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THE PSYCHOLOGICAL IMPACT AND FEAR OF RETURNING TO TRAINING AMONG ATHLETES IN SAUDI ARABIA: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Abstract

Background: Anterior cruciate ligament reconstruction (ACLR) is a commonly performed surgical procedure aimed at restoring knee stability and facilitating a return to sport (RTS). However, psychological factors, such as fear of re-injury and kinesiophobia, significantly impact functional recovery and RTS outcomes. This systematic review examines the characteristics, psychological outcomes, and functional recovery of athletes post-ACLR, with a focus on fear-avoidance behavior, psychological readiness, and factors influencing RTS confidence.

Methodology: A comprehensive literature search was conducted to identify studies assessing psychological and functional recovery following ACLR. The included studies, primarily cross-sectional in design, were evaluated for population characteristics, assessment tools, and key findings related to fear of re-injury and psychological readiness. Psychological outcomes were measured using validated scales, including the Tampa Scale of Kinesiophobia (TSK), ACL-Return to Sport after Injury (ACL-RSI), and Lower Extremity Functional Scale (LEFS).

Results: The included studies shared common themes related to psychological and functional recovery post-ACLR. Athletes recovering from ACLR demonstrated varying levels of psychological readiness, with fear of re-injury identified as a critical barrier to RTS. Abdelraouf et al. (2025) validated the Arabic version of the Injury-Psychological Readiness to Return to Sport Scale (I-PRRS), which showed strong internal consistency ($\alpha = 0.84$) and reliability (ICC = 0.88) and correlated moderately with TSK scores ($rs = 0.69$, $p < 0.05$). Almansour et al. (2023) and Alswat et al. (2021) reported that higher lower limb functionality and frequent post-surgery sports participation were associated with reduced fear and increased RTS confidence. Conversely,

Alsuwayi et al. (2023) highlighted persistent fear in nearly half of the ACLR patients despite overall functional improvement, suggesting psychological barriers may linger even after physical recovery. **Conclusion:** This systematic review underscores the critical role of addressing psychological factors, particularly fear of re-injury, in post-ACLR rehabilitation. Interventions aimed at improving psychological readiness, reducing kinesiophobia, and enhancing RTS confidence are essential for optimal recovery.

INTRODUCTION

Athletic performance is affected by different factors including the physical condition of the athlete as well as their psychological well-being especially after having injuries, prolonged training interruptions, or external stressors [1,2]. After injuries, some athletes may experience a fear of returning to training which is considered a significant barrier to return to play [3–5]. This fear is associated in most cases with concerns about reinjuries, loss of competitive edge, some social expectations, and psychological distress and all these factors affect negatively the athlete's confidence and overall performance [6,7]. Therefore, understanding the psychological impact of the fear associated with returning to training is significant in order to ensure the mental readiness of the athletes and his/her long-term success.

In Saudi Arabia, sports participation has grown significantly in recent years, fueled by governmental initiatives and national sports programs [8]. However, limited research has explored the psychological dimensions of athletes' return to training in this region, particularly concerning anxiety, stress, and fear of reinjury. Studies in other regions suggest that psychological factors, such as self-efficacy, resilience, and perceived support, play a vital role in facilitating a successful return to sports [9,10]. In contrast, athletes experiencing high levels of fear or psychological distress may demonstrate reduced training adherence, impaired performance, or even premature retirement from sports [11,12].

This systematic review and meta-analysis aim to assess the psychological impact and fear associated with returning to training among athletes in Saudi Arabia. By synthesizing existing literature, the study will explore the prevalence of psychological distress, factors influencing FRT, and potential interventions to support athletes in overcoming these barriers. The findings of this review will contribute to the growing body of evidence needed to inform sports psychologists, coaches, and policymakers in developing effective strategies for mental health support in sports rehabilitation and training programs.

METHODOLOGY:

This study was conducted as a systematic review and meta-analysis to assess the psychological impact and fear of returning to training among athletes in Saudi Arabia. To ensure transparency and rigor in the process, the review adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, covering the stages of study selection, data extraction, and synthesis. The inclusion and exclusion criteria were defined using the Population, Intervention, Comparison, Outcome, and Study design (PICOS) framework. The study population comprised male and female athletes of all ages and competition levels, including amateur, collegiate, and professional athletes who had experienced a disruption in their training due to injury, illness, psychological factors, or external events such as pandemics. Eligible interventions included studies evaluating psychological factors such as fear, anxiety, self-efficacy, stress, resilience, and coping mechanisms related to returning to training. Comparisons were drawn between athletes who successfully returned to training and those who experienced psychological barriers. Key outcomes focused on the prevalence and severity of psychological distress, fear of returning to training, and the effectiveness of interventions designed to mitigate these psychological concerns. Eligible study designs included observational studies (cross-sectional, cohort, and case-control), randomized controlled trials (RCTs), systematic reviews, and meta-analyses. Exclusion criteria applied to studies that focused solely on physical rehabilitation without psychological assessments, those with insufficient data on fear or psychological impact, and studies conducted outside the Saudi Arabian context unless they offered relevant regional comparisons.

