was used to support analysis and the study reported in line with the COnsolidated criteria for REporting Qualitative research checklist (online supplemental file 1).[14]

RECRUITMENT

We sought to recruit approximately 12 patients at three separate time points (3 months prior to surgery, 3 months after surgery and 1 year after surgery), estimating that this would be sufficient to reach data saturation and mirrored similar research of musculoskeletal conditions.[15–18] We aimed to include a range of participant characteristics including age, sex, physical activity type and level and prehabilitation engagement (detailed in tables 1 and 2).

Table 1 Participant characteristics

Participant number	Sex	Time point on ACLR pathway	Prehabilitation (Y/N)	Average number of days physically active preinjury	Average number of days physically active at point of interview	Returned to preinjury activity level (Y/N)
001	M	3 months postoperative	N	4	4	N
002	M	Preoperative	Y	4	3	N
003	M	Preoperative	Y	3	1	N
004	F	Preoperative	Y	3	4	Y
005	M	Preoperative	Y	4	1	N
006	M	Preoperative	Y	4	2	N
007	M	Preoperative	Y	7	7	N
008	M	3 months postoperative	Y	6	7	N
009	M	Preoperative	Y	4	4	N
010	F	Preoperative	Y	3	1	N
011	M	3 months postoperative	N	5	5	N
012	M	3 months postoperative	N	4	4	N
013	M	Preoperative	Y	5	0	Y
014	M	Preoperative	Y	3	2	N
015	F	1 year	N	5	5	N
016	M	3 months postoperative	N	7	6	N
017	M	1 year	N	4	2	N
018	M	3 months postoperative	Y	6	3	N

Table 2 Activity types

Activity type	Number of participants engaging in the activity preinjury	Number of participants engaging in the activity at the time of interview
Badminton	1	
Basketball	1	
Cricket	3	
Cycling	1	1
Football	8	
Golf	1	1
Gym (cardiovascular and resistance training)	5	5
Hiking	1	
Indoor cycling	1	1
Judo	1	
Mountain biking	2	
Muscle strength training	7	7
Netball	2	
Road cycling		1
Rugby	3	
Running	3	3
Snowboarding	1	
Squash	1	
Swimming	4	1
Tennis	2	
Volleyball	1	
Wakeboarding	1	
Walking	2	5
Yoga		1

Participants were identified by the clinician in charge of their care and recruited from physiotherapy and orthopaedic waiting lists at the University Hospitals of Derby and Burton NHS Foundation Trust (UHDB). Orthopaedic waiting lists were screened for two lower limb consultants at UHDB and all outpatient musculoskeletal (MSK) physiotherapists working at the Florence Nightingale Community Hospital. All patients had received an MRI and had a consultation with an orthopaedic clinician to determine the extent of concomitant injuries. Clinicians were aware of the study eligibility criteria and highlighted all those appropriate for inclusion in the study. They were subsequently contacted by mail or telephone or introduced in person to the researcher (HC).

Eligibility criteria, shown in table 3, were prescreened by the identifying clinician and then checked prior to consent being gained for participation in the study (HC).

Table 3 Eligibility criteria

Inclusion	► ≥18 years old ► At one of the three identified time points (3 months prior to surgery, 3 months after surgery and 1 year after surgery)
Exclusion	► Concomitant injury requiring surgical intervention that is anticipated to significantly alter the postoperative rehabilitation protocol (eg, meniscal repair requiring a non-weight bearing period) ► Previous knee surgery to the affected limb ► Coexisting injuries requiring surgical intervention impacting on ability to participate in preoperative or postoperative rehabilitation ► Pregnant (as this would affect rehabilitation participation and surgical timings)

DATA COLLECTION

Participants were offered the choice of interview location and medium (face-to-face/telephone/video). Eight participants opted for a face-to-face interview conducted in a hospital setting, and the remainder opted for a telephone interview. Interviews were carried out between August and November 2022. Prior to each interview, the researcher (HC) introduced herself as a physiotherapist working at UHDB and as a researcher conducting a PhD at the University of Nottingham. Written consent was taken prior to the interview and recording.

Semistructured interviews were conducted using a topic guide (online supplemental file 2) developed using the literature, research team and patient and public involvement (PPI) input. The researcher maintained a reflexive journal to document the thoughts after each interview, in addition to revisiting initial interview recordings to review interview and questioning technique. This practice helped to identify areas where the researcher was hesitant to prompt for further clarification and supported deeper exploration of concepts in later interviews. It also acted as a basis for discussion during research group meetings and allowed for participant characteristics to be recognised ensuring recruitment was responsive to data collection.

DATA ANALYSIS

Audio files were transcribed by a third-party vendor. Transcriptions were reviewed against the audio recording by HC for accuracy and were read several times to support data immersion. Transcripts were coded by HC with code generation discussed among the research team. 75% of codes were generated by interview 6, and 100% were reached by interview 16, offering reassurance that no new codes were arising in the latter stages of recruitment.

The codes were organised into five themes, aligning with the research objectives. These themes and supporting extracts were discussed among the research team and were felt to offer a rich and clear insight of the data, individually representing an organising concept while

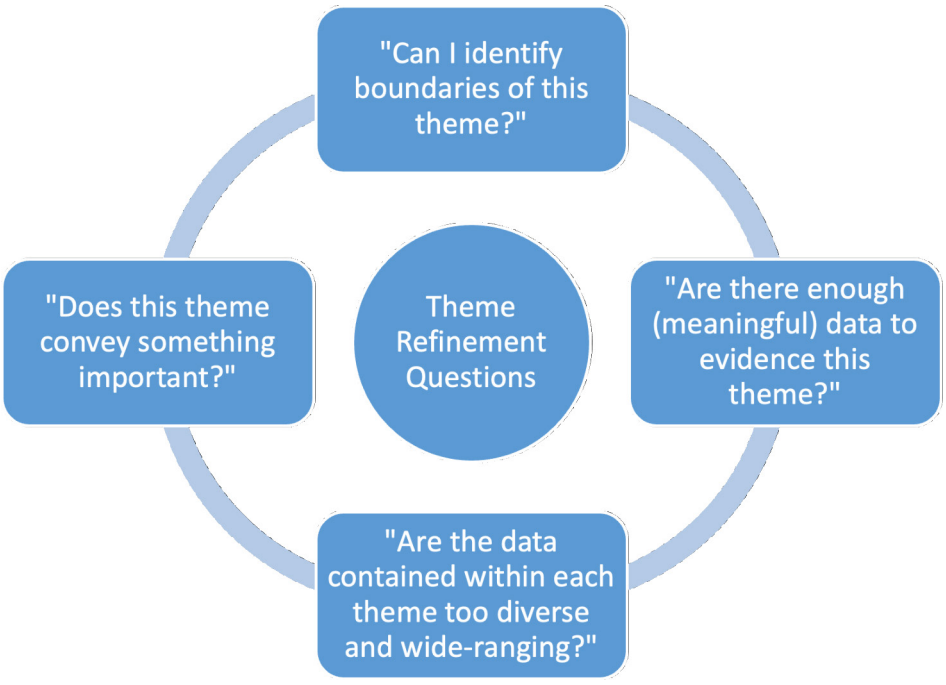

Figure 1 Braun and Clarke questions used to support theme refinement.

contributing to the narrative of other themes and thus the entire dataset. The questions, shown in figure 1, from Braun and Clarke were used to support the refinement of each theme.

Data were organised and coded in NVivo V.12. Themes were developed in Microsoft Excel (Microsoft, Redmon, Washington, USA). The codebook is shown in online supplemental file 3).

PATIENT AND PUBLIC INVOLVEMENT

The PPI group supported the design of the study, helping to identify priorities of inquiry.

FINDINGS

A purposive sample of 18 participants was recruited from physiotherapy and orthopaedic waiting and clinic lists at the University Hospitals of Derby and Burton NHS Foundation Trust. Some participants recruited from the orthopaedic waiting list received rehabilitation (pre and/or post) at another site. The sites at which they received rehabilitation varied across the Midlands and the detail regarding specific hospital departments was not collected. The study was discussed with 26 potential participants, four declined to participate and four did not respond after the initial discussion. Participant characteristics are shown in table 1.

Interview length was 25–51 min (mean: 38 min). Participants ranged from 18 to 45 years of age (median: 29 years), three identified as female (16.7%), with the remainder identifying as male (83.3%). Ethnic origin of participants was predominantly white (n=14, of which one participant also described themselves as Lithuanian), followed by Indian (n=2), British Asian (n=1) and Pakistani (n=1). 10 participants were awaiting ACLR, six were 3 months postsurgery and two were 1 year postsurgery. Injuries were sustained predominantly during a sporting activity (n=12), with the remainder occurring from a slip (n=2), landing from a jump (n=2), a motorcycle incident (n=1) and road traffic collision (n=1). All participants engaged in more than one activity type prior to injury, with 22 different types reported. Football was the most common activity (n=8), followed by attending the gym for muscle strength training alone (n=7) or cardiovascular and muscle strength training (n=5), swimming (n=4), rugby (n=3), running (n=3) and cricket (n=3). Other activity types are shown in table 2. The type of physical activity participants were engaged in at the time of the interview spanned a smaller variety, with muscle strength training the most commonly reported activity (n=7), followed by walking (n=5) and cardiovascular and muscle strength training at a gym (n=5). Activity types are shown in table 2. 12 participants engaged in prehabilitation (varied treatment length, type and frequency) at different sites across the midlands. The average number of days participants where physically active prior to injury was 4.5 days compared with 3.4 days at the time of the interview.

