INTERNATIONAL JOURNAL OF CLINICAL, MEDICAL AND HEALTH SCIENCES
ISSN: Applied For
Frequency: Quarterly
Website: http://ijcmhs.com/

Review Article

Modern Sports Therapy: Evidence-Based Approaches to Injury Prevention, Rehabilitation, and Performance Enhancement

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Received: 04-12-2025
Accepted: 21-01-2026
Published: 10-02-2026

ABSTRACT

Introduction: Sports therapy has evolved into a multidisciplinary field integrating sports medicine, physiotherapy, exercise science, biomechanics, and rehabilitation to address injury prevention, recovery, and athletic performance. Contemporary approaches emphasize individualized interventions, progressive rehabilitation, and evidence-based strategies to meet the physical and functional demands of athletes.
Methods: This narrative review discusses contemporary developments in sports therapy, focusing on injury prevention, clinical assessment, therapeutic exercise, strength rehabilitation, and performance enhancement. It also examines emerging technologies, including wearable devices, digital monitoring, artificial intelligence, and machine learning, in relation to their potential applications in sports rehabilitation and athletic care.
Results: Contemporary sports therapy emphasizes individualized rehabilitation, neuromuscular training, progressive resistance exercise, biomechanical assessment, and training-load management. Wearable technologies and digital monitoring provide opportunities to assess movement, workload, and recovery, while artificial intelligence may support injury-risk assessment and rehabilitation planning. However, the clinical application of these approaches remains influenced by evidence quality, technological accessibility, individual variability, and the need for appropriate professional supervision.
Conclusion: Modern sports therapy integrates injury prevention, rehabilitation, recovery, and performance enhancement through individualized, multidisciplinary care. Combining established exercise-based interventions with appropriately validated technologies may support functional recovery and informed return-to-sport decisions. Further research is required to establish standardized protocols, evaluate emerging interventions, and improve their accessibility across different sporting settings.

Keywords*: Sports therapy; Sports injuries; Injury prevention; Rehabilitation; Therapeutic exercise; Athletic performance.*

INTRODUCTION

Sports injuries are a huge problem in recreational, amateur and elite athletes with the potential to cause long term absence from sport, decrease in physical function, reoccurrence of injury and affect on physical performance. Competitive sports are a pivotal part of the world's sports culture due to its intensity and demanding character [1]. Whether at the Olympics or other high caliber competitions, athletes always perform to the max, setting new records and pushing the limits of the human body [2]. But, with the demands of the competition and high-intensity training sports injuries have become more common [3]. Sports athletes (sprinting, basketball, football) are especially susceptible to several different injuries, including fractures, soft tissue injuries, muscle strains and joint sprains [4,5]. These injuries can not only impact the physical well-being of an athlete, but they can also disrupt training regimens and even end their career in extreme cases.

Therefore, the prevention and treatment of sports injuries efficiently has become a crucial issue in the field of sports medicine.

Conventional techniques in sports medicine for sports injuries have included physiotherapy, medication, surgery and rehabilitation training [6]. Physical therapeutic methods like electrical stimulation, ultrasound, laser therapy, cold and heat therapy, while having beneficial effects on blood flow and on some occasions on pain reduction, are not always effective in stimulating long-term tissue healing [7]. Pharmaceutical treatments such as nonsteroidal anti-inflammatory medicines (NSAIDs) can be successfully used to reduce pain and inflammation, but may have a negative effect in the long term, including kidney problems and gastrointestinal issues but not substantial benefits for tissue regeneration [8]. For more severe injuries, such as a torn ligament, or a fracture, the main course of treatment remains surgical intervention, including ligament repair, arthroscopy and bone grafting. Individual variations, however, make these operations often invasive, with long recovery periods, and with different rehabilitation results [9]. Restoring an athlete's mobility also heavily depends on rehabilitation exercises like functional & progressive load training. However, total prevention of reinjury is still difficult due to the high frequency & intensity of professional sports [10]. All things considered, there are a number of drawbacks to traditional treatment approaches, such as limited applicability, individual outcome variability, longer recovery times, and an incapacity to satisfy the needs of elite athletes who want to resume competition as soon as possible. This highlights the need for the development of more advanced methods of prevention and treatment of sporting injuries.