A comprehensive literature search was conducted using electronic databases, including PubMed, Scopus, Web of Science, PsycINFO, and Google Scholar, targeting peer-reviewed studies published in English and Arabic. The search strategy involved a combination of Medical Subject Headings (MeSH) terms and keywords such as "Fear of returning to training," "Psychological impact in athletes," "Sports anxiety," "Athlete mental health," "Reinjury fear," and "Saudi Arabia." Boolean operators (AND, OR) were employed to refine search results, and additional manual searches of reference lists from relevant articles were conducted to identify supplementary studies. Two independent reviewers screened titles and abstracts to assess eligibility, followed by full-text screening of potentially eligible studies. Discrepancies between reviewers were resolved through discussion or consultation with a third reviewer to minimize selection bias.

Data extraction was conducted using a standardized data extraction form to collect essential information, including study details (author, year, country, study design), participant characteristics (age, gender, sport type, competition level), psychological factors assessed (e.g., fear, anxiety, resilience, self-efficacy), measurement tools used (e.g.,

psychometric scales, questionnaires), main findings related to fear and psychological impact, and details of any interventions applied along with their effectiveness. Quality assessment and risk of bias in the included studies were evaluated using validated tools appropriate for different study designs. The Newcastle-Ottawa Scale (NOS) was used to assess the quality of observational studies, the Cochrane Risk of Bias (RoB 2) tool was applied to randomized controlled trials, and AMSTAR-2 (A Measurement Tool to Assess Systematic Reviews) was employed for systematic reviews. Two reviewers independently assessed the quality and risk of bias, with a third reviewer consulted to resolve any disagreements.

The data synthesis process involved both qualitative and quantitative analyses. A qualitative synthesis was conducted to summarize key findings from the included studies, categorizing them based on the psychological factors evaluated and study outcomes. Ethical considerations were followed despite the retrospective nature of the study, which involved analyzing data from previously published studies. Since the review did not involve direct interaction with human participants, no specific ethical approval was required. However, ethical guidelines for conducting systematic reviews were strictly adhered to, ensuring transparency, unbiased reporting, and proper citation of all included studies.

RESULTS:

The characteristics of the included five studies [13-17] reflect similarities in their cross-sectional designs, predominantly male samples, and focus on athletes recovering from anterior cruciate ligament reconstruction (ACLR). Across the studies, participants' mean ages ranged from mid-20s to mid-30s, with lower extremity injuries as the primary focus. Assessment tools varied depending on the study objectives, with commonly used scales including the Tampa Scale of Kinesiophobia (TSK), ACL-Return to Sport after Injury (ACL-RSI), Lower Extremity Functional Scale (LEFS), and the International Knee Documentation Committee (IKDC) scale. One unique study by Abdelraouf et al. (2025) involved a cross-cultural validation of the Arabic version of the Injury-Psychological Readiness to Return to Sport Scale (I-PRRS), demonstrating strong psychometric properties and a moderate correlation with TSK scores, reflecting its reliability in evaluating psychological readiness among athletes [13] (Table 1).

Table 1: Study Characteristics

Authors and Year	Objective	Study Design	Sample Size	Population Characteristics	Assessment Tools
Abdelraouf O et al., 2025 [13]	To translate and validate the Injury-Psychological Readiness to Return to Sport Scale (I-PRRS) into Arabic.	Cross-cultural validation	120 athletes	Athletes with lower extremity injuries (79.2% males), mean age 26.3 ± 7.8 years	Arabic I-PRRS, Tampa Scale of Kinesiophobia (TSK)
Almansour A et al., 2023 [14]	To assess fear of re-injury post-ACLR and its effect on lower extremity functional scores (LEFS) in professional soccer players (PSPs).	Cross-sectional survey	67 PSPs	PSPs post-ACL reconstruction (mean age 28.9 years)	Athlete Fear-Avoidance Questionnaire (AFAQ), LEFS
Almansour A et al., 2024 [15]	To examine the impact of dominant vs. non-dominant leg ACL reconstruction on functional performance 1–10 years post-surgery.	Cross-sectional	50 individuals	ACL repair patients (ages 20–38), dominant and non-dominant leg injury	Fear Avoidance Belief Questionnaire for Physical Activity (FABQ-PA), LEFS, ACL-RSI survey
Alswat M et al., 2021 [16]	Investigate fear of re-injury and factors influencing its increase among physically active individuals post-	Cross-sectional	103	Mean age: 35 years, 98% male, mean BMI: 27.8 kg/m². Post-surgery follow-up: 5.1 years. Majority played soccer (73.8%).	IKDC scale, Tampa Scale for Kinesiophobia (TSK-11)

