

PSYCHOLOGICAL INTERVENTIONS FOR SPORTS INJURY RECOVERY: A HYBRID SYSTEMATIC LITERATURE REVIEW AND BIBLIOMETRIC ANALYSIS

By Afif Khoirul Hidayat

PSYCHOLOGICAL INTERVENTIONS FOR SPORTS INJURY RECOVERY: A HYBRID SYSTEMATIC LITERATURE REVIEW AND BIBLIOMETRIC ANALYSIS

Aff Khoirul Hidayat ¹*, Edi Purnomo ², Zainul Aziz ³, Rahmawan Santoso ⁴, Nurlayli Hasanah ¹,
Carolus Wasa ¹, Martha Betaubun ¹

¹Universitas Musamus, Merauke, Indonesia

²Universitas Tanjungpura, Pontianak, Indonesia

³Universitas PGRI Semarang, Semarang, Indonesia

⁴Universitas Sriwijaya, Palembang, Indonesia

afif@unmus.ac.id¹, edi.purnomo@fkip.untan.ac.id², zainulaziz@upgris.ac.id³,
rahmawan.santoso@fkip.unsri.ac.id⁴, nurlayli@unmus.ac.id¹, carolus@unmus.ac.id¹,
marthabetaubun@unmus.ac.id¹

* Coresponding Author. E-mail: afif@unmus.ac.id

Abstract

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Introduction: Psychological interventions have become integral to the rehabilitation process for athletes recovering from sports injuries. By addressing the psychological barriers that athletes face during rehabilitation, these strategies promote physical recovery and facilitate athletes' triumphant return to their sport with greater confidence and self-efficacy. Objective: This study explores the role of psychological interventions in sports injury recovery and highlights their integration into recovery protocols. Methodology: This study employs a hybrid approach combining a systematic literature review (SLR) and bibliometric analysis to explore psychological interventions for sports injury recovery. The SLR follows the PRISMA guidelines, synthesizing existing research published until January 26, 2026, while the bibliometric analysis, conducted using VOSviewer, provides a quantitative assessment of the research landscape. The study focuses on peer-reviewed English-language articles published on open-access platforms, mapping key themes, trends, and authors in the field. Results: The systematic review and bibliometric analysis identified six key psychological interventions for sports injury recovery: Deep Breathing, Goal Setting, Imagery, Relaxation, Self-Talk, and Social Support. These interventions are integral in reducing pain, anxiety, and negative emotional responses, enhancing athletes' adherence to rehabilitation programs. Conclusions: This study emphasizes the importance of integrating psychological interventions into the rehabilitation process to optimize both mental and physical recovery outcomes.

Keywords: Psychological, Injury; Recovery, Literature Review, Bibliometric.

Abstrak

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Pendahuluan: Intervensi psikologis telah menjadi bagian integral dalam proses rehabilitasi bagi atlet yang sedang pulih dari cedera olahraga. Dengan mengatasi hambatan psikologis yang dihadapi atlet selama masa rehabilitasi, strategi ini mendorong pemulihan fisik serta memfasilitasi kembalinya atlet ke cabang olahraga secara optimal dengan tingkat kepercayaan diri dan efikasi diri yang lebih tinggi. Tujuan: Penelitian ini mengkaji peran intervensi psikologis dalam pemulihan cedera olahraga serta menyoroti integrasinya ke dalam protokol pemulihan. Metodologi: Penelitian ini menggunakan pendekatan hibrida yang menggabungkan tinjauan pustaka sistematis (Systematic Literature Review/SLR) dan analisis bibliometrik untuk mengeksplorasi intervensi psikologis dalam pemulihan cedera olahraga. SLR dilakukan dengan mengikuti pedoman PRISMA, dengan mensintesis penelitian yang telah dipublikasikan hingga 26 Januari 2026, sedangkan analisis bibliometrik yang dilakukan menggunakan VOSviewer memberikan penilaian kuantitatif terhadap lanskap penelitian. Studi ini berfokus pada artikel berbahasa Inggris yang telah melalui proses penelaahan sejawat (peer-reviewed) dan dipublikasikan pada platform akses terbuka, dengan memetakan tema utama, tren, serta penulis dalam bidang tersebut. Hasil: Tinjauan sistematis dan analisis bibliometrik mengidentifikasi enam intervensi psikologis utama dalam pemulihan cedera olahraga, yaitu pemapasan dalam (deep breathing), penetapan tujuan (goal setting), imajinasi (imagery), relaksasi (relaxation), dialog diri (self-talk), dan dukungan sosial (social support). Intervensi

tersebut berperan penting dalam mengurangi nyeri, kecemasan, serta respons emosional negatif, sekaligus meningkatkan kepatuhan atlet terhadap program rehabilitasi. Simpulan: Penelitian ini menegaskan pentingnya integrasi intervensi psikologis dalam proses rehabilitasi guna mengoptimalkan hasil pemulihan baik secara mental maupun fisik.

Kata kunci: Psikologis, Cedera, Pemulihan, Tinjauan Pustaka, Bibliometrik.

