



# Psychological Interventions in Sports Injuries: A Systematic Review

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**Abstract.** Sports injury is something that must be experienced by athletes. The effects of sports injuries not only affect the physical state, but also the psychological state of athletes. This study aims to identify psychological interventions in sports injuries through a systematic review: Methods Scopus, PubMed, Science Direct databases in 2019-2024 were searched using relevant keywords and with a quantitative research design. Results: 10 out of 1264 papers were included. There were 7 interventions including 1 article on cognitive-behavioural multimedia program, 1 article on structured educational session, 1 article on rehabilitation training modalities, 1 article on a brief online video-based intervention, 1 article on mirror therapy (MT), 1 article on a novel mental health literacy educational intervention program (MHL), and 4 articles on mindfulness. Psychological interventions are recommended as additional interventions in cases of sports injuries. Injury-level studies are needed to measure the effectiveness of psychological interventions in sports injuries.

**Keywords:** Psychological Intervention, Sports Injuries, Athletes

## 1 Introduction

Sports injuries are common among athletes in various sports. The impact is not only physical but also psychological. Physical problems that arise from injuries are usually pain, swelling, fractures, and the inability to move the injured limb [1], [2]. While the psychological effects in the form of anxiety, depression and fear due to not in accordance with the desired expectations. Handling injuries is needed to restore the athlete's condition as before the injury [3].

Based on the results of research conducted by Sadeqi et al (2018) on athletes with anterior cruciate ligament (ACL) injuries, it was found that not all athletes would recover to pre-injury levels, in 2 years of follow-up, 74.9% of patients had returned to running and only 58.4% returned to pre-injury conditions [4]. Injury management should not only focus on resolving physical issues, but should also consider psychological issues. Combining with psychological interventions will improve the recovery process compared to a single intervention [5], [6].

Most interventions for sports injuries focus on physical injury management. Research on psychological interventions is still very limited. Psychological interventions are needed to complement the athlete's recovery process. The aim of this systematic review is to identify the types of psychological interventions for sports injuries.

## 2 Method

The research was conducted using electronic databases, including Scopus, Science Direct and PubMed. The following keywords were used to search for data: "mental" or

"psychological" AND "intervention" AND "sport" AND "injuries". The search was limited to papers published between 2019 and 2024, and to studies conducted using a human model, with results presented in the English language.

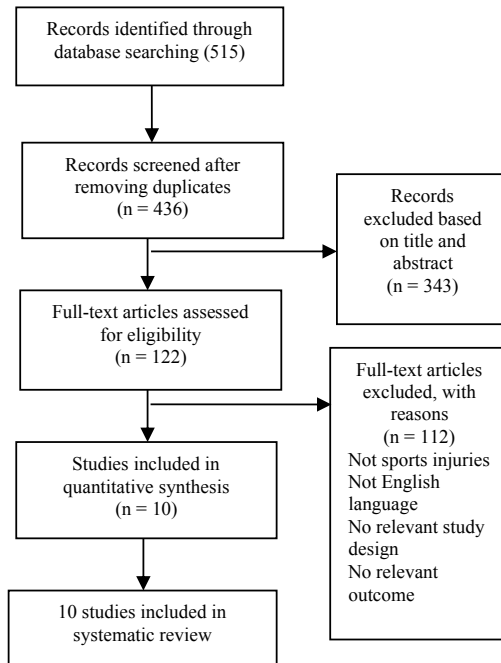


Fig. 1. Study inclusion based on the preferred reporting items for systematic reviews

### 3 Results and Discussions

A total of seven psychological interventions have been identified as potentially beneficial in the context of sports-related injuries.

Table 1. Research Matrix

Author & Years	Title	Samples; Design & Analysis	Intervention	Types of injuries	Result
Tang, 2022	Mindfulness and Regulatory Emotional Self-Efficacy of Injured Athletes Returning to Sports: The Mediating Role of	433 respondents Design: crosssectional Analysis: AMOS	mindfulness	Severe injury	Reduce state anxiety and burnout, increases regulatory emotional self-efficacy

Author & Years	Title	Samples; Design & Analysis	Intervention	Types of injuries	Result
<b>Brewer, 2022</b>	Competitive State Anxiety and Athlete Burnout  An Interactive Cognitive-Behavioural Multimedia Program Favourably Affects Pain and Kinesiophobia During Rehabilitation After Anterior Cruciate Ligament Surgery: An Effectiveness Trial	69 ACL surgery patients Design: RCT Analysis: Anova	- Interactive Cognitive-Behavioural Multimedia Program	- Common ACL knee injuries	- Multimedia program enhances pain management and rehabilitation outcomes. Increased knowledge of ACL surgery and reduced psychological distress. User feedback incorporated in program development for ACL reconstruction.
<b>Almuhaya, 2023</b>	Adding A Structured Educational Session to the Rehabilitation Program of Soccer Players Following Anterior Cruciate Ligament Reconstruction: A Feasibility Study	All of the 36 players who were undergoing rehabilitation post-ACL Design: RCT Analysis: chi square	A Structured Educational Session to the Rehabilitation Program - Intervention lasted for one week post-ACL reconstruction.	Aged between 18 and 45 with an ACL injury and ACLR in soccer	the intervention group shows improvement from the educational session with a lower TSK-17 mean score ( =37.6; SD ± 4.8), and an improvement in readiness as shown by an increased ACL-RSI mean score ( =83.4; SD ± 15.8), no change in knee function as measured by the IKDC.