Innovative sports injury materials have become a research hotspot in competitive sports due to the quick developments in biomedical technology and materials science [11]. An improvement that has been made is the use of therapeutic exercise and progressive rehabilitation. Strength and resistance training, neuromuscular re-education, balance and proprioceptive training, flexibility training and sport specific functional activities are integrated to restore the strength, coordination, mobility and confidence. Load management strategies can also help athletes to progressively build up training load and minimise risk of overloading and re-injury. Other methods for preserving or restoring muscle capacity; Blood-flow-restriction training and neuromuscular electrical stimulation.

Literature Search Methodology

A structured literature search was conducted to identify relevant scientific evidence concerning contemporary sports therapy, injury prevention, clinical assessment, rehabilitation, recovery, and athletic performance enhancement. The search strategy was designed to capture both established evidence and recent developments in sports therapy, including therapeutic exercise, strength and conditioning, neuromuscular training, training-load management, biomechanical assessment, wearable technologies, digital monitoring, blood-flow-restriction training, neuromuscular electrical stimulation, artificial intelligence, and technology-assisted rehabilitation.

Relevant literature was identified through searches of major biomedical and multidisciplinary databases, including PubMed/MEDLINE, Scopus, Web of Science, and Google Scholar. The search used combinations of keywords and Boolean operators such as “sports therapy,” “sports injury,” “injury prevention,” “sports rehabilitation,” “therapeutic exercise,” “neuromuscular training,” “strength training,” “training load,” “return to sport,” “biomechanics,” “wearable technology,” “artificial intelligence,” “blood-flow restriction,” and “athletic performance.” Additional relevant articles were identified by examining the reference lists of selected publications and systematic reviews. The search approach was informed by established principles for conducting and reporting literature reviews. [38,39]

Priority was given to systematic reviews, meta-analyses, clinical reviews, consensus statements, and relevant original research studies published in peer-reviewed journals. Particular emphasis was placed on contemporary evidence addressing advances in sports injury prevention, rehabilitation, recovery, performance optimization, and emerging technologies. Earlier landmark publications were also considered when they provided important foundational evidence for established concepts or therapeutic approaches. Studies were considered relevant when they directly addressed athletic populations, sports-related musculoskeletal conditions, rehabilitation strategies, injury-risk modification, training-load monitoring, recovery, or performance enhancement.

The literature was screened according to its relevance to the objectives of the present review. Publications that were unrelated to sports medicine or sports therapy, lacked sufficient scientific relevance, or did not contribute meaningfully to the themes addressed in this review were excluded. Because this article is a narrative review rather than a systematic review or meta-analysis, no formal quantitative synthesis or statistical pooling was undertaken. Instead, the available evidence was critically organized and narratively synthesized according to major themes, including injury classification, prevention, clinical assessment, therapeutic exercise, advanced rehabilitation, wearable and digital technologies, artificial intelligence, recovery, and athletic performance enhancement.

The review also considered the limitations and emerging challenges associated with contemporary sports therapy. Particular attention was given to variability in individual responses, differences between sports and athlete populations, limitations in technology validation, risk of recurrent injury, accessibility of advanced technologies, and the need for evidence-based clinical interpretation. The overall methodological approach was therefore intended to provide a clinically relevant and comprehensive synthesis of current developments while acknowledging areas in which evidence remains evolving or

limited. The reporting principles of narrative reviews were considered in structuring the search and synthesis process. [38–40]

Classification of most common types of sports injuries
A better knowledge of the mechanisms underlying sports injuries, their clinical presentations, and the associated prevention and treatment strategies can be achieved by classifying them according to various criteria [12].

Mechanism based injuries
Sports injuries can also be divided into two general categories based on the kind of tissue they affect: soft tissue injuries and bone injuries. Sports-related injuries can be divided into acute and chronic categories based on the process of occurrence [13].

