

# Clinical Pathways for the Foot and Ankle

Heel Pain and Lateral Ankle Sprain

---

---

Natalie Wilson Abell, PT, DPT, MTC, OCS, FAAOMPT

APTA Tennessee Fall Meeting 2025

Memphis, TN

1

## OBJECTIVES

- Identify, define, and adopt evidence-based interventions for the foot and ankle to improve patient outcomes.
- Perform movement assessment for lower quarter and define impacts of limited mobility and strength in order to determine appropriate exercise intervention.
- Identify and measure impairments for foot and ankle pain in order to demonstrate objective progress.
- Demonstrate and refine manual therapy for the foot and ankle in order to influence a therapeutic window for exercise.
- Expand knowledge base of exercise prescription and functional progression of lower quarter exercise in order to set appropriate long term goals for patient care.

2

## OBJECTIVES

- Promote evidence-informed practice for therapists to improve patient reported outcomes
- Learn together
- Improve the patient experience and quality of life
- Pay it forward (that is my WHY)

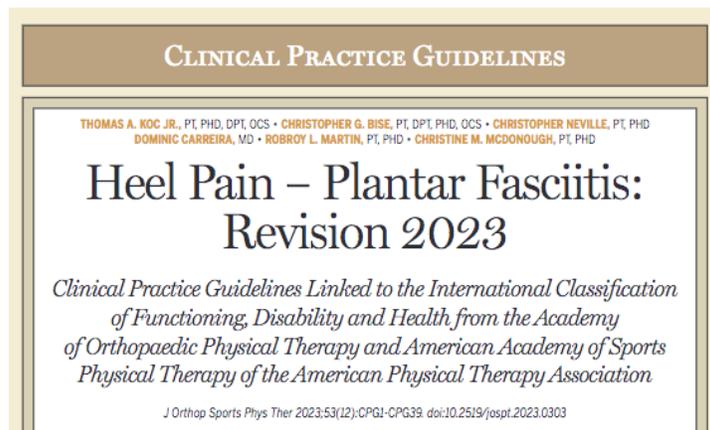
3

## Clinical Pearl (and Finnegan and Bingo)



4

# What is a CPG?



## Why should we spend time on them?

5

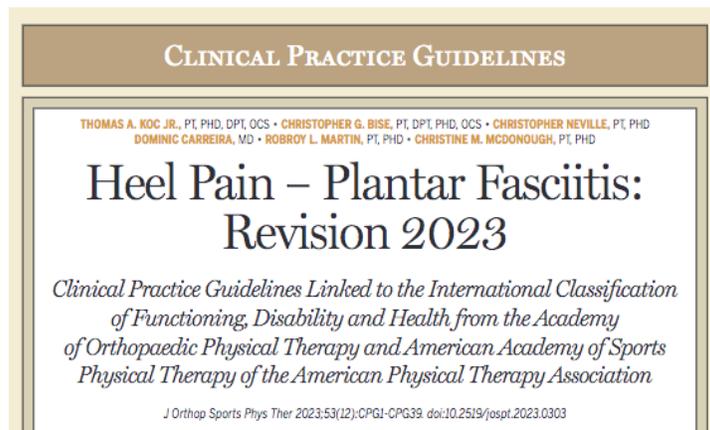
# Recommendations are made based on the Strength of the Evidence

<b>I</b>	Evidence obtained from high-quality diagnostic studies, prospective studies, randomized controlled trials, or systematic reviews
<b>II</b>	Evidence obtained from lesser-quality diagnostic studies, prospective studies, systematic reviews, or randomized controlled trials (eg, weaker diagnostic criteria and reference standards, improper randomization, no blinding, less than 80% follow-up)
<b>III</b>	Case-control studies or retrospective studies
<b>IV</b>	Case series
<b>V</b>	Expert opinion

GRADES OF RECOMMENDATION	STRENGTH OF EVIDENCE	LEVEL OF OBLIGATION
<b>A</b>	Strong evidence A preponderance of level I and/or level II studies support the recommendation. This must include at least 1 level I study	Must or should
<b>B</b>	Moderate evidence A single high-quality randomized controlled trial or a preponderance of level II studies support the recommendation	Should
<b>C</b>	Weak evidence A single level II study or a preponderance of level III and IV studies, including statements of consensus by content experts, support the recommendation	May
<b>D</b>	Conflicting evidence Higher-quality studies conducted on this topic disagree with respect to their conclusions. The recommendation is based on these conflicting studies	
<b>E</b>	Theoretical/foundational evidence A preponderance of evidence from animal or cadaver studies, from conceptual models/principles, or from basic sciences/bench research support this conclusion	May
<b>F</b>	Expert opinion Best practice based on the clinical experience of the guideline development team	May