Author & Years	Title	Samples; Design & Analysis	Intervention	Types of injuries	Result
<b>Kasmi, 2023</b>	The effects of different rehabilitation training modalities on isokinetic muscle function and male athletes' psychological status after anterior cruciate ligament reconstruction	male athletes from different sports (e.g., athletics, team sports) with ACL reconstruction Design: quasi eksperimen Analysis: anova	eccentric training (ECC), plyometric training (PLYO), or combined eccentric and plyometric training (COMB)	ACL reconstruction	No significant between-group baseline differences (pre-6-weeks intervention) were observed for any of the reported psychological and muscle strength parameters. Significant group-by-time interactions were found for TSK-CF ( $p=0.001$ , $d=2.85$ ), KOOS ( $p=0.001$ , $d=1.31$ ), and IKDC ( $p=0.001$ , $d=1.07$ ). The post-hoc analyses indicated that COMB showed larger pre-post improvements for all psychological variables ( $p$
<b>Jones, 2022</b>	A Brief Online Video-Based Intervention to Promote Mental Health Help-Seeking in the Context of Injuries for Athletes: A pilot study	Athlete Design quasi-experimental Analysis: RM manova and t-test	A Brief Online Video-Based Intervention	unclear	- Significant improvement in help-seeking intentions post-intervention. - Increase in help-seeking attitudes and depression

Author & Years	Title	Samples; Design & Analysis	Intervention	Types of injuries	Result
					literacy after intervention.
<b>D’Isanto, 2022</b>	Examining the Effects of Mirror Therapy on Psychological Readiness and Perception of Pain in ACL-Injured Female Football Players	Male with acl injuries Design: quasy exsperiment Analysis: t-test	Mirror therapy	ACL injury	the MT group perceived largely greater psychological readiness (d [95% CIs] = 0.80 [0.53; 0.92]; p < 0.01
<b>O’Keffe, 2023</b>	The Design and Implementation of a Novel Mental Health Literacy Educational Intervention Program in Gaelic Footballers	Elite and subelite Gaelic footballers Design: Controlled laboratory study Analysis: t-test	novel MHL educational intervention program in Gaelic footballers	Not clear	Stigma decreased, and attitudes toward helpseeking and MHL increased in the intervention group from baseline to after the intervention (P , .05), with significant differences sustained at 1-week and 1-month follow-ups. Our results showed differences in stigma, attitudes, and MHL between groups across time points. Intervention participants provided positive feedback, and the program was

Author & Years	Title	Samples; Design & Analysis	Intervention	Types of injuries	Result
<b>Bagheri, 2021</b>	Adding Mindfulness Practice to Exercise Therapy for Female Recreational Runners With Patellofemoral Pain: A Randomized Controlled Trial	Thirty female runners (age $\bar{M}$ 28.36, SD 7.08 years) with PFP Design: RCT Analysis: mixed-model analyses	mindfulness	History of PFP symptoms for at least 3 months. - Specific pain levels during various knee-related tasks.	appraised as informative - Mindfulness-exercise group had less pain during running and stepping. - Mindfulness-exercise group reported better perceived treatment effects. - Pain catastrophizing was lower for mindfulness-exercise participants.
<b>Li, 2023</b>	Association of Mindfulness with Perfectionism, Exercise Self-Efficacy, and Competitive State Anxiety in Injured Athletes Returning to Sports	359 athlete, initial study participants, comprising high-level athletes (national level and above) who had s Design: crosssectional Analysis: AMOS	Mindfulness	Severe injury	interventions enhance exercise selfefficacy, boost task-related confidence, reshape perfectionism towards a positive outlook, and decrease competitive state anxiety.

Author & Years	Title	Samples; Design & Analysis	Intervention	Types of injuries	Result
Wu, 2023	Effects of Mindfulness on Obligatory Exercise During the Return of Injured Athletes to Sports: The Mediating Roles of Self-Criticism and Competitive State Anxiety	f 265 high-level sports players during recovery design: crosssectional Analysis: amos	mindfulness	Not clear	positive correlations between self-criticism and obligatory exercise (standardized coefficients = 0.38, $p < 0.001$ ), as well as competitive state anxiety and self-criticism (standardized coefficients = 0.45, $p < 0.001$ ). Mindfulness and obligatory exercise were correlated negatively (standardized coefficients = -0.31, $p < 0.001$ ), but there was no significant relation between competitive state anxiety and obligatory exercise

Author & Years	Title	Samples; Design & Analysis	Intervention	Types of injuries	Result
					(standardized coefficients = 0.05, $p > 0.01$ ). Selfcriticism and competitive state anxiety mediated mindfulness's positive effects on obligatory exercise in part (standardized indirect effect = -0.16, $p < 0.01$ )

