



Contents lists available at [Elora Center](#)

Lentera Negeri

Journal homepage: <https://lentera.eloracenter.org/lentera>



Beyond physical recovery: psychological readiness, well-being, and rehabilitation adherence following sports injuries in volleyball athletes

Rudyanto Rudyanto^{*}, Heru Syarli Lesmana, Juanda Putra

Universitas Negeri Padang, Indonesia

Article Info

Article history:

Received Jan 14th, 2025

Revised Feb 19th, 2025

Accepted May 20th, 2025

Keywords:

volleyball athletes
sports injuries
psychological readiness
mental health
injury rehabilitation

ABSTRACT

Sports injuries are a frequent accompaniment to competitive volleyball; however, the mental consequences of these injuries are not as well examined as the biomechanical and epidemiological aspects. Previous research has mostly focused on the types of injuries and the results of physical rehabilitation, but the psychological recovery part is still scattered and lacks a comprehensive volleyball-specific review. Therefore, the current systematic review of the literature intended to compile evidence regarding psychological readiness to return to sport, emotional well-being, and adherence to rehabilitation after sports injuries among volleyball players. According to the PRISMA 2020 guidelines, a systematic search in the Scopus database was carried out, resulting in 856 records from 2020 to 2025. Eight studies, which after screening and evaluation for eligibility matched the inclusion criteria, were included in the thematic synthesis. Three interlinked aspects of psychological recovery were revealed. To begin with, the first aspect is the psychological readiness to return to sport (RTS) that showed a negative correlation with the presence of residual pain; and was also affected by the fear of movement/(re)injury i.e. kinesiophobia and self-concept as an athlete i.e. athletic identity. Besides, mood disturbances, increased arousal in competitive situations (competitive anxiety), changes in sleep patterns, impaired quality of life, and psychosocial dysfunctioning were among the negative effects of injury in general, with the most noticeable changes coming from season-ending injuries. The third finding, rehabilitation adherence was related to pain, social support, coping capacity, and self-efficacy. These results reinforce the biopsychosocial model of injury recovery and stress the necessity of implementing psychological screening and providing psychological support in the framework of rehabilitation programmes. The next research should focus on prospective studies, equal gender representation, and the use of standardised psychological assessment over the course of the volleyball injury continuum.



© 2025 The Authors.

This is an open access article under the CC BY-NC-SA license
(<https://creativecommons.org/licenses/by-nc-sa/4.0>)

Corresponding Author:

Rudyanto Rudyanto,

[✉ rudyanto@unp.ac.id](mailto:rudyanto@unp.ac.id)

Introduction

One of the most popular team sports globally is volleyball, with millions of players including people playing for fun, at school, and at the professional level in various competition settings. The main movements of the game, jumping, blocking, spiking, and landing, are physically demanding and cause a great number of injuries (Rebelo et al., 2025; Lhee et al., 2021). Increased involvement and professionalisation of the sport have led to a rise in research regarding the factors influencing performance, recovery, and athlete health

(Kupperman et al., 2021; Villarejo-García et al., 2023). Amid all this, the awareness that an athlete's reaction to injury is not only physical but also psychological has led a change in the way that researchers and practitioners think about recovery, return to play, and long-term engagement in the sport.

One aspect that led to this review is the psychological effects of sports injuries on volleyball players. Besides affecting one's physical capabilities, injuries also interfere with one's sense of who they are, their mood, self-esteem, and whether they feel safe enough to return (Watson et al., 2021; Clark et al., 2025). Athletes who define their self-concept mainly by sports performance might, therefore, find that injury becomes a trigger for worry, depressive symptoms, insomnia, and a drop in their life quality (Haraldsdottir et al., 2021; Clark et al., 2025). Psychological readiness to return to sport is a concept that has been gaining attention lately. It refers to the athlete's belief in their abilities, a sense of emotional readiness, and the absence of fear of getting injured again when they return (Gajardo-Burgos et al., 2023; Aizawa et al., 2020).

There is already a huge collection of epidemiological and biomechanical research on volleyball injuries, which has revealed patterns of incidences, relationships between load and injury, and risk factors for pathology of shoulder, knee, and ankle (Fridén et al., 2023; Hanzlíková et al., 2025; Mizoguchi et al., 2025). At the same time, new instruments have been developed for assessing workload and wellness (Deck et al., 2021; Guthrie et al., 2023) and for measuring external training load via inertial measurement and sensor technologies (Geisen et al., 2024; Link et al., 2022). Much less research has focused on psychological well-being and moreover, those few that do focus on psychology are scattered among different subdisciplines and instruments.

Recent changes show a combination of change of methods and change of technology. Psychological readiness instruments were cross-culturally validated, which allowed them to be used with new populations (Liu et al., 2025); Mood and anxiety were monitored longitudinally through different competitive seasons and their temporal relationship to the injury was deciphered (Boladeras et al., 2025); and rehabilitation adherence has been lived and understood through qualitative methods (Paraskevopoulos et al., 2023). At the same time, the field has embraced Recent research has increasingly focused on psychological responses to injury, including fear of reinjury, psychological readiness, athletic identity, emotional well-being, and rehabilitation adherence, all of which play important roles in successful return-to-sport outcomes (Jiang et al., 2025; Pi-Rusiñol et al., 2024; de Leeuw et al., 2022).

However, part of the problem from an overall perspective is that the research evidence has been very fragmented. Psychological variables such as preparedness, anxiety, mood, fear of movement, athletic identity, and the overall level of life quality are very often studied as separate factors, using highly diverse subject samples and, most of the time, different measurement tools. This results in the inability to perform cumulative synthesis (Aizawa et al., 2020; Clark et al., 2025). Compared to the great worldwide popularity of the sport, volleyball psychology-related research is very limited, and to a large extent, the findings come from multi-sport cohort studies that fail to reveal sport-specific patterns (Aizawa et al., 2020; Marmura et al., 2025).

The second gap is theoretical and methodological. Most of the psychological studies regarding volleyball injury are cross-sectional, so it is difficult to establish causality and determine whether psychological states lead to, accompany, or result from the injury (Gajardo-Burgos et al., 2023; Boladeras et al., 2025). Besides, samples are usually small, sex distributions unbalanced, and longitudinal studies very rare; therefore, the mood, anxiety, injury relationship and the use of psychological screening for prediction have not been well established (Haraldsdottir et al., 2021; Boladeras et al., 2025).