Five themes were identified from the interview data.

Theme 1: injury experience, impact and support

Half of the participants reported an intuitive response to injuring their knee. Explaining an instinctive sense of its seriousness, reporting:

> "I think immediately I sort of knew what I had done, even though I had never done it before" (P8)

Following injury, the route to diagnosis varied. Some described a seamless pathway where a direct referral was made from the emergency department (ED) to an acute knee clinic for specialist assessment and MRI. Others were advised to self-manage for an arbitrary period (typically 12 weeks) before seeking advice from a general practitioner (GP) or returning to ED if symptoms remained. Once diagnosed, several participants described this to be a difficult and distressing time. Beliefs about the injury and recovery were typically negative, with a consistent thought that surgery was essential. A lack of knowledge about the injury and its severity contributed to worry and catastrophising thoughts.

> "During that early stage, I was panicking about what is happening … I was just assuming that my life is gone" (P14)

The burden of ACL injury impacted on self and self-identity, family, social and working life. The injury was described as having a profound impact on physical activity, with many concerned about causing further damage to their knee.

> "I had to wait two years from when I found out it was an ACL rupture to trying to get surgery. …. I couldn't do football. It was dangerous. Quit gym. I couldn't go gym. …. I gained weight." (P17)

Many described having to alter their working duties, finding alternative work or to be on long-term sick leave due to their ACL rupture. This resulted in social and financial loss. Several participants described physical and mental challenges of the injury, such as difficulty accepting changes to their body image. Participants reflected on feeling disabled and described several symptoms of depression.

> "I have struggled really, really sort of deeply to the point where I didn't want to go to work, didn't want to get out of bed" (P6)

Existing personal support networks were valued, and support from those with prior experience of the injury seemed particularly important. There was some sense that healthcare professionals failed to fully understand the patient experience and therefore could not offer holistic care. It was also felt that mental well-being was not addressed by clinicians.

> "When I went to the GP,… physio and the surgical consultant, there was no questions mentally there. … That's something that I feel should be addressed. Because significant injuries like this are life changing and anything that's life changing is very mentally draining" (P7)

Theme 2: navigating the treatment pathway

Participants accounted for several challenges with the patient pathway, describing it as prescriptive and impersonal, like a 'process' (P2 and P3) where 'you're just going through the motions' (P3). This led to participants feeling burdensome to clinicians and the healthcare system. Participants further reported the inconvenience of limited notice for appointments and surgery dates, in addition to frustration with delays and waiting times across the pathway. Participants described feeling lonely and undervalued due to clinician's busyness and restricted appointment times.

There were multiple accounts of disjointed interactions that caused frustration and a lack of confidence in healthcare professionals, with some feeling as though they were responsible for coordinating all those involved in their care.

> "I still don't think there is that communication if I am honest … everything is on a database … even the physio … the first two or three times he kept going, 'remind me what you have done' … Obviously there has been no communication with the surgeon" (P8)

While some valued being an active participant in the communication loop, others felt this was disorganised and were frustrated with repeating their story. Those happy to feedback on previous conversations to the next healthcare professional felt this contributed to a sense of control over their care, which supported decision-making processes.

The primary decision discussed among participants was whether to proceed with ACLR. This decision-making process was described in three ways by participants, who (1) were not presented with an opportunity to partake in decision-making, that is, the decision was made for them (2) attempted to avoid decision-making in fear of feeling responsible should an incorrect decision be made and (3) did not feel they were presented with a decision as it was described to them that surgery was necessary to enable a return to physical activity. Several participants reflected on the lack of support with decision-making, which resulted in the feelings of helplessness and caused decision paralysis.

> "I did not get a clear recommendation from the specialist on whether I should go for surgery, they gave me the personal choice. As a non-medical background person, I got the information from the internet and I am unable to make the decision. So, from my point of view, I was not able to make the decisions because I don't know the severeness of the problem that I have." (P14)

Unsurprisingly, many participants referenced COVID-19 to justify the shortfalls in their care. It was the predominant reason referred to for the delay in surgery, with participants offering some leniency because of this. Participants also reflected on the priority of their injury in comparison to others requiring medical attention during the pandemic. Understanding capacity within the hospital was typically measured against reports in the media, with participants starting to avoid attending the

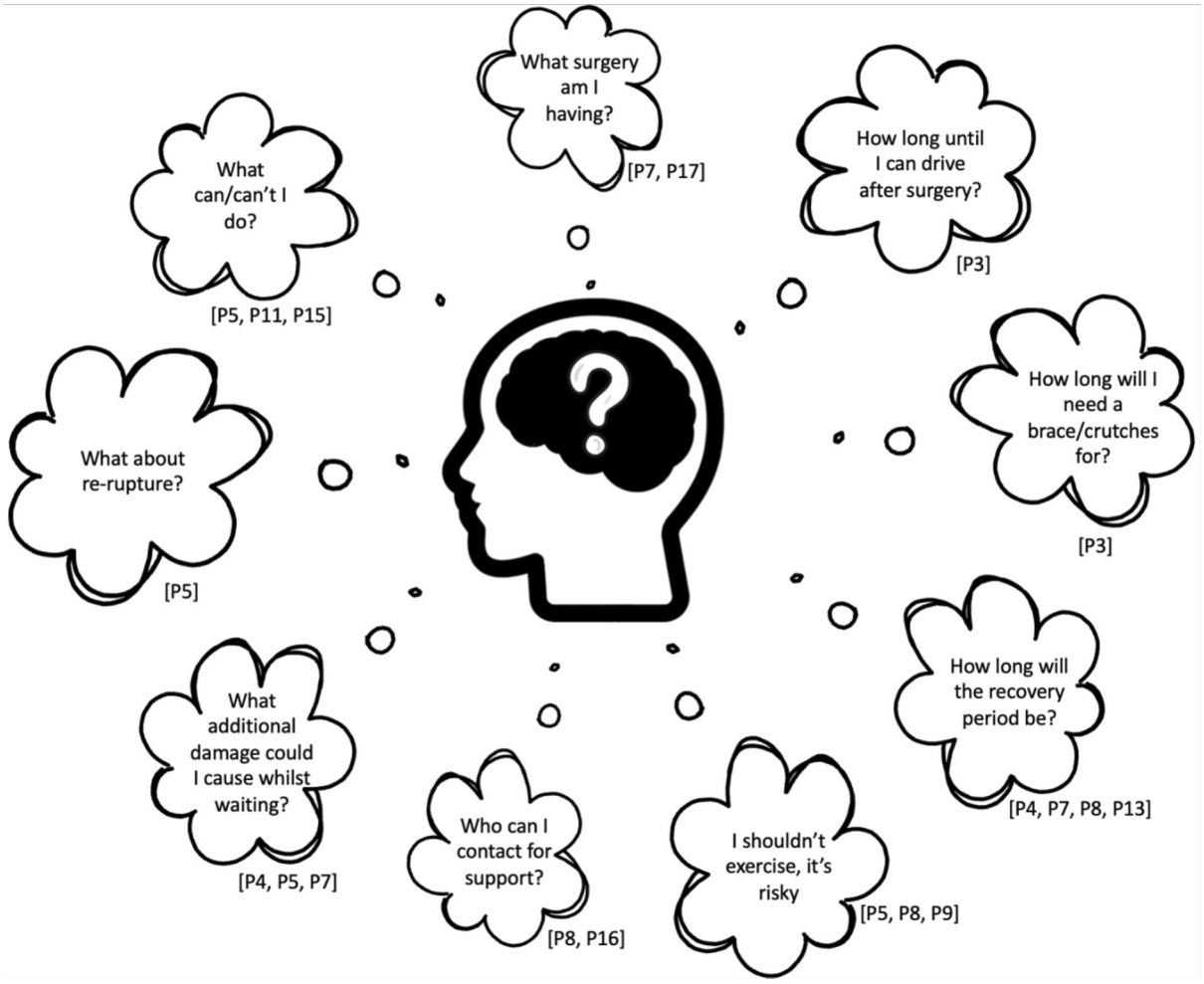

Figure 2 Concerns and questions raised during the preoperative period (supporting quotes are shown in online supplemental file 4).

hospital when, perhaps, prior to COVID-19 they may have presented sooner.

Theme 3: sense making in the preoperative period

Despite all participants being on the waiting list for or having had ACLR, some still recalled questioning its necessity during the preoperative period.

