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Psychological, social and contextual factors across recovery stages following a sport-related knee injury: a scoping review

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ABSTRACT

Objective To explore the role of psychological, social and contextual factors across the recovery stages (ie, acute, rehabilitation or return to sport (RTS)) following a traumatic time-loss sport-related knee injury.

Material and methods This review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews and Arksey and O'Malley framework. Six databases were searched using predetermined search terms. Included studies consisted of original data written in English that identified or described a psychological, social or contextual factor related to recovery after a traumatic time-loss sport-related knee injury. Two authors independently conducted title–abstract and full-text reviews. Study quality was assessed using the Mixed Methods Appraisal Tool. Thematic analysis was undertaken.

Results Of 7289 records, 77 studies representing 5540 participants (37% women, 84% anterior cruciate ligament tears, aged 14–60 years) were included. Psychological factors were investigated across all studies, while social and contextual factors were assessed in 39% and 21% of included studies, respectively. A cross-cutting concept of individualisation was present across four psychological (barriers to progress, active coping, independence and recovery expectations), two social (social support and engagement in care) and two contextual (environmental influences and sport culture) themes. Athletes report multiple barriers to recovery and valued their autonomy, having an active role in their recovery and diverse social support.

Conclusion Diverse psychological, social and contextual factors are present and influence all stages of recovery following a traumatic sport-related knee injury. A better understanding of these factors at the time of injury and throughout rehabilitation could assist with optimising injury management, promoting RTS, and long-term health-related quality-of-life.

BACKGROUND

Up to 40% of reported time-loss sport injuries involve knee trauma.[1 2] Despite best efforts, many athletes do not return to sport (RTS) following a traumatic knee injury[3 4] and/or develop early-onset post-traumatic osteoarthritis (PTOA), irrespective of management approach.[5–7] Traditionally, injury recovery predominantly focused on resolving physical impairments. However, improved physical outcomes are not always associated with return to physical activity,[8] long-term satisfaction[9] or favourable health-related quality-of-life (HRQoL),[10] suggesting that additional 'non-physical factors' may mediate recovery. These non-physical factors likely encompass a broad range of psychological, social and contextual domains.[11]

Psychological factors that influence recovery from a traumatic, time-loss, sport-related knee injury include cognitive (eg, perceptions), behavioural (eg, adherence) and affective (eg, moods) responses associated with an individual's experience of the injury, rehabilitation, surgery and RTS.[11 12] For example, fear of re-injury and poor psychological readiness for RTS in individuals with an anterior cruciate ligament (ACL) tear negatively influence activity levels and RTS.[13–15] Similarly, a recent systematic review highlighted the association between greater preoperative self-efficacy (ie, belief that one is capable of executing a behaviour in a specific context)[16] and less future knee pain and favourable functional and RTS outcomes following an ACL reconstruction (ACLR).[17] Social factors that influence recovery in this population include the social networks (eg, family, sport, therapy) and social exchanges (eg, relationships, support) that influence, and are influenced by an individual's injury experience.[18 19] Specifically, effective communication and a strong patient–therapist (therapeutic) alliance have been shown to be associated with improved rehabilitation outcomes following a musculoskeletal injury.[20 21] Contextual factors that influence an individual's injury experience include the structural and institutional systems that they are embedded in (eg, physical or sport environment, ethnicity, socioeconomic status).[19 22] For instance, cultural perceptions shaped by one's ethnicity or societal influences (eg, community views about disability) could impact beliefs, recovery expectations, rehabilitation satisfaction, and HRQoL in individuals with chronic low back pain.[23 24]

A holistic approach that considers physical, psychological, social and contextual factors was recommended to optimise recovery in a recent consensus statement on sport-related injuries.[25] Yet, evidence about the psychological, social and contextual factors influencing recovery following a time-loss sport-related knee injury is lacking, making clinical application of these recommendations challenging. Although previous reviews[13 15] have broadly summarised psychosocial factors related to sport injury outcomes, no review has looked at psychological and social factors as distinct domains or considered contextual factors after a time-loss

traumatic knee injury. Unlike a systematic review, which aims to synthesise evidence from multiple studies to answer a specific research question,[26] a scoping review aims to map the breadth and depth of the current evidence around a particular topic that is dispersed across disciplines and heterogeneous study designs.[27–29] The aim of this scoping review is to consolidate and examine the evidence related to the role of psychological, social and contextual factors across the recovery stages (ie, acute, rehabilitation or RTS) following a traumatic time-loss sport-related knee injury to identify key themes and knowledge gaps.

METHODS

This review was conducted and reported according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews.[30] We followed the methodological framework of Arksey and O'Malley (2005) with refinements proposed by Levac *et al* (2010) and the Johanna Briggs Institute (2015).[27–29] At the initiation of this review, there was no database to register a priori scoping review strategies.