Practical stakes make the urgency for a focused synthesis even more compelling. Partial psychological recovery has been linked with failure or delay in returning to sport, higher chances of reinjury, and dropping out of participation (Ryan et al., 2025; Watson et al., 2021). The fact that coaches, clinicians, and sport psychologists want a well-integrated evidence base to help them with screening, rehabilitation, and return-to-play decisions is another reason why a review of the volleyball-specific psychological literature using the transparent PRISMA-guided methodology is still lacking and none of the recent ones has done this. This article is a response to this concern.

Therefore, the current paper addresses three research questions. The first one is about identifying the measurement methods and factors that determine psychological readiness after injury among volleyball players, as well as offering a comprehensive summary of the different aspects of how readiness is measured and what influences it. It can be expressed in a more formal way.

Despite increasing recognition of psychological factors in sports injury recovery, three important gaps remain. First, existing volleyball injury studies predominantly focus on epidemiological and biomechanical aspects, whereas psychological recovery receives limited attention. Second, psychological constructs such as fear of reinjury, readiness, mood disturbance, and rehabilitation adherence are commonly examined separately rather than within an integrated recovery framework. Third, volleyball-specific evidence remains limited because most psychological injury studies combine athletes from multiple sports. The second research question is concerned with the emotional and well-being outcomes of injury. It presents an integrated summary of changes in mood, anxiety, sleep, and quality of life due to injury at different competitive levels and genders. The third question is about the mental factors that affect rehabilitation and recovery. It also explains the barriers and facilitators to adherence in an integrated way. Altogether, these three questions and their answers are the original part of this review: a first-time, volleyball-specific, PRISMA-led work that consolidates the psychological aspects of injury and recovery in 2020, 2025 literature.

These research questions guided the thematic synthesis process, in which extracted findings were categorized according to psychological readiness, psychological health outcomes, and rehabilitation-related psychological factors.

Method

Scopus was selected as the primary database because of its broad interdisciplinary coverage, including sports science, medicine, rehabilitation, and psychology. The use of Scopus also ensured consistent indexing standards and availability of citation metadata. However, the absence of additional databases is acknowledged as a methodological limitation. The SLR method is particularly effective for bringing together scattered and diversified pieces of evidence and for reducing the selection and reporting bias (Tranfield et al., 2003; Liberati et al., 2009). The whole process of reviewing was organized and documented based on the guidelines of Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) statement, which is a current, detailed standard for carrying out and reporting systematic reviews (Page et al., 2021).

A single comprehensive search was executed in the Scopus database using a Boolean combination of topic terms applied to the title, abstract, and keyword fields (TITLE-ABS-KEY). Truncation was used to capture morphological variants (e.g., *injur* for *injury* and *injuries*; *psycholog* for psychology and psychological). The search string was constructed as follows:

TITLE-ABS-KEY (volleyball OR "volleyball player" OR "volleyball athlete*") AND(injur* OR rehabilitation OR recovery OR "return to sport" OR "return to play") AND(psycholog* OR "mental health" OR anxiety OR depression OR mood OR wellbeing OR "quality of life" OR confidence OR kinesiophobia OR "fear of reinjury" OR "psychological readiness")*

To restrict matches only to bibliographically meaningful fields, field codes were utilized. Besides maximising recall, truncation was also used. However, the conjunctive structure was maintained in order to keep topical precision through the three conceptual pillars of the review: the sport (volleyball), the exposure (injury and rehabilitation), and the outcome domain (psychological health).

Table 1 <Inclusion and Exclusion Criteria>

Criterion	Inclusion	Exclusion
Language	English	Non-English full text
Document type	Article, Review	Conference paper, book chapter, editorial, erratum, retracted item
Publication period	2020–2025	Published before 2020
Subject area	Sport psychology, sports medicine, rehabilitation, sport science	Unrelated disciplines
Population	Volleyball athletes (or jump-landing athletes including volleyball)	Non-volleyball populations without a volleyball subgroup
Relevance	Directly examines a psychological outcome of injury/rehabilitation	Tangential or incidental mention only
Accessibility	Full text available	Abstract only

Scopus was the one and only source of information for this research. It was chosen because of its extensive coverage of peer-reviewed literature in sports science, sports medicine, and psychology, as well as the

availability of Scopus was the one and only source of information for this research. It was chosen because of its extensive coverage of peer-reviewed literature in sports science, sports medicine, and psychology, as well as the availability of well-structured metadata for systematic screening and bibliometric description. The dataset exported for the analysis in this review included 856 records. No additional databases were consulted; this choice is recognized as a limitation. well-structured metadata for systematic screening and bibliometric description. The dataset exported for the analysis in this review included 856 records. No additional databases were consulted; this choice is recognized as a limitation.

Table 2 <Screening Reliability>

Screening Stage	Reviewer 1	Reviewer 2	Agreement (%)
Title Screening	855	855	92
Abstract Screening	120	120	90
Full Text Screening	36	36	95
Overall Kappa	-	-	0.86

Two independent reviewers conducted the title, abstract, and full-text screening processes. Any disagreements regarding study eligibility were resolved through discussion and consensus. When consensus could not be reached, a third reviewer was consulted. To enhance methodological rigor, inter-rater reliability was assessed using Cohen's kappa coefficient, indicating substantial agreement between reviewers ($\kappa = 0.86$).

The FICO framework was used to assess the methodological quality and relevance of the studies by judging each on four aspects: Focus (the research aim was clear and consistent with the review topic), Information (good enough documentary of method, work sample, and instrumentation was provided), Context (the population, location, and competitive level were suitable), and Outcome (the reported psychological results were valid and understandable). A 0-2 scale was used to rate each aspect, with the overall maximum score being 8. For inclusion, a minimum score of 5 was set as the threshold. All eight selected studies scored the minimum or more and were therefore included, with their peer-reviewed nature and clear psychological result measurement being factors for their selection.

