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REVIEW

Preventing Sports Injuries: A Review of Evidence-Based Strategies and Interventions

Prevención de lesiones deportivas: Una revisión de las estrategias e intervenciones basadas en la evidencia

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ABSTRACT

Athletes' inability to return and pursue their athletics is primarily motivated by their fear of re-injury. Sports injuries have been recognized as a significant deterrent to further physical exercise. This study aims to evaluate evidence-based strategies and interventions for preventing sports-related injuries, including pre-participation screenings, suitable training programs, equipment modifications, and injury prevention programs. A systematic review and meta-analysis (PRISMA) approach was used to gather, choose, and analyze publications on preventing sports injuries. Scopus, Web of Science (WoS), ProQuest, and Springer Link were used as databases for the study. The inclusion and exclusion criteria apply to the study. Adequate treatment of sports-related injuries aids in the recovery of injured parts of the body and the prevention of future injuries. Athletes, coaches, and sports medicine specialists can collaborate to reduce the frequency and severity of sports-related injuries, encouraging safer and longer-lasting physical activity participation. Policies that reduce the likelihood of injuries players sustain can be achieved by implementing these evidence-based strategies and interventions into sports training and competition protocols.

Keywords: Sports injuries; Strategies; Interventions; Prevention.

RESUMEN

La incapacidad de los deportistas para volver a practicar su deporte está motivada principalmente por su miedo a volver a lesionarse. Las lesiones deportivas han sido reconocidas como un importante factor disuasorio para la continuación del ejercicio físico. Este estudio tiene como objetivo evaluar las estrategias e intervenciones basadas en la evidencia para prevenir las lesiones relacionadas con el deporte, incluidos los cribados previos a la participación, los programas de entrenamiento adecuados, las modificaciones del equipamiento y los programas de prevención de lesiones. Se utilizó un enfoque de revisión sistemática y metanálisis (PRISMA) para recopilar, seleccionar y analizar las publicaciones sobre la prevención de lesiones deportivas. Se utilizaron Scopus, Web of Science (WoS), ProQuest y Springer Link como bases de datos para el estudio. Los criterios de inclusión y exclusión se aplican al estudio.
El tratamiento adecuado de las lesiones relacionadas con el deporte ayuda a la recuperación de las partes lesionadas del cuerpo y a la prevención de futuras lesiones. Los deportistas, entrenadores y especialistas en medicina deportiva pueden colaborar para reducir la frecuencia y gravedad de las lesiones relacionadas con el deporte, fomentando una participación más segura y duradera en la actividad física. Mediante la aplicación de estas estrategias e intervenciones basadas en la evidencia en los protocolos de entrenamiento y competición deportiva pueden lograrse políticas que reduzcan la probabilidad de que los jugadores sufran lesiones.

Palabras clave: Lesiones Deportivas; Estrategias; Intervenciones; Prevención.

INTRODUCTION

Sports injuries may negate the positive outcomes of engaging in activities, especially if they keep an athlete from practicing because of persistent discomfort. Participating in sports has a great impact on physiology, psychology, and social life, with improved health conditions, social contacts, self-worth, and a lower chance of depression However, participation in sports is inextricably connected to the development of injuries. The degree and duration of these effects may vary depending on factors such as the person's personality, coping mechanisms, and the depth of the injury.[1,2]

In recent years, sports-related injuries have been recognized as a significant deterrent to further physical exercise. The situation has gotten worse as more people participate in sports. Recognizing the effects of physical activity on the body, as well as the possible outcomes of different motions and pressures. It's essential to understanding the concept of sports injuries.[3] Sports injuries are a broad category that includes a variety of particular ailments and is used to describe any type of injury that occurs during physical activity or sports. However, playing sports now carries a greater psychological and physical cost, requiring players to exercise and train more, which raises their risk of injury.[4]

Numerous epidemiological studies on injuries associated with sports and recreation have examined certain demographics, activities, and sport outcomes. Sports-related injuries frequently impact the spine or the joints of the extremities (hip, shoulder, elbow, wrist, ankle, and ankle). Among the most frequent are injuries to the knee. Meniscal and chondral lesions can arise from knee trauma, frequently in conjunction with damage to the cruciate ligament. Ankle injuries comprise 21 % of all sports-related injuries. Ankle ligament injuries sustained during sports are most commonly (83 %) classified as ligament sprains (incomplete rips). Athletes frequently get musculoskeletal injuries such as fractures, dislocations, sprains, strains, tendinitis, or bursitis.[5]