> "I feel like I've just been on a pendulum – I want it done, no I don't want it done, I want it done, no I don't want it done, I want it done – and I'm still a bit like that, and a bit apprehensive" (P4)

Participants described feeling unsupported while awaiting surgery with several concerns and unanswered questions. Typically, these were related to knowing what to do while awaiting surgery, the surgical procedure itself or the postoperative recovery period. Examples are shown in figure 2 and online supplemental file 4).

Participants described lacking confidence during the preoperative period in (1) their decision-making, (2) ability to exercise, (3) understanding their identity as they adjust to their new lifestyle with their injury and (4) healthcare professionals/hospital procedures running as expected, that is, the concern of being missed off the waiting list.

Support through prehabilitation was valued highly among the participants, regardless of whether they had received it. It was perceived to offer an advantage to recovery, postoperative rehabilitation and support a faster RTS. Participants also felt it supported psychological well-being and increased their knowledge of the injury and its management. Where participants engaged in exercise with physiotherapy guidance it was described to develop confidence and offer reassurance that postsurgery exercise was achievable and may perhaps be easier. Prehabilitation's utility in decision-making regarding surgery was also discussed. One participant explained to have only felt comfortable proceeding with surgery after exhausting their potential during prehabilitation.

> "More a decision tool really, so, yes, I tried it and tried to push my boundaries with it but didn't get where I want to be so, yes, it was more a decision tool for me." (P2)

One participant felt they had nothing to lose by engaging in rehabilitation prior to surgery, describing

desperation of trying anything to improve their knee function. However, there were concerns among some that prehabilitation lacked specificity, with participants describing disappointment when prescribed generic exercises. Where this was the case, participants struggled to understand the value of prehabilitation in their journey.

> "I thought that it would be a little bit more personalised and there would be more of a road to recovery really … I just felt it (prehabilitation) was very generic" (P10)

Many participants wanted support transitioning from an unrestricted active lifestyle to managing the consequences of their knee injury, however, most felt that this need was or would be unmet by NHS services. Participants viewed prehabilitation as safe and valued the security of direction provided by a physiotherapist. Where prehabilitation was not offered, many described concerns about engaging in physical activity due to fear of their knee giving way, worry of causing further damage or experiencing pain and/or swelling.

Theme 4: uncertainty, expectations and reality of the postsurgical period

Those at postsurgical time points reflected on the busyness of the hospital environment and delays experienced while being an inpatient. One participant accounted for feeling overwhelmed, rushed and confused due to the limited amount of time spent with medical staff on the ward.

> "It is really quite confusing and overwhelming, you never really quite know what the plan is." (P15)

The early postoperative period (≤3 weeks) was described as a particularly difficult time, due to unexpectedly high levels of pain, challenges caused by a lack of mobility, struggles maintaining morale and motivation and difficulties with managing thoughts/feelings independently.

> "It's about two weeks [before you] see anybody about it. So having that period where you're expected to crack on with the exercises, in a lot of pain … and all you're left is a booklet to read." (P1)

Participants further described battling anxiety in the first 3 months postsurgery, concerned about the progress they were making, levels of pain and contemplating the success of surgery. Participants reflected on the intensity of postoperative physiotherapy and the challenge of balancing this against work and social commitments. Similar to preoperative rehabilitation, participants valued personalised care with respect to rehabilitation content and consultation medium.

There was a range of expectations regarding the return to work following surgery. Typically, these expectations were not addressed by healthcare professionals and were developed by the participant with little to no support. This is shown in table 4 with supporting quotes.

Expectations of returning to physical activity also formed a spectrum of assumptions with respect to time and ability to return. Time to return ranged from participants' wishes for 'as soon as possible' through to questioning whether they wished to return at all. There was a range of expectations between the 6- and 12-month mark, with some feeling the time to return was based on their commitment to rehabilitation whereas others felt a measurement against time was the best indicator. When considering a return to physical activity, some questioned their confidence to return while others considered their ability to cope with and the impact of a subsequent ACL injury to their work and social life. Others were adamant to return with their confidence of being able to do so stemming from advice given by a healthcare professional:

> "I was always set on it because the success rate that Mr. X gave was very high, like 95 plus to get my pre-injury levels. And I do believe that as well" (P17)

The ability at which participants felt they would be able to return also varied from not returning at all, accepting they would only be able to return at a subinjury level through to expecting a full return to preinjury level.

Theme 5: Balancing resources, advice & opinions

There was a common narrative that resources were contradictory and difficult to navigate. Several participants stated mistrust with the internet and avoided searching

Table 4 Return to work expectations

Return to work expectations	Supporting quote
Following day after surgery	"Yes I'll have to [work from home immediately], I'm self-employed. I've got people who work for me but most of the money comes from me doing, me doing stuff so I have no choice." (P3)
Few days	I did tell work that I was going for surgery. And I told them, "Oh I just need like … three, four days to recover because it's the weekend and then I'll be back at work on Monday." (P17)
6 weeks–3 months	"I think realistically I'll be back to work in six weeks to three months" (P2)
2 years	"in my head I am just kind of going well I am going to be out for 2 years, I am not going to be able to work … I am just going to the worst possible scenario" (P7)
80% better	"I'll just wait until it's better, if it works then about 80% alright, then I'll try it, but there's no point in rushing it, is there, in case you damage it even more" (P13)

their condition, in anticipation of inaccurate information that would conclude catastrophising outcomes.

> "You know what Google is like, you look at knee surgeries and it turns out you are dying of something with the lungs, you know, don't trust the internet." (P7)

Many referenced the NHS website, although views of this resource and its reputability were conflicting. Participants described difficulty with their mental well-being and feeling "in the dark" (P7) due to absent information regarding surgery, how to prepare for it and what to expect postreconstruction. Information regarding timelines was another common frustration. In the absence of support presurgery, participants considered several hypothetical scenarios of how surgery and the subsequent recovery may impact their lives.

> "Could my recovery time be six months plus or even longer, which if so, I could lose my job over that. I could really be up the creek … because I have got a child, a ten-month-old now … and a mortgage and my partner is still a full time mum, so we are relying purely on my income. Not knowing what's happening with the surgery is really putting my stomach in my throat with regards to the future of myself and my family" (P7)

Advice regarding presurgery preparation was mixed. Some participants recalled the surgical team recommending physiotherapy and strengthening exercises while others were advised that this was not necessary and were instead advised against types of activity, for example, road running and swimming. Advice regarding surgery was unsurprisingly mixed, given the disparity in evidence. Where differing opinions and advice were offered, participants explained feeling confused, as they battled with deciding who to believe and trust.

> "Well I don't know who to believe now, do I believe the senior physio or do I believe the orthopaedic consultant?" (P4)

Some tackled this by only seeking advice from those they deemed reliable (predominantly surgeons and/or physiotherapists), which helped to keep the number of opinions they received low. Others gave descriptions of seeking confirmation bias of either their beliefs or beliefs of healthcare professionals they felt they could trust.

An important reflection from this study is the impact of culture, with a unique viewpoint offered by two participants who compared UK NHS treatment to that offered in Lithuania and India. One participant described advice from a surgeon in Lithuania that optimal treatment was surgical intervention 6 weeks postinjury:

> "So, in six weeks, that was his words, when the swelling goes down and starts healing then you get your surgery." (P12)

The second participant described being recommended ACLR by a surgeon when visiting India in addition to the use of complementary medicine (such as herbal oils) to support healing, pain management and muscle strength by a physiotherapist. They reflected on the conflicting advice from clinicians in their home country compared with that offered in the UK. These reflections are an important consideration in the treatment of patients who may come from cultures with different health beliefs and/or have access to care in a different health system with alternative views and practices.

DISCUSSION

This study is the first qualitative exploration of patient experiences specific to the NHS ACLR pathway.

A key finding from this empirical work is the difficulty experienced by participants when navigating the NHS treatment pathway. This was evident at pivotal points from initial injury management to surgery. Challenges were highlighted with (1) referrals to appropriate clinicians to support timely diagnosis and appropriate management, (2) coping independently in the preoperative period, (3) communicating with healthcare professionals (eg, liaising with multiple professions, gaining support with concerns/questions/updates on treatment time-frames), (4) making decisions about injury management and (5) patient-centred, personalised care.

Patient experience has been identified to be positively associated with treatment outcomes and patient safety across a range of conditions, settings and patient groups.[19] A common narrative in this study was the lack of consistent information and reliable resources regarding ACL treatment and outcomes; this has previously been identified to affect patient experience outcomes.[20] A number of participants in this study referenced the NHS website. However, ACL information available on the NHS website is not consistent with the evidence base. Accessed in August 2023, the NHS website states: 'ACL surgery fully restores the functioning of the knee in more than 80% of cases'.[21] There is no reference supporting this claim and 'functioning of the knee' is unclear and open to interpretation. It further states that recovery following surgery 'usually takes around 6 months, but it could be up to a year before you're able to return to full training for your sport'. This does not match the literature, which no longer recommends a return based on time alone and it is commonly acknowledged that a return may take up to 2 years.[22] Surplus amount of information has further been identified to contribute to poor patient satisfaction and the importance of supporting consultations with written patient information has previously been identified as important.[20 23] This empirical work highlights this gap in clinical care and the need for consistent information for the ACL population that is readable and viewed to be reliable. It may further benefit patient understanding and thus satisfaction, for clinicians to directly address patients' internet findings to ensure they are correctly

informed. This would further support shared decision-making, of which there was limited evidence in this study.