Study team

To facilitate robust and clinically relevant review findings,[29] the study team included individuals with expertise in evidence synthesis, quantitative and qualitative research methodology, clinical epidemiology, sport and exercise psychology, clinical therapeutic relationships, and sport and knee injury rehabilitation.

Data sources and search

Relevant studies were identified by searching six online databases (ie, MEDLINE, PsycINFO, CINAHL, SportDiscus, SCOPUS and ProQuest) from inception to May 2018, selected based on their relevance to the research topic. Keywords and constructs (ie, MeSH, Boolean phrases) used to execute each search were developed a priori from a preliminary search, conceptual papers,[11 12 18 22 31] search strategies from relevant systematic reviews,[13 14] and in consultation with team members and a health sciences librarian scientist. A list of search terms is provided in table 1, and the full search strategies for all databases are found in online supplementary file 1. To ensure that the search strategy was capturing relevant records, an iterative process involving team meetings to refine search terms and resolve challenges was used.[27 29] One specific challenge was operationalising 'psychological', 'social' and 'contextual'. In the end, search terms were refined to include examples of each. All searches were limited to the English language, conducted by the lead author, and organised using the reference management software EndNote X8.1.

Study screening

After accounting for duplication, the titles and corresponding abstracts of all returned records were independently reviewed by two raters, blinded to record author(s) and journal title. Prior to the title and abstract reviews, all raters independently screened a random sample of 120 titles and abstracts to assess the applicability of the exclusion criteria and inter-rater agreement and Cohen's kappa (*K*) with the senior author. All reviewers reached acceptable agreement (95%–98%, $K=0.75–0.90$). Finally, two independent raters performed full-text screening to determine final study selection. Consensus was reached on disagreements, first between raters and if required with the senior author. A review of the reference list of included studies, relevant systematic or literature reviews, and clinical guidelines was used to identify additional relevant records.

Study selection

Studies were included if they identified, described or assessed a psychological, social or contextual factor during the acute, rehabilitation or RTS stages of recovery following a traumatic time-loss knee injury resulting from or interfering with sport participation. See table 2 for definitions and table 3 for inclusion and exclusion criteria.

Data extraction

Data extracted from each study included the following: study year, design, location and aim; sport and sport participation level; sample age and size; injury type (eg, ACL, ACLR, patella dislocation); instrument(s) or approach(s) used to assess psychological, social and/or contextual factor; recovery stage (ie, acute, rehabilitation or RTS); and study result (ie, identification or description of psychological, social and/or contextual factor during the acute, rehabilitation or RTS stages of recovery). For studies that asked participants to reflect on past experiences, the assigned recovery stage was categorised based on the period being assessed.

Data extraction was completed by the lead author using a customised form. Prior to data extraction, the performance of the form was assessed by comparing data extracted by two independent raters across a purposive sample of 12 studies of various designs to ensure accurate and relevant data were extracted across different study designs.

Data synthesis

Individual psychological, social and contextual factors were identified across studies. Factors were operationalised based on consultation with the study team and relevant sport injury or

Table 1 Search terms

Construct	Keywords
Population: (sport participants with a lower body injury)*	Athlet* injur* or sport* injur* or recreation* injur* lower extremit* or lower limb* or hip* or thigh* or leg* or knee* or ankle* or foot or feet or toe* or ((anterior or posterior) adj cruciate adj2 ligament*) or ((medial or lateral) adj collateral adj2 ligament*) or femoracetabular or femur or menisc* or patellofemoral
Injury type: (musculoskeletal)	tear* or rupture* or ligament* or sprain* or strain* or dislocation*
Non-physical factor: (psychological, social, contextual)	psycholog* or psychosocial or psycholog* response or psycholog* readiness or social support or cognition* or affect or behav* or motiv* or emotion* or patient belief* or confiden* or attitude* or personalit* or self esteem or locus of control or self efficacy or autonomy or kinesiophob* or fear* of reinjur* or avoidance or anxiet* or frustrat* or coping or cope or stress* or optimism or quality of life or patient satisfaction or goal setting or goal* or expectation* or perception* or patient prefer* or athlet* identit* or well-being or mindfulness or resilienc* or catastrophi* or accept* or compassion* or hope or achiev* or education or knowledge or relationship* or interaction* or alliance* or feedback or encourag* or trust or communicat* or rapport or respect or caring or connection or socioeconomic status or cultural or ethnicity or urban rural

*initial search strategy targeted all traumatic sport-related lower extremity injuries.