A sudden external impact or severe tissue stretching during movement can cause acute injuries. They tend to be sudden, painful and very conspicuous with obvious tissue destruction [14]. These injuries are common in high-impact, contact sports like football, basketball or rugby. Fractures, dislocations, ligament rips, muscle strains, and joint sprains are common forms of acute injuries. For instance, in basketball, a player can sprain an ankle or tear a ligament if he or she lands on it the wrong way after jumping, and twists the ankle very hard. Anterior cruciate ligament (ACL) tears can also result from abrupt stops and direction changes in football. Intense pain, swelling, subcutaneous bruising, with limited movement are common signs of acute injuries. If symptoms are severe, long-term rehabilitation and surgery may be needed [15]. The RICE (Rest, Ice, Compression, Elevation) method is often used for acute injuries as the first step in reducing pain and inflammation. Depending on how serious the damage is, more rehabilitation therapy is recommended [16].

Overusing or overusing a specific body part may result in chronic conditions down the road. These wounds slowly deteriorate and often have mild symptoms initially [17]. Chronic injuries are more likely to occur if a sport requires repetitive motions or sustained high-intensity activity such as long-distance running, swimming, tennis or weight lifting. Chronic injuries involve functional limitations, areas of tenderness and swelling, stiffness, and long-lasting pain. If prompt action is not taken, these injuries could become irreparable.

Tissue based injuries
Soft tissue injuries are injuries to muscles, tendons, ligaments, skin, blood vessels and nerves. Often caused by a blow, over-stretch or repetitive actions. These wounds are common in many sports competitions [18]. Depending on the nature of the damage, soft tissue injuries include contusions, strains, sprains, tendinitis and bursitis. In basketball and football, the contusion, which is a muscle injury, is often caused by a direct impact on the player, causing discomfort, subcutaneous bruising and local edema. Hamstring strains are more likely to happen when excessive force is applied at the start of the race in the sprint events, where this can lead to tears in the fibres and restriction of movement [19]. Racquet sports such as tennis and badminton involve repeated motions of the arm, increasing the likelihood of tendinitis, which is the inflammation of specific tendons causing a persistent pain in those areas. The healing time for soft tissue injuries is dependent on the severity of the injury. Depending on the severity of the injury, treatment for mild injuries may be the RICE approach, while severe injuries will require medical attention or rehabilitation training.

Bone injuries can be caused by external trauma, overuse or structural defects in the skeletal system. The most common types of bone injuries are fractures, stress fractures and periostitis [20]. Fractures can be caused by: falls, severe torsion, and high impact forces. For instance, a basketball player could sustain tibia fractures when landing incorrectly and a football player could sustain clavicle fractures when landing during a tackle. A bone injury is a serious injury that requires surgical stabilization and can cause serious pain, swelling and loss of function. Controlled load management, scientific training courses and adequate nutrition (calcium and vitamin D supplements) are among the measures to be taken to optimize bone density and reduce the risk of injury [21]. Athletes, coaches, and medical professionals can implement more effective injury prevention and treatment strategies, ultimately improving athletic performance and guaranteeing long-term physical well-being, by methodically comprehending the classification and characteristics of sports injuries in competitive sports.

Sport therapy for athletic performance enhancement
Sports therapy has gradually moved away from sports injury prevention and treatment and is now an important aspect of sport performance enhancement. Modern athletes train at high volumes, compete at high intensity, and are subjected to repetitive movements as well as significant physical and mental stress. Therefore, ensuring optimal physical capacity with minimal fatigue and injury risk is important for ensuring consistent performance. Modern sports therapy combines therapy, strength and conditioning, biomechanics, exercise physiology, the science of recovery, nutrition, psychology and the use of technological hardware and software to produce personalised training strategies to meet the demands of the individual athlete and sport.