Finally, a key element highlighted by participants was the importance of tailored, patient-centred care. This was in reference to treatment discussions, provision of written information and rehabilitation programmes. Descriptions of generic exercise prescription by participants perhaps mirror the lack of consensus in the literature for this stage of treatment.[4 24] Inconsistencies in care were evident in this study, despite all participants receiving treatment within the same UK region, predominantly at one hospital. With widespread financial restrictions across NHS services, understanding optimum treatment is important to inform clinicians and financial stakeholders as services that lack clear guidance are likely to be cost-inefficient.

Clinical implications

There are a number of messages important for clinical practice arising from this research. First, failure to recognise a suspected ACL rupture and referral onto an appropriate management pathway remains an issue, with several participants failing to be referred for specialist assessment after ED attendance. Getting it right first time is a current national initiative in the UK.[25] Suboptimal management results in delays to diagnosis and treatment in addition to increased healthcare and economic costs.[26] A 2015 NHS study reported a reduction in days to diagnosis and treatment of ACL ruptures following implementation of an acute knee clinic;[27] demonstrating the success in getting it right first time.

Second, greater attention needs to be paid to decision-making regarding injury management. This was particularly evident for those questioning the necessity of surgery during the preoperative period. Shared decision-making has been shown to improve patients' knowledge, help patients and clinicians to understand preferences for treatment, reduce decisional conflict, help to clarify and set realistic expectations, and increase patients' involvement in their care.[28] It is outlined by the National Institute for Health and Care Excellence (NICE) as a process by which patients and clinicians work collaboratively to determine investigations, management plans and support needed based on individual preferences and relevant evidence.[29] Findings from this study demonstrated variation in patient involvement in decision-making conversations. Motivation to be involved in decision-making is multifaceted, influenced by individual preferences, level of risk, fear of a negative outcome, perceived importance of the decision and cultural, social and economic factors.[30–32] In the absence of a tool specific to the ACL population, we suggest that clinicians seek to understand patient's treatment preferences, values and beliefs, their preferences to be involved in the decision and factors that may affect this and use up-to-date evidence to educate patients on their options to support informed, shared decision-making. Further, it was felt that mental well-being was not addressed by clinicians, despite musculoskeletal and orthopaedic injuries being commonly linked to poorer mental health outcomes.[33] This could be considered by clinicians to ensure appropriate support, and signposting is provided to patients to manage their condition and make decisions about their care.

Third, signposting patients towards reliable information should be considered to support face-to-face discussions and patient education conversations. Educating patients on the specificities of their condition and how this differs from 'generic' advice is another important reflection of this study. Encouraging patients to present contradictory advice/information may also support patient understanding of their condition and consolidate their ability to make clear, informed decisions.

It is important to acknowledge that participants in this study were recruited from one hospital Trust but received rehabilitation at a range of different sites within the Midlands. While data on specific sites were not collected, the experiences discussed may not represent those of other areas of the UK.

Research implications

This research highlights the perceived benefit of preoperative rehabilitation and support among ACL patients. Current evidence supporting preoperative care is limited[4 24] and so further exploration of this phase of treatment is warranted. The development and evaluation of preoperative interventions that address patients' understanding of their condition, decision-making ability and optimal physical and mental preparation for surgery is needed. Understanding what warrants optimal preparation also needs further consideration, with input from both patients and clinicians. The evaluation of these interventions on patient-reported outcomes, clinical measures and cost-effectiveness would further support the delivery of optimal and cost-effective treatment pathways.

The absence of a decision support tool for this patient group has been identified. A 2021 systematic review highlighted that shared decision-making implementation research in hospital settings is an emerging field and an important area for further work.[34] Implementation factors are an important consideration to ensure decision support tools are developed with their context of use in mind. We have discussed the potential benefits to patient and clinical outcomes of implementing such a tool. Further work to develop and evaluate this would be a novel area for future exploration.

This research also recognised the importance of high-quality patient information resources which are currently lacking for this patient population. Future codevelopment work to develop these resources may also be beneficial.

Strengths, limitations and reflexive considerations

Participants were given the choice of a face-to-face or virtual interview. During study design, PPI members felt this was important to offer flexibility to participate in addition to considering personal preferences. In-person interviews were carried out in a hospital setting. While private

rooms were arranged and participants were reassured of anonymity, participants may have felt less comfortable recounting negative experiences when physically present in front of the researcher who also identifies as a member of the clinical team.

In addition, the same topic guide was used across interviews and HC was responsible for guiding questioning and probing topics. A reflexive journal was kept to account for experiences and initial responses after each interview to raise awareness towards the channelling of questions. These points were considered during data analysis and mitigated by collaboration with the research team, trial management group and trial steering committee which includes patients and stakeholders.

Another important factor to consider, impacting patient experience on the surgical pathway, is the timing of this research study. Interviews were carried out two and a half years after the COVID-19 pandemic reached the UK. COVID-19 had a profound impact on NHS services with many face-to-face procedures delayed and the rapid implementation of virtual consultations.[35] Although the NHS recovery plan for managing the backlog of elective procedures was rolled out in February 2022,[36] service demand and capacity remained unevenly balanced. Unsurprisingly, several participants attributed shortfalls in their care to COVID-19.

Finally, the study population was treated within hospitals in one region of the UK (Midlands). We did not collect data to detail all hospital departments in which patients received rehabilitation treatment. While it is not the aim of qualitative research to be generalisable, these findings may not represent the experiences of those treated in other UK regions and outside of an NHS setting. However, a purposive technique was employed, which allowed sampling to be responsive to emerging data. Further, there was an inconsistent number of participants at the three identified time points for the study. There were a greater number of participants at the preoperative time point which is likely to have resulted in a greater richness of data regarding the preoperative pathway than that of the postoperative pathway (particularly at the 1-year time point, where only two participants were interviewed).

CONCLUSION

This study has illuminated patient experiences of the NHS ACL surgical treatment pathway, novel to the ACL evidence base.

It highlights the gaps in patients' support and the magnitude of issues patients face when navigating the NHS system, communicating with clinicians, making decisions about surgery and managing conflicting sources of healthcare advice. These issues have not previously been recognised in the literature.

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Contributors All authors (HC, PLe, PLo, FM, BS, DB and KEW) contributed to the design of the study. Data collection was completed by HC. Data analysis was completed by HC with support from FM, BES, PLe, PLo, DB and KW. HC drafted the manuscript. All authors (HC, PLe, PLo, FM, BS, DB and KW) critically reviewed the manuscript and approved the final version for publication. HC is responsible for the overall content (as guarantor).

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Competing interests None declared.

Patient and public involvement Patients and/or the public were involved in the design, conduct, reporting or dissemination plans of this research. Refer to the Methods section for further details.

Patient consent for publication Not applicable.

Ethics approval This study involves human participants and was approved by North East–Newcastle and North Tyneside 1 Research Ethics Committee (22/NE/0119). Participants gave informed consent to participate in the study before taking part.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement All data relevant to the study are included in the article or uploaded as supplementary information.

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COREQ (COnsolidated criteria for REporting Qualitative research) Checklist

A checklist of items that should be included in reports of qualitative research. You must report the page number in your manuscript where you consider each of the items listed in this checklist. If you have not included this information, either revise your manuscript accordingly before submitting or note N/A.

Topic	Item No.	Guide Questions/Description	Reported on Page No.
Domain 1: Research team and reflexivity			
Personal characteristics			
Interviewer/facilitator	1	Which author/s conducted the interview or focus group?	
Credentials	2	What were the researcher's credentials? E.g. PhD, MD	
Occupation	3	What was their occupation at the time of the study?	
Gender	4	Was the researcher male or female?	
Experience and training	5	What experience or training did the researcher have?	
Relationship with participants			
Relationship established	6	Was a relationship established prior to study commencement?	
Participant knowledge of the interviewer	7	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	
Interviewer characteristics	8	What characteristics were reported about the inter viewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	
Domain 2: Study design			
Theoretical framework			
Methodological orientation and Theory	9	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	
Participant selection			
Sampling	10	How were participants selected? e.g. purposive, convenience, consecutive, snowball	
Method of approach	11	How were participants approached? e.g. face-to-face, telephone, mail, email	
Sample size	12	How many participants were in the study?	
Non-participation	13	How many people refused to participate or dropped out? Reasons?	
Setting			
Setting of data collection	14	Where was the data collected? e.g. home, clinic, workplace	
Presence of non-participants	15	Was anyone else present besides the participants and researchers?	
Description of sample	16	What are the important characteristics of the sample? e.g. demographic data, date	
Data collection			
Interview guide	17	Were questions, prompts, guides provided by the authors? Was it pilot tested?	
Repeat interviews	18	Were repeat inter views carried out? If yes, how many?	
Audio/visual recording	19	Did the research use audio or visual recording to collect the data?	
Field notes	20	Were field notes made during and/or after the inter view or focus group?	
Duration	21	What was the duration of the inter views or focus group?	
Data saturation	22	Was data saturation discussed?	
Transcripts returned	23	Were transcripts returned to participants for comment and/or	

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Topic	Item No.	Guide Questions/Description	Reported on Page No.
		correction?	
Domain 3: analysis and findings			6
Data analysis			
Number of data coders	24	How many data coders coded the data?	Supp File 3
Description of the coding tree	25	Did authors provide a description of the coding tree?	6
Derivation of themes	26	Were themes identified in advance or derived from the data?	7
Software	27	What software, if applicable, was used to manage the data?	6
Participant checking	28	Did participants provide feedback on the findings?	
Reporting			10-17
Quotations presented	29	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	18-20
Data and findings consistent	30	Was there consistency between the data presented and the findings?	10-17
Clarity of major themes	31	Were major themes clearly presented in the findings?	10-17
Clarity of minor themes	32	Is there a description of diverse cases or discussion of minor themes?	

