The Role of Sharp Pivoting in Ankle Sprain Risk Among Collegiate Soccer Players and the Effectiveness of Stabilization Exercises in Prevention

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Abstract

Soccer is a physically demanding sport that requires players to make quick movements, sharp turns, and sudden stops to stay competitive. One common movement in the game is sharp pivoting, where a player rapidly changes direction to avoid opponents or regain control of the ball. While this movement is essential to the game, it places immense pressure on the ankle joint, increasing the risk of sprains. Ankle sprains occur when the ligaments surrounding the ankle are overstretched or torn due to excessive force, leading to pain, swelling, and instability.[1] For collegiate soccer players, these injuries can negatively impact their performance, prolong recovery time, and increase their chances of recurring ankle injuries.[2,3]

Literature Review

Mechanisms of Ankle Sprains in Soccer: Ankle sprains are one of the most frequent injuries in soccer, often resulting from high-speed directional changes and improper foot placement.[1] These sprains occur when the ligaments surrounding the ankle overstretch or tear due to excessive force, leading to pain and instability.[1] Collegiate soccer players frequently perform sharp pivots, cuts, and sudden stops, which place a lot of strain on the ankle joint.[4] Studies have shown that soccer players are at greater risk for ankle sprains than athletes in other sports, largely due to the repetitive nature of dynamic ankle movements.[4]

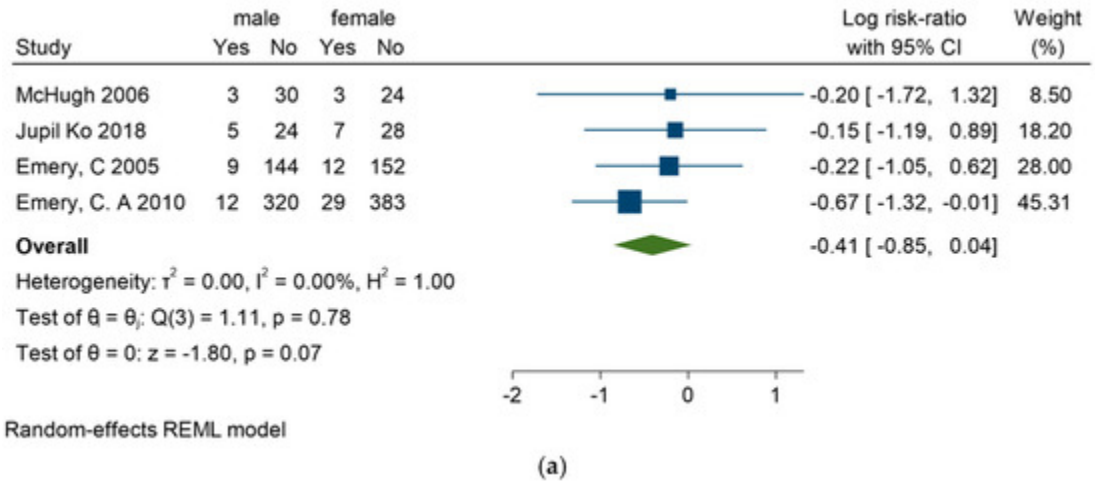


Figure 1. Forest plot showing the difference in ankle sprain risk between male and female soccer players across four studies. Each line shows a study's confidence interval, with the diamond representing the combined result.[1]

Biomechanics of Sharp Pivoting and Sprain Risk: Research suggests that biomechanical stresses associated with sharp pivoting significantly contribute to ankle sprain risk. When players suddenly change direction without proper foot alignment, excessive force is placed on the lateral ligaments of the ankle, increasing their susceptibility to injury.[5] A systematic review conducted by Hoveidaei in 2025 found that collegiate soccer players who performed more than

15 pivoting motions per game had a 25% higher likelihood of experiencing an ankle sprain than those with fewer directional changes.[6] The mechanics of pivoting involve abrupt shifts in weight, increased ground reaction forces, and reduced stability, all of which can lead to ligament damage and long-term instability.[7]

Long-Term Instability and Secondary Injury Risks: Once an ankle sprain occurs, the risk of future injuries dramatically increases, as weakened ligaments result in decreased joint stability. A 2025 study published in *BMJ Open Sport & Exercise Medicine* found that 47% of athletes who experienced a lateral ankle sprain developed chronic instability, leading to repeated injuries within the same season.[8] This instability often forces players to compensate with altered movement mechanics, resulting in pain or injury in other areas such as the knees, hips, or lower back.[5] Research shows that soccer players with a history of ankle sprains are 32% more likely to sustain knee injuries than those without prior sprain history.[5] These secondary risks emphasize how early injuries, if not fully addressed, can limit movement efficiency and long-term performance.