Strength and power is basic to an athlete's performance. Appropriately prescribed explosive exercises, plyometrics and ballistic movements can help increase power and rapid force production, and progressive resistance training can increase muscular strength, force production, stability and functional capacity. Sports therapists are becoming more involved with strength and conditioning professionals in the development of progressive training programmes that are dependent on the athlete's training status, injury and sport specific history and performance goals. Similarly, training for speed, agility,

acceleration, deceleration and change of direction can boost sports performance in sports that involve quick movements. It is especially crucial for athletes who repeatedly sprint, jump, land and change direction in competition to develop proper strength, trunk control, coordination, and movement mechanics in the lower body [22].

Other components of sports therapy that are relevant to sport are flexibility, mobility, balance, proprioception, and neuromuscular coordination. Evaluation of joint mobility, muscle flexibility, movement control and functional stability can determine restrictions that can hinder effective movement during athletics. Individualized mobility and neuromuscular programs can then be used to enhance the quality of the movement while keeping the balance between flexibility and stability in check. Proprioceptive and balance tasks can help to develop coordination and control, and sport-specific drills can progressively allow the athlete to recreate the physical and technical requirements of the sport. Today, more of the rehab has moved from basic functional activities to complex high intensity exercises, which mimic sport.

The biomechanical assessment has again confirmed the performance enhancement strategies. Objective data on movements, force production, loading characteristics and asymmetries can be captured using a range of tools including video analysis, motion-capture systems, force platforms, pressure sensitive technologies and wearable sensors. This information may help to determine the inefficient technique and provide specific intervention in running mechanics, jumping, landing, throwing, lifting or other sports specific activity. One other major breakthrough is in training-load management: inadequate training loads, coupled with inadequate recovery, can cause fatigue and performance failures, and inadequate training loads can reduce adaptation. There may be ways of adjusting workloads to suit the individual's tolerance, using either training volume or intensity, or the physiological response and/or perceived exertion, when trained by an expert.

Recovering is also a crucial factor for continued performance. Lack of sleep, water, food, active recovery, mobility or mental state can all adversely affect the athlete's tolerance to training and/or competition. Sports therapy has become more popular due to the importance of nutrition and psychological support in a multi-disciplinary approach to the care of the athlete. Psychological preparedness and confidence can be particularly important in injury as the fear of reinjury can affect movement and performance. A gradual return to sport (RTS) program and psychological support can help to achieve a successful RTS [25].

New technology, including wearable technologies, artificial intelligence, digital monitoring, virtual reality and state-of-the-art motion analysis, is creating new opportunities for personalized performance management. These technologies can help to ensure the monitoring of workload, movement, recovery and functional progression, but still require professional clinical interpretation. The overall concept of modern sports therapy is the holistic treatment of prevention, rehabilitation, recovery and performance enhancement of an injury. Sport therapy consists of many components, such as individualized exercise prescription, biomechanical optimization, workload management, recovery strategies, nutrition, psychological support and technology-assisted monitoring, which can all contribute to optimizing an athlete's physical capacity, reducing modifiable injury risk, and helping to optimize their sporting career and career longevity.

Advances in sports therapies

Sports therapy has come a long way from past therapies that only focussed on pain reduction and treatment of existing sports injuries to the current evidence-based holistic approach that focuses on injury prevention, early diagnosis, rehab, recovery and optimizing athletic performance. Sports therapy is a highly contemporary field that incorporates knowledge and concepts from sports medicine, physiotherapy, biomechanics, exercise physiology, strength and conditioning, nutrition, psychology, rehabilitation science and a variety of new digital technologies. This multidisciplinary development has enabled the development of more individualised interventions based on the nature of the injury, the athlete's physical condition, the demands of the sport, training conditions and performance goals.