6

## Heel Pain – Plantar Fasciitis



7

## Heel Pain → STRONG EVIDENCE

- Manual therapy
- Gastrocnemius, soleus, plantar fascia/great toe stretching
- Taping
- Night splints
  
- **SHOULD NOT USE ultrasound\*\***
  - To complement stretching

8

## Heel Pain → MODERATE EVIDENCE

- Short term orthotics
- Foot and ankle exercise and neuromuscular re-education
- Dry needling
  - Gastrocnemius
  - Soleus
  - Plantar of foot

9

## Heel Pain

### SUBJECTIVE

- LEFS
- Pain in AM

### OBJECTIVE

- Dorsiflexion, great toe extension
- Windlass test
- Single leg balance
- Single leg heel raise
  
- Hip – consider assessment

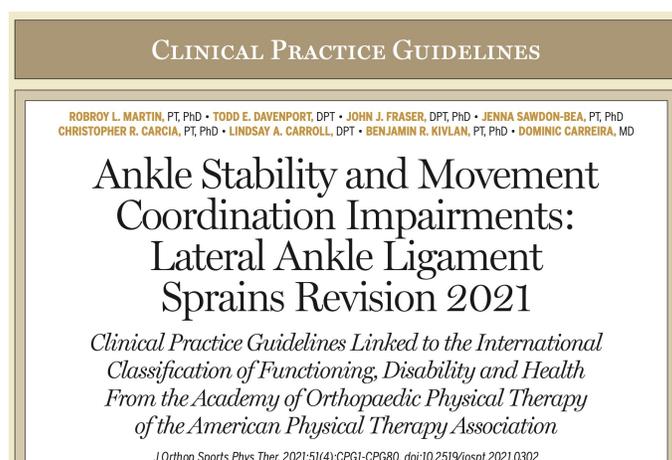
10

## Heel Pain Objective Assessments

- Dorsiflexion
  - Closed chain: Knee to wall
- Great toe extension
  - Structural or functional?
  - PROM 60 degrees walking
  - PROM 80 degrees running
- Windlass Test (De Garceau D et al. 2003)
  - Weight bearing great toe extension
  - Pain provocation for plantar fascia

11

## Ankle Stability & Movement Coordination Impairments: Lateral Ankle Sprain



12

## Ankle Stability and Movement Coordination Lateral Ankle Sprain (LAS)

- Acute Ankle Sprain
  - 50% of all ankle sprains seek medical attention
  - 7-11% of those that seek care are referred to a PT
  - Twice as likely to be female
  - Most common foot and ankle injury
- Chronic Ankle Instability (CAI)
  - CAI diagnosed after 1 year of persistent instability after LAS
  - Higher prevalence in high school athletes vs collegiate athletes
  - Higher prevalence in females

13

## Lateral Ankle Sprain → STRONG EVIDENCE

### SUBJECTIVE

- LEFS
- Foot & Ankle Ability Measure
- Cumberland Ankle Instability Tool
  - CAI

### OBJECTIVE

- Swelling Measurements
- Ankle AROM/PROM
- Talar Accessory Motion
- Single Leg Balance
- Star Excursion Test

14

## Lateral Ankle Sprain → MODERATE EVIDENCE

### SUBJECTIVE

- Reports of previous LAS
- Instability
- Ability to weight bear
- Ability to jump and land

### OBJECTIVE

- Reverse Anterolateral Drawer Test
- Traditional Anterior Drawer Test
- Anterolateral Talar Palpation
- Cumberland Ankle Instability Tool
- Identification of Functional Ankle Instability

15

## Lateral Ankle Sprain → STRONG EVIDENCE

### BRACING

- All for progressive weight bearing and to normalize gait
  - Bracing and taping
  - Assistive Devices
- Immobilization up to 10 days post severe injury

### PROPHYLACTIC BRACING

- For those with risk factors of LAS
  - Prevent First Time LAS
  - Prevent Subsequent LAS

**Bracing is NOT  
RECOMMENDED as a  
standalone intervention**

16

## Lateral Ankle Sprain → STRONG EVIDENCE

### MANUAL THERAPY

- Swelling management
- Joint mobilization
  - AP talocrural glide
- Soft tissue mobilization

### EXERCISE

- Restore AROM/PROM
  - Closed chain dorsiflexion
- Balance training
  - Static & Dynamic
- Proprioceptive activities
- Early bracing for return to sport