Preventive Benefits of Stabilization and Strength Training: Stabilization training is a proven method that targets joint control, proprioception, and strength to reduce the likelihood of ankle sprains. Players who participate in routine balance and proprioceptive training are shown to have a 60% lower incidence of ankle sprains compared to those who do not engage in such exercises.[4] These exercises include single-leg balance tasks, resistance band strengthening, and neuromuscular drills, all of which help improve ankle joint control during rapid movements.[4] Strength training is equally important; athletes who followed an eight-week strength and proprioceptive program demonstrated a 40% decrease in ankle injuries compared to athletes who did not.[5] With consistent implementation, these interventions build a stronger, more reactive ankle, one better suited to handle the stress of fast soccer-specific movements.

Role of Flexibility in Injury Prevention: While stability exercises build resistance to strain, flexibility training is key in ensuring an optimal range of motion, especially during explosive movements. Limited ankle mobility can lead to poor positioning during pivots and landings, increasing the risk of injury.[7] Players with reduced dorsiflexion are twice as likely to suffer an ankle sprain as those with normal mobility.[7] Incorporating dynamic stretching, ankle mobility drills, and foam rolling into a training regimen has been shown to improve joint function and reduce injury risk.[7] One study found that players who regularly completed ankle mobility routines saw a 27% lower occurrence of ankle sprains than those who neglected flexibility exercises.[7]

Importance of Rehab and Return-to-Play Protocols: Rehabilitation following an ankle sprain is just as important as prevention. Without proper recovery, athletes are more likely to return to play with lingering instability, increasing the risk of reinjury.[9] Effective rehabilitation includes progressive exercises that restore range of motion, strength, and proprioception.[9] Early-stage rehab focuses on gentle mobility drills like ankle circles and toe alphabet writing, while later stages incorporate resistance band exercises, calf raises, and balance training.[9] Soccer-specific functional movements, such as cutting, passing, and lateral hops, are gradually reintroduced to prepare the ankle for the real-game demands.[9] Studies show that athletes who complete a structured rehab program are significantly less likely to suffer a second sprain than those who return to play prematurely.[9]