Table 1: Study Characteristics					
Authors and Year	**Objective**	**Study Design**	**Sample Size**	**Population Characteristics**	**Assessment Tools**
	ACL reconstruction.			59.2% resumed sports.	
Alsuwayi A et al., 2023 [17]	Assess fear of re-injury and its effect on returning to pre-injury sports level post-ACL reconstruction.	Cross-sectional	204	Mean age: 29.9 years, 97.5% male, 98.5% Saudi nationals. 90.7% played football. 62.5% felt relaxed about sports post-surgery, but 46.4% feared re-injury.	RTS after ACL scale, Godin Leisure-Time Exercise Questionnaire

The included studies collectively highlight the complex relationship between psychological factors, functional recovery, and return to sport (RTS) following anterior cruciate ligament reconstruction (ACLR). Across the studies, fear of re-injury, functional performance, and psychological readiness played pivotal roles in shaping RTS outcomes. Abdelraouf et al. (2025) uniquely validated the Arabic Injury-Psychological Readiness to Return to Sport Scale (I-PRRS), demonstrating strong reliability (ICC = 0.88) and a moderate correlation with kinesiophobia (TSK scores) [13]. Almansour et al. (2023) and Alswat et al. (2021) found that reduced lower limb functionality and knee function scores were significantly linked to increased fear of re-injury, while younger age and frequent post-surgery sports participation were associated with reduced fear and greater RTS confidence [14,16]. Almansour et al. (2024) noted that the injury's laterality (dominant vs. non-dominant leg) had minimal impact on recovery [15]. Despite overall improvements in RTS confidence, Alsuwayi et al. (2023) reported that nearly half of ACLR patients still experienced lingering fear, underscoring the persistent psychological barriers that can delay full recovery and RTS [17]. These findings emphasize the importance of addressing both physical and psychological recovery in post-ACLR rehabilitation programs (Table 2).

Table 2: Key Findings			
Authors and Year	**Psychological Outcomes**	**Fear of Re-Injury Findings**	**Other Findings**
Abdelraouf O et al., 2025 [13]	The Arabic I-PRRS had good internal consistency ($\alpha = 0.84$) and reliability (ICC = 0.88). A significant difference was found between athletes cleared for RTS and new patients seeking physical therapy ($p < 0.001$).	Moderate correlation with fear-related scores from Tampa Scale of Kinesiophobia (TSK) ($rs = 0.69$, $p < 0.05$).	No floor/ceiling effects observed; MDC = 3.27 points; SEM = 1.14.
Almansour A et al., 2023 [14]	Reduced lower limb functionality linked to higher fear of re-injury post-ACLR. Strong negative correlation between lower extremity functional scores (LEFS) and BMI ($rs = -0.501$, $p = 0.001$).	Athlete Fear-Avoidance Questionnaire (AFAQ) strongly predicted LEFS scores ($b = -0.92$, $p < 0.001$, $R^2 = 0.329$).	BMI significantly impacted perceived functionality and fear-avoidance behavior.
Almansour A et al., 2024 [15]	No significant differences in psychological outcomes (ACL-RSI, FABQ-PA) between dominant vs. non-dominant leg ACL injuries.	Fear scores remained comparable in both dominant and non-dominant leg injury groups ($p = 0.26$).	Functional performance measures (LEFS) showed no statistically significant differences ($p = 0.95$).
Alswat M et al., 2021 [16]	Higher knee function (IKDC) correlated with lower fear (TSK-11). Frequent sports participation after surgery reduced fear.	Fear of re-injury linked to frequency of resumed sports and IKDC scores.	No significant correlation between age, BMI, follow-up period, or time from injury to surgery and TSK-11 scores.