In sports injuries, pain is the most common symptom depending on the sort of damage, it may vary as the body's warning indication that something is off. Typical symptoms of musculoskeletal injuries include nociceptive pain, inflammatory pain, or both. Muscle injuries are often in high-demand sports, amounting to 10 to 55 % of all acute sports injuries.[6,7]

Sports injuries are common in young athletes; young athletes frequently sustain sports-related injuries, and the likelihood is mostly due to earlier initiation of more vigorous practice and a higher degree of sports specialization compared to adult athletes. Several studies have sufficiently demonstrated that top athletes are more likely than athletes participating in recreational sports to experience trauma and overuse injuries and that these injuries also have an impact on their long-term health.[8] Numerous factors can contribute to sports-related injuries, such as subpar equipment, exercising when exhausted, intentionally rude behavior from partners, inadequate insurance, difficult workouts without proper planning, and violations of hygienic and technical standards in training facilities.[9,10] Sports injuries cost the health system a lot of financial constraints, so it's imperative to create policies that will reduce the likelihood that players will sustain them.[11] Athletes in every sport have different demands. Hence the researchers will likely want to provide evidenced -based strategies and interventions to help prevent and reduce the risk of sports-related injuries among university athletes. Athletes, coaches, and trainers can use the information to implement proactive injury prevention measures. Additionally, enhancing performance and preventing sports injuries can assist athletes in maintaining their fitness, avoiding missed playing time, and achieving optimal performance. Thus, enhancing safety will help implement the strategies and interventions highlighted in the study, which can help create a safer environment for athletes, reducing the likelihood of serious or catastrophic injuries.

METHODS

A systematic review and meta-analysis (PRISMA) approach was employed for this study. PRISMA was selected as the study's methodological base since it was thought to be the best approach for minimizing potential bias. The reporting items used in this study gather, choose, and analyze publications on preventing sports injuries. Methods of search and sources of information Scopus, Web of Science (WoS), ProQuest, and Springer Link are some of the databases that were employed in this investigation. The databases were selected because of their excellent standing in the scholarly community and their accessibility to our circumstances. All articles that are relevant to a chosen study subject were approved because there is no publication time constraint for the article search that was conducted. In databases that provide "search within results," like Scopus and Web of Science, the built search string is entered into the "search within result" line, one phrase at a time, sequentially. Both inclusion and exclusion criteria apply to this study. Documents meeting the exclusion criteria were eliminated, while those meeting the inclusion criteria were added. After several articles was review, An adequate treatment of these injuries among athletes' aids in the recovery of the injured part of the body and

the prevention of future injuries.

DISCUSSION

Classification of sport injuries

Sports injuries can be broadly categorized into two main types: Acute and chronic injuries[12] Athletes often sustain injuries from sports to the shoulder, elbow, wrist, knee, and ankle, among other body parts. Abrupt damage to previously healthy tissue occurs. Acute injuries are characterized by abrupt stress on the tissue and manifest their symptoms nearly instantly. The idea here is that the force applied to the tissue (bone, muscle, tendon, ligament, etc.) at the time of injury is greater than the tissue's strength. The site of the injury (bone, cartilage, ligament, muscle, tendon, joint, nerve, or skin) and the kind of damage (fracture, dislocation, sprain, or strain) can be used to categorize acute injuries.[13,14,15] In contrast, Chronic sports injuries are injuries that occur over time (repetitive stress) as a result of overuse of a certain body area. Chronic injuries usually develop gradually and are linked to repeated motions, movements, patterns, or sustained stress at a specific location, in contrast to acute injuries, which happen quickly and are frequently the consequence of a singular occurrence or trauma.[16,17] Individuals who participate in frequent physical activities, where the same set of actions are done again, are more likely to get these injuries. This type of injury includes tendinitis (inflammation of a tendon)[18,19] stress fractures[20] runner's knee (Patellofemoral Pain Syndrome)[21] shin splints[22] stiffness and muscle imbalances, and bursitis (inflammation of the bursa).