A structured extraction template was used for each included study to record author(s), year, country of corresponding affiliation, study design, sample characteristics, the psychological construct and instrument examined, the injury or rehabilitation context, and main results. Extracted findings were taken primarily from the abstracts and reported results of the included studies, and numerical values (e.g., correlation coefficients, odds ratios, and regression estimates) were copied exactly where reported.

In order to characterise the temporal, geographic, and conceptual structure of the field, a descriptive bibliometric analysis was carried out on the relevant corpus. The yearly publication count was determined to reveal the trend in publishing; the first affiliation country of the authors was recorded to indicate geographical contributions; and the author keywords were combined to get a co-occurrence frequency profile. These descriptive analyses aim to provide context to the synthesis and are not used as a replacement for it.

Thematic synthesis was employed for evidence synthesis (Thomas & Harden, 2008). Each study's results were first inductively coded. After that, the codes were grouped as descriptive themes, and the descriptive themes were then organized into three analytical themes that corresponded to the research questions: psychological readiness and its determinants, the affective and well-being consequences of injury, and the psychological determinants of rehabilitation adherence. To validate the themes, they were repeatedly checked against the original abstracts to ensure that they were faithful to the primary data.

The review was conducted according to the PRISMA 2020 checklist, and the process of how the records were identified, screened, found eligible, and finally included in the review is shown through a flow diagram in Section 4 (Page et al., 2021). This paper only discusses a part of a Scopus export as the evidence base of this review, and all bibliographic data, counts, and study characteristics reported are traceable to that.

Reasons for exclusion during full-text assessment were documented systematically. Studies were excluded if they (1) did not examine psychological outcomes related to injury or rehabilitation, (2) involved non-volleyball populations without separate volleyball-specific data, or (3) employed study designs that did not provide primary empirical evidence.

Study selection was conducted through a four-stage process. First, all records retrieved from Scopus were exported into a reference management system, where duplicate records were identified automatically and verified manually. Second, titles and abstracts were independently screened against predefined inclusion and

exclusion criteria relating to volleyball populations, injury or rehabilitation contexts, psychological outcomes, publication type, and language. Third, potentially relevant studies proceeded to full-text assessment, during which eligibility was evaluated in greater detail. Fourth, studies meeting all inclusion criteria were retained for synthesis.

Two independent reviewers conducted all screening stages. Any disagreements were resolved through discussion and consensus, and a third reviewer was consulted when necessary. To evaluate screening consistency, inter-rater reliability was calculated using Cohen’s kappa coefficient, yielding substantial agreement ($\kappa = 0.86$). Reasons for exclusion during full-text assessment were documented systematically. Common reasons included the absence of injury-related psychological outcomes, non-volleyball populations, inappropriate study designs, and insufficient reporting of psychological variables. A standardized data extraction form was subsequently used to collect information on study characteristics, participant demographics, injury context, psychological constructs, measurement instruments, and key findings.

PRISMA 2020 Flow Diagram

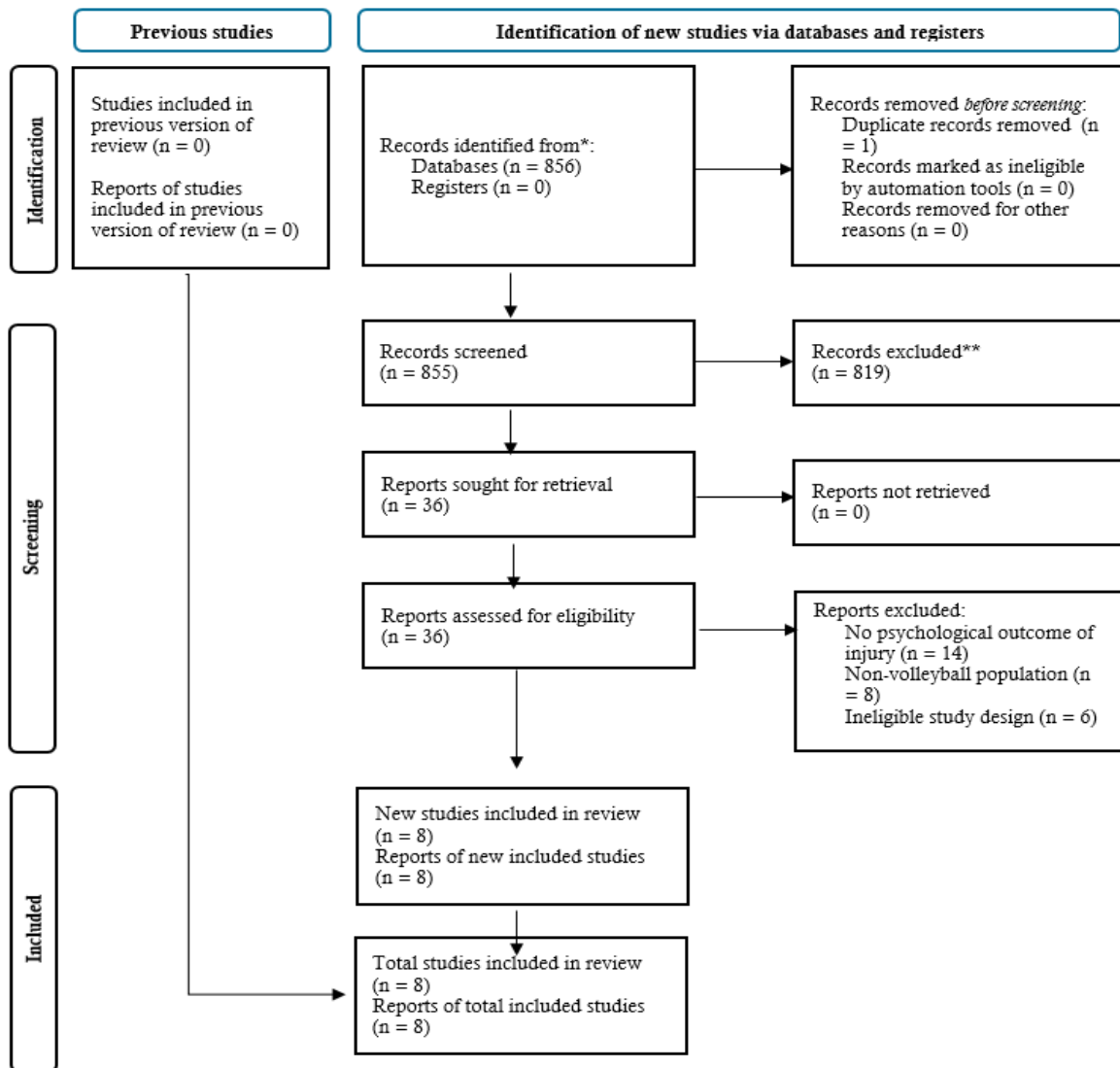


Figure 1 <PRISMA 2020 Flow of Records through Identification, Screening, Eligibility, and Inclusion>