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INTRODUCTION

Psychological interventions have increasingly been recognized as a critical component in the rehabilitation process for athletes recovering from sports injuries. These interventions not only address physical recovery but also help athletes cope with the emotional and psychological challenges associated with injury (Wang et al., 2025; Ardern et al., 2022). One of their key functions is stress management, as athletes commonly experience stress, anxiety, and frustration during rehabilitation, which can negatively affect both mental and physical recovery if left unaddressed (Olmedilla et al., 2019). Stress, anxiety, and frustration can severely impact an athlete's rehabilitation progress, and without proper management, these emotions can hinder both mental and physical recovery (Jaekel et al., 2025; Haugen, 2022; Madsen et al., 2022). Integrating psychological support into rehabilitation contributes to a more holistic recovery approach by promoting emotional stability and reducing the risk of future injuries.

Psychological support also enhances athletes' self-efficacy, or their belief in their ability to successfully recover and return to sport (Singleton & McAllister-Deitrick, 2023; Gennarelli et al., 2020). Greater self-efficacy can improve motivation and encourage athletes to remain committed to the rehabilitation process. Psychological interventions help athletes develop resilience, which is essential for overcoming setbacks and maintaining progress throughout recovery.

Increased mental resilience helps athletes better prepare to face the challenges of recovery, which may include setbacks such as prolonged rehabilitation times or unexpected complications. W. Zhang & Li, (2025) explains that cultivating a positive mindset through psychological strategies support long-term recovery success. A positive mental outlook can significantly accelerate rehabilitation, as athletes are more likely to engage in recovery programs and follow prescribed protocols actively (S. Zhang & Meng, 2025; Martin-Rodriguez et al., 2024; Powell et al., 2023). By addressing both the physical and psychological aspects of recovery, these interventions not only accelerate rehabilitation but also enhance overall performance outcomes, ensuring that athletes can return to their sport stronger.

Several studies have highlighted the effectiveness of psychological interventions in reducing injury risk and promoting recovery. Psychological strategies integrated into training programs have been

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1. Some sentences in paragraphs 1 and 2 feel a bit repetitive regarding the role of psychological interventions. These could be streamlined to allow for a more fluid transition between paragraphs.

2. You mention multidisciplinary collaboration (coaches, physicians, psychologists). If possible, briefly touch on whether this SLR will target elite athletes, amateurs, or another specific category to narrow the scope.

shown to reduce injury risk by managing competitive pressure and emotional stress (Gredhill et al., 2018; Traenkle et al., 2015). These strategies are preventive and can be pivotal in minimizing the risk of reinjury. Psychological interventions such as guided imagery, relaxation, and goal-setting are widely recognized for reducing post-injury psychological consequences, improving coping mechanisms, and mitigating re-injury anxiety (Weiß et al., 2024; Codner et al., 2023). The empirical evidence supporting these interventions underscores the need for a thorough review of current research to synthesize findings and determine best practices.

Despite the promising outcomes of psychological interventions, significant gaps exist in the current research landscape. One notable gap is the variability in study designs, injury definitions, and injury severity across studies, which makes it difficult to draw consistent conclusions (Jaekel et al., 2025). There is also limited psychological support provided during injury rehabilitation, despite the clear emotional impact of injuries on athletes (Schwab Reese et al., 2012). This research gap calls for more comprehensive and standardized approaches to incorporating psychological support into injury recovery. Psychological factors are known to influence an athlete's return to play, there is insufficient research on the effectiveness of psychosocial interventions in this area (A. Z. Chen et al., 2022; Nwachukwu et al., 2019; Arden et al., 2013). A systematic literature review would help identify the specific psychological factors that need further attention and explore the most effective interventions to facilitate a triumphant return to play.

Collaboration among medical personnel, sports psychologists, coaches, and athletes is critical to developing comprehensive recovery plans that address both the physical and mental aspects of rehabilitation (Kaur et al., 2025; Rollo et al., 2021). An interdisciplinary approach is essential to optimize recovery and enhance performance, particularly among competitive and elite athletes who often face greater physical and psychological demands during rehabilitation. These athletes require support not only in regaining physical strength but also in overcoming the mental challenges that commonly accompany recovery from injury (Dzieciatkowska et al., 2025; Qin et al., 2023; S. Li et al., 2020). Integrating psychological interventions into broader recovery programs can foster a more holistic approach to athlete care, improving both rehabilitation outcomes and psychological well-being.

Given the existing gaps in research and the recognized importance of psychological interventions in sports injury recovery, conducting a systematic literature review (SLR) is essential. These interventions play a critical role in both mental and physical recovery, highlighting the need for a comprehensive evaluation of their effectiveness and applicability. An SLR would provide a thorough synthesis of current evidence, identify the most effective interventions, and highlight areas requiring further investigation (Azarian et al., 2023). To clarify the scope of this review, the study is guided by the following research question based on the PICO framework: does the exploration of psychological interventions for sports injury recovery remain a topic of significant relevance for future scientific

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studies? (RQ1); what is the distribution of research related to psychological interventions for sports injury recovery? (RQ2); and what are the theoretical and practical implications from the perspective of future research? (RQ3). By defining the review question explicitly, this study aims to support the development of evidence-based psychological interventions that can be standardized and implemented across various sports disciplines. Ultimately, the review seeks to contribute to more effective and widely applicable rehabilitation strategies that improve both recovery outcomes and the overall well-being of injured athletes.

METHOD

This study employs a hybrid approach that combines a systematic literature review (SLR) and bibliometric analysis to examine psychological interventions in sports injury recovery. The SLR follows PRISMA guidelines to qualitatively synthesize findings from previous studies, while the bibliometric analysis uses VOSviewer to quantitatively map research trends, author collaborations, and thematic relationships within the field.