Developed from: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

Once you have completed this checklist, please save a copy and upload it as part of your submission. DO NOT include this checklist as part of the main manuscript document. It must be uploaded as a separate file.

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Supplementary File 2

Interview Topic Guide – Preoperative / 3 Month / 1 Year Postoperative Interview

(delete as appropriate for interview time point)

Version 1.0 – 31/05/2022

Introduction and Background

- Thank you for agreeing to take part in the study to discuss you experiences
- Tell me about your journey so far

Possible prompts:

- Timeline of injury and initial management
- Waiting times to surgery and support given in that time
- Knowledge of [include as appropriate – planned] surgery and postoperative rehabilitation

Topic 1: Expectations of treatment and returning to physical activity

Possible prompts:

- Expectations of treatment, returning to physical activity and work after surgery
- Who have expectations been set/influenced by
- Have they changed since diagnosis
- Expectation versus reality of current ability

Topic 2: Views and involvement in prehabilitation

Possible prompts:

- Engagement in physical activity [delete as appropriate - since injury / prior to surgery]
- Specific referral for prehabilitation
- Description of rehabilitation intervention e.g. advice, exercise
- Views of prehabilitation and what it should/should not involve
- [Delete as appropriate - Engagement in postoperative rehabilitation]

Topic 3: Healthcare advice

Possible prompts:

- What advice has been given
- Who has given the advice e.g. healthcare professional, friend/family member, internet
- Conflicting advice

Close

- Is there anything you feel could have been managed differently by your healthcare providers e.g. surgeon, GP, physio
- Anything further you would like to mention/discuss
- Thank you for taking the time to discuss your experience

Carter HM, *et al. BMJ Open* 2024; 14:e079468. doi: 10.1136/bmjopen-2023-079468

Supplementary File 3 – Codebook

Theme 1: Injury experience, impact and support	**Theme 2**: Navigating the treatment pathway	**Theme 3**: Sense making in the preoperative period	**Theme 4**: Uncertainty, expectations and reality of the post-surgical period	**Theme 5**: Balancing resources, advice & opinions

No.	Code	Definition	Coding Coverage	Exemplar Quote
Theme 1: Injury experience, impact and support				
1.01	Impact of ACL injury	Descriptions of the impact of the ACL injury to the participant	57 references across 14 interviews	*"I have struggled really, really sort of deeply to the point where I didn't want to go to work, didn't want to get out of bed. Obviously you are young and when you are so used to having a certain lifestyle"*
1.02	Blame for injury	Descriptions of blame for sustaining the ACL injury	7 references across 6 interviews	*"I was stationary at a set of traffic lights when a car doing nearly forty miles an hour crashed into the back of me. It was an elderly gentleman who had just come from the hospital, so he was still under medication when he sort of, he bumped me ... I had been playing football for years and never really hurt myself so maybe it was something that was due to come."*
1.03	Actions of the patient re mental health	Actions taken by the participant regarding their mental health	15 references across 11 interviews	*"Being honest I went and got a dog. I went and got a greyhound which needs walking. So I take him out for walks so he can pull me a little bit and I take the children out for walks and stuff. So I have been a little bit more family devoted in respect that I don't really spend that much time on my own anymore, it's always me with somebody else. But I think that was a comfort thing for myself because when I was able to take the dog and take my son out, or take my dog and take my kids out, or just me and my partner and my dog would go for a walk, it was like a de-stress. It was like shifting my focus onto something different""*

1.04	Patient thoughts re mental health support	Descriptions of the participants thoughts regarding the mental health support available	19 references across 7 interviews	*"I think the support would have been definitely helpful and it might have made some changes really to how I felt but that's just how it is I suppose"*
1.05	Support from those with similar experience	Descriptions of support received or wanted by the participant from those with similar experiences e.g. an ACL injury	10 references across 5 interviews	*"I think you can only get so much information from doctors, nurses, and physios and stuff, if they have actually gone through it themselves. You can get a very different picture from someone who has had the surgery and gone through all of the rehab process and how they found it and the setbacks and things like that."*
1.06	Opportunities to seek help	Descriptions of the opportunities for the participant to seek help	6 references across 6 interviews	*"unfortunately I haven't really had a chance to speak to anyone with regards to any questions I have got"*
1.07	Knowledge of injury	Descriptions of the participants knowledge of their injury	14 references across 9 interviews	*"All I have heard from the doctors is that kind of throw away comment of oh that's quite a bad ACL tear isn't it?"*
1.08	Knowledge of ortho interactions pre surgery	Descriptions of the participants knowledge of orthopaedic interactions e.g. appointments prior to surgery	4 references across 3 interviews	*"I just don't know what to expect from now, what kind of like procedure there is or progression there is from now. I am just kind of waiting to hear anything"*
1.09	Knowledge of surgery & postoperative rehabilitation	Descriptions of the participants knowledge of surgery and postoperative rehabilitation	54 references across 14 interviews	*"'ve definitely got surgery in six weeks, I run a company, I've got staff members. I know I'm going to have to be at home. Do I know how long I can't drive for? Do I know how long I'll be in a leg brace? You know how long on crutches for? I know absolutely nothing"*
1.10	Thoughts about recovery from ACL tear	Descriptions of the participants thoughts about recovery following an ACL tear	27 references across 15 interviews	*"Not able to swim and not able to muck about with the kids … I don't think I'll get to that point until I've had a repair"*

1.11	Thoughts about how other's might have dealt with their situation	Accounts and reflections of how the participant feels other may deal/cope in their situation	1 reference across 1 interview	*"other people they do struggle don't they? ... it would be hard and some people wouldn't just accept it because they feel like a victim and probably rightly so but that's the, depends how you see things don't it? Everyone's different"*
1.12	Reactions to negative stories of ACLR	Participants reactions to hearing negative stories of others treatment of ACLR	11 references across 9 interviews	*"any stories of people becoming worse off after the surgery kind of I dismissed"*
1.13	Outlook on life	Participants reflections/descriptions of their outlook on life	9 references across 7 interviews	*"I worked in sales for seven years of me life. It's dead cut throat etc, etc. I set up me own company at 26, got people working for me. If you're not like, you can't beat around the bush so that's my outlook on life. You get in what you get out. Put in what you get out of it"*
1.14	Ability to cope	Descriptions of the participants thoughts about their ability to cope with adversity/their ACL injury	6 references across 3 interviews	*"I just prefer not to know and go in with an open mind, do everything they have asked me to do. If I get through it I get through it. If I don't then that will be something I have to reconsider with regards to my mental health"*
1.15	Importance of physical activity	Descriptions of the important of physical activity to the participant	11 references across 8 interviews	*"looking at the importance of football to myself I think it was like I use it as kind of like a way out psychologically as well as keeping fit so and I've played since I was quite young so around seven so it's quite engrained in me"*
1.16	Actions after initial injury	Descriptions of the participants actions after sustaining their initial knee injury	24 references across 17 interviews	*"I didn't go to the- Because we were out with friends, and I was out with my daughter and you sort of try and hobble along and cope. And then we went for dinner and I stayed out and then when I tried to get up after the meal I was like, I literally can't walk, really, very well. So then it was like, I think maybe I do need to go to A&E"*
1.17	Actions whilst awaiting/pre-diagnosis	Descriptions of the participants actions prior to diagnosis of an ACL rupture	10 references across 7 interviews	*"In the meantime [whilst awaiting a diagnosis] I did start kind of going to the gym and trying to strengthen my leg and get back to normal kind of walking as much as I was able to"*

