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**Dr. Christopher Lu**  
MBChB FRCSC, CBI Health  
Centre, Georgetown, Canada

**Sneha Sathe**  
BPT, Post Graduate Dip  
Sports Therapy, CBI Health  
Centre, Georgetown, Canada

# Focused shockwave therapy for chronic ankle instability: A retrospective case series of 10 patients

**Christopher Lu and Sneha Sathe**

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## Abstract

**Background:** Chronic ankle instability (CAI) is a disabling sequela of lateral ankle sprains, often requiring surgical reconstruction when conservative care fails. Few non-surgical modalities directly address both pain and instability.

**Purpose:** To evaluate the effects of focused shockwave therapy (FSWT), delivered according to ISMST guidelines, combined with balance rehabilitation in CAI patients, including those initially scheduled for surgical stabilization.

**Study Design:** Retrospective case series.

**Methods:** Ten patients (mean age 45 years) with CAI underwent five weekly FSWT sessions (5 Hz, 0.20 mJ/mm<sup>2</sup>, 2000 shocks/session) using a Chattanooga focused shockwave device. Treatment was administered by an ISMST-certified therapist in accordance with ISMST guidelines, targeting the anterior talofibular ligament (ATFL), peroneal tendons, and muscle trigger points. Balance training began at week 4. Outcomes included pain (VAS), Lower Extremity Functional Scale (LEFS), ADL performance, and stability (anterior drawer, talar tilt). Patients were followed up at 3 and 6 months.

**Results:** All patients demonstrated significant improvements in pain, LEFS (mean gain 18 points, exceeding MCID), and clinical stability. Benefits were maintained at 3 and 6 months. Notably, two patients scheduled for ligament reconstruction cancelled surgery due to functional recovery. No adverse effects occurred.

**Conclusion:** FSWT delivered under ISMST standards, combined with rehabilitation, improved pain, function, and stability in CAI patients. Durable outcomes and avoidance of surgery in some cases highlight FSWT as a safe, effective, and surgery-sparing alternative.

**Keywords:** Chronic ankle instability (CAI), focused shockwave therapy (FSWT), balance rehabilitation

## Introduction

Chronic ankle instability (CAI) affects up to 40% of individuals after lateral ankle sprains and is characterized by pain, recurrent instability, and reduced function (Gribble *et al.*, 2014) <sup>[1]</sup>. While traditional conservative management-including physiotherapy, balance and proprioceptive training, bracing, and manual therapy-remains first-line, persistent instability often leads to surgical reconstruction (Kaminski *et al.*, 2013) <sup>[2]</sup>.

Focused shockwave therapy (FSWT) has emerged as a promising non-invasive adjunct, promoting tissue regeneration, reducing pain, and enhancing ligament and tendon function (Wang, 2012; Notarnicola & Moretti, 2012) <sup>[6, 3]</sup>. By complementing conventional rehabilitation, FSWT may reduce the need for surgical intervention, offering both patient-centered and healthcare system benefits, particularly in resource-limited settings such as the Canadian medical system.

Focused shockwave therapy (FSWT) promotes tissue regeneration via angiogenesis, collagen remodeling, and neuromodulation (Wang, 2012; Notarnicola & Moretti, 2012) <sup>[6, 3]</sup>. International Society for Medical Shockwave Treatment (ISMST) guidelines recommend its use in musculoskeletal disorders, but its application in ligament instability is understudied.

We present a retrospective case series of CAI patients treated with FSWT according to ISMST guidelines. Importantly, validated functional outcomes (LEFS), long-term follow-up, and surgery avoidance in some patients strengthen the clinical relevance.

## Methods

**Design & Participants:** Retrospective review of 10 consecutive CAI patients (mean age 45). Inclusion:  $\geq 2$  ankle sprains, persistent instability  $> 6$  months, positive anterior drawer/talar tilt (performed by a qualified orthopaedic ankle and foot specialist surgeon).

**Corresponding Author:**  
**Sneha Sathe**  
BPT, Post Graduate Dip  
Sports Therapy, CBI Health  
Centre, Georgetown, Canada

Exclusion: recent fracture, acute ankle sprains, inflammatory disease, prior ankle surgery- modified Brostrom repairs, FSWT contraindications.

### Intervention

- **Device:** Chattanooga focused shockwave unit.
- **Protocol:** Five weekly FSWT sessions (5 Hz, 0.20 mJ/mm<sup>2</sup>, 2000 shocks/session).
- **Application:** Directed at ATFL, peroneal tendons, and peroneal muscle trigger points.
- **Therapist:** ISMST-certified provider, adhering to ISMST guidelines.
- **Rehabilitation:** Balance/proprioceptive training initiated in week 4 (Biomechanical Ankle Platform System (BAPS) Protocol)

### Outcomes

- Pain (VAS, 0-10).
- **Function:** Lower Extremity Functional Scale (LEFS; 0-80).
- ADL performance (patient-reported).
- Stability: anterior drawer and talar tilt tests.
- Follow-up assessments at 3 and 6 months post-treatment.