17

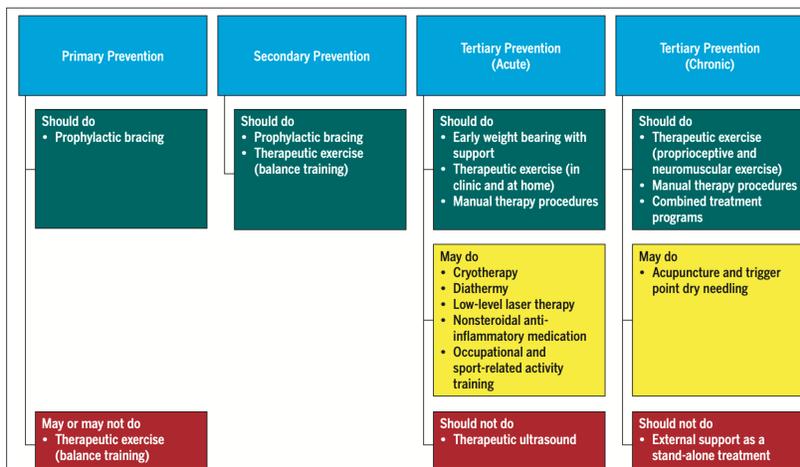
## Lateral Ankle Sprain → STRONG EVIDENCE

### ULTRASOUND

- Clinicians should NOT use ultrasound for acute lateral ankle sprain.
  - No documented beneficial effect

18

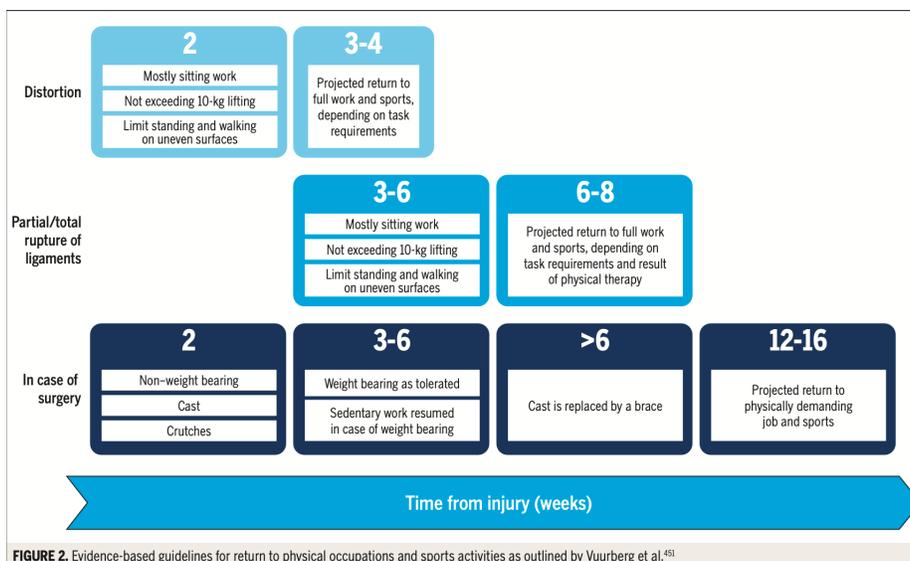
# Lateral Ankle Sprain: Management Considerations



**FIGURE 1.** Evidence-based interventions by level of prevention. Primary prevention refers to interventions to reduce the risk of a first-time LAS in people exposed to risk factors, secondary prevention refers to interventions to reduce the risk for recurrent LAS after a first-time LAS, and tertiary prevention refers to interventions to reduce the effects and progression of a LAS. Abbreviation: LAS, lateral ankle sprain.

19

# Lateral Ankle Sprain: Management Considerations

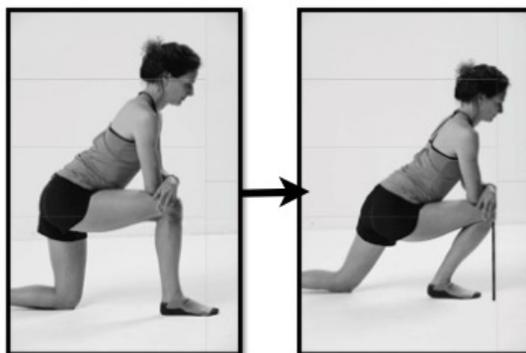


**FIGURE 2.** Evidence-based guidelines for return to physical occupations and sports activities as outlined by Vuurberg et al.<sup>453</sup>