Table 1. Major Components of Modern Sports Therapy

Component	Primary Objective	Key Approaches/Interventions	Expected Clinical/Performance Benefit
Injury prevention	Reduce modifiable injury risk	Strength training, neuromuscular conditioning, balance, proprioception, movement-control exercises	Reduced injury incidence and improved movement quality
Clinical assessment	Identify injury characteristics and functional limitations	History, physical examination, functional testing, biomechanical assessment, imaging	Improved diagnosis and individualized treatment planning
Therapeutic exercise	Restore strength, mobility and tissue capacity	Progressive resistance exercise, eccentric/concentric training, flexibility, mobility and sport-specific exercises	Restoration of function and tolerance to sporting demands
Neuromuscular rehabilitation	Improve coordination and movement control	Balance training, proprioceptive exercises, reaction drills, landing and change-of-direction training	Improved stability, coordination and functional performance

Training-load management	Balance training stress and recovery	Monitoring volume, intensity, frequency, perceived exertion and fatigue	Reduced excessive fatigue and potentially lower injury risk
Recovery management	Optimize physiological and psychological recovery	Sleep, hydration, nutrition, active recovery, mobility and psychological support	Improved recovery, readiness and training tolerance
Technology-assisted therapy	Improve objective monitoring and rehabilitation decisions	Wearable sensors, GPS, motion analysis, force platforms and digital monitoring	Improved monitoring of workload, movement and functional progression
Performance enhancement	Optimize sport-specific physical capacity	Strength and power training, plyometrics, speed, agility and sport-specific conditioning	Improved strength, power, speed and athletic performance

1)Personalized and Research-Based Sports Therapy

The focus of this course is on individualized sports therapy and the application of evidence to support the practice. A major development in sports therapy has been from the blanket approach of treatment protocols to tailored sports therapy rehabilitation for the individual. The athletes are different in terms of age, sex, fitness level, previous injury experiences, biomechanics, training loads, recovery capacity and psychological preparedness. The more modern treatment programmes now primarily involve measuring the athlete's response to rehabilitation and then tailoring treatment to the athlete based on the results of the assessment. Clinical decision making can encompass all of the above. Evidence-based practice is also gaining a greater significance. Sport therapists would be utilizing a mixture of treatments, not just traditional treatments, but a blend of clinical knowledge, scientific research and personal preference of the athlete. This strategy encourages the right type of interventions, incremental loading, objective tracking and frequent re-evaluation. Thus rehabilitation, rather than a "one-size-fits-all" set of steps, is now considered a dynamic process [26].

2) Advances in injury prevention

Prevention of injuries is a key focus of modern sports therapy. All of these are typical components of an injury-prevention program: strength training, neuromuscular conditioning, balance and proprioceptive exercises, flexibility and mobility exercises, movement-control exercises and sport-specific drills. Special emphasis on biomechanical factors including landing technique, joint alignment, trunk control, muscle coordination and movement asymmetry [27]. Another significant advancement is training-load management. Too much or too high a rate of workload can lead to fatigue and may increase the risk of injury while too little workload can lead to insufficient physical preparation. In modern sport therapy, the interplay between training stress, recovery and adaptation is becoming more and more a subject of interest [28]. In order to reduce injury and illness, it is crucial to measure global athlete fatigue levels (i.e., mental, physical, and emotional) in response to prescribed training loads due to the extremely complex nature of tiredness and individualized responses to similar training loads [29, 30]. In order to maximize performance and minimize injury and illness, monitoring technologies are widely utilized in top sports as reliable indicators of the athlete's recovery status and to help support staff make judgments about how best to balance training and rest [31]. With a variety of subjective and objective metrics used to track both load and fatigue, it is possible to quantify many aspects of global training load and exhaustion that affect the athlete's daily readiness [31].

Coaches and therapists can adjust training loads based on the athlete's self-reported fatigue, in addition to monitoring training volume, intensity, and frequency. Preseason screening and performing functional evaluation periodically can also help identify modifiable risk factors. While not predictive of injury, screening may give information on strength deficits, mobility limitations, neuromuscular control and previous injury-related impairments. Preventive programs can then be integrated into regular training and not only following injury.