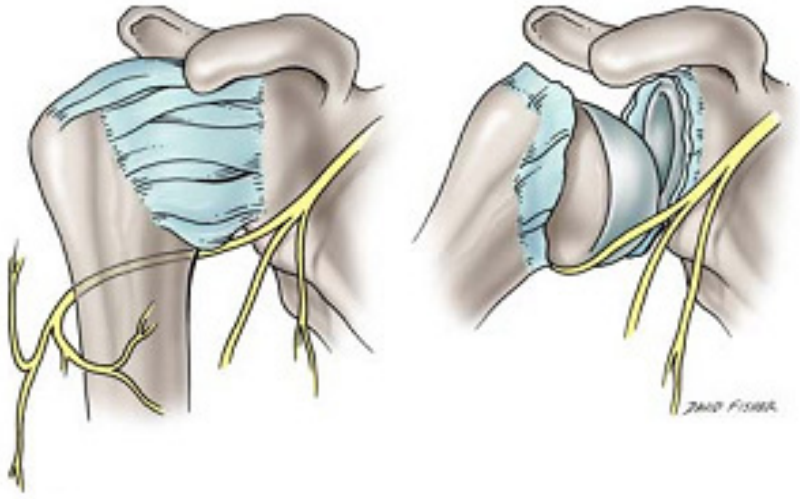

Figure 1. Axillary Nerve Injury (Adapted from Apaydin et al.,2010)

It's critical for players, coaches, and medical professionals to distinguish between acute and chronic sports injuries. Accurately identifying the types of injuries and their causes helps determine the best course of action for care and treatment, as well as the best rehabilitation schedule and safe return to play dates. A key component of thorough sports injury prevention and treatment is the coach or trainer's ability to distinguish between these two types of injuries.

Causes of sports injuries

Sports-related mishaps occur sometimes but mostly result from a variety of factors, including poor quality sports equipment, exercising while fatigued, indiscipline, difficult workouts without adequate preparation, and violations of hygienic and technical standards in training facilities.[23] By engaging in safe activities in designated zones and adopting other preventative measures, these injuries can be adequately avoided. For instance, sliding and falling might occur when playing soccer on damp leaves.[24]

Prevention of sports injuries

Recent trends in the growing acknowledgment of sports injuries as a public health problem have led to an increase in intervention measures for sports injury prevention. Injury prevention is a multimodal process that require collaboration and skill contributions from a variety of professionals to achieve this common goal. Improving understanding of each expert's role in this interdisciplinary team fosters collaboration.[25] Technological innovation, scientific study, and a growing understanding of biomechanics have all contributed to

astonishing breakthroughs in the field of sports injury prevention.[26]

Intervention studies to prevent sports injuries.

According to [27], a study conducted on psychosocial factors and sports injuries stated that numerous interventions based on psychological strategy have been conducted to prevent the risk of sports injuries. This can be accomplished by altering stress reactions through participation in practices that have been shown to reduce the risk of injury, such as cognitive behavioral therapy, psychological skills training, and the mindfulness-acceptance-commitment method.[25] in the same vein, introduce the training process framework and contextualization role of manipulating training load (TL) in monitoring injury prevention. These strategies are founded on the essential training concepts of progression and overload. This entails creating the training curriculum, in which the expert formulates a plan using the body of knowledge, expertise, and accessible data. Training-load monitoring enables the coach to assess how well athletes have handled the physical stress, their psychology toward training, and if they have finished training according to improved functionality to meet the specific requirements of the schedule. A great deal of the research evidence on preventing sports injuries focuses on the behaviors and mindsets of individual athletes, evaluating behavioral change on the part of an athlete.[6,28,29,30,31] The use of effective equipment plays a vital role in the prevention of sports injuries. A key component of this advancement is the creation and use of specific technology designed to meet the particular needs. and shortcomings of various recreational and competitive sports activities. From impact-absorbing equipment and protective padding to biomechanically designed footwear and cutting-edge monitoring technologies.[32,33] this equipment covers a broad spectrum. Helmets, which protect the head against traumatic brain injuries and concussions common in contact sports like football, hockey, and cycling, are at the cutting edge of injury prevention equipment[34] Likewise, protective shields and pads are essential for preventing abrasions, contusions, and ligamentous injuries while protecting sensitive body areas such as the shoulders, elbows, and knees. Sports functional clothing, which helps enhance performance and improve functionality to meet specific requirements among sportsmen, such as physical, physiological, ergonomic, and psychological requirements[35] try to “work through” the pain of an injury, regardless of whether it is an acute or overuse injury. When you have pain from a particular movement or activity, you should stop right away. Continuing the activity may cause further harm.

Treatment and management of sports injuries

Continued activity, regardless of whether it is an acute or overuse injury during sport, results in further harm and poor functionality. Treatment of these injuries’ aids in the recovery of the injured part of the body and the prevention of future injuries. Sports injuries are usually managed by combining multiple strategies among athletes. strategies employed for treatment include the administration of rapid and appropriate first aid via immobilization and rest, ice, compression, and elevation (R.I.C.E.)[36] medical evaluation (physical examination, diagnostic imaging),[37] non-surgical treatment (physical therapy, bracing or taping, modality)[38], surgical intervention. (fracture fixation, arthroscopic surgery, ligament or tendon repair)[39,40], and rehabilitation (progressive exercise program, sport-specific training, education, and injury prevention strategies).[1] To speed up healing, maximize performance, and advance general well-being, athletes, coaches, athletic trainers, physical therapists, and other medical experts must collaborate in the treatment process of sports injuries.