20

## LAB: Measure Closed Chain Dorsiflexion

- Lunge test (Simondson, MT, 2012)
- Measured by:
  - Negative scores – measure distance from the knee to the wall
  - Positive scores – measure distance from the toe to the wall
  - Intra- and inter-rater reliability both yielded ICC = .97 ( $p=.001$ )



21

## What is impacted by lack of closed chain dorsiflexion???

- Flexor hallucis longus
- Flexor hallucis digitorum
- Subtalar joint stress
  - Differential diagnosis for heel pain!
- Windlass Mechanism
- Dynamic Lower Extremity Valgus
- Decreased ankle strategy
  - Fall risk!
- Low back pain

22

## LAB: Great toe extension

- Great toe extension
  - Structural
    - Limited in open chain (supine)
  - Functional
    - Limited in weight bearing
    - NOT limited in open chain
      - Test with ankle in PF and DF
- Windlass test
  - Open and Closed Chain



23

## LAB: Foot and Ankle Manual Therapy

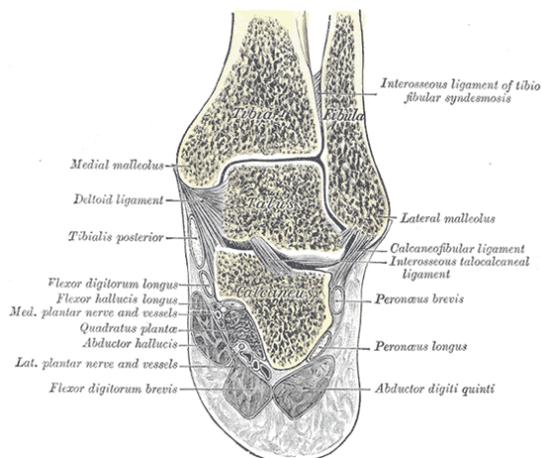
- Talocrural Joint AP Mobilization
  - Block posterior distal tibia-fibula
  - Contact anterior talus with webspace of hand
  - Use thigh to control amount of dorsiflexion



24

## LAB: Foot and Ankle Manual Therapy

- Talocrural Joint AP Mobilization with Rotation
- Apply anterior to posterior force
  - Bring foot into some pronation
  - Posterior / lateral corner
  - Posterior / medial corner



25

## LAB: Foot and Ankle Manual Therapy

- Talocrural Joint Distraction
  - Grasp fingers over Talus neck & head
  - Slight Plantarflexion & Inversion
- Subtalar Joint Distraction
  - Grasp fingers at navicular
  - As much Dorsiflexion possible & Eversion



26

## What happens when there is a lack of plantar flexion strength??

- Poor shock absorption
- Decreased push off propulsion
- Slower gait speed
- Knee hyperextension
- Increased stress at the midfoot
- Heel walking or foot flat

## What about the soleus?

- The calf is considered “the second heart”
- It is critical for venous return (Halkar 2020)

27

## LAB: Heel Raise

- Heel raise
  - Does the calcaneus invert? – posterior tibialis
  - Can they rise onto the forefoot?
  - Weightbearing through great toe?
- Double leg heel raise
  - Equal heel height
- Single leg heel raise
  - Heel height comparison
  - Eccentric control
  - Number of reps before quality diminishes \*\*

28

## Consider Patient Goals

- Walking
- Running
- High Heels

- Normative Data for Single Leg Heel Raise

- Herbert-Losier et al. Physiother; 2017

Age	Repetitions for Male	Repetitions for Female
20-29	37	30
30-39	32	27
40-49	28	24
50-59	23	21
60-69	19	19
70-79	14	16
80-89	10	13

