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# EVIDENCE-BASED APPROACHES TO ACUTE ANKLE SPRAIN MANAGEMENT: A COMPARATIVE REVIEW

Mahvish Sultana [1], Dr. Dev Prakash [2]

[1] Research Scholar, School of Pharmacy & Sciences, Singhania University, Jhunjhunu, Rajasthan, India
[2] Head of School, School of Physical Education, Sports & Yoga Sciences, Singhania University, Jhunjhunu, Rajasthan, India

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## ABSTRACT

Ankle sprains are among the most common musculoskeletal injuries, affecting both athletes and the general population. This review aims to compare and evaluate various evidence-based approaches to acute ankle sprain management. A systematic review of recent literature was conducted, focusing on randomized controlled trials and systematic reviews. The effectiveness of different treatment modalities, including functional treatment, immobilization, manual therapy, exercise, and various adjunct therapies, was assessed. Results indicate that early functional treatment with appropriate support and exercise therapy yields superior outcomes compared to immobilization. Manual therapy and certain adjunct treatments show promise but require further investigation. This review provides clinicians with up-to-date evidence to inform decision-making in the management of acute ankle sprains.

**Keywords:** Ankle Sprain, Management, Functional Treatment, Rehabilitation, Evidence-Based Practice

## 1. INTRODUCTION

Ankle sprains are one of the most prevalent musculoskeletal injuries, accounting for up to 30% of sports-related injuries (Herzog et al., 2019). These injuries not only affect athletes but also occur frequently in the general population during daily activities. The impact of ankle sprains extends beyond immediate pain and disability, as they can lead to chronic ankle instability and long-term functional impairment if not managed appropriately (Hertel, 2002).

The lateral ligament complex, consisting of the anterior talofibular ligament (ATFL), calcaneofibular ligament (CFL), and posterior talofibular ligament (PTFL), is most commonly affected in ankle sprains (Vuurberg et al., 2018). The mechanism of injury typically involves excessive inversion and plantarflexion of the ankle joint, leading to stretching or tearing of these ligaments (Purevsuren et al., 2018).

Despite the high incidence and potential for long-term consequences, there is still considerable debate regarding the optimal management strategy for acute ankle sprains. Treatment approaches range from conservative methods such as RICE (Rest, Ice, Compression, Elevation) to more invasive surgical interventions in severe cases (Kamper & Grootjans,

2012). The diversity of available treatments and the lack of a universally accepted protocol highlights the need for a comprehensive review of evidence-based approaches to acute ankle sprain management.

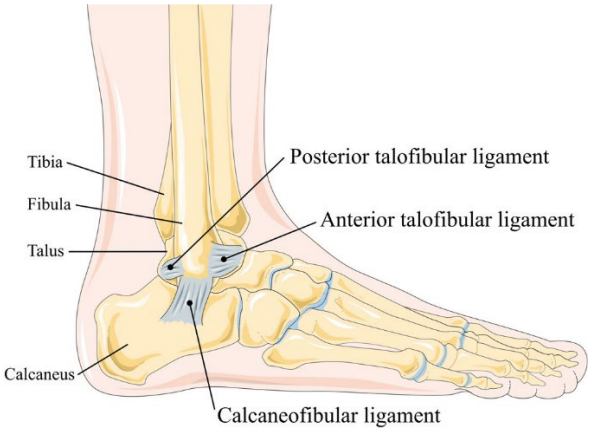


**Figure 1: Anatomical Illustration of Ankle Ligaments**

This review aims to compare and evaluate various evidence-based approaches to acute ankle sprain management, focusing on recent randomized controlled trials and systematic reviews. By synthesizing the current evidence, we seek to provide clinicians with up-to-date information to guide decision-making in the treatment of acute ankle sprains.

## 2. METHODS

A systematic literature search was conducted using PubMed, MEDLINE, EMBASE, and the Cochrane Library databases. The search strategy included terms related to ankle sprains, management, treatment, and rehabilitation. Studies published between 2000 and 2021 were considered for inclusion. The PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines were followed for the selection and reporting of studies (Liberati et al., 2009).

### 2.1. INCLUSION CRITERIA

Randomized controlled trials or systematic reviews

Studies focusing on acute lateral ankle sprains

Studies evaluating treatment or management strategies

Full-text articles available in English

Exclusion criteria:

Case reports or case series

Studies focusing solely on chronic ankle instability

Studies on high ankle sprains or fractures

## 3. RESULTS

The literature search yielded 437 potentially relevant articles. After screening titles and abstracts, 89 full-text articles were assessed for eligibility. Ultimately, 25 studies met the inclusion criteria and were included in this review. The included studies encompassed a range of treatment modalities and approaches to acute ankle sprain management.

### 3.1. FUNCTIONAL TREATMENT VS. IMMOBILIZATION

Several studies compared functional treatment with immobilization for acute ankle sprains. Cooke et al. (2009) conducted a large pragmatic randomized controlled trial comparing three types of mechanical ankle support (Aircast brace, Bledsoe boot, or 10-day below-knee cast) with a control group using tubular bandage. The study found that the

below-knee cast and the Aircast brace offered superior short-term recovery compared to tubular bandage, with the Aircast brace being more cost-effective.