Table 2 Operationalised definitions

Term	Definition
Psychological factor	Cognitive, behavioural or affective responses associated with an individual's experience of injury, rehabilitation, surgery and RTS[11]
Social factor	Social networks and social exchanges that shape an individual's experience of injury, rehabilitation, surgery and RTS[18 32]
Contextual factor	Structural and institutional systems in which an individual is embedded that influence their experience of injury, rehabilitation, surgery and RTS[22 31]
Acute recovery stage	The time period immediately post-injury and/or pre-surgery or post-surgery
Rehabilitation recovery stage	The time period between the acute and RTS stage that is focused on restoring physical and psychological function
RTS recovery stage	The time period when an injured athlete is engaged in a graduated RTS programme or have returned to sport and/or physical activity
Traumatic time-loss knee injury	Any trauma to the knee (joint, ligament, muscles) caused by a transfer of energy that exceeded the body's ability to maintain its structural and/or functional integrity and resulted in a player missing at least one training session (practice) or match play[129]
Sport participation	Participation in any level (recreation, competitive or professional) of organised sport at time of injury[130] ► Recreational=sport participation primarily for fun and entertainment ► Competitive=amateur sport participation at a high competitive level (eg, varsity or collegiate level) ► Professional=elite sport participation at the highest level of a sport (eg, national, international, professional level athletes) with monetary support (eg, salary/carding, stipends, sponsorships)

RTS, return to sport.

conceptual papers.[11 12 18 22 32] An inductive thematic analysis[33] was used to identify patterns, summarise consistent findings across studies and generate common themes. The Biopsychosocial Model[11] and WHO HRQoL framework[34] were used to categorise individual factors and themes into psychological, social and contextual domains. These conceptual models were used to facilitate translation of the findings to patients, healthcare providers and other stakeholders and assist in the identification of knowledge gaps. Regular study team meetings were held to discuss and agree on emerging themes and interpretations.

Quality assessment

The methodological quality of included studies was assessed by two independent raters using the Mixed Methods Appraisal Tool (MMAT) 2018 Version (online supplementary file 2).[35] The MMAT assesses five different methodological categories, allowing the tool to be used across various study designs and is reliable, valid and efficient.[35–37] The level of evidence represented by each record was determined with a modified version of the Oxford Centre of Evidence Based Medicine (OCEBM) 2009 model (online supplementary file 3). Discrepancies in the MMAT scoring or OCEBM categorisation were resolved by consensus between the raters and as needed with the senior author.

Rigor

The iterative nature of a scoping review allows for refinement of exclusion and inclusion criteria to ensure an adequate yet feasible scope of relevant evidence.[27 29] The initial scope of this review included grey literature (ie, PhD theses) and all sport-related lower extremity injuries. Given the small number of records remaining after title/abstract screening that assessed non-knee injuries (n=5) or grey literature (n=18), a decision was made to focus on published peer-reviewed studies and knee injuries. Of the 16 grey literature records pertaining to the knee, the findings of three were included as peer-reviewed papers and the remaining were re-visited to ensure no theme or construct was missed.

Table 3 Study exclusion and inclusion criteria

Inclusion criteria	Exclusion criteria
English language	Not English language
Human participants	Animal models or cadavers
Primary study design with original data	Not primary or original data (eg, conference proceedings or abstracts, editorials, commentaries, opinion-based papers or reviews)
Traumatic time-loss knee injury	Do not involve a traumatic time-loss knee joint injury
Describes a psychological, social or contextual factor during recovery (acute, rehabilitation or RTS)	Does not describe a psychological, social, contextual factor during recovery (eg, injury prevention, epidemiology or surgical technique studies)

RTS, return to sport.

RESULTS

Identification of studies

An overview of the study identification process is provided in figure 1. Of 7289 potential records, 4746 unique records underwent title/abstract screening, 293 were reviewed in full, and 77 studies were included.

Study characteristics

In all, 54 (70%) studies were quantitative (involving longitudinal (30%),[38–63] cross-sectional (27%)[64–84] or case series (5%)[85–88] designs), three (4%) included an intervention,[89–91] 18 (23%) studies were qualitative[92–109] (consisting of seven (39%) descriptive, five (28%) case or narrative, three (17%) grounded theory, and three (17%) phenomenology approaches) and five (6%) mixed methods designs.[110–114] Full details of study characteristics are summarised in online supplementary file 4.

Studies represented data from 5540 participants (men=2986, women=2030) ranging in age from 14 to 60 years from 14 countries. Across studies, participants represented a variety of sport participation levels. Most studies investigated individuals 18 years of age or older (77%), with only two studies investigating adolescence. In all, 65 (84%) of studies involved individuals following ACL injury or ACLR, with the remaining investigating individuals with a patella dislocation, meniscectomy or other ligament injury.

Psychological, social and contextual factors and recovery stage

Table 4 provides the summary and definition of the psychological, social and contextual factors identified across studies. Psychological factors were reported in all studies, while only 39% and 21% of included studies reported on social and contextual factors, respectively. Most studies were performed during