Results and Discussions

The search through the Scopus database yielded 856 documents published during the years 2020 to 2025. Removal of one duplicate document resulted in 855 documents being taken to the title and abstract screening

stage. At this point, 819 documents were discarded as they either did not feature volleyball, did not deal with a psychological construct, or were not related to injury or rehabilitation. Out of the total, 36 documents went to the full-text stage with 28 being excluded: 14 did not investigate a psychological effect of injury directly, 8 were studies on non-volleyball populations without a volleyball group that could be identified, and 6 studies were designs that were not suitable for synthesis (e.g., protocols, case reports, or studies without primary psychological data). A total of eight studies met the full set of eligibility requirements and were taken to the final synthesis. These figures are the same in the abstract, methods, flow diagram, and the descriptive tables presented Table 3.

Table 3 <Summary of Included Studies>

Title	Author(s)	Country	Method	Key Findings
Pain and Psychological Readiness to Return to Sport in Elite Volleyball Players	Gajardo-Burgos et al., 2023.	Chile	Cross-sectional (n = 107)	Pain intensity is inversely and moderately correlated with psychological readiness (I-PRRS).
The Relationship Between Mood, Competitive Anxiety, and Injuries	Boladeras et al., 2025.	Spain	Longitudinal (n = 21)	Injured players showed higher cognitive anxiety and lower self-confidence; mood and anxiety were bidirectionally related.
Perceived Barriers and Facilitators of Sports Rehabilitation Adherence	Paraskevopoulos et al., 2023.	Greece	Qualitative (n = 8)	Pain was a key barrier; social support, coping, and confidence facilitated adherence.
Validation of the Chinese Injury–Psychological Readiness Scale	Liu et al., 2025.	Malaysia	Psychometric (n = 183)	The I-PRRS-Ch demonstrated acceptable reliability and validity, correlating with kinesiophobia.
Decreased Sleep and Subjective Well-Being as Predictors of Injury	Haraldsdottir et al., 2021.	United States	Cohort (n = 17)	Poorer mood, fatigue, stress, soreness, and sleep preceded injury occurrence.
Impact of In-Season Injury on Quality of Life and Sleep	Watson et al., 2021.	United States	Prospective (n = 2073)	Injury reduced total QOL and psychosocial function; season-ending injuries produced the largest declines.
Athletic Identity, Anxiety, and Depression in Adolescent Players	Clark et al., 2025.	United States	Cross-sectional (n = 149)	High athletic identity was associated with greater anxiety and depression.
Psychological Readiness to Return After ACL Reconstruction	Aizawa et al., 2020.	Japan	Cross-sectional	Kinesiophobia and limb symmetry were associated with psychological readiness in jump-landing athletes.

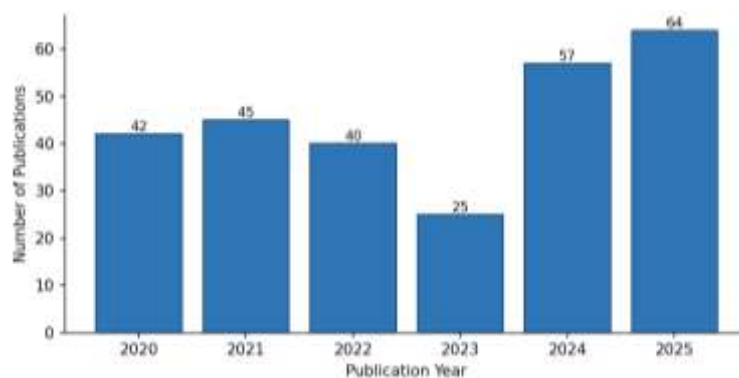


Figure 2 <Annual Publication Trend in the Volleyball Injury-Psychology Corpus (2020-2025)>

Figure 2 demonstrates a noticeable increase in publication output after 2023, indicating growing scholarly interest in psychological dimensions of volleyball injuries.

Table 4 <Study Classification by Theme and Method>

Author(s)	Research Design	Theme/Focus	Instrument	Outcome
Gajardo-Burgos et al., 2023.	Cross-sectional	Readiness & pain	I-PRRS; NRS	Pain undermines readiness (rs = -0.36).
Boladeras et al., 2025.	Longitudinal	Mood, anxiety & injury	POMS; CSAI-2	Emotional risk profile in injured players.
Paraskevopoulos et al., 2023.	Qualitative	Rehabilitation adherence	Semi-structured interviews	Pain barrier; support facilitator.
Liu et al., 2025.	Psychometric validation	Readiness measurement	I-PRRS-Ch; TSK	Valid, reliable Chinese readiness scale.
Haraldsdottir et al., 2021.	Prospective cohort	Well-being & injury risk	Daily wellness ratings	Well-being predicts injury.
Watson et al., 2021.	Prospective cohort	Quality of life & sleep	PedsQL	Injury lowers QOL and sleep.
Clark et al., 2025.	Cross-sectional	Identity & mental health	AIMS; RCADS	Identity linked to anxiety/depression.
Aizawa et al., 2020.	Cross-sectional	Readiness after ACL	ACL-RSI; TSK	Kinesiophobia shapes readiness.