Alsuwayi A et al., 2023 [17]	62.5% felt relaxed about sports; 60.3% confident in performing well. Fear of re-injury (46.4%) influenced RTS.	Fear of re-injury lower among young patients and students.	Positive RTS scores were higher among younger participants, students, and those playing sports for 1-5 years post-surgery.

DISCUSSION

This systematic review of studies investigating psychological, fear of return, and functional recovery following anterior cruciate ligament reconstruction (ACLR) highlights the multidimensional nature of return to sport (RTS) outcomes. Psychological readiness, fear of re-injury, and lower extremity functionality emerge as critical factors influencing RTS and rehabilitation success [4,18]. Despite variations in population characteristics, assessment tools, and follow-up periods, several consistent patterns and unique findings contribute to a comprehensive understanding of post-ACLR recovery.

Fear of re-injury was a recurring psychological challenge across multiple studies. Almansour et al. (2023) observed that reduced lower limb functionality was linked to higher fear of re-injury, as indicated by a strong negative correlation between Lower Extremity Functional Scale (LEFS) scores and body mass index (BMI) ($r_s = -0.501$, $p = 0.001$) [14]. This aligns with existing literature emphasizing the impact of lower extremity dysfunction on psychological readiness and self-confidence post-ACLR [19-22]. Moreover, the Athlete Fear-Avoidance Questionnaire (AFAQ) was identified as a strong predictor of LEFS scores ($b = -0.92$, $p < 0.001$, $R^2 = 0.329$), highlighting the potential benefits of fear-avoidance interventions in rehabilitation programs [3,23,24].

Interestingly, Almansour et al. (2024) found no significant differences in psychological outcomes, such as ACL-Return to Sport after Injury (ACL-RSI) and Fear-Avoidance Belief Questionnaire for Physical Activity (FABQ-PA), between dominant and non-dominant leg injuries [15]. Functional performance measures, including LEFS scores, also showed no statistically significant differences ($p > 0.05$), suggesting that the laterality of ACL injury has minimal impact on long-term recovery outcomes. This finding contrasts with earlier reports suggesting that dominant leg injuries might pose greater psychological challenges due to perceived functional reliance [25].

Frequent sports participation and improved knee function appear to mitigate fear of re-injury, as demonstrated by Alswat et al. (2021) [16]. Their study found that higher International Knee Documentation Committee (IKDC) scores were associated with lower TSK-11 scores, reflecting reduced fear. Athletes who resumed sports more frequently post-surgery also reported diminished psychological distress. However, no significant correlations were observed between fear scores and variables such as age, BMI, follow-up duration, or time from injury to surgery, emphasizing the individualized nature of psychological recovery.

Despite positive RTS trends, Alsuwayi et al. (2023) reported lingering psychological concerns, with 46.4% of participants expressing fear of re-injury that influenced their RTS decisions [17]. Notably, younger patients, students, and those resuming sports within 1–5 years post-surgery exhibited lower fear levels and higher confidence, suggesting that early engagement in physical activities may enhance psychological resilience. This finding is consistent with studies highlighting the role of early functional exposure in reducing fear-avoidance behaviors and fostering psychological readiness [26-28].

This systematic review has several limitations that should be acknowledged. First, the included studies were predominantly cross-sectional, limiting the ability to establish causality between psychological factors and return to sport (RTS) outcomes following ACLR. Second, variations in the assessment tools used across studies, such as the Tampa Scale of Kinesiophobia (TSK), ACL-Return to Sport after Injury (ACL-RSI), and Lower Extremity Functional Scale (LEFS), may have introduced heterogeneity in measuring psychological readiness and functional recovery, making direct comparisons challenging. Third, the majority of the studies involved male athletes, particularly soccer players, which may restrict the generalizability of the findings to female athletes and those participating in other sports. Additionally, sample sizes varied, with some studies including relatively small cohorts, potentially affecting the robustness of their conclusions. Lastly, cultural differences and the inclusion of only one cross-cultural validation study (the Arabic I-PRRS) highlight the need for further research exploring psychological readiness across diverse populations to improve the external validity of these findings.

In conclusion, these findings underscore the interplay between psychological and functional factors in shaping RTS outcomes. Addressing fear of re-injury, enhancing psychological readiness, and improving lower limb functionality are critical components of post-ACLR rehabilitation programs. Moreover, validated assessment tools such as the Arabic I-PRRS can aid clinicians in tailoring interventions to individual psychological profiles, thereby optimizing RTS outcomes. Future research should explore longitudinal patterns of psychological recovery and the effectiveness of targeted interventions in diverse athletic populations to further refine rehabilitation strategies and promote sustained recovery.

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