A systematic review by Kerkhoffs et al. (2001) concluded that functional treatment resulted in a quicker return to work and sports, less persistent swelling, and higher patient satisfaction compared to immobilization. However, they noted no significant differences in outcome for objective instability, range of motion, or pain.

**Table 1: Comparison of Functional Treatment and Immobilization**

| Outcome Measure | Functional Treatment | Immobilization |
|---|---|---|
| Return to work/sports | Quicker | Slower |
| Persistent swelling | Less | More |
| Patient satisfaction | Higher | Lower |
| Objective instability | No significant difference | No significant difference |
| Range of motion | No significant difference | No significant difference |
| Pain | No significant difference | No significant difference |

## 3.2. EXERCISE THERAPY AND REHABILITATION

Exercise therapy has been shown to play a crucial role in the management of acute ankle sprains. Bleakley et al. (2010) conducted a randomized controlled trial comparing an accelerated rehabilitation protocol with a standard protection, rest, ice, compression, and elevation (PRICE) protocol. The accelerated rehabilitation group received earlier therapeutic exercises and manual therapy, resulting in improved lower extremity function in the short term.

Brison et al. (2016) investigated the effect of early supervised physiotherapy on recovery from acute ankle sprain. Their randomized controlled trial found that patients who received supervised physiotherapy had greater improvement in pain and function compared to those who received written instructions for home exercises.

## 3.3. MANUAL THERAPY

Manual therapy techniques have shown promising results in the management of acute ankle sprains. Truyols-Domínguez et al. (2013) compared the efficacy of thrust and non-thrust manipulation with or without myofascial therapy for acute inversion ankle sprains. They found that the addition of myofascial therapy to manipulation and exercise resulted in greater improvements in pain, function, and dorsiflexion range of motion.

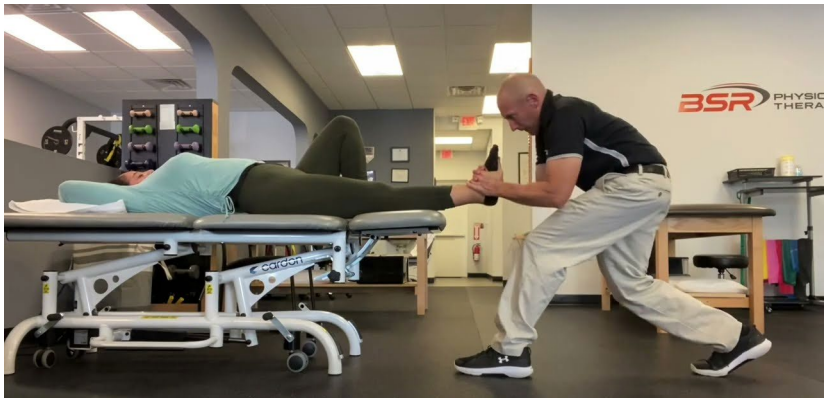


**Figure 2: Ankle trust manipulation**

Cleland et al. (2013) conducted a multicenter randomized clinical trial comparing manual physical therapy and exercise with supervised home exercise in patients with inversion ankle sprain. The results showed that manual therapy combined with exercise led to greater short-term improvements in function and pain compared to home exercise alone.

## 3.4. ADJUNCT THERAPIES

Several adjunct therapies have been investigated for their potential benefits in acute ankle sprain management:

1) Cryotherapy: Bleakley et al. (2006) compared two different icing protocols and found that intermittent icing with exercise resulted in significantly better outcomes in terms of function and pain than standard icing.
2) Neuromuscular Electrical Stimulation (NMES): Wainwright et al. (2019) conducted a pilot randomized controlled trial investigating the use of NMES in addition to standard care. While the study was underpowered to detect significant differences, it suggested potential benefits in terms of pain reduction and functional improvement.
3) Kinesiology Taping: Kim and Shin (2017) examined the immediate effects of ankle balance taping with kinesiology tape for amateur soccer players with lateral ankle sprain. They found significant improvements in dynamic balance and ankle inversion range of motion.
4) High-Voltage Pulsed Current (HVPC): Sandoval et al. (2010) investigated the effect of HVPC in addition to conventional treatment for acute ankle sprains. The results showed that HVPC combined with conventional treatment led to greater reductions in pain and edema compared to conventional treatment alone.

**Table 2: Summary of Adjunct Therapies for Acute Ankle Sprain Management**

| Therapy | Study | Key Findings |
|---|---|---|
| Cryotherapy | Bleakley et al. (2006) | Intermittent icing with exercise superior to standard icing |
| NMES | Wainwright et al. (2019) | Potential benefits in pain reduction and functional improvement |
| Kinesiology Taping | Kim & Shin (2017) | Improved dynamic balance and ankle inversion range of motion |
| HVPC | Sandoval et al. (2010) | Greater reductions in pain and edema when combined with conventional treatment |

## 3.5. PHARMACOLOGICAL INTERVENTIONS

Several studies have explored the use of pharmacological interventions in the management of acute ankle sprains:

1) Topical NSAIDs: Coudreuse and De Vathaire (2010) evaluated the effect of a plaster containing diclofenac epolamine (DHEP) and heparin in acute ankle sprains with edema. They found that the DHEP-heparin plaster was more effective than placebo in reducing pain and improving function.
2) Venotonics: Fotiadis et al. (2011) investigated the effectiveness of venotonic drugs in decreasing acute posttraumatic edema following ankle sprain. Their results showed that venotonics were effective in reducing edema and pain compared to placebo.
3) Herbal Extracts: Kučera et al. (2004) studied the efficacy and safety of topically applied Symphytum herb extract cream in the treatment of ankle distortion. They found that the herbal extract cream was effective in reducing pain and swelling compared to placebo.