The literature search was conducted using major academic databases, including Scopus, Web of Science, and PubMed. The inclusion criteria were: (1) articles published up to January 26, 2026; (2) studies whose titles, abstracts, or keywords were directly related to psychological interventions in sports injury recovery; (3) articles published in peer-reviewed journals; (4) publications written in English; and (5) articles available through open-access platforms.

The bibliometric analysis was conducted to identify publication trends, influential authors, highly cited studies, and keyword networks related to psychological interventions in sports injury rehabilitation. This approach provides both qualitative evidence synthesis and quantitative trend mapping, offering a comprehensive overview of the development and future directions of research in this field.

Operational Definition

Psychological interventions for sports injury recovery can be understood as a structured set of mental and behavioural techniques designed to support rehabilitation by addressing both psychological and functional outcomes. Across the cited studies, these interventions commonly include visualisation or imagery, relaxation training, self-talk, and goal setting, which are positioned not merely as adjunctive strategies but as mechanisms for reducing pain and anxiety and strengthening adherence to rehabilitation routines (Ramos-Pastrana et al., 2025; Rodriguez et al., 2019). Psychological support is treated as integral to recovery because it shapes how athletes interpret symptoms, regulate emotional responses, and sustain engagement with the demands of treatment (Yang et al., 2024). These interventions contribute to improved psychological readiness and more consistent participation in

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2. Eliminate unnecessary wording (e.g., "The combination of these two approaches is intended to...") and focus directly on the technical objectives.
3. If possible, include a list of the databases you used (e.g., Scopus, Web of Science, or PubMed), as this is the most crucial information in SLR methodology

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rehabilitation activities.

More specifically, the literature highlights cognitively oriented approaches, particularly cognitive-behavioural therapy alongside mindfulness-based practices, psychoeducation, and emotional regulation strategies. These methods are repeatedly described as targeting maladaptive cognitions and affective responses that arise during injury and rehabilitation, including catastrophic thinking, pain-related fear, and negative appraisals of pain (Modarresi et al., 2022). Related strategies such as cognitive restructuring, guided imagery, and exposure-based techniques are presented as practical means of addressing common injury-related cognitive disruptions, including fear of re-injury, persistent questioning, and overthinking, which can otherwise hinder confidence and progress during recovery (Golub & Steinfeldt, 2025; Yang et al., 2024). These approaches help athletes develop adaptive coping strategies and maintain motivation throughout rehabilitation.

In applied rehabilitation contexts, psychological interventions are also systematically integrated into recovery protocols to optimise outcomes and support decision-making regarding return to sport. This integration reflects a broader view that recovery is not solely biological, but also dependent on mental state, motivation, and the capacity to manage stressors associated with pain, uncertainty, and performance expectations (Zhao & Zhang, 2024; Marušič et al., 2020). Empirical emphasis on motivation and psychological readiness further reinforces that an athlete's psychological state can function as a primary contributor to successful return to sport, thereby positioning psychological interventions as both clinically relevant and practically necessary within contemporary sport injury rehabilitation (Gashi et al., 2023; Conder et al., 2020). Incorporating psychological strategies into rehabilitation programmes may assist athletes in achieving a smoother transition back to competitive participation.

Table 1. Defining Elements of Psychological Interventions for Sports Injury Recovery

No	Defining	Reference
1	Psychological interventions for sports injury recovery involve techniques like visualization, relaxation, self-talk, and goal setting to reduce pain and anxiety, and improve adherence to rehabilitation.	(Ramos-Pastrana et al., 2025)
2	Psychological interventions include cognitive-behavioral therapy, mindfulness practices, goal setting, emotional regulation, and psychoeducation.	(Yang et al., 2024)
3	Psychological interventions for sports injury recovery include strategies such as cognitive restructuring, mindfulness-based practices, guided imagery, and exposure-based techniques to address injury-induced	(Golub & Steinfeldt, 2025)

No	Defining	Reference
	cognitive disruptions, such as fear of reinjury, persistent questioning, and overthinking.	
4	Psychological interventions for sports injury recovery involve methods to improve athletes' mental state after injury.	(L. Chen et al., 2023)
5	Psychological interventions are critical for managing mental health and biological aspects in injured athletes.	(Zhao & Zhang, 2024)
6	Psychological interventions are a range of techniques that have demonstrated effectiveness in the rehabilitation of sports injuries.	(Berengüi et al., 2021)
7	The patient's strong motivation and psychological state of mind were primary contributory factors in returning to sports.	(Gashi et al., 2023)
8	Psychological interventions, such as cognitive-behavioral therapy, help reduce catastrophic thinking, pain-related fear, and negative appraisals of pain to improve mental and physical symptoms.	(Modarresi et al., 2022)
9	Psychological interventions are systematically incorporated into rehabilitation protocols to optimize an athlete's recovery and inform decisions about returning to sport.	(Marušič et al., 2020)
10	Psychological interventions for sports injury recovery include cognitive behavioral therapy and behavioral medicine approaches, such as relaxation and stress management training.	(Conder et al., 2020)
11	Imagery is a psychological intervention that reduces anxiety, tension, and pain, while promoting healing after an injury.	(Rodríguez et al., 2019)

The literature review in this study was conducted systematically using the Scopus database. Relevant keywords were carefully selected to identify studies aligned with the research focus. A macro-methodological, top-down approach was applied to examine the development of research on psychological interventions for sports injury recovery, including key themes, influential authors, and commonly used methodologies. Reviewing the progression of studies and research trends provided a foundation for understanding the current state of knowledge in this field and informed the subsequent analysis.