- Surgical cancellation tracked for patients initially referred for stabilization.

### Results

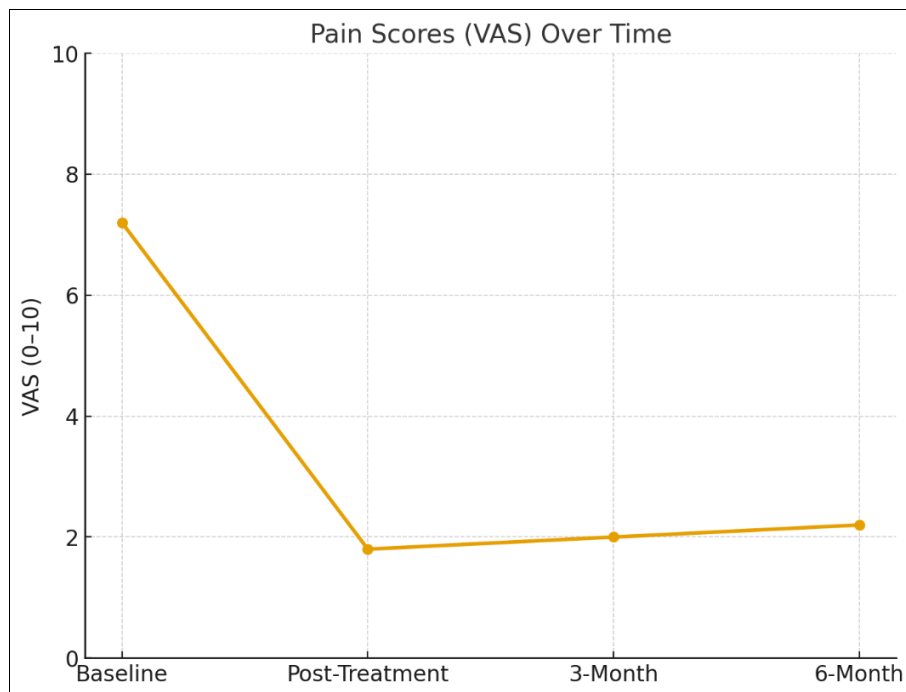
- **Pain:** Mean VAS decreased from 7.2 at baseline to 1.8 post-treatment; improvements sustained at 3- and 6-month follow-ups.
- **Function (LEFS):** Mean baseline score 53/80 → 71/80 post-treatment (mean gain 18 points, >MCID = 9). Improvements were maintained at 3 months (70/80) and 6 months (69/80).
- **ADLs:** All patients reported greater walking tolerance, fewer giving-way episodes, and return to work/sports activities.
- **Stability:** Anterior drawer and talar tilt tests improved in all patients (performed by a qualified orthopaedic ankle and foot specialist surgeon).
- **Surgery Avoidance:** Two patients scheduled for surgical ligament reconstruction cancelled surgery after marked recovery.
- **Safety:** No adverse events reported.

**Table 1:** Clinical outcomes at baseline, post-treatment, and follow-up (n = 10)

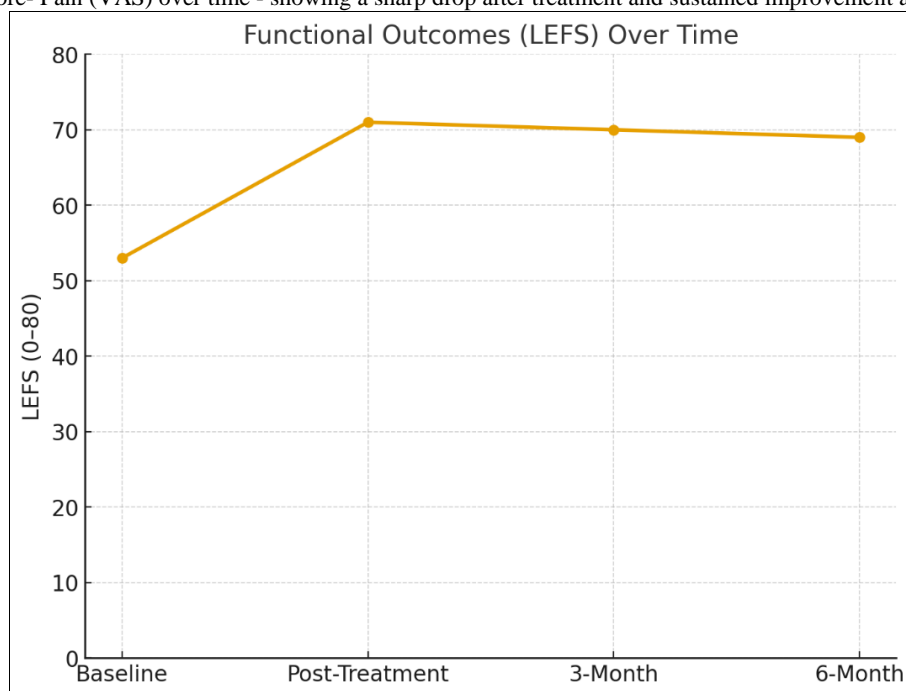
Outcome Measure	Baseline (Mean ± SD)	Post-Treatment (Mean ± SD)	3-Month Follow-up (Mean ± SD)	6-Month Follow-up (Mean ± SD)	Clinical Significance
Pain (VAS, 0-10)	7.2±1.1	1.8±0.9	2.0±1.0	2.2±1.1	>50% reduction sustained
LEFS (0-80)	53±6	71±5	70±6	69±7	Mean gain = 18 points (exceeds MCID = 9)
Anterior Drawer Test (positive cases)	10/10	3/10	3/10	4/10	Marked reduction in laxity
Talar Tilt Test (positive cases)	9/10	2/10	3/10	3/10	Marked reduction in laxity
Surgical cancellation cases	-	2 patients	2 patients	2 patients	Surgery avoided in 20%