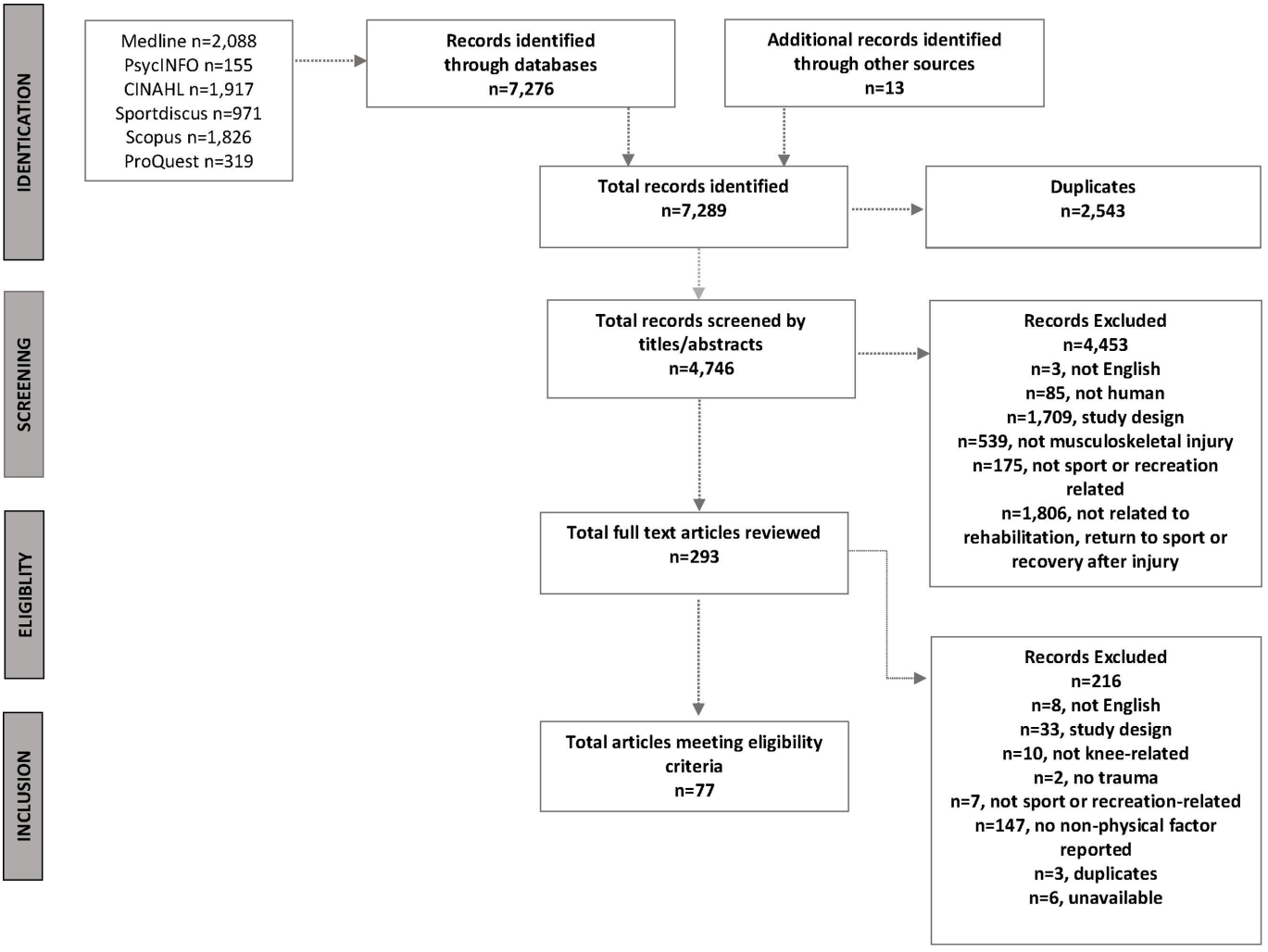

Figure 1 Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews flow chart.

rehabilitation (47%) or RTS (37%) recovery stage, with only 15% of included studies addressing the acute stage.

Data synthesis

Higher-level themes that represented consistent findings and patterns across studies are presented in figure 2. These themes were further categorised into psychological, social or contextual domains resulting in four psychological, two social and two contextual themes with one cross-cutting concept.

Psychological domain themes

Barriers to progress

Athletes experience a variety of barriers to progress during recovery from a knee injury. While fear was most commonly reported, other emotional barriers such as frustration and anxiety[68 92–94 100 101 105 106 108 112 113] were evident throughout all recovery stages.[41 57 68 83 93 96 100 110] Fear was most commonly seen as a major barrier during RTS.[61 65 73 76 78 82 92 95 105 106 110 113 114] However, only 20%–45% of athletes stated fear as the main reason for not returning to sport[73 76 78 113] with psychological readiness,[48 64 84 85] knee and sport confidence,[92 94 114] and motivation[54 58] identified as other barriers for RTS. Beyond recovery, fear of re-injury was associated with ACL re-injury within 2–5 years[53 88] and reduced activity levels 3–20 years following ACLR.[47 95 113] Across studies, early recognition and acknowledgement of negative emotions were important for recovery.[93 102 110]

