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The Role of Physiotherapist in Preventing Recurrent Ankle Sprain in Football Athletes – A Literature Review

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ABSTRACT:

Background: The present review was conducted to critically evaluate the existing body of literature on the role of physiotherapy in preventing recurrent ankle sprain in football athletes to offer evidence-based insights that can lead more individualized, rehabilitation interventions, potentially improving the quality of life in football athletes.

Methods: Databases including Cochrane library, Google scholar, PuBbMed were searched for published papers from 2015 to 2023. We evaluated the role of physiotherapist in preventing recurrent ankle sprain in football players.

Results: The review of 14 trials with 2,182 participants found exercise-based rehabilitation significantly improved ankle mobility, strength, and stability, reducing re-injury risk over 12 months. Balance training and FIFA prevention programs decreased ankle injury rates by up to 42% in soccer players. Strengthening exercises enhanced motor control and functional mobility, while weaker hip-abductor strength was linked to higher injury risk. However, patient-reported outcomes and training volume effects on re-injury were inconclusive.

Conclusion: A comprehensive review of literature on preventing and managing recurrent ankle sprains in football players highlights various effective interventions. Research by Ruben Allois and colleagues emphasizes the benefits of fascial therapy, strength and eccentric exercises, taping, balance training, and hop-stabilization programs. These approaches collectively improve ankle stability, muscle strength, and biomechanics. Hip strength assessment also plays a key role in identifying injury risk. Overall, a multimodal strategy is essential for successful prevention and rehabilitation of ankle sprains in soccer athletes.

Keywords: Ankle Sprain, Athlete, Ankle Stability, Recurrent, Soccer, Ankle Injury.

Introduction :

Ankle sprains are a common ailment that happen when the ankle rolls, twists, or applies too much force, causing the ligaments to become stretched or torn.(Fong et al ., 2007) Strong tissue bands called ligaments bind bones to one another and support joint stability.(Herthel j et al.,2002) Ankle sprains commonly result in discomfort, bruising, edema, and restricted ankle movement. (Fong et al., 2007) Ankle sprains can range in severity from minor to severe, contingent on the degree of ligament damage. (Kerkhoffs et al .,2002)

In football, recurrent ankle sprains are a major problem that can seriously impair an athlete's ability to perform, prolong their career, and maintain their general well-being.(McKay et al ., 2001) Because of the dynamic motions and high-intensity demand of the sport, these injuries are prevalent and can result in chronic ankle instability, long-term functional deficits, and an increased risk of future injuries. (Hertel, J et al.,2002) Ankle sprains are recurrent injuries that frequently lead to weakening of the ligaments, reduced proprioception, and impaired neuromuscular control, which makes healing more difficult and raises the risk of reinjury. (Arnold, B. L., & Schmitz, R. J.1998).

Osteoporosis is a significant public health concern characterized by diminished bone mineral density (BMD), resulting in increased bone fragility and susceptibility to fractures (Howe et al. (2011; Poduval & Vishwanathan (2023). According to the World Health Organization (WHO), osteoporosis is operationally defined as a BMD that is 2.5 standard deviations or more below the mean of a young adult reference population (T-score ≤ -2.5) (Salari et al. (2021; Mäkitie & Zillikens (2022). The most used and validated diagnostic method for measuring BMD is dual-energy X-ray absorptiometry (DXA) (Salari et al. (2021). Alongside DXA, ultrasound imaging to assess the speed of sound (SOS) in bones like the tibia is also utilized in some diagnostic settings (Salari et al. (2021).

There are both internal and external factors that contribute to the high frequency of ankle sprains in football. Ankle alignment, joint laxity, and imbalances in muscle strength are examples of individual anatomical and biomechanical variances that are considered intrinsic variables. (Docherty, C. L., & Arnold, B. L.2008) Because insufficient recovery and persistent deficiencies in joint stability and proprioception can predispose athletes to repeated injuries,

past injury history is a crucial predictor of future sprains. Extrinsic factors are outside variables that can increase the chance of injury, such as inappropriate footwear, playing fields, and the volume and intensity of physical exercise. Football players with recurring ankle sprains can benefit from myofascial treatments along with strength training with an isoinertial device to increase ankle strength and range of motion as well as stability. When used in conjunction with Kinesio taping, myofascial treatment, weight training, and ankle plantar flexion and dorsiflexion exercises can enhance lower limb stability, mobility, and perceived discomfort. (Allois et al., 2021)

Regardless of the application of stabilizing taping, the improvement in ankle functionality in terms of strength, mobility, and stability is comparable in both research groups. The emphasis in the rehabilitation process to enhance functional motor control and performance is shifting more and more toward strengthening exercises to acquire the best possible abilities for functional actions. To regain skilled performance, one must be able to generate muscular forces as well as have the ability for muscle activations to manage complex musculoskeletal interactions. (Lephart et al.,1997) This evaluation finds a number of little researched intervention components that, when combined with strengthening exercises, may significantly improve motor control and performance in people who have sprained their ankle. (Hiller et al .,2007)

