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Sports injuries: the role of preventive physiotherapy in reducing the risk of injuries in athletes.

Sports injuries: the role of preventive physical therapy in reducing injury risk in athletes

Injuries in sports: The role of preventive physiotherapy in reducing the risk of injuries in athletes

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Summary

Sports injuries can compromise performance, keep athletes away from training and competitions, and produce functional repercussions. Prevention requires identifying the demands of the sport, exposures, injury history, and potentially modifiable individual factors. This study aimed to critically analyze the contributions attributed to preventive physiotherapy in reducing the risk of injuries in athletes. This is a qualitative narrative review, composed of seven publications released between 2022 and 2026. The sources included bibliographic, integrative, and systematic reviews on knee injury prevention, exercise-based preventive programs for adolescents, Pilates, exercise in hypertension, post-competition recovery, core strengthening, and high-intensity squats. The most direct evidence indicated a protective effect of exercise-based programs in the adolescent population, while the other publications offered partial or indirect support. The documents also suggest the potential usefulness of functional assessment, neuromuscular training, proprioception, strengthening, and load progression. It is concluded that physiotherapy can contribute to individualized preventive programs integrated with sports training, but the analyzed data does not define a single protocol nor does it support generalizations for all sports and age groups. Prospective studies and controlled trials with adequately measured exposure, adherence, and injury occurrence are necessary.

Keywords: sports physiotherapy; injury prevention; athletes; neuromuscular training; musculoskeletal health.

Abstract

Sports injuries may impair performance, remove athletes from training and competition, and lead to functional consequences. Prevention requires identification of sport-specific demands, exposure, injury history, and potentially modifiable individual factors. This study critically analyzed the

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contributions attributed to preventive physical therapy in reducing injury risk among athletes. This qualitative narrative review encompasses seven publications published between 2022 and 2026, including bibliographic, integrative, and systematic reviews on knee injury prevention; exercise-based injury prevention programs for adolescents; Pilates; exercise in hypertension; post-competition recovery; core strengthening; and high-intensity squatting. The most direct evidence indicated a protective effect of exercise-based programs in adolescents, whereas the remaining publications provided partial or indirect support. The documents also suggest a potential role for functional assessment, neuromuscular training, proprioception, strengthening, and load progression. Physical therapy may contribute to individualized preventive programs integrated into sports preparation, but the analyzed evidence does not define a single protocol or support generalization to all sports and age groups. Prospective studies and controlled trials with adequate measurements of exposure, adherence, and injury occurrence are required.

Keywords: sports physical therapy; injury prevention; athletes; neuromuscular training; musculoskeletal health.

1. Introduction

Sports practice promotes health and performance, but it also exposes the athlete to mechanical demands.
physiological and contextual factors that can contribute to injuries. These occurrences can result in pain,
Loss of function, absence from work, and reduced income. The risk does not stem from a single deficit:
Injury history, workload and recovery, sport characteristics, sleep, environmental conditions,
Psychosocial factors and physical abilities interact dynamically.
Injury prevention should be understood as an ongoing process. Clinical assessments and
Functional tests can help identify needs and guide interventions, but tests
Isolated findings do not accurately predict who will suffer an injury. Therefore, the findings must be...
associated with history, sports exposure, job demands, and response monitoring.
to training.

In a sports context, the physiotherapist can collaborate with the multidisciplinary team in the assessment,
in exercise planning, load progression, athlete education, and monitoring.
of symptoms. Strengthening, balance, proprioception, neuromuscular control and training of
trunk strategies are possible, the selection of which should consider modality, age, competitive level,
Season phase and previous injuries (Gomes, 2022; Salgado, 2026).
Preventive programs should not be confused with rehabilitation or post-competition recovery.
Although these fields are related, reducing symptoms or improving recovery does not necessarily mean that...
In itself, a lower incidence of new injuries. Similarly, general benefits of exercise in
Clinical populations cannot be automatically extrapolated to athletes.
Given this, the objective of this study was to critically analyze the contributions attributed to physiotherapy.
preventive measures in reducing the risk of sports injuries, distinguishing directly related evidence.

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to athletes from publications that offer only indirect support.

2. Theoretical Framework

The occurrence of injuries results from the interaction between exposure and the ability to tolerate the demands.
The load should not be considered inherently harmful, as it constitutes a necessary stimulus to...
adaptation. The risk can increase when demand abruptly exceeds current capacity or
when recovery, technique, preparation, and context are inadequate.
Resistance training can develop strength, power, and tissue tolerance, but its safety is also a concern.
It depends on prescription, technique, progression, and monitoring. The source of Ferreira et al. (2025) included
The corpus evaluated resistance exercise combined with aerobic exercise in hypertensive individuals, and not
Injury prevention in athletes. Therefore, it serves only as a reference for exercise in the general population.
Clinical findings do not support direct sporting conclusions.
The knee receives frequent attention in sports involving jumping, deceleration, and changes of direction.
Neuromuscular programs that integrate strength, landing, balance, and movement control.
They can be used as part of the preparation. However, risk factors are multifactorial and the
assessment should not automatically assign causality to a postural pattern or isolated test (Gomes,
2022).
Pilates can improve abilities such as trunk control, mobility, and body awareness.
However, the review by dos Santos and Paiva (2023) is an integrative synthesis and does not allow us to state that the
This method, in isolation, reduces the incidence of injuries in athletes. Its application should be described as...
complementary, according to the objectives and demands of the modality.
Zhang et al. (2024), in a systematic mixed-methods review with meta-analysis, evaluated programs
Exercise-based sports injury prevention for adolescents. A synthesis of 16 trials.
Randomized trials found a protective effect on the injury rate, while qualitative analysis highlighted...
Athletes' perceptions, the role of coaches, organizational support, and the characteristics of
program as relevant factors for implementation. The results are directly relevant to
prevention, but they remain restricted to the adolescent population and depend on adherence and context.
application.
Post-competition recovery may include symptom management, return to baseline, and preparation.
for new exhibition. Mesquita, Souza and Lima (2025) discuss physiotherapeutic resources in this
period, but the review design and focus on recovery do not allow us to attribute a reduction to
new injuries to the aforementioned techniques.