Active coping

Injured athletes value playing an active role in their recovery. Immediately after injury, athletes reported wanting strategies that help them understand their injury and diagnosis,[94 103 110] manage emotions[87 93 106] and deal with athletic identity loss.[96–98 106 108 109] Approaches to managing recovery setbacks (eg, flare-ups or re-injuries)[105 112] and problem-based coping tactics during RTS[92] were also important. There was a continued need for active coping strategies beyond RTS to assist in accepting the long-term consequences of knee injury,[94 95] improve knee confidence[75] and transition to a life outside of sport.[98 107] An absence of coping strategies was associated with being unprepared for the mental demands of recovery,[97] depressed feelings,[108] failed RTS[102] and maladaptive behaviours such as substance abuse or catastrophising pain.[40] In contrast, providing active coping strategies was associated with greater motivation,[99 101 102 110 111] resilient behaviour,[99 112] and adherence to rehabilitation.[93 104]

Independence

Across studies, injured athletes reported a desire to develop or preserve their independence and have control over their rehabilitation.[42 56 60 67 69 70 93 97 99 101–103 112] Developing greater

Table 4 Categorisation and definitions of identified psychological, social and contextual factors and themes

Theme	Factor	Definition	No. of studies
Psychological domain	Psychological factor		**77**
Barriers to progress	Fear/anxiety[131]	Fear* is a biological mechanism associated with definite danger (eg, fear of re-injury), whereas anxiety is associated with anticipation or uncertainty from previous experience (eg, re-injury anxiety)	29
	Other emotions[32]	The way one feels after an event (eg, injury) and can consist of feelings and/or mood disturbances (eg, frustration, anger, depression)	24
	Psychological readiness[32]	A state of mental preparedness. In the context of RTS, this includes an appraisal of one's health status and risks (perceived or actual) associated with sport participation	8
	Sport-confidence[132]	The belief or degree of certainty individuals possess about their ability to be successful in sport	6
Active coping	Coping[133]	Cognitive and behavioural efforts used to manage demands that are appraised as taxing or exceeding one's resources	19
	Identity[134]	An internal, self -constructed, dynamic organisation of drives, abilities, beliefs, and individual history	13
	Catastrophising pain[24]	A negative appraisal of pain that may represent ineffective or inappropriate pain coping strategy	4
	Resilience[135]	The ability to use personal qualities to withstand pressure, 'bounce back', and persist during stressful or adverse encounters (eg, injury)	2
Independence	Self-efficacy[16]	A situation-specific form of confidence that involves self-assessment or judgement of one's capability to execute behaviours to attain an outcome	12
	Motivation[115]	All aspects of activation and intention on behaviour, including energy, direction, persistence and equifinality	10
	Autonomy[115]	An internal perceived locus of causality or degree to which individuals desire to control life events or behaviour	4
Recovery expectations	Recovery expectation[127]	A belief that some anticipated future outcome is likely	12
	Perceptions[136]	How one views or perceives their current situation or injury	8
	Beliefs[136]	A dispositional mindset that may or may not manifest either in consciousness or behaviour	5
Social domain	Social factor		**30**
Social Support	Social support[137]	An exchange of resources or social interactions between individuals comprising of emotional, informational and tangible support	29
Engagement in care	Therapeutic alliance[138]	A working relationship between a healthcare provider and patient that involves agreement on treatment goals, tasks, and an affective bond (eg, trust)	7
	Shared decision-making[125]	A process whereby healthcare providers and patients work together to make healthcare choices based on best available evidence and patient's values	4
Contextual domain	Contextual factor		**16**
Environmental influences	Environment[139]	The atmosphere or setting of a situation which is created by a combination of external (eg, healthcare provider) factors and/or one's individual context	12
Sport culture	Sport culture[139]	The environment or ethos of a sport	4

*Given that fear has been heavily investigated in this population, we chose to separate it from 'other emotions.' Fear and anxiety (fear of re-injury/re-injury anxiety) were grouped together as these two constructs were often used interchangeably across studies.
RTS, return to sport.

independence by promoting self-motivation,[54 64 67 70 76 85 87 101 104–106] confidence,[78 92 94 98 100 102 105 108 113 114] self-efficacy,[60 81 99] and autonomy around decisions for RTS and future activity choices[42 69 97 103 104] were reported to positively influence either rehabilitation or RTS outcomes. Furthermore, fostering psychological readiness for RTS promoted independence, self-awareness on readiness to RTS and greater confidence on RTS.[39 48 64 84 85 92 100 102 103 109]

Recovery expectations

Establishing realistic expectations for rehabilitation or RTS[97 98 103 106 108] and long-term recovery[66 109] was important to athletes recovering from knee injuries. However, several studies identified unrealistic expectations about the length of recovery by athletes requiring surgery.[55 72 79 83] Not meeting recovery expectations was associated with negative emotions (eg, frustration) and a loss of confidence during rehabilitation.[97 98 112]