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Study Organization

After evaluating the selected studies, the limitations inherent in the existing body of research were thoroughly assessed. This included identifying knowledge gaps regarding psychological interventions for sports injury recovery. The study's focal point was to ensure a comprehensive review of databases across all relevant fields, with particular emphasis on the Scopus database. Studies were excluded based on specific criteria, including titles, abstracts, and keywords, to maintain focus on the most pertinent research. This exclusion process was crucial for refining the investigation's scope, ensuring that only studies directly related to the subject were included.

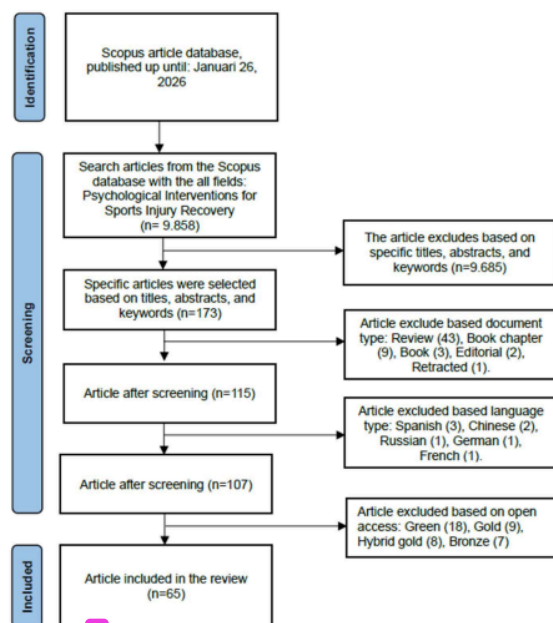


Figure 1. Systematic literature review using PRISMA

Based on the search outcomes retrieved from the Scopus database on 26 January 2026, using the all fields query "Psychological interventions for sports injury recovery" across diverse academic disciplines, the corpus spans from the earliest record in 1988 to the most recent publications in 2026, yielding a total of 9,858 documents (Figure 1). In the identification and initial screening stages, 9,685 records were excluded because their titles, abstracts, and keywords did not directly correspond to the topic, leaving 173 records for further screening. The subsequent eligibility process applied additional

exclusion filters to ensure methodological coherence and relevance: records were removed by document type Review (43), Book chapter (9), Book (3), Editorial (2), and Retracted (1) followed by exclusions on language grounds Spanish (3), Chinese (2), Russian (1), German (1), and French (1). Finally, access-related criteria were applied, excluding items that did not meet the open-access requirement: Green (18), Gold (9), Hybrid gold (8), and Bronze (7), resulting in 65 articles included for full review.

Data Extraction

Data extraction for the study on psychological interventions for sports injury recovery was conducted using a standardised, purpose-built data extraction form to capture essential information from each article meeting the inclusion criteria. The extraction process was undertaken by three independent reviewers and followed a systematic procedure to ensure impartial, consistent, and reproducible results. Each reviewer carefully appraised the studies that had passed full-text eligibility assessment and then recorded the core information across a set of predefined components.

The extracted information covered three main areas: publication year and the country in which the study was conducted, to map the temporal and geographical distribution of the evidence base. The methodological characteristics analysed in this study included study design, research setting and context, participant profiles, intervention duration, the type and content of psychological interventions implemented, as well as the measurement instruments and outcome indicators used in each study. The analysis also synthesised key findings regarding the effectiveness and potential contribution of psychological interventions to sports injury recovery, particularly their influence on physical and functional recovery, psychological responses, and recovery-related behaviours.

Data extraction was conducted systematically using a predefined extraction form developed to ensure consistency across the selected studies. The extracted information included bibliographic details, study design, research setting and context, participant characteristics, intervention duration, the type and content of psychological interventions, measurement instruments, and reported outcome indicators. Two reviewers independently extracted and verified the data from the 65 eligible articles to minimise bias and improve accuracy. Any disagreements or inconsistencies identified during the extraction process were resolved through consensus discussion, and when necessary, by consultation with a senior reviewer. By consolidating evidence from peer-reviewed, English-language, open-access sources, the study aims to provide a robust account of the field's development, to clarify its prevailing trajectories, and to identify gaps that may guide subsequent research agendas and intervention design.

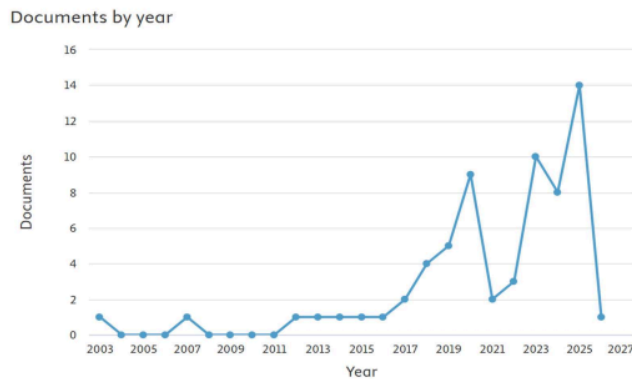
RESULTS

The results presented in this study are derived from the 65 articles ultimately included following PRISMA-guided screening of records in the Scopus database on psychological interventions for sports injury recovery. This evidence base is analysed to describe the field's publication profile, including the volume of research output, the temporal distribution of publications across the study period, and the

journals in which the scholarship is most frequently disseminated. In addition, the analysis identifies the intellectual and institutional architecture underpinning this research area by examining the most visible authors, leading affiliations, and the countries contributing to the development of knowledge. Taken together, these descriptive and relational findings illuminate not only how the literature has evolved, but also who has shaped its direction and where scholarly activity is most concentrated, thereby offering a human-centred account of how research communities have engaged with the psychological needs of injured athletes.