All patients demonstrated significant improvements in pain, function, and stability following FSWT. Mean VAS decreased from 7.2 at baseline to 1.8 post-treatment, with improvements sustained at 3 and 6 months. LEFS improved by an average of 18 points, exceeding the MCID (9 points).

Clinical laxity, as measured by anterior drawer and talar tilt tests, improved in the majority of patients. Two patients cancelled scheduled ligament reconstruction surgery due to recovery.



**Fig 1:** VAS score- Pain (VAS) over time - showing a sharp drop after treatment and sustained improvement at 3 and 6 months



**Fig 2:** LEFS follow up- Function (LEFS) over time - showing a clear gain post-treatment, maintained during follow-up.

## Discussion

This retrospective case series demonstrates that focused shockwave therapy (FSWT), delivered by an ISMST-certified therapist according to ISMST guidelines, is a safe and effective intervention for chronic ankle instability (CAI). Patients experienced substantial and sustained improvements in pain, function (LEFS), stability, and activities of daily living, with benefits persisting at 6 months. Notably, two patients initially scheduled for surgical ligament reconstruction were able to cancel surgery due to functional recovery, highlighting FSWT's potential as a surgery-sparing option.

Conservative management remains the first-line approach for CAI and typically includes targeted physiotherapy, balance and proprioceptive training, bracing, manual

therapy, and pharmacological pain control. While these interventions are effective, they often require prolonged commitment and may not fully address persistent pain or ligament laxity. FSWT complements these therapies by promoting tissue regeneration through angiogenesis, collagen remodeling, and neuromodulation (Wang, 2012; Notarnicola & Moretti, 2012) [6, 3]. By combining FSWT with balance rehabilitation, clinicians can enhance proprioceptive recovery, reduce instability episodes, and accelerate functional improvement.

In the context of the Canadian healthcare system, FSWT offers additional systemic benefits. By reducing the need for surgical intervention, FSWT decreases the demand on operative resources, shortens patient wait times, and lowers overall healthcare costs. This non-invasive, outpatient

treatment is particularly valuable in settings where surgical access is limited, providing timely functional recovery and a quicker return to work and daily activities.

Overall, FSWT acts as an effective “team player” in conservative CAI management. When integrated with physiotherapy and targeted rehabilitation programs, it enhances the efficacy of traditional interventions, improves patient-centered outcomes, and provides a cost-effective alternative to surgery. Future randomized controlled trials with larger cohorts and longer follow-up are warranted to further define FSWT’s role within comprehensive CAI management strategies.

**Clinical Implications:** FSWT represents a safe, non-invasive, and effective adjunct in the conservative management of chronic ankle instability (CAI). When combined with targeted balance and proprioceptive training, it can significantly reduce pain, improve functional outcomes, and enhance ankle stability. FSWT also has systemic advantages: by reducing the need for surgical intervention, it lessens the burden on operative resources, shortens wait times, and lowers healthcare costs, particularly within the Canadian medical system. As a “team player,” FSWT complements existing conservative therapies, augmenting their efficacy and providing a comprehensive, patient-centered approach to CAI management.

**Limitations:** Small sample, retrospective design, absence of control group. Larger randomized studies with long-term follow-up are warranted.

## Conclusion

In this retrospective case series, FSWT delivered according to ISMST guidelines, combined with structured rehabilitation, led to meaningful and sustained improvements in pain, function, and stability in patients with chronic ankle instability. Functional gains exceeded MCID thresholds, and some patients avoided scheduled surgery, demonstrating FSWT’s potential as a surgery-sparing option. Integrated within a conservative management framework, FSWT enhances physiotherapy outcomes, accelerates recovery, and provides a cost-effective, outpatient solution for CAI. Future large-scale, randomized controlled studies are warranted to further establish FSWT as a cornerstone in non-surgical CAI care.

## Conflict of Interest

Not available.

## Financial Support

Not available.

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### How to Cite This Article

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