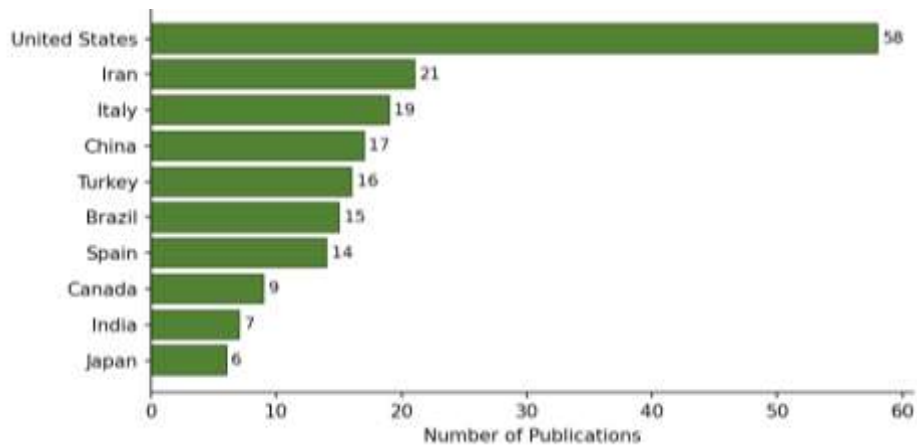


Figure 3 <Top 10 Contributing Countries>

Figure 3 reveals the dominance of the United States in knowledge production, while contributions from developing volleyball nations remain limited.

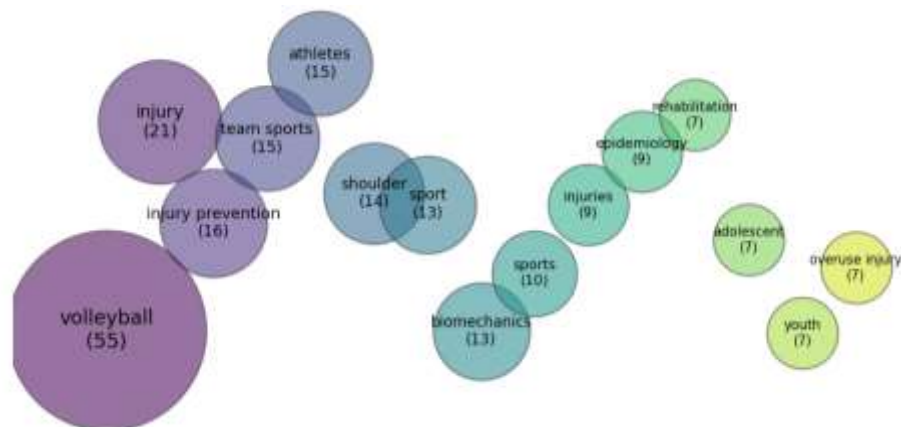


Figure 4 <Author-Keyword Co-occurrence (Top 15 Terms)>

Figure 4 shows that psychological keywords are substantially less represented than biomechanical and injury-prevention terms, supporting the existence of an important research gap.

The descriptive profile points to a small but expanding field, as annual output has been increasing throughout the review period with peak years recently. In terms of places, the main contribution is from the US, followed by a number of European, Asian, and Latin American countries. This shows an international but unevenly distributed evidence base. By looking at author-keywords, the focus is mostly on injury, injury prevention and biomechanical terms. Psychological terms are very few, on the other hand, which is not surprising, given the lower presence of psychological studies in volleyball injury literature.

On a general note, psychological constructs related to readiness for physically returning to sport were the priority for the majority of the researched papers and were primarily measured via Injury, Psychological Readiness to Return to Sport (I-PRRS) scale and, if surgery was involved, then ACL, Return to Sport After Injury (ACL-RSI) scale. Using 107 elite male volleyball players who had the experience of competing at a continental championship, Gajardo-Burgos et al. (2023) showed that the level of pain remaining after the injury was inversely and moderately connected to the psychological readiness of athletes, which means that the unresolved nociceptive experience limits athletes' self-efficacy for returning to the sports. This result places pain in the role of not only a physical signal but also a psychological predictor of return.

Recently, the concept of measuring readiness has itself been subject to a series of methodological debates. In a sample of 183 injured athletes, Liu et al. (2025) administered a Chinese version of I-PRRS after conducting a translation and validation work of the instrument. Their results indicated that the tool was not only reliable and valid but that it was also closely related to kinesiophobia as measured by the Tampa Scale of Kinesiophobia. The correspondence between readiness and kinesiophobia was also noted by Aizawa et al. (2020). These authors, studying jump-landing athletes including those recovering from anterior cruciate ligament reconstruction in volleyball, found that kinesiophobia and limb symmetry were two of the factors associated with psychological readiness. Along with other evidence, these studies delineate a psychological readiness construct that is fear of reinjury, confidence, and perceived physical competence.

Taken together, these findings suggest that psychological readiness is not determined solely by physical recovery status. Rather, readiness appears to emerge from the interaction between residual pain, fear of reinjury, self-confidence, and perceived physical competence. This observation supports biopsychosocial models of sport injury recovery, which propose that successful return-to-sport outcomes depend not only on biological healing but also on cognitive and emotional adaptation. Consequently, athletes who achieve satisfactory physical recovery may still experience delayed return-to-sport if psychological barriers remain unresolved.

This interpretation is consistent with the biopsychosocial model of sport injury recovery, which proposes that successful rehabilitation depends on the interaction of biological healing, psychological adaptation, and social influences. The present findings reinforce the view that psychological readiness should be regarded as a dynamic recovery outcome rather than merely a consequence of physical rehabilitation. Despite the consistency of these findings, caution is warranted when interpreting the evidence.

Bringing together all these studies shows wide agreement that readiness is influenced by the interaction of pain, fear, and physical recovery, however, there is also some disagreement and differences. Gajardo-Burgos et al. (2023) and Aizawa et al. (2020) use cross-sectional designs which do not allow them to make causal claims, and their populations differ in sex, competitive level, and injury type, therefore, they can hardly be compared directly. However, the frequent identification of kinesiophobia as a factor related to readiness, supported by the larger return-to-sport literature (Ryan et al., 2025), indicates that a psychological intervention aimed at reducing fear would be a reasonable focus for helping volleyball players in their return.

The second theme is about the emotional and well-being repercussions of injury, and the evidence here is not only the most methodologically diverse but also the most uniformly directed. For instance, Watson et al. (2021), in their follow-up research involving 2, 073 female high-school volleyball players, showed that an injury during the season resulted in significant reductions in the overall quality of life and in physical, school, and psychosocial functioning, while injuries leading to the end of the season happened to cause drops that were much larger. This study, because of its size, gives special emphasis to the idea that injury results in a psychosocial cost that can be quantified and is above and beyond the physical impairment.