RQ1: Does the exploration of psychological interventions for sports injury recovery remain a topic of significant relevance for scientific studies in the future?

Based on data from the Scopus database, it has been revealed that, over nearly four decades, scholarly work on psychological interventions for sports injury recovery has been relatively limited, with a total of 65 articles published on the topic. This indicates that research in this field remains somewhat restricted, as illustrated in Figure 2. However, psychological interventions for sports injury recovery have undergone significant development over the last decade, particularly since 2018. In 2018, there was a notable increase in the number of Scopus-indexed articles on this topic, with 4 published. This trend continued in 2020, 2023, and 2025, with 9, 10, and 14 articles. Currently, research on psychological interventions for sports injury recovery is gaining significant attention, focusing on improving emotional states, attention, motivation, anxiety management, resilience, connection, empathy, and mutual support within team environments (Čolić et al., 2025; Golub & Steinfeldt, 2025; Yang et al., 2024; Gashi et al., 2023; L. Chen et al., 2023; Morriss et al., 2023; Berengüi et al., 2021). Additionally, psychological interventions for sports injury recovery significantly improve athletes' sleep quality (Ramos-Pastrana et al., 2025).



Source: Scopus Database

Figure 2. Number of psychological interventions for sports injury recovery publications

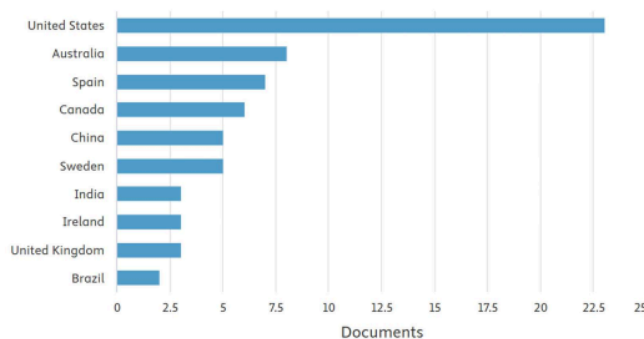
Since 2003, literature on psychological interventions for sports injury recovery has remained limited due to the scarcity of research published in reputable journals, thereby creating an opportunity for future researchers to fill this gap. This study is crucial for enriching the understanding of psychological interventions for sports injury recovery, which influences both athletes' and coaches' behaviors during the injury recovery process. It can help foster a deeper understanding of the practical and sustainable application of psychological interventions for sports injury recovery across various sectors.

RQ2: What is the distribution of research related to psychological interventions for sports injury recovery?

The analysis of the distribution of research on psychological interventions for sports injury recovery across 65 articles was conducted by grouping the articles by country, region, affiliation, source (journal/publication), and author, with a focus on the top 10 articles in each classification. Understanding the allocation of relevant scholarly work on psychological interventions for sports injury recovery will be valuable for both academics and practitioners in formulating future research agendas, particularly to promote the sustainable development of the paradigm. The allocation of scientific studies on psychological interventions for sports injury recovery by country or geographic region is dominated by the United States with 23 articles, Australia with 8 articles, Spain with 7 articles, Canada with 6 articles, China with 5 articles, Sweden with 5 articles, India with 3 articles, Ireland with 3 articles, the United Kingdom with 3 articles, and Brazil with 3 articles (see Figure 3).

Documents by country or territory

Compare the document counts for up to 15 countries/territories.

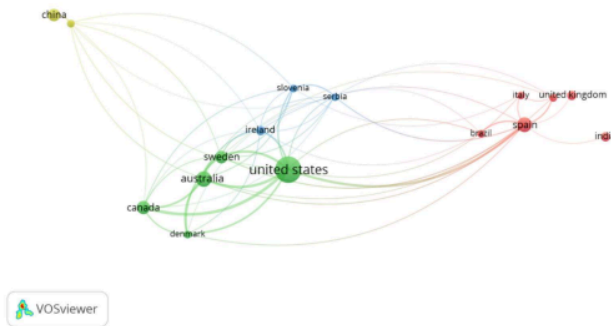


Source: Scopus Database

Figure 3. Number of articles by the top 10 countries or territories

The allocation of scholarly studies on psychological interventions for sports injury recovery by country or region shows the United States with 23 articles, followed by Australia with 8. Additionally, several other countries have made significant contributions to this research, including Spain (7 articles), Canada (6), China (5), Sweden (5), and India, Ireland, the United Kingdom, and Brazil (3 each). These findings indicate that the issue of psychological interventions for sports injury recovery has attracted attention across many countries.

The researchers will also analyze the relationships between countries involved in research on psychological interventions for sports injury recovery using VOSviewer software. This stage is essential for formulating a systematic prospective research agenda. The VOSviewer analysis results indicate a connection between countries in studying the topic of psychological interventions for sports injury recovery (see Figure 4).