1.18	Thoughts about the initial injury pre-diagnosis	Participants thoughts about their initial injury prior to diagnosis of an ACL rupture	25 references across 15 interviews	*"I've just gone down to the floor and I knew what I'd done because there was that sound and pain and loose leg, and it just started pumping up quite quickly"*
1.19	Thoughts about the injury post-diagnosis	Participants thoughts about their injury post diagnosis	17 references across 9 interviews	*"I was panicking, I was just assuming that my life is gone, trust me. I've gone to that level because I don't know what is the implication of ACL. So, you are physically fit and you are a normal person and all of a sudden, someone is saying you have got an ACL problem"*
1.20	Experiences of diagnosis	Descriptions of the participants experience of their ACL rupture diagnosis	44 references across 17 interviews	*"So it was just oh we have done the X-ray yes, no there is nothing wrong with you, you have just got a bit of swelling. No there is something definitely wrong with me. Oh what we will do is we will do an ultrasound, oh yes look listen there is still definitely nothing wrong with you. I am telling you there is. I know my knee. I know my body, something is not right. Okay, well we have done everything I just think it's the after effects of the accident. Okay, so what I will do is I will go to the doctor then every time I feel pain, which is obviously quite regular and then this is what happens.* *They referred me. The specialist chased it up and then I got the correct diagnosis."*
1.21	Experiences of (potentially) missed diagnosis	Descriptions of the participants experience of encounters with healthcare after their knee injury where an ACL rupture diagnosis was not made	22 references across 9 interviews	*"I was annoyed that it was missed but then again honestly, it's just - Well I went to A and E and they - Well they did the test for the ACL but I guess my knee was swollen at that point so they couldn't really see it. But I was annoyed when it was missed because after that I thought it was all fine that I could do what I want and then when it collapsed on me in the snow, I was in a lot of pain it took what from that point a month and 1/2 until I got diagnosed with it"*
1.22	Second injury	Descriptions of a second knee injury	12 references across 7 interviews	*"I left it and went back to playing football. In January, I think it was January the 6th or 7th, probably no further distance from about a metre away, someone just passed me the ball, I opened up my leg, or my foot to a right angle again and it just popped and exploded and within about a minute, it was the size of a football. And at that point, I knew that I had actually done something quite bad to it"*

1.23	Actions of the patient after reinjury	Descriptions of a the participants actions after their second knee injury	24 references across 17 interviews	*"I was throwing snow balls at my sister and then it just completely gave way and that's when I got in touch with my GP and they referred me for an MRI"*
1.24	Comparing previous experiences of ACL injury/surgery with current experience	Descriptions/reflections of previous ACL injury experiences and ACLR	9 references across 1 interview	*"This time I'm a bit surprised how long it takes me to build myself up, but now, it makes sense, because the last time, I had that pre-surgery physio and that could be the reason, exactly that's the reason why. Last time, it didn't take as long as I'm doing it now, even though it is a very similar surgery that has been done"*

Theme 2: Navigating the treatment pathway

2.01	Making decisions	Descriptions of the patients decision making processes and thoughts about decision making	54 references across 16 interviews	"I want absolving of any responsibility. I just need to, because I've never really had to have any surgery before, either. So it's, you know, I don't want it if I don't have to have it, but if I do need to have it, then I will have it. Do you know what I mean, so I want somebody to tell me whether I need to have it."
2.02	Factors involved affecting the participant/their choices	Descriptions of factors considered by participants that affected them/their choices	52 references across 14 interviews	"Probably a slight influence would be family, because my father went through the exact same injury"
2.03	Suggestions or references for pathway improvements	Suggestions from participants on improvements that could be made to the ACLR pathway	84 references across 14 interviews	"[I would have liked] having a bit of physiotherapy input before the surgery as well, just to help prepare myself for what would happen afterwards, but also just to improve my level of function beforehand as well."
2.04	Experiences/thoughts of the pathway	Participants descriptions of their experiences and thoughts of the ACLR pathway	33 references across 12 interviews	"I was frustrated that when I went to A&E to get it checked they just, I don't want to say palmed me off as such but they just said, "Oh it's bruised. It will heal within a few weeks." That kind of annoyed me when later on I found out that I've got a stability issue three months down the line and then the GP had to get involved to send me for an MRI."

2.05	Elements valued by participants	Participants descriptions of elements/factors they valued across their care	53 references across 11 interviews	"the surgeon was fantastic. It was quite a younger gentleman, I think he was like mid-thirties. He was quite a sporty person himself so he was dead relatable, he was very friendly. And he was basically saying look I can't sort of say to yourself to go for something or not, but what I am saying to you is if you did want to go and play sports again that this would be your option. However, please note that there is a risk that it will not work and that you could consider not still playing sports like you do now. So he was honest but like I said he was very friendly and understanding"
2.06	Interdisciplinary communication	Descriptions of participants perceptions/experiences of communication between healthcare professionals e.g. orthopaedics and physiotherapy	17 references across 7 interviews	"I will call up my GP and be like hey what's going on with this? And they will be like contact the orthopaedics and they will be like contact your GP and, you know, you are just going round in circles."
2.07	Communication between the participant and healthcare professionals	Descriptions of participants experiences of communicating with healthcare professionals	54 references across 15 interviews	"No they give you the pamphlet but they basically they don't go through it with you they just go here's some documents. You get handed it at the end of the thing and then you walk out. Do you know what I mean they don't run through it with you so it's just this is that, it's all just very here's some documents you might find useful, see you in a bit basically"
2.08	Communication during inpatient stay	Descriptions of participants inpatient experience	3 references across 3 interviews	"I think while you're on the ward as an inpatient it is in and out so you're being seen by the nurse, they pop out, the consultant out, physio out. So I don't think from a patient point of view it doesn't seem very connected in terms of how everyone is collaborating for yourself on the ward"
2.09	Participants' role in communication	Descriptions of the participants role in communication with healthcare professionals	14 references across 9 interviews	"I couldn't remember who I had to ring, so, I just left it to them to get in touch with me."

2.10	Points of contact	Participants descriptions of people they contacted/knew where available to contact for support	8 references across 5 interviews	"Like who do you go to? Do you go the surgeon, do I speak to the receptionist? Do you go to the physio who you have not seen in the last year? Do you go to the GP who you are not going to get seen because GPs are difficult to get hold of at the best of times, never mind if it's not an urgent case where you aren't going to drop dead the next day? So it's like where do you go? You are not being given any information. Do you go back to A&E? A&E is absolutely rammed at the minute with patients left, right and centre"
2.11	Advice/actions sought from GP	Descriptions of advice sought from or actions of the participants GP	25 references across 10 interviews	"I don't like to go to the hospital because I know there is a lot of people that need it more than myself, so I don't like to feel I am wasting any time. So I booked the earliest appointment at the doctors on Monday morning and then they sent me to the hospital"
2.12	Experience of GP interactions	Participants experiences of interactions with the GP	10 references across 6 interviews	"my previous GP unfortunately ... had never passed me on or they had not passed on the right information ... then I moved house, got a new doctors, a new GP earlier this year, which I then said right what's going on? I spoke to my new GP and they basically said I have no idea why you have not been contacted yet regarding this ... my new GP basically got the wheels in motion"
2.13	ED actions	Descriptions of actions taken by the emergency department after participants visited with their knee injury	21 references across 13 interviews	"I went to A&E, I think it was that evening. I think I went straight there pretty much and just explained what had happened and how the injury had taken part. They literally thought it was a meniscus tear because of where the pain was and they said come back in six weeks' time if you still have any pain, any difficulty with walking etcetera"
2.14	Experiences of orthopaedic interactions	Participants descriptions of interacting with orthopaedics	43 references across 14 interviews	"I first saw a consultant and he kind of didn't listen to my problems as much, so I decided to get a second opinion about it and then I felt I was listened to a bit more"
2.15	Thoughts about seeking private treatment/paying for healthcare	Participants thoughts about seeking private healthcare and/or paying for investigations and treatment	18 references across 6 interviews	"We did look at having it done privately but then that was like eight thousand pound. And then I have got a wedding to save for and it's like I don't think the wife is going to be too happy if I take eight grand out of the wedding budget"

2.16	Thoughts about the NHS	Participants thoughts about and reflections of the National Health Service	14 references across 8 interviews	"it's just a case of getting through with the NHS, getting through to the right person that you need to"
2.17	Thoughts about virtual interactions	Participants thoughts about virtual interactions/consultations/appointments	4 references across 2 interviews	"I'd have thought you would need to see somebody in person to see what was up with them"
2.18	Impact of COVID	Participants reflections of the impact of COVID on their ACL injury assessment, management and treatment/hospital care and procedures	26 references across 11 interviews	"because of Covid all the operations and everything got put on hold for like two years. So I had to wait two years from when I found out it was an ACL rupture to trying to get surgery basically"

Theme 3: Sense making in the preoperative period

3.01	Descriptions of preoperative physiotherapy	Participants descriptions of preoperative physiotherapy treatment	30 references across 13 interviews	"gave me an exercise and told me to practice them at home, they showed me how to do them there and just said practice these when you go home"
3.02	Experience of rehabilitation/physiotherapy first	Participants accounts of their experiences of undergoing rehabilitation, as recommended by their clinician, for the management of their ACL injury prior to being listed for surgery	3 references across 1 interview	"I waited for six months then after six months, I went to the physio rehabilitation centre, I did all my physios, and then they put me back to an orthopaedic specialist"