In line with this, Haraldsdottir et al. (2021) how in collegiate athletes a worse mood, higher level of fatigue, stress and soreness, as well as less sleep time and quality were the conditions that preceded injuries. So, they suggest that subjective well-being is not only a result of injury, but can also be one of the causes

(Haraldsdottir et al., 2021). Boladeras et al. (2025) provide support to this over a longer period as they found that injured high-performance female players showed higher levels of cognitive anxiety, lower self-confidence, and more emotional instability. Also they found that mood and anxiety influenced each other. Clark et al. (2025) were the first to relate a strong athletic identity to high levels of anxiety and depression in specialised adolescent players. Therefore, they consider identity the psychological weakness which, together with the injury, leads to the problem.

These two studies complement each other and support the hypothesis that injury and psychological distress are mutually related: less well-being may lead to an increased risk of injury, and an injury may negatively impact one's mood, sleep, and overall quality of life. The main controversy concerns the direction and extent of these effects. The large prospectively designed study of Watson et al. (2021) is in contrast to the small samples used by Haraldsdottir et al. (2021) and Boladeras et al. (2025), and group differences in the latter even failed to reach statistical significance at times. So, the findings not only endorse the existence of a strong link but also highlight the necessity for highly reliable longitudinal studies to definitely determine the causal relationship.

Psychological factors affecting rehabilitation form the third locus of concern. Qualitative studies provide the deepest understanding here. Paraskevopoulos et al. (2023) conducting interviews with eight professional volleyball athletes who had successfully undergone rehabilitation after musculoskeletal injury found pain to be one of the main hindrances to exercise adherence while social support in various forms mental, instrumental, and task-related was a strong facilitator. The athletes' ability to come up with coping techniques and the development of self-assurance in doing home exercises also played a role in continuing compliance with the program although these aspects were mentioned less often.

The adherence dynamics mentioned above are directly linked to the themes of readiness and well-being. First, pain, which Gajardo-Burgos et al. (2023) described as a factor limiting readiness, occurs again here preventing the rehabilitation behaviors that readiness assumes, thereby creating a vicious circle where the pain that is not treated at the same time lowers the adherence and the confidence. Secondly, the social support highlighted by Paraskevopoulos et al. (2023) very well might alleviate the emotion and anxiety issues as per the most recent articles of Boladeras et al. (2025) and Haraldsdottir et al. (2021).

The integration of three themes thus provides one holistic explanation: mental preparedness, emotional state, and rehabilitation compliance that the person is undergoing are not three distinct things but three different aspects of a continuous healing process, which is influenced by pain, fear, social support, ways of coping, and identity. The main problem with the RQ3 data is its limited source one qualitative study with only eight participants that limits the applicability and points to the urgent need for larger, mixed-methods adherence research in volleyball populations.

Most of the studies we reviewed mainly relied on cross-sectional and observational designs. Only a few used prospective cohorts, a longitudinal seasonal study, a psychometric validation, and a qualitative inquiry. In this respect, the distribution of these studies parallels the general sports science literature, where descriptive and biomechanical designs mainly dominate. At the same time, experimental and intervention studies on psychological recovery are still minimally conducted, in comparison (Hanzlíková et al., 2025; Guthrie et al., 2023). Sample sizes differ by two orders of magnitude, from eight participants in the qualitative study to over two thousand in the largest prospective cohort, which is reflected in widely varying precision and generalisability.

A significant methodological change during the review period is the rising standardisation and cross-cultural adaptation of psychological instruments, as shown by Liu et al. (2025) validation work and the regular use of the I-PRRS and ACL-RSI scales. This move towards harmonising instruments is a positive sign for future cumulative synthesis. On the other hand, the continuation of small, single-season, sex-imbalanced samples is an underutilized opportunity for multi-site prospective collaboration, which is becoming more and more common in the broader sports-medicine literature (Lhee et al., 2021; Marmura et al., 2025).

Collectively, the synthesis seems to suggest that the psychological aspect of a volleyball injury is not only real and measurable but also has a big impact. Injury negatively affects mood, the ability to control anxiety, sleep, and life satisfaction, while the psychological state of readiness determines the return path; these factors become even more effective with pain, fear of re-injury, and strong athletic identity, and are lessened by social support and coping ability. The results are in line with the well-known stress, injury and biopsychosocial models of sport injury where psychological and social stressors affect injury risk and recovery through thought and physical channels.

In fact, the review serves to adapt these models to the particular challenges of volleyball, a sport where the continuous jump-landing and overhead loading cause a specific kind of injuries and where the two-way mood, anxiety, injury relationship that Boladeras et al. (2025) and Haraldsdottir et al. (2021) have described can be used to provide empirical support for reciprocal-causation theories. On a practical level, the data back up the regular psychological assessment of injured volleyball players, the inclusion of fear- and pain-focused interventions in rehabilitation, and the intentional use of social support when going through the recovery process (Paraskevopoulos et al., 2023; Liu et al., 2025).

Compared with previous reviews which mostly discussed sport injury psychology as a whole or focused on volleyball epidemiology and biomechanics only, this synthesis provides a detailed volleyball-injury psychological recovery perspective. The main contradiction of the literature relates to the directionality and statistical significance: although links between well-being and injury have always been positive, the size and causal ordering of these relationships are still debated, partly due to the lack of sufficient data (Boladeras et al., 2025; Haraldsdottir et al., 2021).

At least three research gaps are clearly visible. Firstly, there have not been enough well-powered, prospective, sex-balanced studies to make strong causal inferences about the mood-anxiety-injury sequence. Secondly, research on rehabilitation adherence in volleyball has been based on a very limited qualitative base. Third, psychological constructs are still measured with different instruments in different studies, making it difficult to carry out meta-analytic synthesis. The review itself is, however, subject to at least three limitations: it relied primarily on one database (Scopus), it was limited to only English language full texts, and the small final corpus, though reflecting real topical scarcity, really limits the strength of the conclusions.