Core strengthening can be integrated into training programs, but it should not be presented as such.

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universal solution. Salgado (2026) discusses relationships between trunk stability, motor control and chronic injuries; being a narrative review, its conclusions offer theoretical support and not Direct estimate of preventive effectiveness.

Neo et al. (2026) examined the impacts of high-intensity dynamic squatting on the knees. The study is relevant to safety and load management, but it does not evaluate a program. Preventive physiotherapy does not demonstrate that multi-joint exercises are, by definition, more effective. Harmful. Motor complexity requires learning and progression, not automatic exclusion.

3 methodology

This is a narrative, descriptive review with a qualitative approach. The corpus consisted of... seven publications released between 2022 and 2026 and previously compiled by the authors. They were Texts considered on sports physiotherapy, prevention, exercise, motor control, recovery and musculoskeletal demands related to sports.

The sources were examined regarding population, purpose, design, exposure, or The intervention, the outcomes, and the direct or indirect relationship to the review question. Articles about The non-athlete population or outcomes other than the occurrence of injuries were retained only for contextualization and identified as indirect evidence.

The synthesis was organized in a narrative format, without meta-analysis. The date of publication was not provided. search, complete strategies by database, number of records identified, duplicates, deletions or Formal assessment of the risk of bias. Consequently, this review should not be interpreted as... This is neither a systematic approach nor an exhaustive review of the literature.

4. Results and discussion

Of the seven publications, Gomes (2022) addressed knee injury prevention in soccer players, and Zhang et al. (2024) directly analyzed exercise-based injury prevention programs. for teenagers. Dos Santos and Paiva (2023), Mesquita, Souza and Lima (2025), Salgado (2026) and Neo et al. (2026) presented a partial relationship with the question. Ferreira et al. (2025) dealt with population and distinct objectives. Thus, the corpus brings together direct, partial, and indirect evidence, with different levels of applicability.

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Table 1 – Characterization and relevance of the included publications

Author/Year	Outline	Focus	Relevance to this revision
Gomes (2022)	Literature review	Prevention of injuries knee in football	Direct, but secondary; It does not estimate the combined effect.
Dos Santos and Paiva (2023)	Integrative review	Pilates and injuries musculoskeletal	Partial; does not prove reduction in incidence athletes.
Zhang et al. (2024)	Systematic review with meta-analysis and qualitative synthesis	Preventive programs based on exercises for teenagers	Direct; protective effect restricted to teenagers and subject to implementation.
Ferreira et al. (2025)	Systematic review and meta-analysis	Exercise in individuals hypertensive	Indirect and inadequate for to infer sports prevention.
Mesquita, Souza and Lima (2025)	Narrative review	Post-recovery competition	Partial; recovery not This is equivalent to prevention.
Salgado (2026)	Narrative review	Core and chronic injuries in athletes	Partial; theoretical support without incidence estimate.
Neo et al. (2026)	Systematic review	Intense squat and knee	Partial: addresses exposure and security, not a program preventive.

Source: prepared by the authors (2026).

The documents agree on the potential usefulness of strength, neuromuscular control, Proprioception, balance, and trunk training. However, narrative convergence does not equate to scientific consensus. As heterogeneous secondary studies predominate and there is no synthesis of Regarding incidence, it is not possible to quantify the risk reduction or determine which component produces it. greater effect.

The original article focused its conclusions on the knee, although the title referred to injuries. sports in general. Gomes's publication (2022) supports a specific discussion about football. and knee, and Neo et al. (2026) address joint loading in the squat. These data should not be generalized to shoulder, ankle, muscle injuries or other conditions.

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The term "functional assessment" also requires caution. Tests can identify deficits and guide...
training, but they should not be presented as deterministic forecasting tools.
Decision-making should combine history, symptoms, exposure, physical capacity, and demands.
Sports and evolution over time.
Prevention tends to be more plausible when programs are specific, progressive, and adherent.
integrated into the sports routine. However, the corpus did not report comparable frequency.
duration, adherence, adverse events, sports exposure, or injury definitions. These gaps
prevents us from recommending a single protocol.
Limitations include the absence of a reproducible search strategy and the small number of...
sources, the predominance of reviews, the inclusion of publications not directly related, and
The absence of a formal assessment of methodological quality was noted. Essays were also not included.
clinicians or cohorts that directly measured the incidence of lesions after intervention.
physiotherapy.

Final considerations

Physical therapy can contribute to the prevention of sports injuries through assessment.
contextualized, education, strengthening, neuromuscular training, proprioception, progression of
Workload and integration with the sports team. The choice of strategies must respect the sport, the
History, the stage of the season, and the athlete's characteristics.
The data analyzed, however, does not allow us to conclude that these interventions reduce [the risk] in a meaningful way.
The incidence of injuries is uniform across all sports. Only one publication addressed this directly.
of knee injury prevention in soccer players, while the others provided partial evidence or
Indirectly. Nor was the superiority of Pilates, core strengthening, or [other methods] demonstrated.
a specific modality.
It is concluded that preventive physiotherapy programs are feasible and can be integrated into the preparation.
While the content is sporting, the conclusions must be proportionate to the quality and relevance of the sources.
It is recommended to expand the corpus with prospective studies and controlled trials that adopt
Standardized definitions of injury, record exposure, adherence, load, adverse events, and time of
follow-up.

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