Source: Output Vosviewers Software

Figure 4. Network country visualization

These further demonstrate that research on psychological interventions for sports injury recovery has developed through several interconnected international collaboration clusters. The green cluster, led by the United States, represents the most dominant and extensive collaboration network, with strong connections to Australia, Sweden, Canada, Denmark, and Ireland. This pattern suggests that North American and Oceanian institutions play a central role in shaping the development of research in this field. The red cluster is centred around Spain and includes collaborations with Italy, the United Kingdom, Brazil, and India, indicating the emergence of a strong European-led research network with links extending to South America and Asia. Meanwhile, the blue cluster, involving Slovenia and Serbia, reflects a smaller but regionally connected European research group, while the yellow cluster, represented by China, appears relatively isolated despite maintaining several collaborative links with Western countries.

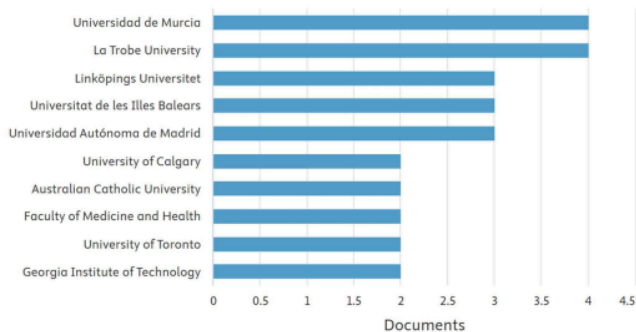
Commented [R6]: Describe the clusters (colors in VOSviewer). Who leads which clusters? Is there strong cross-continental collaboration, or is the research still "siloed" within individual countries?

The VOSviewer network visualisation indicates that international collaboration in this field is growing, particularly across Europe, North America, and Australia. However, the collaboration structure also suggests that research remains partially concentrated within regional or country-based clusters rather than forming a fully integrated global network. Cross-continental collaboration is visible, especially through the central role of the United States and Spain as bridging countries, yet contributions from African countries remain absent from the network. This finding indicates that research on psychological interventions for sports injury recovery is still unevenly distributed globally and highlights the need for broader international collaboration involving underrepresented regions to develop a more inclusive and globally relevant rehabilitation framework

The allocation of scholarly works on psychological interventions for sports injury recovery by institutional affiliation is dominated by Universidad de Murcia (Spain) with 4 articles, La Trobe University (Australia) with 4 articles, and Linköpings Universitet (Sweden) with 4 articles. Additionally, Universitat de les Illes Balears (Spain) contributed 3 articles, Universidad Autónoma de Madrid (Spain) with 3 articles, University of Calgary (Canada) with 2 articles, Australian Catholic University (Australia) with 2 articles, Faculty of Medicine and Health (Australia) with 2 articles, University of Toronto (Canada) with 2 articles, and Georgia Institute of Technology (United States) with 2 articles (see Figure 5).

Documents by affiliation

Compare the document counts for up to 15 affiliations.



Source: Scopus Database

Figure 5. Number of articles by the top 10 affiliations

Although the United States dominates the publication of articles on psychological interventions for sports injury recovery, an interesting trend emerges when examining the Top 10 Affiliations. Notably, this topic is also being explored in depth at institutions outside the United States, such as the

Universidad de Murcia (Spain), with 4 articles; La Trobe University (Australia), with 4 articles; and Linköpings Universitet (Sweden), with 4 articles. This phenomenon is particularly intriguing because it highlights the growing international interest and contribution to this area of research, suggesting that psychological interventions for sports injury recovery are recognized as a key component of rehabilitation practices worldwide. It also underscores the importance of cross-cultural perspectives and diverse research environments in advancing the field.

The allocation of studies on psychological interventions for sports injury recovery based on journal sources or publishing institutions is dominated by *Frontiers in Psychology* with 5 articles, followed by *BMC Musculoskeletal Disorders* with 4 articles, *Orthopaedic Journal of Sports Medicine* with 3 articles, *Revista Brasileira De Medicina do Esporte* with 3 articles, *Clinical Journal of Sport Medicine* with 2 articles, *Frontiers in Sports and Active Living* with 2 articles, *International Journal of Environmental Research and Public Health* with 2 articles, *International Journal of Human Movement and Sports Sciences* with 2 articles, *International Journal of Sport Studies for Health* with 2 articles, and *Journal of Physical Education and Sport* with 2 articles (see Figure 6).

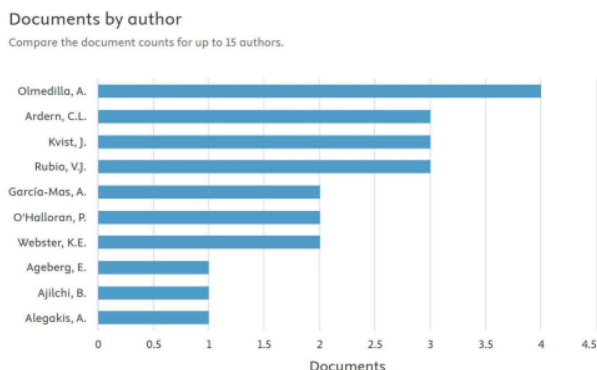


Source: Scopus Database

Figure 6. Number of articles by top 10 source

The author's distribution of research on psychological interventions for sports injury recovery does not show a clear dominance pattern. Among the top 10 authors, Olmedilla, A. has written 4 articles; Ardern, C.L. has written 3 articles; Kvist, J. has written 3 articles; Rubio, V.J. has written 3 articles; Garcia-Mas, A. has written 2 articles; O'Halloran, P. has written 2 articles; Webster, K.E. has written 2 articles; Andersberg, E. has written 1 article; Ajilchi, B. has written 1 article; and Alegakis, A. has written 1 article. The author's distribution of research on psychological interventions for sports injury recovery

is clearly shown in Figure 7.