Psychological buildup after injuries

Athletes' inability to return and pursue their athletics is primarily motivated by their fear of re-injury. Research has recently revealed that 50 % of athletes who have had long-term, untreated injuries never fully recover because of the negative effects on their physiological and physical preparedness. There is an urgent need for the adoption of psychological support couches and qualified specialists.[41]

The vital component of the recovery from sports injuries in terms of psychological development, every wounded athlete must acknowledge their emotions and admit that their pain is real. Acknowledge that it's normal to feel a variety of emotions, including disappointment, annoyance, and even sadness.[42] Self-connectivity through self-awareness, self-acceptance based on self-awareness, and behavior alignment with self-awareness is the most crucial component of acceptance. An athlete ought to embrace their identity as unique individuals and project a positive image of themselves onto the system. Concentrate on the areas of your rehabilitation that you can manage to help you develop an upbeat mindset. Stress how crucial having a positive outlook is to the healing process.[43]

Athletes should use goal-setting interventions to select goals they believe are significant, to assist them improve them choices, and to promote commitment to training regimens. Giving up control over the goal-setting process to the athlete encourages self-efficacy, which enhances the results of rehabilitation. For your rehabilitation, set short- and long-term objectives that are both attainable and reasonable. Divide the objectives into more manageable benchmarks and acknowledge and appreciate your progress as you go[44]

The requirement is that athletes consistently establish open lines of communication with their medical team, which consists of coaches, physiotherapists, and physicians. Talk about your worries, ask questions, and keep updated on the rehabilitation plan and your progress. Create a solid support network with your teammates, coaches, friends, and family. Talk to people they can trust and who can understand and support you about personal thoughts and experiences, include visualization and mental imagery exercises in your daily practice. Imagine yourself getting well soon, going back to your favorite sport, and giving it your all. This may support the preservation of optimism.[45]

The mindfulness-acceptance-commitment method should be considered to help athletes heal from injuries. Deep breathing, meditation, progressive muscle relaxation, and other mindfulness and relaxation practices can help manage the tension and anxiety brought on by the injury. Athletes are starting to use mindfulness as a kind of mental training more frequently. Athletes should not be taught to accept defeat in the face of difficulty; instead, mindfulness should be explicitly taught as awareness of the current situation or awareness of one's mental or emotional response to it. Based on preliminary data, athletes may find it easier to achieve the flow state when they engage in mindfulness practices.[46]

CONCLUSION

Based on the objectives outlined earlier, here are some possible inputs and outputs that a research study based on the review paper could emphasize:

Inputs:

1. Literature review on sports injuries: A comprehensive analysis of existing research and studies related to the causes, prevention, treatment, rehabilitation, and psychological aspects of sports injuries.
2. Primary data collection: conducting surveys, interviews, or observational studies to gather additional insights and perspectives from athletes, coaches, trainers, and healthcare professionals.
3. Comparative analysis: comparing different approaches, interventions, or strategies used in the prevention, treatment, and rehabilitation of sports injuries to identify their effectiveness and potential gaps.
4. Meta-analysis: conducting a systematic review and meta-analysis of relevant studies to synthesize the available evidence and determine overall trends, patterns, and outcomes related to sports injuries.

Outputs:

1. Recommendations for injury prevention: Provide evidence-based guidelines and recommendations for athletes, coaches, and healthcare professionals to reduce the risk of sports injuries. This could include suggestions for training techniques, equipment modifications, and injury prevention programs.
2. Treatment guidelines: developing guidelines for the acute management and treatment of various types of sports injuries, highlighting the most effective interventions and approaches.
3. Rehabilitation protocols: proposing evidence-based rehabilitation protocols and exercise programs to optimize recovery and facilitate the safe return to sports activities after injuries.
4. Psychological support strategies: identifying effective strategies for psychological support and counseling to help athletes cope with the emotional and psychological challenges that arise after a sports injury.
5. Identification of research gaps: Highlighting areas where further research is needed, such as investigating novel prevention strategies, evaluating long-term outcomes of specific injuries, or exploring innovative psychological interventions.

These outputs would contribute to the existing body of knowledge and provide valuable insights to inform future practices and research related to sports injuries.

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