## 4. DISCUSSION

This review of evidence-based approaches to acute ankle sprain management reveals several key findings that can inform clinical practice. The comparison between functional treatment and immobilization consistently favors functional treatment in terms of quicker return to work and sports, less persistent swelling, and higher patient satisfaction (Kerkhoffs et al., 2001; Cooke et al., 2009). This supports the current trend towards early mobilization and functional rehabilitation in the management of acute ankle sprains.

Exercise therapy and rehabilitation have emerged as crucial components of effective ankle sprain management. The studies by Bleakley et al. (2010) and Brison et al. (2016) demonstrate that early, supervised exercise programs lead to improved outcomes in terms of pain reduction and functional recovery. These findings highlight the importance of initiating appropriate exercises early in the rehabilitation process and providing adequate supervision and guidance to patients.

Manual therapy techniques, including manipulation and myofascial therapy, have shown promising results when combined with exercise therapy (Truyols-Domínguez et al., 2013; Cleland et al., 2013). The addition of manual therapy to exercise programs appears to enhance short-term improvements in pain, function, and range of motion. This suggests that a multimodal approach incorporating both manual techniques and exercise may be more effective than exercise alone.

The review of adjunct therapies reveals several potentially beneficial interventions. Cryotherapy, particularly when applied intermittently and combined with exercise, has demonstrated superior outcomes compared to standard icing protocols (Bleakley et al., 2006). This finding challenges the traditional approach of continuous icing and supports a more dynamic use of cold therapy in combination with early mobilization.

Neuromuscular electrical stimulation, kinesiology taping, and high-voltage pulsed current therapy have shown promise in improving various aspects of ankle sprain recovery (Wainwright et al., 2019; Kim & Shin, 2017; Sandoval et al., 2010). While these interventions require further research to establish their efficacy conclusively, they represent potential tools that clinicians can consider as part of a comprehensive treatment approach.

Pharmacological interventions, particularly topical NSAIDs and venotonics, have demonstrated effectiveness in managing pain and edema associated with acute ankle sprains (Coudreuse & De Vathaire, 2010; Fotiadis et al., 2011). These findings suggest that targeted pharmacological treatments can play a role in symptom management and potentially facilitate earlier engagement in functional rehabilitation.

The evidence presented in this review supports a multifaceted approach to acute ankle sprain management. Key components of an effective management strategy include:

1) Early functional treatment with appropriate support (e.g., bracing or taping)
2) Progressive exercise therapy and rehabilitation, preferably supervised
3) Incorporation of manual therapy techniques
4) Judicious use of adjunct therapies such as intermittent cryotherapy
5) Consideration of targeted pharmacological interventions for symptom management

It is important to note that while general principles can be derived from the available evidence, treatment should be tailored to individual patient needs, taking into account factors such as injury severity, patient preferences, and functional demands.

## 5. LIMITATIONS AND FUTURE DIRECTIONS

This review has several limitations that should be considered. First, the heterogeneity of the included studies in terms of interventions, outcome measures, and follow-up periods makes direct comparisons challenging. Second, the quality of evidence varies across studies, with some interventions supported by stronger evidence than others.

Future research should focus on:

1) Conducting large-scale, high-quality randomized controlled trials to further evaluate the efficacy of promising interventions

2) Investigating the long-term outcomes of different management approaches, particularly in relation to the prevention of chronic ankle instability
3) Exploring the potential of emerging technologies, such as wearable devices and mobile applications, in facilitating ankle sprain rehabilitation
4) Developing and validating standardized, comprehensive treatment protocols that integrate the most effective evidence-based approaches

## 6. CONCLUSION

This comparative review of evidence-based approaches to acute ankle sprain management highlights the superiority of functional treatment over immobilization and underscores the importance of early, progressive exercise therapy. Manual therapy techniques and various adjunct therapies show promise in enhancing recovery, while targeted pharmacological interventions can aid in symptom management.

The optimal management of acute ankle sprains appears to involve a multimodal approach that combines early functional treatment, supervised exercise therapy, manual techniques, and judicious use of adjunct therapies. Clinicians should consider this evidence when developing treatment plans, while also tailoring interventions to individual patient needs and preferences.

As research in this field continues to evolve, it is crucial for healthcare providers to stay informed about the latest evidence and integrate new findings into their clinical practice. By doing so, we can continue to improve outcomes for patients with acute ankle sprains and reduce the risk of long-term complications.

## CONFLICT OF INTERESTS

None.

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