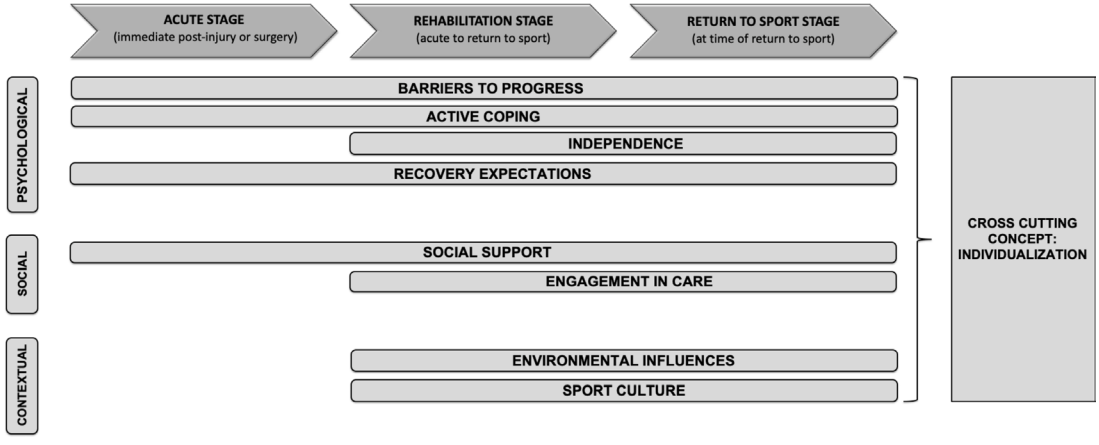

Figure 2 Representation of psychological, social and contextual themes by recovery stage.

Interestingly, recovery expectations were influenced by interactions with healthcare providers,[98 106] high-level role models, other players and coaches,[98 105] prior perceptions,[87] and/or beliefs.[68 83]

Social domain themes

Social support

The exchange of resources such as informational (ie, education) or emotional support positively influenced recovery expectations,[98 101 106] negative emotions[92 98 107 108] and risk appraisal on RTS.[100 109] Social support was associated with greater adherence,[52 67 93 104 106] resilience,[94 99] confidence[98 108] and self-motivation.[106 108] Sources of social support changed throughout recovery with athletes reporting support from family, friends and teammates as important in early stages[98 110] and a shift towards valuing support from coaches, physical therapists and other medical staff at later stages.[50 92 110] Furthermore, an injury role model, a forum to discuss and share experiences, and establishing new social roles and networks were important for staying motivated and effectively coping during recovery from injury.[94 96 99–101 103 106 108 111 112]

Engagement in care

Injured athletes valued healthcare providers who engaged and involved them in their care through strategies such as goal setting.[93 97 102 105 106] A strong therapeutic alliance, where individual goals and values of athletes were respected led to positive rehabilitation experiences and improved trust in healthcare providers.[93 96 101 102 108] Open discussions with healthcare providers and coaches[92] allowed for athletes to have autonomy over surgery and RTS decisions and favour successful RTS.[98 103 106]

Contextual domain themes

Environmental influences

An environment that promoted autonomy-supported behaviours were associated with greater levels of adherence to rehabilitation, independence and self-motivation.[69 70 110] Considerations important for adherence to rehabilitation included addressing situational factors (eg, lack of time or equipment, personal activity preferences)[104] and making rehabilitation enjoyable or challenging.[93 97 104]

Sport culture

A paucity of studies investigated the role of sport culture on recovery from a traumatic sport-related knee injury, but a few studies reported on the hyper-masculine culture of sport that validated enduring pain and downplaying injuries.[92 107] Intense social pressure from peers[106] and culture of risk-taking within sport[92 109] contributed to athletes considering premature RTS.[106 109]

Cross-cutting concept of Individualisation

Psychological, social or contextual factors manifested differently across athletes, highlighting a concept of 'individualisation'. For example, fear or anxiety may manifest as fear of re-injury/re-injury anxiety,[65 71 73 74 76 78 82 94 95 105 106 113 114] fear/anxiety of poor performance,[92 101 106] fear of failure,[110] fear of the unknown or uncertainty of the situation (eg, contact sport, future long-term consequences)[100 109 113] or fear of having to repeat rehabilitation.[106 108 109 113] Similarly, individual coping strategies,[83 101 111] desire for social support,[50 112] preference to remain or avoid social roles[96 102 105 106] and environmental factors that influence treatment adherence exist.[44 104] Recovery expectations differed by gender and age, with men and younger athletes reporting greater expectations to RTS[55 72 79 113 114] and different pressures to RTS (ie, peer pressure, performing through pain) compared with women or adults.[106 107 109]

Quality assessment

MMAT ratings of included studies are summarised in online supplementary file 4. Most quantitative studies were rated as poor to moderate quality with only six studies rated as high quality (scoring four or higher). Qualitative studies had higher MMAT scores with nine studies rated as high quality. The highest level of evidence demonstrated by quantitative studies using the OCEBM model was level 2b (low-quality RCTs), with the majority classified as level 4 (61%).

