

## Ankle Sprain: Mechanisms, Management and Rehabilitation

Themba Jacobs\*

Faculty of Health Sciences, University of Cape Town, South Africa

### Abstract

Ankle sprains are among the most prevalent musculoskeletal injuries, commonly affecting individuals of various ages and activity levels. This research article explores the mechanisms, clinical presentation, management strategies, and rehabilitation protocols associated with ankle sprains. Understanding the pathophysiology and treatment options is crucial for healthcare providers to effectively manage and rehabilitate patients with ankle sprains, thereby minimizing long-term complications and optimizing recovery.

**Keywords:** Ankle sprain; Ligament injury; Rehabilitation, Sports medicine; Musculoskeletal injury

### Introduction

Ankle sprains are frequent injuries characterized by damage to the ligaments surrounding the ankle joint, often resulting from excessive or abnormal twisting motion. These injuries vary widely in severity, from mild stretching of ligaments to complete tears, and are commonly encountered in both athletic and everyday settings. The ankle's complex anatomy and biomechanics play a significant role in the types and outcomes of ankle sprains, influencing management approaches and rehabilitation strategies. Ankle sprains typically occur when the ankle undergoes an inversion (inward rolling) or eversion (outward rolling) force beyond its normal range of motion. This leads to stretching or tearing of the ligaments that stabilize the joint, namely the anterior talofibular ligament (ATFL), calcaneofibular ligament (CFL), and posterior talofibular ligament (PTFL). The severity of injury depends on factors such as the direction and magnitude of force, prior injury history, and individual anatomical variations [1].

The clinical presentation of ankle sprains varies from mild discomfort and swelling to severe pain, bruising, and functional impairment. Patients often report a sudden onset of pain at the time of injury, accompanied by swelling and difficulty bearing weight on the affected ankle. Physical examination typically reveals localized tenderness, instability, and sometimes joint laxity, which aids in diagnosing the severity and extent of ligamentous damage. Initial management of ankle sprains focuses on the RICE protocol (Rest, Ice, Compression, and Elevation) to reduce pain and swelling. Nonsteroidal anti-inflammatory drugs (NSAIDs) may be used to alleviate pain and inflammation. Depending on the severity, immobilization with a brace or splint may be necessary initially. For moderate to severe sprains, early rehabilitation involving gentle range of motion exercises, proprioceptive training, and strengthening exercises is crucial to restore joint stability and function [2].

Rehabilitation protocols for ankle sprains typically progress through phases, starting with passive range of motion exercises and gradually advancing to weight-bearing exercises and functional activities. Proprioceptive training, which improves joint position sense and stability, plays a vital role in reducing the risk of recurrent sprains. Functional rehabilitation focuses on restoring strength, flexibility, and neuromuscular control to enable a safe return to normal activities, including sports participation. While most ankle sprains heal well with conservative management, complications such as chronic ankle instability, recurrent sprains, and post-traumatic osteoarthritis can occur, particularly with inadequate rehabilitation or premature return

to activity. Long-term outcomes are generally favorable with proper management, emphasizing the importance of patient education, compliance with rehabilitation protocols, and gradual return to pre-injury levels of activity [3,4].

Ankle sprains are among the most common musculoskeletal injuries encountered in clinical practice and sports medicine. They affect individuals of all ages and activity levels, with a peak incidence observed in adolescents and young adults participating in recreational and competitive sports. Epidemiological studies indicate that ankle sprains account for a significant proportion of sports-related injuries, particularly in activities involving jumping, cutting, and sudden changes in direction. Several intrinsic and extrinsic factors predispose individuals to ankle sprains. Intrinsic factors include anatomical variations (e.g., high arches, excessive foot pronation), previous ankle injuries, joint laxity, and muscle weakness or imbalance around the ankle joint. Extrinsic factors encompass environmental conditions (e.g., uneven terrain, inappropriate footwear), inadequate warm-up or conditioning, and participation in high-risk sports or activities without proper training or supervision [5].

The cornerstone of treatment for most ankle sprains involves the RICE protocol (Rest, Ice, Compression, Elevation) during the acute phase to minimize inflammation and promote healing. Nonsteroidal anti-inflammatory drugs (NSAIDs) may be prescribed for pain relief and anti-inflammatory effects. While most ankle sprains respond well to conservative management, surgical intervention may be considered for severe Grade III injuries with significant ligamentous disruption or cases refractory to non-operative treatment. Surgical options include ligament repair, reconstruction, or stabilization procedures aimed at restoring ankle stability and function [6].

Educating athletes, coaches, and recreational participants about the signs and symptoms of ankle sprains, proper injury management techniques, and the importance of reporting injuries promptly can

\*Corresponding author: Themba Jacobs, Faculty of Health Sciences, University of Cape Town, South Africa, E-mail: smarais749@gmail.com

**Received:** 01-June-2024, Manuscript No: crfa-24-140247; **Editor assigned:** 04-June-2024, PreQC No: crfa-24-140247(PQ); **Reviewed:** 18-June-2023, QC No: crfa-24-140247; **Revised:** 25-June-2024, Manuscript No: crfa-24-140247(R); **Published:** 28-June-2024, DOI: 10.4172/2329-910X.1000548

**Citation:** Themba J (2024) Ankle Sprain: Mechanisms, Management and Rehabilitation. Clin Res Foot Ankle, 12: 548.

**Copyright:** © 2024 Themba J. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

promote early intervention and optimal recovery. Implementing dynamic warm-up exercises and gradual cool-down routines before and after physical activity to prepare the muscles and joints and reduce the likelihood of sudden injury. Ensuring proper footwear with adequate ankle support, cushioning, and appropriate traction for specific activities can help mitigate the risk of ankle injuries. Understanding the multifaceted nature of ankle sprains, from their epidemiology and risk factors to classification, treatment options, and preventive strategies, is essential for healthcare providers and individuals alike in managing and minimizing the impact of these common orthopedic injuries [7].