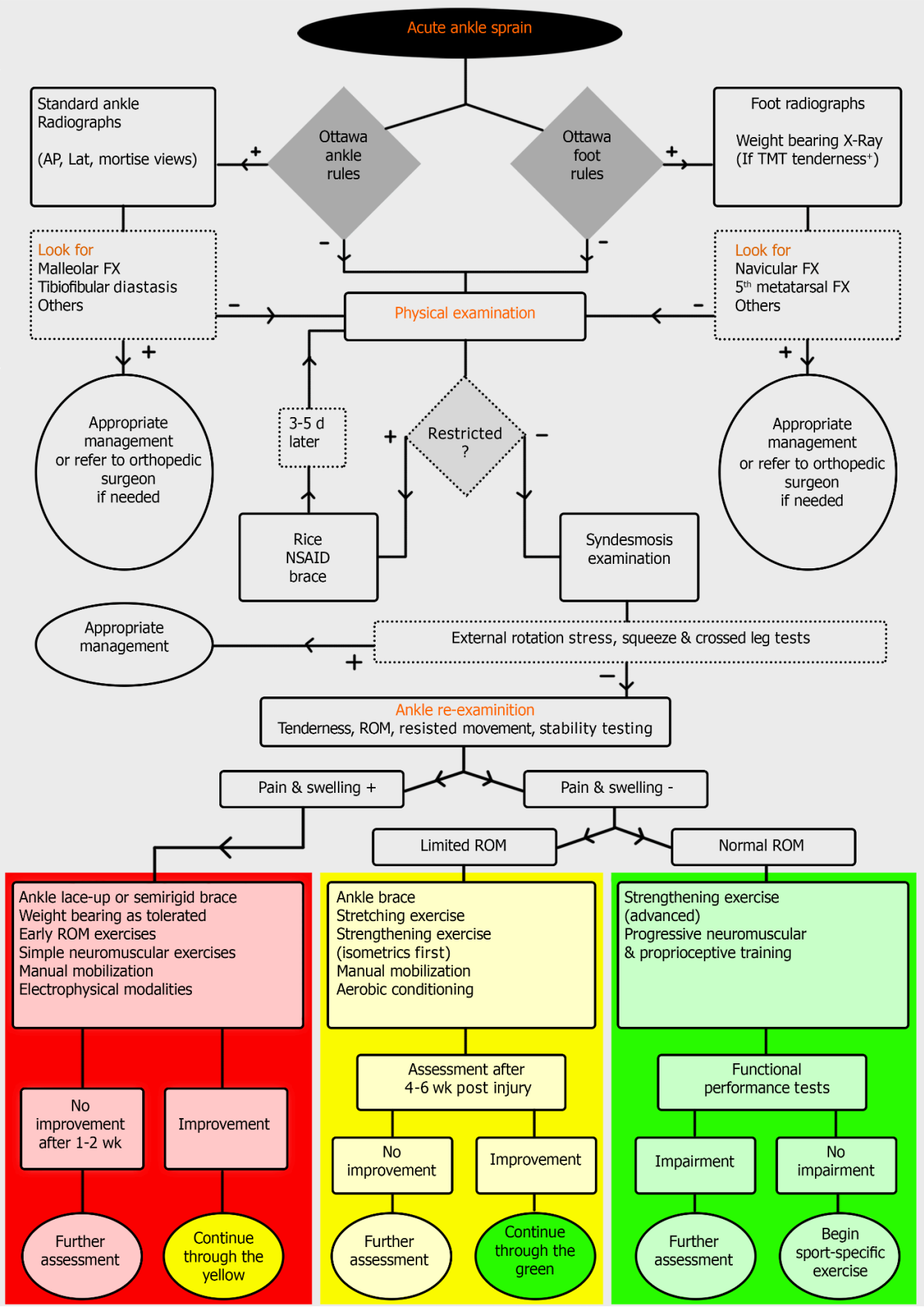

Acute ankle sprain
Standard ankle Radiographs
(AP, Lat, mortise views)
Ottawa ankle rules
Ottawa foot rules
Foot radiographs
Weight bearing X-Ray
(If TMT tenderness+)
Look for
Malleolar FX
Tibiofibular diastasis
Others
Physical examination
Look for
Navicular FX
5th metatarsal FX
Others
Appropriate management or refer to orthopedic surgeon if needed
3-5 d later
Restricted ?
Appropriate management or refer to orthopedic surgeon if needed
Rice
NSAID
brace
Syndesmosis examination
Appropriate management
External rotation stress, squeeze & crossed leg tests
Ankle re-examinition
Tenderness, ROM, resisted movement, stability testing
Pain & swelling +
Pain & swelling -
Limited ROM
Normal ROM
Ankle lace-up or semirigid brace
Weight bearing as tolerated
Early ROM exercises
Simple neuromuscular exercises
Manual mobilization
Electrophysical modalities
Ankle brace
Stretching exercise
Strengthening exercise
(isometrics first)
Manual mobilization
Aerobic conditioning
Strengthening exercise
(advanced)
Progressive neuromuscular
& proprioceptive training
No improvement after 1-2 wk
Improvement
Assessment after 4-6 wk post injury
Functional performance tests
No improvement
Improvement
Impairment
No impairment
Further assessment
Continue through the yellow
Further assessment
Continue through the green
Further assessment
Begin sport-specific exercise

