



INJURY PREVENTION FOR RUNNERS

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Mechanisms of Injury

Inflammatory Processes

- Acute (Sprained Ankle)
 - Sorry about your luck
- Overuse (Tendonitis)
 - Milage
 - Speed
 - Elevation
 - Recovery
 - Sleep
 - Nutrition

Lack of Mobility

- Functional limitation in length of tissue
 - Calves and Achilles
- Joint arrangement
 - Big Toe
 - Thoracic Spine
- Sticky collagen between layers of muscles
 - Poor sliding
- Hardware Problem

Lack of Motor Control

- Nervous system can't control ROM that's available
 - Hamstrings
- You will experience this as perceived "tightness"
- Overlooked
- Today's focus
- Software Problem

Threshold/Strength

- System works well
- All the pieces are functioning well
- Can't control the amount of forces
- Can't control the amount of forces for that amount of time.
- External load strength training

Inflammatory Processes

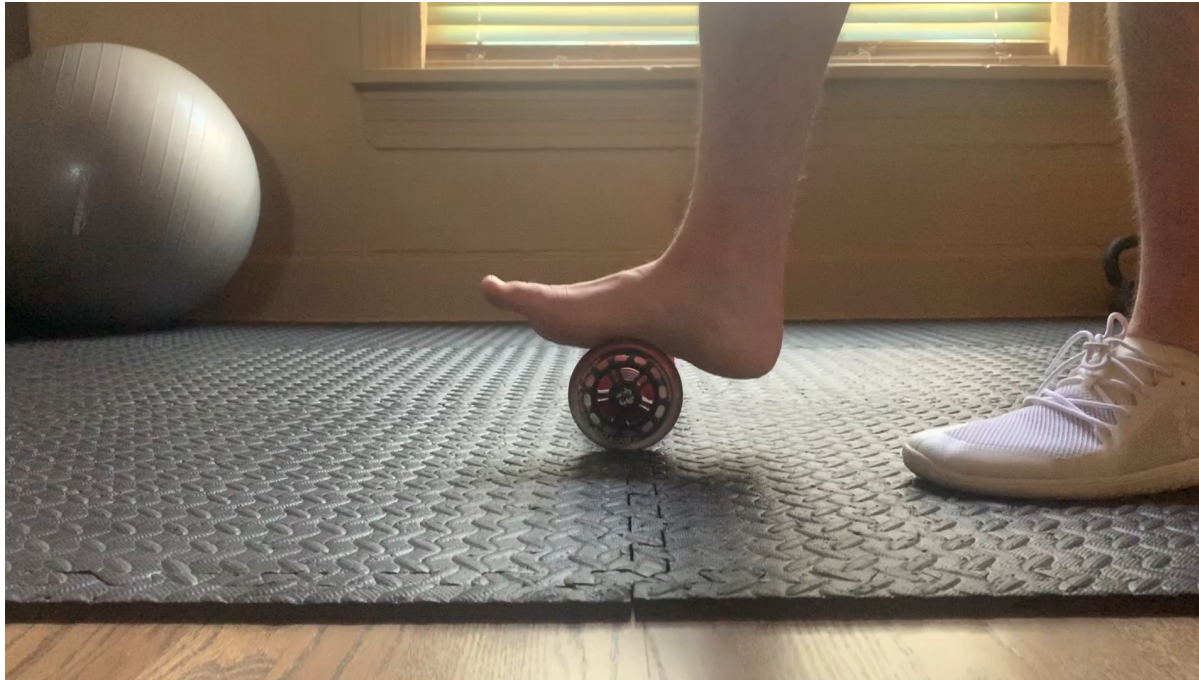
- Management of exaggerating factors
 - Milage, Speed, Elevation, Recovery, Sleep, Nutrition
- Tendon's take up to 3X longer to repair in comparison to the muscles
- Blood Flow
- Movement
- “Rest”

We've Been Doing it Wrong....

- Dr. Gabe Mirkin coined the treatment of “R.I.C.E.” in his book, *Sportsmedicine Book* in 1978
- In 2015, he came out saying not only does this treatment style not help, it makes things worse and delays healing.
- We need inflammation to heal the tissue.
- We also need movement to restructure the fascial repair in the proper planes of stress.
 - Threshold becomes an important conversation here.
- Here's where to continue this conversation on your own
 - <https://www.drmirkin.com/fitness/why-ice-delays-recovery.html>

Lack of Mobility

- True loss of functional ROM
- You can't move yourself through the functional ROM plus ***I*** can't move you through functional ROM.
- Most common places I see in runners creating bigger issues
 - Big Toe Extension
 - Closed Chain Ankle Dorsiflexion



SMFR OF FLEXOR HALLICUS BREVIS



BIG TOE EXTENSION



SMFR SOLEUS



CLOSED CHAIN ANKLE DORSIFLEXION

Lack of Motor Control

- You have the functional ROM, but you don't have CONTROL of the ROM
- The nervous system is unsure how to coordinate the full movement pattern, so it shuts it down
- You will experience this as a feeling of “Tightness” BUT IT IS NOT TIGHTNESS!
- We must provide support to these ROM's through exercises, NOT STRETCH THEM!
- Most common places I see lack of motor control creating issues:
 - Hamstrings (aka hip flexion)
 - Hips
 - Thoracic Spine (aka mid back)



HIP FLEXION MOTOR CONTROL



HIP MOTOR CONTROL

THORACIC SPINE MOTOR CONTROL



Threshold/Strength

- Over 3X Body Weight GRF's have been measured during running
- 80-100 foot falls per side - per minute
 - 150lb person = 36,000lbs to 45,000lbs per foot - per minute
- HEAVY resistance training can help
 - Motor Fiber Recruitment
 - Power Output
 - Control of larger ROM under heavy loads
 - Anabolic Hormone Production