3.03	Experiences of preoperative physiotherapy	Participants descriptions of their experiences of undergoing preoperative physiotherapy	37 references across 11 interviews	"So I have been home with exercises and I never really got a follow up or anything like that. And still to this day I didn't hear anything from them until I started chasing it up again at the start of 2020"
3.04	Participants thoughts about engaging in physical activity pre-surgery	Participants thoughts about engaging physical activity with their ACL rupture, prior to ACLR	11 references across 7 interviews	"I thought I can't exercise anymore because anything I do will cause me pain or swollenness again, I will do more damage to it"
3.05	Participants thoughts about preoperative physiotherapy/prehabilitation	Participants thoughts about preoperative physiotherapy/prehabilitation +/- how it may have helped	77 references across 15 interviews	"For me, personally, doing the prehab has helped me continue with daily activities, so if I didn't do it, I probably would be a lot worse and I'm now in a better position to have surgery because my tissue's healing well and stuff."
3.06	Participants thoughts about what prehabilitation should contain	Participants thoughts as to what they think prehabilitation should include to support surgical intervention	18 references across 8 interviews	"probably early stage it's just focus on getting the swelling down, working on more stretching, just to gain that range of movement back, being patient with it, because you can't rush rehab, and then gradually just strengthening"
3.07	Justification for stopping preoperative physiotherapy advice/exercises	Descriptions of particpants reasoning/justification for discontinuing or going against advice and/or exercises given during the preoperative period	5 references across 4 interviews	"in the end I will be honest I left them [the exercises] because again I felt like I was getting no benefit and it was a bit, it was a bit tedious to be honest"
3.08	Other treatment/adjuncts	Descriptions of treatments and adjuncts other than exercise used by the participants during the preoperative period	9 references across 5 interviews	"I went and got a knee brace"

3.09	Participants expectations of the wait for surgery	Descriptions of the participants expectations of the wait for ACLR	10 references across 9 interviews	"obviously with Covid he did say to me that the wait was going to be quite a long time because of the situation, so I was prepared for that at the time"
3.10	Participant experiences of waiting for surgery	Descriptions of the participants experiences whilst awaiting ACLR	42 references across 14 interviews	"Maybe it's not that bad, maybe I'll wait, maybe it's not that long, maybe they'll call me how long will it be? You just sort of blindly expect the best"
3.11	Descriptions of thoughts/feelings pre surgery	Descriptions of the participants thoughts and feelings leading up to ACLR	36 references across 9 interviews	"I feel like I've just been on a pendulum - I want it done, no I don't want it done, I want it done, no I don't want it done, I want it done - and I'm still a little bit like that, and a bit apprehensive"
3.12	Actions of the participant whilst awaiting surgery	Descriptions of actions of the participants whilst awaiting ACLR	17 references across 8 interviews	"over time I was like, look I've had enough. I'm going for my walks in the Peak District and at that point I kind of assessed it myself. I was like, oh I can walk okay but I just have to be a bit careful not to do sudden movements. I just have to be mindful that my leg is not 100%."
3.13	Function during the preoperative period	Descriptions of the participants functional ability during the preoperative period	23 references across 10 interviews	"I can't do that—I can go swimming and that still but it hurts afterwards. And if I'm walking down the road, I used to do quite a bit of walking, if I took the dog for a walk, I wouldn't be able to walk the next day."
3.14	Description of current state - preop	Participants description of their current state during the preoperative period	26 references across 8 interviews	"'ve been tempted to try and play some sport, but it's not been great with it, so I've just left it and focused on more general rehab physical activity"
3.15	Thoughts about surgery	Participants thoughts about surgery	49 references across 18 interviews	"I don't really want to have surgery, but I don't want to be living my life saying, "No." To the kids."
3.16	Participants questions about surgery	Participants questions about surgery	9 references across 6 interviews	"it made me a bit nervous, to be fair, because I don't know what to expect, and I don't know what's going to happen, I'm a bit nervous. I've never had an operation before, never, so, I don't even know what to expect"
3.17	Thoughts during preoperative period	Participants thoughts during the preoperative period (not about surgery)	23 references across 10 interviews	"What's going on and what's happening? ... It's been ages since I've seen anybody. Since I went to the hospital, it must be over a year and a half"

3.18	Things missing from preoperative period	Descriptions of things participants felt were missing from the preoperative period	24 references across 13 interviews	"Well to explain what the surgery entailed and what your recovery's going to look like … I don't know, just a bit of reassurance really, you know. "

Theme 4: Uncertainty, expectations and reality of the post-surgical period

4.01	Experiences of surgery	Descriptions of participants personal experience of surgery	5 references across 3 interviews	"So I had a spinal block and I was actually watching it. It looked like fluffy clouds to me but the fluffy clouds was my ligament basically"
4.02	Experiences as an inpatient	Descriptions of participants experiences during their inpatient stay	14 references across 5 interviews	"I was here at 7 o'clock because I had to be, I couldn't eat, couldn't drink, and I didn't go into surgery until half 4 ... I did stay overnight as well, which I wasn't meant to, I was meant to come and wake up and go. I had to stay overnight, which wasn't ideal, and then I didn't get let out until I think about 5 o'clock the next day. So, in terms of how I was set up for how it would affect me moving forward, it was almost a bit of—You can't drive, use your crutches, we'll be in contact about physio and that was it and I thought, okay, see you later."
4.03	Experiences in the early postoperative period	Descriptions of participants experiences in the first few weeks post-surgery	23 references across 5 interviews	"I found it really, really difficult and frustrating just being in bed for that first week or so, and particularly the pain, I just wasn't expecting that that was quite difficult. Definitely, at certain points in those first couple of weeks, I questioned whether I should have had the surgery or not."
4.04	Experiences postoperatively	Descriptions of participants experiences following surgery	24 references across 5 interviews	"I think initially, it didn't feel too hard but then I think you get to a certain point where it does feel quite intense and trying to fit that around university and work and things like that is quite difficult as well"
4.05	Participants thoughts postoperatively	Descriptions of participants thoughts following surgery	6 references across 3 interviews	"I've got different feelings, a lot of feelings in my leg, so, that makes you think a lot like, why are these muscles not building back; why is it taking so long, is everything alright? So, you start to overthink everything now, I'm at that point now. Did they do a good surgery, do I need another, because I know there are so many unsuccessful ones and you do have to—Is that right? So, yes, overthinking definitely by this point."

4.06	Thoughts about postoperative progress	Descriptions of participants thoughts about their progression following surgery	11 references across 6 interviews	"As I said, it's frustrating now because we're talking—June, July, August, September, October, so, it is three months and I still can't bend fully without pain"
4.07	Thoughts about postoperative rehab	Descriptions of participants thoughts about postoperative rehabilitation	35 references across 12 interviews	"I feel like the stuff I have been given post-surgery has been more detailed and more explanation as to why we are doing this."
4.08	Expectations postoperation	Descriptions of participants expectations of the postoperative period	14 references across 10 interviews	"once I've had the surgery and the recovery process is complete, don't get me wrong there will still be that lingering doubt but it will be a lot less and then over time it will just be eliminated because you will establish confidence in your knee"
4.09	Expectations of RTW post surgery	Descriptions of participants expectations about returning to work following surgery	9 references across 8 interviews	"I expect to go back to work probably six weeks"
4.10	Expectations and thoughts about return to preinjury sport/physical activity	Accounts of participants expectations and thoughts about returning to their preinjury levels of sport or physical activity	49 references across 16 interviews	"I am between a rock and a hard place. I am thirty-five years old and I don't know, should I play rugby being a police officer? I would like to, to be honest, I never want to stop. But I also need to take into consideration the probability of injury"
4.11	Expectations vs reality	Participants descriptions and reflections of the reality of their situation versus their prior expectations	8 references across 3 interviews	"You don't necessarily think about the setbacks that you might have and how difficult you might find that. You just have this idea that you'll have the surgery, you might have a bit of pain for a few days and then gradually, you'll just keep making progress. Whereas in reality, you might have setbacks or your progress might level off for a while and you might not see much improvement and dealing with that is quite difficult"
4.12	Experiences of RTW postoperatively	Descriptions of participants experiences of returning to work following surgery	3 references across 3 interviews	"I was working the day after my surgery. Because I was working from home and I was like well I am just going to be sat here anyway."

4.13	Experience of return to impact	Descriptions of participants experiences of returning to impact activities following surgery	3 references across 1 interviews	"It felt very weird the first few times I did it, I remember when I started to jog, it was like I had completely forgotten how to do it and I was overthinking everything. And it's quite scary as well, the first time you start hopping and jumping and things like that because you've always got that worry in the back of your mind that your knee is going to give way or you're going to re-injure yourself."
4.14	Thoughts about rehab progression and return to preinjury sport/level	Descriptions of participants thoughts about their rehabilitation progression and how this related to returning to their preinjury levels of sport or physical activity	14 references across 6 interviews	"Not yet, I feel like I'm just about ready to although since I've started work I probably have not been doing as much physio as I'd like to be doing normally. So, I think I'm probably at the stage where I could get back into it, it's more just fitting it around my work commitments and everything."
4.15	RTS following previous ACLR (contralateral leg)	Descriptions of returning to sport following previous ACLR on the contralateral side	2 references across 1 interviews	"I was doing it but physically, it wasn't too bad but mentally to get over it, was a lot harder so I didn't push myself too much. I was starting it but I didn't go to that competitiveness zone, I would say, where I was before the surgery. I would say it took me around a year, it did take me a year."