This is an app-based intervention for athletes with ACL injuries using a cognitive-behavioural approach. The intervention is in the form of information that corresponds to the subdivisions. The main menu of the programme consists of three subdivisions: General Information, Surgery, Rehabilitation. The section on surgical procedures is further divided into three sub-sections, each of which addresses a specific phase of the surgical process: the preoperative period, the surgical procedure itself, and the postoperative period.. While in the General Information section and Rehabilitation section, and each of the three Surgical sub-sections, there are three further subdivisions: (a) Overview; (b) Taking a Closer Look; and (c) Being Practical. Explanations are also in the form of easy-to-understand videos using simple language [7]

Additional online-based interventions are conducted via Zoom. The material is presented in the format of a structured educational programme, comprising both surgical and rehabilitation content. The intervention is presented in an interactive format and includes the use of visual aids, such as images and graphs, to facilitate comprehension. Furthermore, a question-and-answer session is included [8].

The intervention consisted of 3 interventions: a single-mode eccentric group (ECC), a single-mode plyometric group (PLYO), and a combined eccentric and plyometric group (COMB). The intervention was conducted over a six-week period, comprising two sessions per week, each lasting 60 minutes. The results demonstrated that the combined eccentric and plyometric group (COMB) exhibited enhanced psychological and isokinetic muscle strength outcomes in comparison to the other groups [9].



The intervention employed the use of brief video clips, with an approximate duration of 23 minutes each. The material comprised three videos, which included the following content: 1) information about the athlete's response to injury; 2) an exploration of help-seeking and social support, with a focus on its importance and guidance on how to access help; and 3) an overview of the signs and symptoms of depression [10].

It is an additional intervention to complement the conventional intervention. Mirror therapy lasts for 20 weeks and is given three times per week after the completion of the conventional intervention. The intervention consists of 3 phases, namely the relaxation phase, the nuclear phase and the final phase. Athletes will visualise the movement of the injured limb in front of a mirror [11].

The findings of the study conducted by O'Keeffe et al. (2023) on Gaelic footballers with MHL indicated a favourable outcome in terms of enhancing attitudes towards seeking assistance and attenuating negative stereotypes. MHL enhances the capacity to pursue opportunities by leveraging information to enhance well-being. The therapy was developed based on the Theory of Planned Behaviour and the Help-Seeking Model and is presented in the form of a 25-minute online course [12].

Mindfulness is a psychological intervention that functions by enhancing awareness of events experienced or felt in the present, without any involvement of judgement [13]. The results of the study demonstrate that mindfulness can confer benefits in situations where it enhances regulatory emotional self-efficacy in individuals who have sustained injuries [14]. Furthermore, other results demonstrate that mindfulness can enhance exercise self-efficacy, boost task-related confidence, reshape perfectionism towards a positive outlook, and decrease competitive state anxiety. Mindfulness largely improves the individual's emotional cognitive ability by reducing self-criticism [14], [15], [16].

This systematic review aims to identify psychological interventions in sports injuries. The review found 7 types of interventions, 3 of which were online and 4 offline. Online interventions include Cognitive-Behavioural Multimedia Program, A Brief Online Video-Based Intervention, and MHL. Forms of online interventions such as using applications that contain information about the type of injury and treatment during the initial injury process to the rehabilitation stage and also through zoom and videos that contain motivational information and how to seek help and social support [7], [8], [10]. Meanwhile, online interventions include Structured Educational Session, Rehabilitation training modalities, mirror therapy and mindfulness [9], [10], [11], [16], [17], [18].

The addition of psychological intervention as an adjunct to therapy showed more positive results compared to those who only received standardised interventions. The benefits of psychological interventions include the improvement of coping strategies and regulatory emotional self-efficacy, reducing competitive state anxiety, depression, burnout, kinesphobia and reshape perfectionism towards a positive outlook ([7], [9], [14], [15], [16]). Furthermore, the physical benefits of psychological intervention can reduce pain, increase acceptance of the intervention, shorten recovery time to return to exercise, increase attitudes towards seeking help [8], [9], [10], [13].

The majority of the psychological interventions described in the articles were mindfulness, with four articles specifically focusing on this approach. Mindfulness practice enhances an athlete's capacity to be fully present in the moment, thereby facilitating a heightened awareness of the challenges they are currently facing. The application of mindfulness management techniques has been demonstrated to mitigate

the adverse effects of negative emotions associated with injury, including competitive state anxiety, burnout, and excessive focus. These benefits extend beyond the injury rehabilitation process. Furthermore, it can assist in developing self-efficacy training and reducing tension due to the demands of achieving specific targets by focusing on the task at hand [15]. It is further recommended that additional mindfulness be made available not only to injured athletes, but also to those who will and are participating in competitions [14], [16], [17], [18].

## 4 Conclusion

This review cannot statistically show which psychological intervention is more effective. Further study is needed regarding the effectiveness of each psychological intervention. However, the addition of psychological interventions is recommended to complement interventions for injured athletes or for the rehabilitation process. Psychological interventions have been shown to reduce the negative emotional effects of injury in athletes.

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