3) Advances in Clinical Assessment and Functional Diagnosis

Sports injury assessment has evolved and is now a more complex process involving clinical examination and objective functional measurements. The traditional methods of history taking, inspection, palpation, range of motion, muscle testing and orthopedic testing are still valuable, and are now supplemented by assessment of functional performance. Abnormalities can be detected when running, jumping, cutting, throwing, lifting or other sports specific movements are performed in a movement analysis.

There are a number of quantitative tools available to obtain information about force production, loading patterns, asymmetries, and movement mechanics; these tools include force platforms, pressure sensitive systems, dynamometers, and technologies for motion analysis [31]. These measurements can be used to set the goals for rehabilitation and to decide if an athlete is ready for a progressive return to sport.

Other diagnostic imaging methods such as magnetic resonance imaging, ultrasound, computed tomography and other advanced imaging methods also help characterize musculoskeletal injuries. Magnetic resonance imaging is useful for obtaining detailed images of various muscles, tendons, ligaments, cartilage and other soft tissues, while ultrasound is particularly useful for dynamic assessment of selected soft tissue structures. Importantly, the imaging findings must be correlated with clinical symptoms and functional findings and not viewed as stand-alone.

4) Therapeutic exercise development

Therapeutic exercise is now firmly established as a key aspect of modern sport rehab. Past rehabilitation methods often focused on rest and passive treatment, while modern rehabilitation practice understands the need to progressively load tissues and restore their capacity and function. Strength and resistance training are actually increasingly the recommended form of activity at each stage of the healing process and the type of sport an athlete participates in. Rehabilitation can take the course from low load exercises to more load strengthening, eccentric and concentric, power development, plyometrics, and sport-specific exercises. The goal is not just to get rid of pain, but to make the athlete capable of tolerating the forces of competition and the work they perform. Another significant breakthrough is in the field of neuromuscular training. Balance, coordination, proprioceptive, reaction time, joint control and movement mechanics exercises are designed to enhance functional performance and help athletes regain their confidence after injury. Eventually, progressive rehab can involve cutting, acceleration, deceleration, jumping, throwing, sprinting etc., which are movements typical to the sport of choice [32].

5) Advanced Strength Rehabilitation

A new method of training that has recently gained popularity as a rehabilitation technique, blood-flow-restriction (BFR) training, is a method that involves temporarily reducing blood flow to muscles during resistance training frequencies. BFR is a process of intermittent, controlled ischemia to a limb during low-load exercises and may induce resistance training-type adaptations with relatively lower external loads [33]. BFR may be beneficial in the right circumstances and for the right patients to help keep muscles working during certain stages of rehabilitation. It does, however, depend on the use of the right kind of apparatus and proper supervision and attention to individual contraindications. It should thus be used in addition to and not as a substitute for traditional progressive resistance training. For some, the word “technology” might conjure up images of high-powered gadgets or even robots.The word technology may bring to mind images of high-powered gadgets or even robots for some. When appropriate, therapeutic training using NMES may be used in the rehabilitation process to assist in activating muscles and restore strength and/or neuromuscular function. It could be helpful in situations where voluntary muscle movement is impaired after injury or surgery [34-36].

6) Wearable Technology and Digital Monitoring

Wearable Technology has opened up the potential to monitor athletes in a significantly larger range of non-clinical settings. Information on physical activity, movement, workload, speed, acceleration and physiological responses can be provided by a range of devices including smart watches, inertial sensors, heart-rate monitors, GPS, accelerometers, etc. Continuous monitoring will enable changes in workload, fatigue, movement patterns or recovery status to be identified. Wearable devices can furnish objective data on an athlete's transition from structured workouts to sport-based activities during the rehabilitation process. In professional sports, these technologies can also make it easier for strength and conditioning professionals, physicians, and coaches to communicate with their therapists. However, care should be taken with any wearable measurement as the accuracy of the device will depend on the activity, body position, measurement approach, and the technology [37.],

7) Artificial intelligence and machine learning

The application of artificial intelligence (AI) and machine learning in sports injury prevention, diagnosis, monitoring of rehabilitation and performance analysis continues to be explored. AI systems can analyze vast amounts of data collected from wearables, video feeds, biomechanical analysis, training logs, and clinical data. These may be used to identify patterns of motion that correlate with increased injury risk, workload and/or performance changes, image interpretation, rehabilitation outcomes, and personalized training recommendations. The computer-vision systems can also be used to study other movements such as running, jumping, landing, and others without a need for extensive lab equipment. While there is great promise in using AI techniques, they need to be thoroughly validated. One population or sport may not perform as well as another when modeling. Before a widespread implementation, questions regarding data quality, privacy, transparency, bias and clinical responsibility should be addressed.