Additional limitations should also be acknowledged. Considerable heterogeneity existed across the included studies regarding injury type, competitive level, participant characteristics, and psychological measurement instruments. Such variability limited direct comparison across studies and prevented quantitative meta-analysis. Furthermore, most included studies employed cross-sectional designs, restricting the ability to draw causal conclusions regarding psychological recovery processes following injury.

Such a research agenda for the future should first of all focus on multi-site prospective cohorts methods that will track psychological readiness, mood, and quality of life throughout the injury-to-return period; secondly, mixed-methods adherence studies that go beyond small interview samples; and thirdly, consensus on a harmonized psychological instrument battery for volleyball injury research to support future meta-analysis. To directly respond to the research questions: psychological readiness of the injured volleyball players is a complex construct, and the main factors that lower it are pain and fear of movement (kinesiophobia). (RQ1); injury has detrimental and very similar effects on the mood, anxiety, sleep, and the quality of life, the effects being the most serious after a season-ending injury (RQ2); and pain limits rehabilitation adherence while social support, coping, and confidence enhance it (RQ3).

Practical Implications

The findings of this review have important implications for coaches, physiotherapists, sport psychologists, and rehabilitation specialists working with injured volleyball athletes. First, psychological readiness should be assessed routinely alongside physical recovery indicators before return-to-sport decisions are made. Instruments such as the Injury–Psychological Readiness to Return to Sport Scale (I-PRRS) and the ACL-Return to Sport after Injury Scale (ACL-RSI) may help identify athletes who remain psychologically unprepared despite satisfactory physical recovery.

Second, rehabilitation programmes should incorporate strategies targeting fear of reinjury, confidence restoration, and coping skills development. Third, structured social support from coaches, teammates, family members, and healthcare professionals should be considered an integral component of rehabilitation, given its consistent association with improved adherence and recovery outcomes. Collectively, these findings support a more holistic and psychologically informed approach to volleyball injury rehabilitation.

Conclusions

This systematic review is the first volleyball-focused compilation of psychological health after sports injuries. The data suggest that psychological readiness, emotional well-being, and rehabilitation adherence are the three interrelated aspects of recovery which are altered by pain, fear of reinjury, athletic identity, self-confidence, and social support. These results add to biopsychosocial viewpoints of sport injury recovery and point out the need to integrate psychological assessment and support into rehabilitation programmes.

Although there are limitations regarding study heterogeneity and the small amount of volleyball-specific evidence, the review points out major areas for future prospective and longitudinal investigations aimed at enhancing psychological recovery and return-to-sport outcomes in volleyball players.

References

- Aizawa, J., Hirohata, K., Ohji, S., Ohmi, T., Koga, H., & Yagishita, K. (2020). Factors Associated With Psychological Readiness to Return to Sports With Cutting, Pivoting, and Jump-Landings After Primary ACL Reconstruction. *Orthopaedic Journal of Sports Medicine*, 8(11). <https://doi.org/10.1177/2325967120964484>
- Boladeras, A., Gil-Caselles, L., Moreno-Fernández, I., Guillén-Cots, J., Garcia-Naveira, A., Ruiz-Barquín, R., & Olmedilla-Zafra, A. (2025). The Relationship Between Mood, Competitive Anxiety, and Injuries: A Longitudinal Analysis in High-Performance Female Volleyball Players. *Applied Sciences (Switzerland)*, 15(13), Article 7585. <https://doi.org/10.3390/app15137585>
- Clark, V. C., Ulman, S. M., Erdman, A. L., Gale, E. B., Janosky, J., & Stapleton, E. J. (2025). Athletic identity, anxiety, and depression in moderate to highly specialized female adolescent volleyball players. *Frontiers in Psychology*, 16, Article 1525074. <https://doi.org/10.3389/fpsyg.2025.1525074>
- de Leeuw A.-W., van Baar, R., Knobbe, A., & van der Zwaard, S. (2022). Modeling Match Performance in Elite Volleyball Players: Importance of Jump Load and Strength Training Characteristics. *Sensors*, 22(20), Article 7996. <https://doi.org/10.3390/s22207996>
- Deck, S., Doherty, A., Hall, C., Schneider, A., Patil, S., & Belfry, G. (2021). Perceived Time, Frequency, and Intensity of Engagement and Older Masters Athletes' Subjective Experiences. *Frontiers in Sports and Active Living*, 3, Article 653590. <https://doi.org/10.3389/fspor.2021.653590>
- Fridén, C., Ekenros, L., & Von Rosen, P. (2023). Previous injury, sex and well-being are associated with injury profiles in 422 adolescent elite athletes of age 15-16 years: a 20-week longitudinal study. *BMJ Open Sport and Exercise Medicine*, 9(1), Article 001485. <https://doi.org/10.1136/bmjsem-2022-001485>
- Gajardo-Burgos, R., Valdebenito-Tejos, C., Gálvez-García, G., & Bascour-Sandoval, C. (2023). Pain and Psychological Readiness to Return to Sport in Elite Volleyball Players: A Cross-Sectional Study. *International Journal of Environmental Research and Public Health*, 20(3), Article 2492. <https://doi.org/10.3390/ijerph20032492>
- Geisen, M., Seifriz, F., Fasold, F., Slupczynski, M., & Klatt, S. (2024). A Novel Approach to Sensor-Based Motion Analysis for Sports: Piloting the Kabsch Algorithm in Volleyball and Handball. *IEEE Sensors Journal*, 24(21), 35654–35663. <https://doi.org/10.1109/JSEN.2024.3455173>
- Guthrie, B. M., King, E. L., Patwardhan, S., Wei, Q., Sikdar, S., Chitnis, P. V., & Jones, M. T. (2023). Relationships between surrogate measures of mechanical and psychophysiological load, patellar tendon adaptations, and neuromuscular performance in NCAA division I men's volleyball athletes. *Frontiers in Sports and Active Living*, 5, Article 1065470. <https://doi.org/10.3389/fspor.2023.1065470>
- Hanzlíková, I., Klimešová, K., Lehnert, M., Bizovská, L., Sméal, D., & Hébert-Losier, K. (2025). Decoding injury risk: Exploring the impact of asymptomatic hypermobility on lower limb injury risk factors in young female volleyball players. *Journal of Sports Sciences*, 43(16), 1549–1559. <https://doi.org/10.1080/02640414.2025.2511358>
- Haraldsdóttir, K., Sanfilippo, J., McKay, L., & Watson, A. M. (2021). Decreased Sleep and Subjective Well-Being as Independent Predictors of Injury in Female Collegiate Volleyball Players. *Orthopaedic Journal of Sports Medicine*, 9(9). <https://doi.org/10.1177/23259671211029285>
- Jiang, L., Yang, Z., & Gang, L. (2025). Transformer-Based Multi-Player Tracking and Skill Recognition Framework for Volleyball Analytics. *IEEE Access*, 13, 8806–8824. <https://doi.org/10.1109/ACCESS.2025.3526775>
- Kupperman, N., Curtis, M. A., Saliba, S. A., & Hertel, J. (2021). Quantification of Workload and Wellness Measures in a Women's Collegiate Volleyball Season. *Frontiers in Sports and Active Living*, 3, Article 702419. <https://doi.org/10.3389/fspor.2021.702419>
- Lhee S.-H., Jain, R., Madathur Sadasivam, M., Kim, S., Bae, M., Yu, J., & Lee, D. Y. (2021). Sports injury and illness incidence among South Korean elite athletes in the 2018 Asian Games: A single-physician prospective study of 782 athletes. *BMJ Open Sport and Exercise Medicine*, 7(1), Article e000689. <https://doi.org/10.1136/bmjsem-2019-000689>