DISCUSSION

This comprehensive synthesis highlights a broad spectrum of psychological, social and contextual factors that mediate recovery after a traumatic time-loss sport-related knee injury. Athletes who have suffered a sport-related knee injury experience fear/anxiety as well as other barriers to progress recovery, most predominately at RTS. Across all recovery stages, athletes valued having an active role in their recovery and engaging in decision-making, as well as having their autonomy respected. Working with healthcare providers to set realistic expectations and receiving educational resources and social support was essential to successfully recover from a sport-related knee injury. The psychological, social and contextual factors were dynamic over recovery stages, and must be assessed and managed on an individual level.

Psychological considerations for recovery from sport-related knee injury

We identified four themes within the psychological domain: barriers to progress, active coping, independence and recovery expectations. Consistent with previous research,[13 14] fear is common in this population and consistently reported as a barrier for RTS.[73 76 78 113] However, other barriers such as frustration, anxiety, lack of confidence,[92 94 114] motivation[54 58] or psychological readiness for RTS[48 64 65 84 85] are also important. The desire for 'active coping' and 'independence' is consistent with the well-established self-determination theory[115] that highlights satisfying individual needs for competence, relatedness and autonomy enhance recovery outcomes.[116] Active coping strategies appear to be a common approach for athletes,[117] which can promote motivation and resilience, particularly when facing a significant time-loss injury.[59 99 101 102 110 111] Athletes should be active in the development of their rehabilitation plan to foster autonomy and enhance internal locus of control.[115] Given the importance of RTS for this population, early discussions and setting realistic expectations are vital to minimise negative emotions in later stages of recovery.[97 98 112]

Social considerations for recovery from sport-related knee injury

Social support and engagement in care were the two themes identified in the social domain. As highlighted by others,[20 118] needs for social support change over time and continued re-evaluation of these needs are required to ensure the amount and type of social support desired by the athletes recovering from a knee injury is provided. Social support in the form of education was desired throughout recovery. Knowledge is a cornerstone of

Table 5 Clinical implications

Key findings from review	Clinical implications
1. Acknowledge the importance of psychological, social and contextual factors	Psychological, social and contextual factors should be acknowledged and not be viewed as less important than physical factors. Given the wide range of psychological, social and contextual factors present, a holistic approach may more adequately determine the individual needs
2. Psychological, social and contextual factors are dynamic and change over time	Psychological, social and contextual factors should be assessed early and monitored throughout recovery stages as they change from the acute to RTS stage of recovery
3. Consider addressing social and contextual factors to optimise care	Strategies to develop a strong therapeutic alliance and engaging athletes in their care while considering how broader environmental and societal factors impact decision-making should be vital components of recovery
4. Focus on the individual	Interpretation and experience of psychological, social and contextual factors during recovery is individual, and will facilitate the development of a recovery plan that best addresses individual needs and most likely to achieve success.

patient empowerment[119] and may be an important consideration for coping with a significant time-loss injury.

Patient and healthcare provider engagement in care is drawing considerable attention, given its positive association with self-care (eg, fostering autonomy) and overall health outcomes.[120] Engagement is a necessary condition for a strong therapeutic relationship in physical therapy[121] and a key component of a shared decision-making model.[122] A strong therapeutic alliance was associated with improved rehabilitation outcomes in chronic musculoskeletal conditions[123] and is likely relevant to recovery from a sport-related knee injury. Given the high risk of re-injury[124] and future PTOA[5] in this population, employing a shared decision-making approach early in the recovery process might enhance patient autonomy and the ability to make informed decisions regarding their current and future knee health. Although this model has been widely promoted as the ideal approach for RTS decisions,[25] there appears to be a lack of understanding of shared decision-making in healthcare.[125]

Contextual considerations for recovery from sport-related knee injury

Contextual factors during recovery from a sport-related knee injury are rarely studied, but consistent themes of environmental influences and sport culture were present. Our findings align with prior research that highlight sport cultivates a culture of 'no pain no gain' and risk-taking, which can contribute to premature RTS and further injury.[31] While it is not typical for healthcare providers to consider the systemic environmental factors that shape an athlete's recovery from injury, it is essential to understand that this context may be a stronger determinant of recovery than the treatment provided as it determines access to resources and shapes behaviours.

Individual considerations for recovery from sport-related knee injury

The importance of tailoring recovery to the individual is essential if patient-centred care is the goal.[126] Understanding personal goals, values and definitions of success are important as they influence recovery expectations.[127] It is clear that individual characteristics such as gender, age and level of sport participation influence the presentation of psychological, social and contextual factors across recovery stages and can shape recovery outcomes, such as sport participation after an injury. For example, prior studies have reported that men are more likely to return to their pre-injury sport compared with women after ACLR.[3] This might reflect gender-specific and sex-specific psychological, social and contextual factors. Specifically, men may embrace the hyper-masculine sport culture and indulge in risky behaviours[92 107] than women who may be more risk adverse.[109] Similarly, the social peer pressure to RTS may be more apparent during adolescence[106] as sport participation is an important form of social connection during the developmental years.[128] It is likely that cultural perceptions, religion, social gradient, and multiple other social and contextual factors also influence recovery and drive specific actions and behaviours in different populations. A better understanding of an individual's context is essential to developing a holistic approach to optimise recovery.