Table 2. Emerging Technologies in Sports Therapy and Their Applications

Technology	Primary Application	Information/Function Provided	Potential Clinical Value	Current Considerations
Wearable sensors	Training and rehabilitation monitoring	Movement, acceleration, speed, workload and physiological responses	Continuous monitoring of athlete status and rehabilitation progression	Device accuracy may vary according to activity and measurement conditions

GPS-based monitoring	External training-load assessment	Distance, speed, acceleration, deceleration and workload	Supports individualized training-load management	Requires appropriate interpretation and sport-specific context
Motion-capture systems	Biomechanical assessment	Joint movement, movement patterns and asymmetries	Identification of movement limitations and biomechanical abnormalities	Equipment and technical expertise may be required
Force platforms	Functional and performance assessment	Force production, loading characteristics and asymmetry	Objective evaluation of strength, power and return-to-sport readiness	Cost and laboratory requirements may limit accessibility
Pressure-sensitive systems	Movement and loading assessment	Pressure distribution and loading patterns	Assessment of movement mechanics and load distribution	Interpretation depends on protocol and technology
Artificial intelligence and machine learning	Injury-risk and performance analysis	Patterns from clinical, biomechanical, wearable and training data	Potentially supports prediction, individualized monitoring and decision-making	Requires validation, high-quality data, transparency and appropriate clinical oversight
Virtual reality	Rehabilitation and movement training	Simulated sport-specific environments and interactive exercises	May improve engagement and facilitate controlled functional training	Evidence and accessibility remain variable
Digital health platforms	Remote and longitudinal monitoring	Training, recovery and rehabilitation data	Facilitates communication, progress tracking and individualized management	Data privacy, interoperability and professional interpretation are important

CONCLUSION

Sports therapy has grown from a therapy-based subject to a multi-disciplinary and holistic discipline that deals with the prevention of injury, early identification, rehabilitation, recovery, safe return to sport and performance enhancement. In the area of therapeutic exercise, neuromuscular training, strength and conditioning, movement analysis, workload management, and individualized rehabilitation, there have been great developments that have increased the capacity of sports professionals to engage with the complex physical demands that are experienced by athletes. A greater emphasis is placed on restoring function rather than just relieving clinical symptoms and improving the ability to move today. Technology has transformed sports therapy as well in this day and age. These technologies can augment the clinical skills and knowledge of the practitioner in determining changes in movement, workload, performance and recovery. In the wider context of athletes' care, however, the different aspects of nutrition, hydration and sleep, as well as psychological health and recovery management are gaining increasing relevance. The current rehabilitation approach takes into account strength, mobility, neuromuscular control, functional performance, psychological preparedness, and sport-specific needs, in addition to time since injury. This can help facilitate safe return to training and competition and mitigate for factors of recurrent injury. While there has been significant advances, there is still some challenges such as variations in individuals, repeated injuries, differences in rehabilitation protocols, lack of evidence, uneven access to advanced technologies, and financial and resource limitations in many areas. There should therefore be a greater focus on scientifically-proven interventions, low cost technologies, personalized treatment and increased interdisciplinary collaboration when developing new products. The integration of clinical knowledge, exercise-based medicine, digital technologies, recovery science and precision strategies is a novel approach to sports therapy that is more proactive and athlete-centred in its approach, with the potential of improving health, reducing injury risk, supporting optimal recovery, and maximizing performance everywhere.

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