Physiotherapy interventions for patients with motor-control deficiencies may benefit from a clinical strategy that recognizes the influence of the task, the environment, and the individual on the execution of a specific functional movement activity through the application of motor control theory in strengthening exercise. Distinguishing the enhancement of motor control from strength training acknowledges the obstacles and approaches specific to strength training engagement. To develop a better strengthening intervention to enhance motor control and performance in all populations in their functional activity, more research is needed to examine the ideal parameters, dosage, and effects of strengthening exercises on motor control for people with an ankle sprain. Population participation in fulfilling both strength and motor control criteria helps to improve and optimize population health outcomes in the future, with varied study concentrating on strength training behavior change especially. (Allois et al.,2021)

Male athletes with chronic ankle instability had different jump-landing biomechanics after a 6-week hop-stabilization training program. These findings may offer a possible molecular explanation for increases in patient-reported outcomes and decreases in the risk of injury following ankle sprain rehabilitation regimens including hop-stabilization exercises. (Ardakani et al.,2019) Competitive male soccer players were more likely to sustain noncontact lateral ankle sprains when their isometric hip-abductor strength was reduced.(Ardakani et al.,2019)

Materials and Methods:

In this literature review, the selection of studies was collected from Cochrane Library trials, PubMed Central, and Google Scholar. Results Yielded from PubMed Central –(4).

Search Strategy: An electronic web search for studies from 2015 to 2023 was conducted in databases Pub Med. Keywords used in this search are —'ankle sprain', 'recurrent', 'football', 'athlete', 'ankle injury' , 'ankle stability' , 'soccer' ,along with their Medical Subjects Headings (MeSH) terms.

Inclusion and exclusion criteria:

The eligible studies were required to have the following criteria:

1. Studies focusing on patients with chronic idiopathic ankle pain.
2. Studies published in English.
3. Only full text articles were chosen.
4. Time line for selection of studies: 2015-2023.

Exclusion criteria :

1. Articles not accessible online.
2. Duplication articles.
3. Articles where full texts are not available.
4. Articles published in other languages.

Data Extraction

Table 1- Demographic Characteristics of Population

Authors	Population	Intervention	Control Groups
Wesam Saleh et al.,(2022)	Approximately 4,959 soccer players which includes both males and females has taken for the study.	Soccer players who participated in injury prevention programs that included balance training exercises for 2-3 times per week. Most interventions lasted between 6 weeks to one full soccer season (often around 3 to 8 months).	Soccer players who followed their usual warm-up or training routines without added balance training exercises for 2-3 times per week.
Al Attar et al.,(2017)	Male amateur soccer players aged 14 to 35 years. 21 teams were involved in the study. 344 players in total.	Pre-training FIFA 11+: Performed for 20 minutes before training sessions. Post-training FIFA 11+: Performed for 10 minutes after training sessions has taken for the study for 3 times per week lasted for one soccer season	Pre-training FIFA 11+: Performed for 20 minutes before training sessions. No post-training exercises: No additional exercises after training sessions for 3 times per week lasted for one soccer season.
Allois et al.,(2021)	Male soccer players with a history of recurrent ankle spraiin of 36 federated footballers were recruited and randomized into two study groups.	Myofascial Techniques: Applied to the subastragaline joint. Eccentric Training: Performed using an isoinertial device. Neuromuscular Taping: Applied as part of the intervention for 4 weeks.	Myofascial Techniques: Applied to the subastragaline joint. Eccentric Training: Performed using an isoinertial device. No Neuromuscular Taping: This component was excluded from the control group for 4 weeks .
Ardakani et al.,(2019)	Twenty-eight male collegiate basketball players diagnosed with chronic ankle instability (CAI) where taken for the study .	An Intervention of 6-week supervised hop-stabilization training program consisting of 18 training sessions Focused on Improvement of lower extremity kinetics and kinematics during jump-landing tasks. of 18 sessions over a 6-week period.	No specific intervention was provided participants maintained their usual activities for 6 weeks.