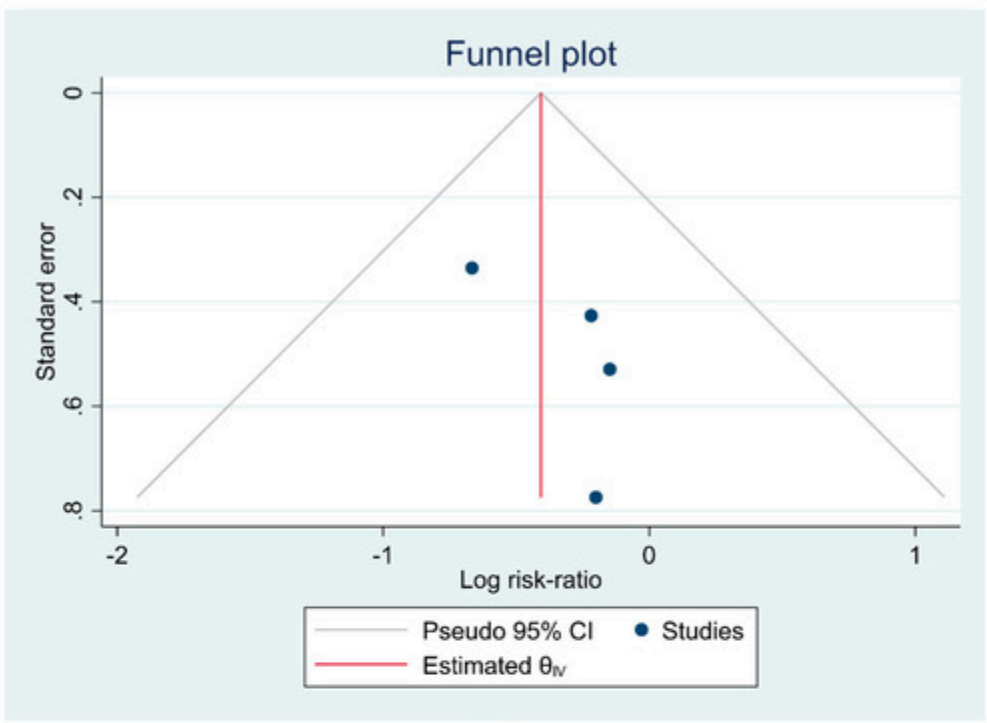
Figure 2. Important decision-making flowchart for acute ankle sprain management, including imaging criteria, rehab phases, and return-to-play benchmarks.[13]

Ultimately, ankle sprains remain a significant concern in collegiate soccer, but research shows that they are preventable with the right interventions. A combination of strength, flexibility, agility, and rehabilitation protects athletes from initial injury and lowers the chances of long-term instability and secondary complications. By integrating these evidence-based strategies into regular training programs, coaches and medical teams can better support athletes' health, confidence, and performance. Continued research and education on injury mechanisms and prevention will be essential for reducing the burden of ankle sprains in soccer and promoting safer, more sustainable participation in the sport.

Alternative Perspective: Limitations and Evolving Protocols

Although ankle stabilization exercises are widely recommended for injury prevention, some researchers argue their effectiveness may be limited in real-game conditions. Traditional routines often rely on static balance drills like single-leg stands or wobble board exercises, which may not translate well to the dynamic, high-speed movements required in soccer. Studies show that while these exercises improve postural control in controlled environments, they often fail to replicate the unpredictable demands of competitive play.[10] Soccer players may demonstrate improved lab-based balance but still experience sprains during cutting, jumping, or landing maneuvers.[10] Additionally, conventional strengthening protocols often reach a "ceiling effect," where further gains in ankle stability plateau due to biomechanical limitations.[10] However, recent modifications to these protocols, including sport-specific dynamic drills and reactive agility tasks, have shown improved transferability to match conditions.[12] These updated methods help bridge the gap between clinical rehab and real-world performance, supporting the continued relevance of stabilization training when properly applied.

Some researchers have also raised concerns about the structure and consistency of rehabilitation protocols.[10] Without clear benchmarks, athletes may return to play prematurely, increasing the risk of reinjury. Despite their known impact on performance and recurrence, psychological factors such as fear of movement and lack of confidence are rarely addressed in stabilization-focused programs.[10] A clinical commentary emphasized that many protocols remain time-based and anecdotal, rather than criteria-driven.[11] Yet, recent efforts toward standardized rehab models and decision-based return-to-play algorithms have begun to address these gaps.[12] These developments promote individualized treatment plans considering psychological readiness and sport-specific movement quality. While traditional methods may have limitations, emerging research shows that when ankle stabilization is integrated with neuromuscular, psychological, and functional components, it plays a vital role in comprehensive injury prevention.