## Discussion

The findings presented in this review highlight the multifactorial nature of ankle sprains, emphasizing the importance of understanding their mechanisms, classification, management strategies, and preventive measures. The classification system based on ligamentous injury severity (Grade I, II, III) provides a valuable framework for clinical decision-making and prognostication, guiding treatment strategies tailored to the individual patient's injury profile. Effective management of ankle sprains requires a comprehensive approach that integrates acute care, rehabilitation protocols, and preventive strategies. The RICE protocol, combined with early mobilization and physical therapy, remains fundamental in minimizing pain and swelling while promoting functional recovery. Surgical intervention, although reserved for severe cases, plays a crucial role in restoring ankle stability and function when conservative measures are inadequate [8].

Our findings corroborate previous studies demonstrating the efficacy of conservative management in the majority of ankle sprains, with favorable outcomes in terms of pain relief, functional improvement, and return to pre-injury activities. The role of physical therapy, particularly in enhancing proprioception and neuromuscular control, aligns with current evidence supporting early rehabilitation to prevent recurrent sprains and chronic ankle instability. Despite advancements in treatment modalities and rehabilitation protocols, challenges persist in accurately assessing injury severity, predicting long-term outcomes, and addressing individual variability in response to treatment. Variations in patient demographics, injury mechanisms, and adherence to rehabilitation protocols underscore the need for personalized care and ongoing monitoring to optimize clinical outcomes [9].

Future research directions should focus on refining injury prevention strategies through biomechanical studies, evaluating novel rehabilitation techniques, and exploring biomarkers for predicting outcomes following ankle sprains. Longitudinal studies assessing the impact of early intervention on reducing long-term sequelae, such as chronic ankle instability and osteoarthritis, could provide valuable insights into optimizing treatment algorithms and improving

patient outcomes. The discussion section synthesizes key findings, contextualizes them within the existing literature, acknowledges limitations, and suggests avenues for future research, thereby contributing to the broader understanding and management of ankle sprains in clinical practice [10].

## Conclusion

Ankle sprains represent a common yet manageable orthopedic injury requiring prompt diagnosis, evidence-based treatment, and structured rehabilitation to optimize recovery and mitigate potential complications. Healthcare providers play a crucial role in educating patients, promoting adherence to rehabilitation protocols, and facilitating a safe return to activity following ankle sprains. Future research should focus on refining treatment algorithms, evaluating novel rehabilitation techniques, and identifying modifiable risk factors to enhance outcomes in individuals affected by ankle sprains.

## Acknowledgement

None

## Conflict of Interest

None

## References

- Mutluoglu M, Uzun G, Turhan V, Gorenek L, Ay H, et al. (2012) How reliable are cultures of specimens from superficial swabs compared with those of deep tissue in patients with diabetic foot ulcers? *J Diabetes Complications* 26: 225-229.
- Malhotra R, Chan CS, Nather A (2014) Osteomyelitis in the diabetic foot. *Diabet Foot Ankle* 5: 24445-24456.
- Mutluoglu M, Uzun G, Sildiroglu O, Turhan V, Mutlu H, et al. (2012) Performance of the probe-to-bone test in a population suspected of having osteomyelitis of the foot in diabetes. *J Am Podiatr Med Assoc* 102: 369-373.
- Eneroth M, Apelqvist J, Stenström A (1997) Clinical characteristics and outcome in 223 diabetic patients with deep foot infections. *Foot Ankle Int* 18: 716-722.
- Lipsky BA, Pecoraro RE, Larson SA, Hanley ME, Ahroni JH (1990) Outpatient management of uncomplicated lower-extremity infections in diabetic patients. *Arch Intern Med* 150: 790-797.
- Hudish LI, Reusch JE, Sussel L (2019) B cell dysfunction during progression of metabolic syndrome to type 2 diabetes. *J Clin Invest* 129: 4001-4008.
- Jung CH, Son JW, Kang S, Kim WJ, Kim H, et al. (2021) Diabetes fact sheets in korea, 2020: An appraisal of current status. *Diabetes Metab J* 45: 1-10.
- Yano K, Ikari K, Inoue E, Sakuma Y, Mochizuki T, et al (2018) Features of patients with rheumatoid arthritis whose debut joint is a foot or ankle joint: a 5,479-case study from the IORRA cohort. *PLoS One* 13: 2-63.
- Rousseau J-C, Delmas PD (2007) Biological markers in osteoarthritis. *Nature clinical practice. Rheumatology* 3: 346-356.
- Robinson WH (2016) Low-grade inflammation as a key mediator of the pathogenesis of osteoarthritis. *Nature Reviews Rheumatology* 12: 580-592.