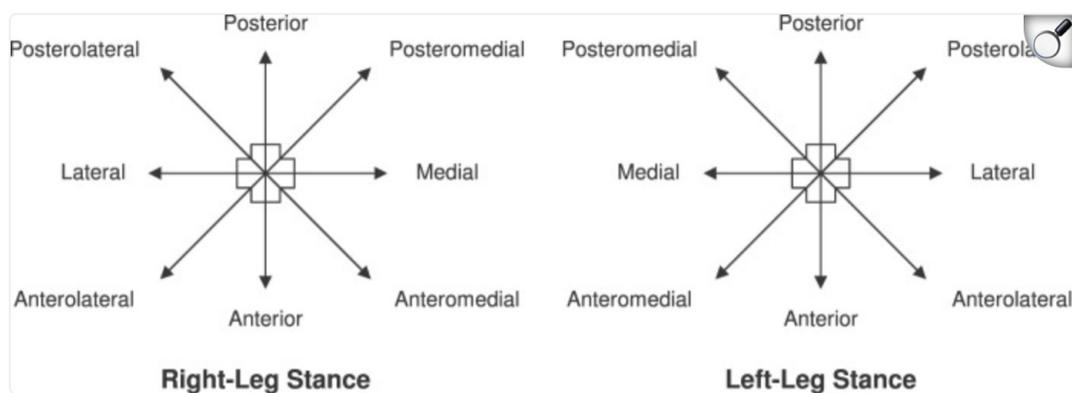
29

## LAB: Star Excursion Test

- Reaching directions are named in orientation to the stance limb
- Incomplete if:
  - Heavy touch
  - Rest at touch-down
  - Loss of balance of stance leg
- Recommend only 3 directions
  - (anterior, posteromedial, and posterolateral)
- Bilateral comparison
  - Consider limb length for validity

30

## LAB: Star Excursion Test



31

## EXERCISE

- Strength
- Endurance
- Power
- Toe/intrinsic strength
- Eccentric control
- Single leg heel raise progression

32

## Applying Critical Thinking Skills - Practice

- Impairment – Limited ankle DF
  - Functional complaint – anterior TC joint pain descending stairs
    - Manual Therapy –
    - Exercise (x2 with dosage) –
- Impairment – poor plantarflexion strength
  - Functional complaint – heel pain standing >1 hr
    - Manual Therapy –
    - Exercise (x2 with dosage) –
- Impairment – limited tolerance to 1<sup>st</sup> MTP compression -- Visit 5 – 50% improved
  - Functional complaint – pain with back foot in a lunge
    - Manual Therapy –
    - Exercise (x2 with dosage) –

33

## Conclusion

- Measurable impairments for the foot and ankle
- Don't forget about the great toe!
- Can we move the needle for our profession and our patients?
- Consider manual interventions prior to exercise to assist in neuro-motor response
- Test-re-test at all times to approach interventions
  - progress or lack of progress
- Communication with the team is important for optimal patient outcomes

34

## Practice Creates the Master



35

## References

1. Koc TA, Bise C, Neville C, et al. Heel Pain – Plantar Faciicitis: Revision 2023. *J Orthop Sports Phys Ther.* 2023;53(12):CPG1–CPG39. doi:10.2519/jospt.2023.0303
2. De Garceau D, Dean D, Requejo SM, Thordarson DB. The association between diagnosis of plantar fasciitis and Windlass test results. *Foot Ankle Int.* 2003;24(3): 251-255
3. Martin RL, Davenport TE, Paulseth S, et al. Ankle Stability and Movement Coordination Impairments: Lateral Ankle Ligament Sprains Revision 2021: Clinical Practice Guidelines. *J Orthop Sports Phys Ther.* 2021;51(4):CPG1-CPG80. doi:10.2519/jospt.2021.0302.
4. Simondson D, Brock K, Cotton S. Reliability and smallest real difference of the ankle lunge test post ankle fracture. *Man Ther.* 2012;17(1):34-38. doi:10.1016/j.math.2011.08.004
5. Chang, R., Kent-Braun, J. A., & Hamill, J. Use of MRI for volume estimation of tibialis posterior and plantar intrinsic foot muscles in healthy and chronic plantar fasciitis limbs. *Clinical Biomechanics.* 2012; 27(5): 500-505.
6. McClinton, S., Collazo, C., Vincent, E., & Vardaxis, V. Impaired foot plantar flexor muscle performance in individuals with plantar heel pain and association with foot orthosis use. *JOSPT.* 2016;46(8): 681-688.
7. Halkar M, Medina Inojosa J, Liedl D, et al. Calf muscle pump function as a predictor of all-cause mortality. *Vasc Med.* 2020;25(6):519-526. doi:10.1177/1358863X20953212
8. Hébert-Losier, K., Wessman, C., Alricsson, M., & Svantesson, U. Updated reliability and normative values for the standing heel-rise test in healthy adults. *Physiotherapy.* 2017; 103(4): 446-452.
9. Gribble PA, Hertel J, Plisky P. Using the Star Excursion Balance Test to assess dynamic postural-control deficits and outcomes in lower extremity injury: a literature and systematic review. *J Athl Train.* 2012;47(3):339-357. doi:10.4085/1062-6050-47.3.08
10. Cleland JA, Fritz JM, Brennan GP, Magel J. Does continuing education improve physical therapists' effectiveness in treating neck pain? A randomized clinical trial. *Phys Ther.* 2009;89(1):38-47.

36