10

Source: Scopus Database

Figure 7. Number of articles by top 10 author

1 *RO3: What are the theoretical and practical implications from the perspective of future research?*

The examination was conducted on 65 manuscripts obtained from the Scopus repository. VOSviewer was used to demonstrate that the results could have both theoretical and pragmatic impacts for future research on psychological interventions for sports injury recovery. The metadata analysis results using VOSviewer will assist researchers and practitioners in better understanding the assumptions and findings related to psychological interventions for sports injury recovery. The bibliometric analysis results from VOSviewer can highlight which variables have been extensively studied by previous researchers and which remain to be explored, providing a foundation for future research. From a practitioner's perspective, the literature analysis results using VOSviewer will support practitioners in implementing sustainable psychological interventions for sports injury recovery in the future and in promoting these interventions worldwide.

From Figure 8, the occurrence of the following terms is noted: Psychology (23), Sports Injury (20), Rehabilitation (17), Anxiety (11), Physical Activity (11), Exercise (9), Social Support (5), Return to Sport (20), Rehabilitation Outcome (3), Pain Management (2), Psychological Readiness (4), Sports (8), Psychological Aspect (7), Performance (5), Sleep (5), Fatigue (5), Psychological Intervention (2), Muscle Injury (2), Injury (14), Treatment Outcome (4), Pain Measurement (2), Psychological Well-being (5), and Pathophysiology (5).

to address the limitations of previous research and offer more comprehensive insights into psychological interventions for sports injury recovery. By exploring this topic in a broader, global context, it can contribute to the development of universal applications adaptable across diverse settings.

DISCUSSION

This study highlights the significant role of psychological interventions in sports injury recovery. Psychological techniques such as cognitive-behavioral therapy, stress management, and goal-setting have been shown to effectively support athletes in enhancing mental resilience and promoting physical recovery. In line with Fitria et al., (2025) these interventions, such as behavioural therapy, stress management, and goal-setting, are crucial in helping athletes cope with the emotional challenges of injury by reducing anxiety and fostering a positive outlook during recovery. Psychological interventions improve self-confidence, which can accelerate the healing process and contribute to a more successful return to sport (Marušić et al., 2020; L. Podlog et al., 2014; Schwab Reese et al., 2012). By incorporating these strategies, athletes are better equipped to manage stress, overcome mental barriers, and reduce the likelihood of re-injury, thus improving their overall rehabilitation outcomes (Lindsay et al., 2023). Integrating psychological interventions into rehabilitation programs is essential to optimizing both mental and physical recovery in athletes.

The articles analyzed in this study reveal that psychological interventions are frequently incorporated systematically into injury recovery protocols to optimize rehabilitation outcomes. Many studies emphasize the critical role of a multidisciplinary approach that integrates physical and mental support to promote a more effective recovery. By combining physical rehabilitation techniques with psychological strategies such as cognitive behavioral therapy, stress management, and goal-setting, athletes can address both the physical and mental challenges of injury recovery (Rajasekhar, 2024; L. W. Podlog et al., 2020). Moreover, the evidence indicates that these interventions can improve key psychosocial outcomes such as self-efficacy, motivation, and adherence to rehabilitation, thereby supporting more consistent engagement throughout the recovery trajectory (Goddard et al., 2021). Taken together, the findings suggest that embedding tailored psychological support within standard rehabilitation pathways may reduce psychological distress (e.g., anxiety and fear of re-injury) and facilitate a safer, more confident return to sport.

The holistic approach not only accelerates physical healing but also enhances mental resilience, which is crucial for an athlete's return to competition. In line with Kaur et al., (2025) and Lindsay et al., (2023) The integration of psychological interventions can help reduce anxiety, improve confidence, and prevent reinjury, ultimately enabling athletes to return to their sport in a better physical and mental state, fully prepared for the demands of competition. This study concludes that such interdisciplinary approaches are necessary in sports injury rehabilitation programs to ensure the most comprehensive and successful recovery outcomes.

Preventive strategies such as neuromuscular training, proprioceptive exercises, strength and

conditioning programs, and movement pattern correction have been shown to enhance joint stability, improve coordination, and reduce biomechanical risk factors associated with injury. Training interventions combined with psychological readiness can help athletes develop greater body awareness and confidence in their movements, thereby reducing fear of re-injury and promoting safer return-to-play decisions (Fahmi et al., 2023). Education on injury prevention, including proper technique, load management, and recovery strategies, plays a crucial role in empowering athletes to take an active role in maintaining their physical health (Perdana et al., 2026). Integrating injury prevention training alongside psychological and physical rehabilitation approaches provides a comprehensive framework that supports long-term athlete well-being and optimal performance sustainability.

Based on the literature review, previous research typically categorize psychological interventions for sports injury recovery into five main activities: Goal Setting, Imagery, Relaxation, Self-Talk, and Social Support. However, a deeper examination revealed an additional psychological intervention technique that is particularly effective at the moment of injury: Deep Breathing. At the time of injury, most athletes experience feelings of anxiety, confusion, fear, and worry. Many coaches and medical teams instruct athletes to practice deep breathing to help them calm down and regain emotional control (Tamminen & Watson, 2022; L. W. Podlog et al., 2020). This intervention enables athletes to manage their emotions effectively, ensuring that first aid can be administered optimally and recovery can begin in the best possible condition. Here is an illustration of the novelty findings in this study, which is psychological interventions for sports injury recovery, consisting of 6 items: Deep Breathing, Goal Setting, Imagery, Relaxation, Self-Talk, and Social Support (see Figure 9).