Theme 5: Balancing resources, advice & opinions

5.01	Advice and treatment outside the UK	Descriptions of advice given and treatment received outside of a UK healthcare setting	7 references across 2 interviews	"The first thing, in India, they told me; they said the same advice in terms of it's not a life-saving problem, so, it's not something that needs to be operated on, but however, what they told me was, at your age, we recommend you to get operated, but it is left to your choice."
5.02	Advice given re engaging in physical activity pre surgery	Descriptions of advice given about engaging in physical activity prior to surgery	18 references across 11 interviews	"Doctor Z said I shouldn't run on the road or and just run on the treadmill when I am fit enough"

5.03	Advice given regarding surgery	Descriptions of advice given regarding surgery	47 references across 16 interviews	"There was a lot of mixed messages, and then the knee fellow had said, 'Oh you're not doing a high-level sport, so you probably won't need to.' And then I saw Mr A, and you know when you're going like this to that to this to that in your head as to what's going to happen, I thought I'd just be guided by Mr A and he sort of said, 'If I was you, then I'd be having that repaired'"
5.04	Advice given regarding postoperative rehabilitation	Descriptions of advice given regarding postoperative rehabilitation	8 references across 6 interviews	"They said to me, you have to do all the rehabilitation or the operation won't work, they have said that but they ain't actually said what it is or nothing ... Yes, they said that is the most important bit, the rehabilitation really, that's what I got off him because they can do the surgery and if I do that then it's a waste of time doing the surgery, so, I think that is the more important bit, so, he said
5.05	Advice/information given re RTS	Descriptions of advice given regarding returning to sport	7 references across 6 interviews	"So the aim is to be fighting fit for April next year, so that's about nine months on from the surgery and he [the physio] knows that. And, you know, we have sort of said nine months is a push to get you there for nine months but it has been done"
5.06	Consistency of advice	Descriptions and accounts of the consistency of advice participants received	29 references across 14 interviews	"I think the only thing probably was that I had spoken to Doctor X about obviously netball and said, you know, can I still play netball and he said absolutely not. And then I think when I went to see the physio she said I would still probably be able to play as long as I wasn't twisting and turning as much. And then I kind of said to my mum like what do you think and she was like absolutely not, I don't think that's the best thing to do. So I haven't played at all.
5.07	Resources used (preoperatively)	Descriptions and accounts resources used by participants prior to surgery	27 references across 15 interviews	"I didn't really know what your ACL was to be honest with you, so obviously they showed it to me on the scan. And then I did go home and obviously just had a little look at it and I watched some videos of like people after they had had surgery"
5.08	Thoughts on information/resources available	Participants thoughts about information and resources available	36 references across 11 interviews	"I think online, it does say what ACL means, there is no doubt about it, but what I was expecting, as the indirect resource, the information is everywhere, I don't know which one I should believe and which one I shouldn't believe."

5.09	Consequences of lack of information	Descriptions of the consequences of the lack of information given regarding their condition and treatment	32 references across 9 interviews	"I don't know what I am expecting next because I have kind of been in the dark a bit with it. And I don't know whether I am going to get a call next to just say hey your surgery is on this date or whether I am going to have a consultation with a surgical consultant regarding what's going to happen. Still to this day I don't know whether the plan is kind of keyhole or something more extreme than that. I don't know ... I work as an outdoor pursuits instructor, so the last thing I want if I was to get a call tomorrow saying hey we have got you in for surgery in two weeks' time, it's going to be a six month recovery. I can't do that. After two years of waiting for potentially something to happen with my knee, I would have to turn that down because, you know, I have got a child and I have got a mortgage and I can't just turn down work. I can't just stop working like that"
5.10	Influence and advice of/given by friends and family	Descriptions of the influence of opinions from friends and family in addition to advice given by them	32 references across 14 interviews	"before the surgery my Mum was kind of simply saying don't get it done because it's obviously a surgery it's an invasive kind of procedure. You don't know what the outcome is going to be afterwards. So if it, if I didn't have a physio background, if it was just what other people were telling me and my family I probably would have thought, second thoughts about it."
5.11	Influence of the media	Descriptions of the influence of the media	3 references across 2 interviews	"I am a Liverpool fan. I have seen Van Dyke it took him a year to get back to playing football and he's got the best physio's and best coaches around him in the world, so I am not expecting to be kicking a football any time soon"
5.12	Information/Knowledge = power	Accounts of information and knowledge equating to power	28 references across 11 interviews	"And unfortunately you and I both know, NHS don't give enough information on rehab on the injuries. So yes if I was in a situation where I didn't know what I was doing I would have liked more information on how to do it and with my health as well, access to gyms and stuff like that ... I think knowledge is power"
5.13	Concerns	Descriptions of participants concerns	3 references across 2 interviews	"Yes, you worry, obviously, outcomes was mentioned as well, that I should think about—I was surprised about how many things were mentioned, in the future, what I should expect because of the surgery, because of this injury that I had, that knee replacement itself, I have to expect; I should think of within 30 years or whatever."

Supplementary File 4 - Concerns and questions raised during the preoperative period

Concerns and questions raised during the preoperative period	Supporting Quote(s)
What surgery am I having?	"I don't know what surgery I am expecting" [P7] "All I knew is that I was going to get two procedures" [P17]
How long until I can drive after surgery?	"Do I know how long I can't drive for? … I know absolutely nothing" [P3]
How long will I need a brace/crutches for?	"Do I know how long I'll be in a leg brace? You know how long on crutches for? I know absolutely nothing" [P3]
How long will the recovery period be?	"Well to explain what the surgery entailed and what your recovery's going to look like" [P4] "it depends what surgery I am expecting depends on what Google is telling me and I don't know what surgery I am expecting. I don't know if it's, as I said Google is telling me how long recovery is for like a small keyhole surgery and what the length of the surgery will be and this and that. But then it's telling me something completely different for a different style of knee surgery to repair it a different way and I don't know which one I am having." [P7] "Because the questions that I was asking the nurse, she could sort of give me an idea but couldn't confirm it, so like things like how long the recovery period would take and things like that." [P8] "I don't even know how long it will take me to heal up, nobody has said ought" [P13]
I shouldn't exercise, it's risky	"I don't like it, well it's more that confidence thing I probably could exercise but it's just the mental blocks like what happens if I fall off, what happens if I do further damage to it and that's a risk I don't want to take" [P5] "I didn't really have the confidence to go and run for example. So I have not really done any running for at least two years. A bit of a confidence thing because my knee has given way pre-surgery a couple of times and it's not a nice feeling, but I also know that it's not stable at all so I haven't even risked it really." [P8]

	"there is not enough information for people and the probability of reoccurrence injury is much higher than I would like it to be because people will rush back to exercise, especially football, rugby or any sport where they have torn their ACL… Avoid things that are going to damage it even more" [P9]
Who can I contact for support?	"Like who do you go to? Do you go the surgeon, do I speak to the receptionist? Do you go to the physio who you have not seen in the last year? Do you go to the GP who you are not going to get seen because GPs are difficult to get hold of at the best of times, never mind if it's not an urgent case where you aren't going to drop dead the next day? So it's like where do you go? You are not being given any information. Do you go back to A&E? A&E is absolutely rammed at the minute with patients left, right and centre" [P8] "knowing that someone could be on the end of a phone would have been great." [P16]
What additional damage could I cause whilst waiting?	"he says, 'Oh, you're at a much higher risk of doing further damage if it's not repaired.' And then they leave you for all that big, long period of time to do that further damage, that then he infers might make repair definitely more difficult, or impossible. Do you know what I mean, so I think that you feel a bit adrift for that." [P4] "I probably could exercise but it's just the mental blocks like what happens if I fall off, what happens if I do further damage to it and that's a risk I don't want to take" [P5] "I have kept myself active. I have kept myself moving, I have kept myself really healthy despite my injury but how much extra damage has that done? Has it done extra damage? I don't know." [P7]
What about re-rupture?	"The only thing I'm worried about is well when I was reading up on the surgery side of things if it snaps again because if you have surgery a second time it's going to give it less chance to heal or

	fail. That is the only thing I am worried about; I've just got to make sure I take good care of it in the recovery process." [P5]
What can/can't I do?	"obviously throughout the year and a half I've been waiting I know what my knee is capable of it just that time period, but I suppose a physio could of helped with that don't do these movements, these movements, these movements, only do these certain movements" [P5] "I had no direction for prehab … can I do this, can I do that, whereas I may have just done it ... I want to push myself as much as possible but you need to tell me where that limit is because otherwise I may get nowhere near it." [P11] "I think it would have been good to have a bit of physiotherapy support, and also, to make sure I was doing the right kind of things to prepare myself for the surgery because I didn't really have any plan before the surgery." [P15]