- Liberati, A., Altman, D. G., Tetzlaff, J., Mulrow, C., Gøtzsche, P. C., Ioannidis, J. P. A., Clarke, M., Devereaux, P. J., Kleijnen, J., & Moher, D. (2009). The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: Explanation and elaboration. *PLoS Medicine*, 6(7), Article e1000100. <https://doi.org/10.1371/journal.pmed.1000100>
- Link, J., Perst, T., Stoeve, M., & Eskofier, B. M. (2022). Wearable Sensors for Activity Recognition in Ultimate Frisbee Using Convolutional Neural Networks and Transfer Learning. *Sensors*, 22(7), Article 2560. <https://doi.org/10.3390/s22072560>
- Liu, S., Zhang, Y., Noh Y.-E., & Zhou, T. (2025). Translation, cross-cultural adaptation, and validation of the Chinese version of the injury-psychological readiness to return to sport scale. *BMC Sports Science, Medicine and Rehabilitation*, 17(1), Article 76. <https://doi.org/10.1186/s13102-025-01127-0>
- Marmura, H., Morassutti, O., Bryant, D. M., Getgood, A. M. J., & Webster, F. (2025). Reconceptualisation of sport and quality of life in young athletes following anterior cruciate ligament reconstruction: understanding the experiences behind the numbers through a prospective mixed-methods study. *BMJ Open Sport and Exercise Medicine*, 11(1), Article e002107. <https://doi.org/10.1136/bmjsem-2024-002107>
- Mizoguchi, Y., Suzuki, K., Hasegawa, S., Shimada, N., Kimura, F., Hall, T., & Akasaka, K. (2025). Nontraumatic Shoulder Pain Affects Proprioception and Dynamic Stability in Female High School Volleyball Players. *Journal of Athletic Training*, 60(2), 161–169. <https://doi.org/10.4085/1062-6050-0413.24>
- Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., ... Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ*, 372, Article n71. <https://doi.org/10.1136/bmj.n71>
- Paraskevopoulos, E., Gioftos, G., Georgoudis, G., & Papatheou, M. (2023). Perceived Barriers and Facilitators of Sports Rehabilitation Adherence in Injured Volleyball Athletes: A Qualitative Study From Greece. *Journal of Clinical Sport Psychology*, 17(1), 86–105. <https://doi.org/10.1123/jcsp.2021-0040>
- Pi-Rusiñol, R., Verhagen, E., Blanch, M., & Rodas Font, G. (2024). Process mining to investigate the relationship between clinical antecedents and injury risk, severity and return to play in professional sports. *BMJ Open Sport and Exercise Medicine*, 10(2), Article e001890. <https://doi.org/10.1136/bmjsem-2024-001890>
- Rebello, A., Pereira, J. R., Nakamura, F. Y., & Valente-dos-Santos, J. (2025). Beyond the Jump: A Scoping Review of External Training Load Metrics in Volleyball. *Sports Health*, 17(1), 111–125. <https://doi.org/10.1177/19417381241237738>
- Ryan, P. C., Ching, I. C., Ierulli, V. K., Pickett, K., & Mulcahey, M. K. (2025). Fear of Re-injury, Psychological Factors, and Sport Played Have Negative Impact on Return to Sport Following Medial Patellofemoral Ligament Reconstruction for Patellar Instability. *Arthroscopy - Journal of Arthroscopic and Related Surgery*, 41(5), 1605–1617. <https://doi.org/10.1016/j.arthro.2024.05.022>
- Thomas, J., & Harden, A. (2008). Methods for the thematic synthesis of qualitative research in systematic reviews. *BMC Medical Research Methodology*, 8, Article 45. <https://doi.org/10.1186/1471-2288-8-45>
- Tranfield, D., Denyer, D., & Smart, P. (2003). Towards a methodology for developing evidence-informed management knowledge by means of systematic review. *British Journal of Management*, 14(3), 207–222. <https://doi.org/10.1111/1467-8551.00375>
- Villarejo-García, D. H., Moreno-Villanueva, A., Soler-López, A., Reche-Soto, P., & Pino-Ortega, J. (2023). Use, Validity and Reliability of Inertial Movement Units in Volleyball: Systematic Review of the Scientific Literature. *Sensors*, 23(8), Article 3960. <https://doi.org/10.3390/s23083960>
- Watson, A., Biese, K., Kliethermes, S. A., Post, E., Brooks, M. A., Lang, P. J., Bell, D. R., Haraldsdottir, K., & McGuine, T. (2021). Impact of in-season injury on quality of life and sleep duration in female youth volleyball athletes: A prospective study of 2073 players. *British Journal of Sports Medicine*, 55(16), 912–916. <https://doi.org/10.1136/bjsports-2020-103331>