Figure 9. Novelty of psychological interventions for sports injury recovery

²⁹ This hybrid systematic literature review and bibliometric analysis also identified the impact of psychological interventions on athletes' recovery from sports injuries. The impacts observed during the implementation of these interventions include improvements in emotional states, attentional focus, motivation, anxiety management, resilience, connection, empathy, sleep quality, and mutual support within team environments.

⁵ This Hybrid Systematic Literature Review and Bibliometric Analysis also successfully identified several key impacts of psychological interventions on athletes' recovery from sports injuries. These interventions improved emotional states, enabling athletes to better manage their emotions during rehabilitation. Attention focus, motivation, and anxiety management were also enhanced, helping athletes stay focused on recovery goals and reduce stress (Forelli et al., 2024; Brooks et al., 2022). Additionally, resilience was strengthened, enabling athletes to overcome setbacks more effectively. The interventions fostered greater connection and empathy ⁵² within team environments, improved sleep quality, and increased mutual support among teammates. These findings highlight the critical role of psychological strategies not only in promoting mental well-being but also in enhancing overall recovery outcomes and supporting athletes' triumphant return to sport.



Figure 10. Novelty of impact psychological interventions for sports injury recovery

A crucial aspect to consider in this research is whether the effectiveness of psychological interventions varies by injury type or severity. It would be insightful to examine how different types of injuries (e.g., soft-tissue, fractures, or joint injuries) influence the psychological challenges athletes face during recovery. According to Martin et al., (2021) ³⁵ a deeper understanding of the relationship between injury types and the psychological challenges athletes face can enhance the development of more specific and compelling rehabilitation programs. Kaur et al., (2025) reveals that understanding whether specific interventions are more effective for particular types of injuries can help refine rehabilitation protocols. This could lead to more tailored psychological support based on injury-specific needs,

ultimately improving the overall success rate of the recovery process.

The immediate impact of psychological interventions on sports injury recovery has been well documented, but less attention has been paid to their long-term benefits. This research could further investigate how psychological interventions continue to benefit athletes after their physical recovery is complete. Improved mental resilience, anxiety management, and increased self-confidence may contribute to better performance in future competitions, even after the athlete has fully recovered from the injury (Y. Li et al., 2025; Herrero et al., 2021). Psychological support plays a crucial role in ensuring that athletes maintain a positive mindset and continue to perform at their best, even in the face of future challenges (Hussain et al., 2023; Mann & Narula, 2017). These interventions may lead to long-term changes in an athlete's overall approach to training, competition, and the management of setbacks.

Understanding the lasting effects of psychological interventions could provide valuable insights into their potential to enhance long-term athlete development and career longevity. This could also underscore the ongoing importance of mental health support in sports, making clear that psychological well-being is just as crucial as physical health for sustaining athletic performance over time. Future studies could examine how the benefits of psychological interventions persist over time and whether athletes who received psychological support during injury recovery perform better in their careers post-recovery. As noted by Husain et al., (2024) integrating psychological care into rehabilitation can help athletes maintain peak performance levels throughout their careers, even after the physical recovery phase.

CONCLUSIONS

This study confirms that psychological interventions play an important role in sports injury rehabilitation by addressing not only physical recovery but also the emotional and cognitive challenges experienced by athletes throughout the rehabilitation process. Interventions such as cognitive-behavioural therapy, imagery, relaxation, goal-setting, self-talk, and social support were consistently associated with improved coping, stronger rehabilitation adherence, and greater psychological readiness to return to sport. A notable contribution of this review is the identification of deep breathing as an additional intervention frequently applied during the immediate post-injury phase to help athletes regulate anxiety, panic, and emotional distress. This finding suggests that psychological support in sports injury recovery extends beyond traditional rehabilitation approaches and should also include early emotional regulation strategies. At the same time, the review reveals that the implementation of psychological interventions remains inconsistent across rehabilitation settings, despite growing recognition of their importance in supporting holistic athlete recovery.

The bibliometric analysis further demonstrates that research on psychological interventions for sports injury recovery continues to grow, although scholarly contributions remain concentrated in developed countries such as the United States, Australia, and several European nations. This uneven

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distribution highlights the need for more context-specific research in developing and underrepresented regions, where cultural and institutional differences may shape rehabilitation experiences and psychological support practices. In addition, the existing literature still shows considerable variation in study design, injury classification, intervention duration, and outcome measurement, making it difficult to establish standardized rehabilitation guidelines. Future research should therefore prioritise longitudinal and comparative approaches to examine the long-term effects of psychological interventions on post-recovery performance, reinjury prevention and athlete career sustainability. Overall, this study contributes to the growing evidence supporting the integration of psychological care into sports injury rehabilitation and provides a foundation for the development of more comprehensive and evidence-based recovery frameworks.

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PSYCHOLOGICAL INTERVENTIONS FOR SPORTS INJURY RECOVERY: A HYBRID SYSTEMATIC LITERATURE REVIEW AND BIBLIOMETRIC ANALYSIS

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