Table 2- Research Outcome Measures and its Significance

Authors	**Outcome measures**	**Measurement tools**	**P-value**	**Effect of Ankle Sprain**
Wesam Saleh et al.,(2022)	exposure-based ankle injury rate	A pooled IRR of 0.64 indicates a 36% reduction in ankle injury risk for players using balance programs versus controls. For FIFA-specific programs, the reduction was 37%, and for balance-only interventions, 42%.	significance	Balance of soccer player is affected.
AI Attar et al .,(2017)	Injury incidence rate, Injury severity scale	During the season, the experimental group reported significantly fewer injuries compared to the control group. The combined pre- and post-training FIFA 11+ program significantly reduced total and initial injury rates, but had no significant effect on recurrent injuries or injury severity.	significance	Ankle Injury
Ruban Allois et al.,(2021)	Range of motion, MMT, VAS score.	After the intervention and follow-up, the experimental group showed significant improvements in ankle mobility, strength, and stability. The control group also demonstrated progress in all measured variables. However, there were no significant differences in the extent of improvement between the two groups.	significance	Strength, range and pain of the dorsiflexors and plantar flexors effected
Mohammad Karimizadeh Ardakani et al.,(2019)	Lower Extremity Kinetics and Kinematics, Self-Reported Function	The hop-stabilization training led to significant improvements in self-reported function, increased hip and knee flexion angles in the sagittal plane, and greater ankle dorsiflexion compared to the control group. Additionally, the hopping group showed reduced frontal-plane joint angles at the hip, knee, and ankle, along with lower ground reaction forces and a delayed time to reach peak ground reaction forces after the intervention.	significance	ankle stability and control during dynamic movements, specifically during jump-landing biomechanics.

Discussion

Numerous methods for preventing and treating ankle sprains are revealed by the literature analysis on injuries to soccer players' ankles. Studies have looked at how well ankle bandaging and taping, functional training, wearing functional socks, and taping work to improve ankle stability, postural control, and injury prevention. Functional rehabilitation training is advised for both prevention and recovery because it has been demonstrated to improve ankle performance and agility. Furthermore, compared to bandaging alone, taping and kinesiology taping have been shown to improve neuromuscular control of the lower limb, particularly when paired with exercise. Yet, some studies' evidence quality is weak, suggesting that more investigation is necessary to identify the best practices for treating soccer players' repeated ankle sprains.

The systematic review and meta-analysis by Ardakani et al. (2019) examined the effectiveness of injury prevention programs incorporating balance training exercises in reducing ankle injury rates among soccer players. The study analyzed data from nine randomized controlled trials involving 4,959 participants. The findings indicated that such programs led to a 36% reduction in ankle injuries per 1,000 hours of exposure compared to control groups. Specifically, FIFA-endorsed programs resulted in a 37% reduction, while balance training alone led to a 42% reduction. These results underscore the efficacy of balance training in mitigating ankle injuries in soccer players. (Al Attar et al.,2022)

The study by Al Attar et al. (2017) demonstrated that adding a post-training FIFA 11+ exercise program to the standard pre-training FIFA 11+ injury prevention program significantly reduced injury rates among male amateur soccer players. The experimental group reported 26 injuries, while the control group reported 82 injuries during one season. Statistical analyses revealed that the combined pre and post-training program led to a 75% reduction in overall injuries and a 63% reduction in initial injuries. However, there was no significant difference in the incidence of recurrent injuries or injury severity between the two groups. These findings suggest that incorporating post-training exercises into the FIFA 11+ program can enhance its effectiveness in preventing injuries among soccer players. (Al Attar et al., 2017)

The study by Allois et al. (2021) aimed to evaluate the effectiveness of combining fascial therapy, eccentric strength training, and kinesiotaping in improving ankle mobility, strength, and stability in soccer players with recurrent ankle sprains. The results indicated that both the experimental group (which received all three interventions) and the control group (which received fascial therapy and strength training without taping) showed significant improvements in the targeted variables. However, no significant differences were observed between the two groups, suggesting that the addition of kinesiotaping did not provide additional benefits over the combined fascial therapy and strength training regimen. The study concluded that while fascial therapy and strength training are effective in enhancing ankle function, the role of taping as an adjunctive treatment remains uncertain. (Allois et al.,2021)

The study by Ardakani et al. (2019) investigated the effects of hop-stabilization training on landing biomechanics in athletes with chronic ankle instability. The results indicated that the hop-stabilization program led to improved self-reported function, increased sagittal-plane hip and knee flexion angles, and greater ankle dorsiflexion compared to the control group. Additionally, the hop-stabilization group exhibited reduced frontal-plane joint angles at the hip, knee, and ankle, along with decreased ground reaction forces and a longer time to peak ground reaction forces after the intervention. These findings suggest that hop-stabilization training can enhance neuromuscular control and landing mechanics in athletes with chronic ankle instability. (Ardakani et al.,2019)

CONCLUSION:

A comprehensive literature review on the prevention and management of recurrent ankle sprains in football athletes can be synthesized from the data provided in the research papers.Research conducted by Ruben Allois, Jente Wagemans, Wesam Saleh, Mohammad Karimizadeh Ardakani . Powers highlights the efficacy of diverse interventions in lowering the frequency of recurrent ankle sprains in soccer players. These interventions include fascial therapy, strength exercises, taping, exercise-based rehabilitation, balance training programs, strengthening exercises, eccentric exercises, hop-stabilization training, and hip strength assessment. These interventions emphasize the multimodal approach necessary for effective ankle sprain therapy and prevention. They play a critical role in increasing ankle stability, enhancing muscle strength, optimizing biomechanics, and eventually preventing reinjury.

CONFLICT OF INTEREST:

The authors declare no conflict of interest related to this study.

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