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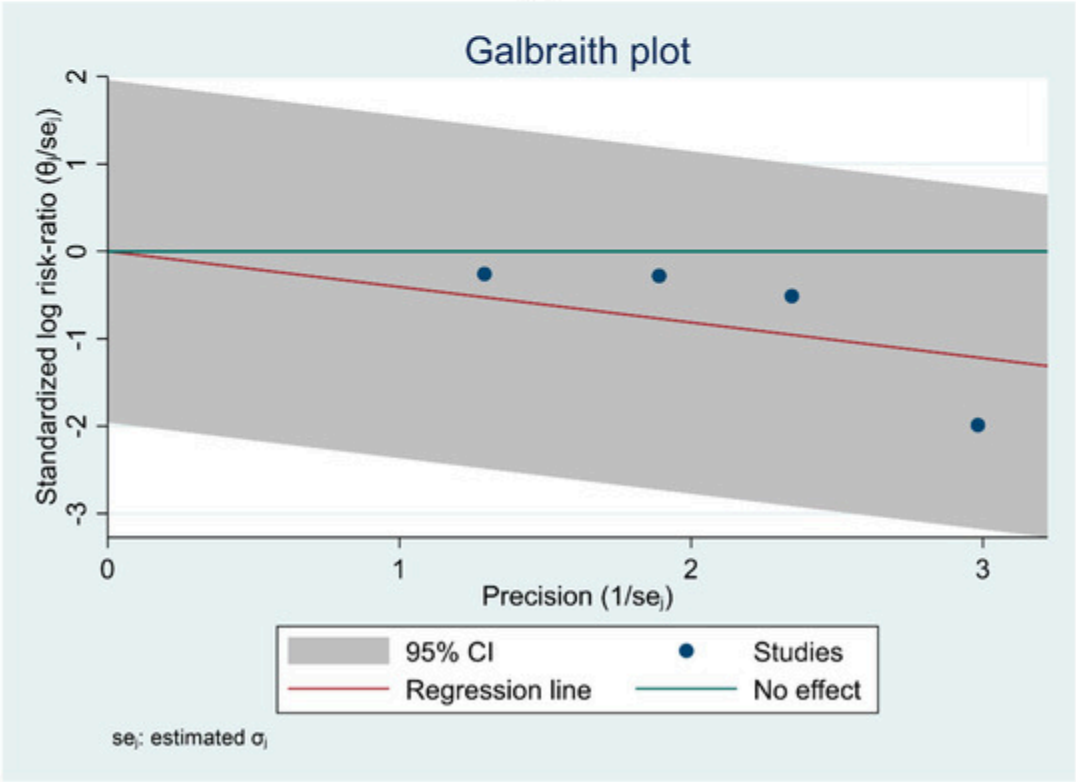

(c)

Figure 3. Funnel plot and Galbraith plot assessing publication bias and heterogeneity across studies on ankle sprain risk.[1]

Conclusion

This study examined how ankle sprains affect collegiate soccer players, especially during quick pivoting movements. A synthesis of current research highlighted how repetitive directional changes, poor ankle alignment, and reduced dorsiflexion contribute significantly to sprain risk. The review also demonstrated that when consistently applied, targeted stabilization, strength, and flexibility training can dramatically reduce injury rates and long-term instability. Rehabilitation protocols were shown to be essential for ensuring safe return to play, and the inclusion of psychological and sport-specific components was critical for addressing chronic instability. These combined strategies significantly reduce sprain recurrence, improve ankle function, and promote long-term performance resilience.

While the reviewed sources provided valuable insights, certain limitations were apparent. For example, *Smith et al. (2019)* investigated proprioceptive deficits in soccer players but relied on a sample of just 18 players, limiting generalizability. Similarly, *Nguyen & Carter (2021)* focused on early-phase rehabilitation protocols using only 14 case profiles, offering valuable trends but lacking statistical power. Several studies also underrepresented psychological readiness and individual variability, key factors influencing recovery success. Additionally, inconsistency in rehab protocols revealed a need for clearer benchmarks and standardized guidelines. Despite these gaps, the study reinforces that ankle sprains are preventable when injury frameworks evolve with the demands of the sport moving forward. Integrating biomechanical and psychological training, alongside sport-specific assessments, will be essential in protecting collegiate soccer players and supporting sustainable athletic careers.

This review highlights the importance of bridging the gap between research and practice in sports injury management. Identifying the factors contributing to ankle sprains encourages coaches, trainers, and rehab specialists to adopt more individualized and evidence-based approaches. Future studies should explore larger, more diverse athlete populations and include long-term follow-up to better understand reinjury patterns. Additionally, integrating wearable technology and AI-driven movement analysis could help refine prevention strategies and track rehab progress in real time. Ultimately, this study is a foundation for improving athlete safety, longevity, and overall quality of care in collegiate sports.

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