Clinical implications

Table 5 provides the summary of the clinical implications of our findings.

Strengths and limitations

The broad research question and inclusion of diverse study designs that contained both quantitative and qualitative data resulted in a rich, in-depth mapping of the current evidence-base. Using two established frameworks required us to consider factors and themes in psychological, social and contextual domains, and provided more clarity about the types of factors and themes that are present in this population. We recognise that many identified factors share overlapping domains; however, this complexity and interrelatedness is critical to an accurate representation and understanding of psychological, social and contextual factors across recovery stages.

Scoping reviews rarely evaluate the methodological quality of included studies, but we chose to take this additional step to confidently develop our conclusions and identify the knowledge gaps.[29] It is important to reiterate that most included studies were of poor to moderate methodological quality, indicating the need for higher-quality studies in this field. With that said, the consistent themes that emerged across studies provide us with confidence in our conclusions.

Despite a comprehensive search strategy, most included studies were limited to ACL injuries, pointing to a paucity of evidence related to other traumatic time-loss lower extremity injuries potentially limiting the generalisability of our findings. With that said, it is possible that our findings and their clinical implications may have broad applicability across recovery from other traumatic sport injuries. The studies contributing data to the RTS stage were heterogeneous in time since injury as many were retrospective in nature. While we followed a rigorous approach and engaged a research team with diverse expertise, formal consultation with other stakeholders (ie, persons with traumatic knee injuries), disciplines (ie, social scientists) and inclusion of grey literature may have provided further insight at all stages of the review.

Future directions

This review provides a foundation to understand the role and interactions between psychological, social and contextual factors

What are the new findings?

- Psychological, social and contextual domains play an important role in recovery following a sport-related knee injury.
- Athletes who suffer a sport-related time-loss knee injury experience many barriers to progress beyond fear across all stages of recovery.
- Athletes value having an active role in their recovery, being engaged in decision-making, and having their autonomy respected.
- Psychological, social and contextual factors change over time and should be assessed early and often throughout recovery stages.
- Individual consideration of psychological, social and contextual factors is an essential component of an evidence-based approach to management of sport-related knee injuries.

How might it impact on clinical practice in the future?

- Recovery from a traumatic time-loss knee injury does not always have a happy ending, with a significant proportion of individuals failing to return to pre-injury sport and reporting reduced health-related quality of life.
- Despite many reports about the importance of considering psychological, social and contextual factors after a sport-related knee injury, management tends to prioritise physical impairments.
- Assessment and monitoring of psychological, social and contextual factors should be conducted throughout recovery, and not just at the return to sport stage
- Consider an individual and patient-centered focus when managing psychological, social and contextual factors to optimise recovery

as it relates to recovery following a traumatic time-loss sport-related knee injury. Although a great deal is known about interpersonal psychological factors, particularly fear, further research is needed to understand social and contextual factors, including the broader influence of systemic determinants on recovery from a traumatic time-loss sport-related knee injury. Overall, there is a paucity of knowledge about the status of psychological, social and contextual factors at the time of injury. Better understanding of these factors in the early stages of recovery will assist in the development of screening strategies for poor recovery and facilitate research aimed at understanding how these factors change and are influenced over time.

There is an opportunity to address inconsistencies in terminology used to define social and contextual factors within the sport and exercise medicine/rehabilitation field, and align with broader definitions from the social sciences. Furthermore, developing consensus on how individual psychological, social and contextual factors are defined and reported is essential for amalgamating data across studies and will promote uptake of these constructs in clinical practice.

Currently, there is a tendency in the sport and exercise medicine/rehabilitation field to lump psychological and social factors together and to focus care at the individual level. To date, few studies have considered the broader systemic aspects of social (societal) and contextual conditions (eg, social isolation or social gradient) in which athletes are injured and recover.[19] A better understanding of how these broader social and contextual factors shape an athletes recovery is essential to optimising that process and improving overall well-being.

CONCLUSIONS

This scoping review highlighted the broad spectrum of psychological, social and contextual factors that can play a role during the acute, rehabilitation and RTS stages of recovery following a traumatic time-loss sport-related knee injury. The experience and interpretation of these factors are individual. While high-quality research is needed in this field, there appears to be consistent evidence of the impact of psychological and social factors on recovery. Individualised consideration of these factors should be an essential component of an evidence-based approach to managing sport-related knee injuries.

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Contributors LKT and JLW were responsible for the conception of the study and along with Maria Tan developed the search strategy. LKT executed the search strategy. All authors independently reviewed records, assessed the methodological quality of included studies and extracted data. LKT was responsible for the first draft of the manuscript. All authors contributed to the interpretation of the findings, critical revision of the manuscript and reviewed the document prior to submission.

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