If Our Feet Had a 6-Pack, Would You Train Them More Seriously?

Why We Ignore What Matters Most

Have you ever heard someone say, *"I am going to the gym to train my feet!"*

I am confident the answer is no—but it should be.

My name is Dr. Joel Kerr, and I am **FOOT OBSESSED**.

All jokes aside, I am a Manual Medicine Clinician and Strength and Conditioning Coach with a focused practice on injury mitigation and performance enhancement of the lower limb—specifically the foot and ankle. The foot and ankle are the cornerstone of human movement, yet they are often neglected within the performance care space and by health & fitness enthusiasts altogether.

Training your feet—or as I describe it to my athletes and active population, **B.A.S.E (Building an Athletic Structure for Exercise)**—starts from the ground up. That is my professional mission.

Function Over Aesthetics

Training the foot and ankle is not about aesthetics—it is about function.

It is about:

- Stability
- Mobility
- Performance enhancement

If our feet had visible abs, we would train them daily. But because they don't, they are overlooked—until something goes wrong.

A Masterpiece We Undertrain

Leonardo da Vinci described the human foot as *"a masterpiece of engineering and a work of art."* I couldn't agree more.

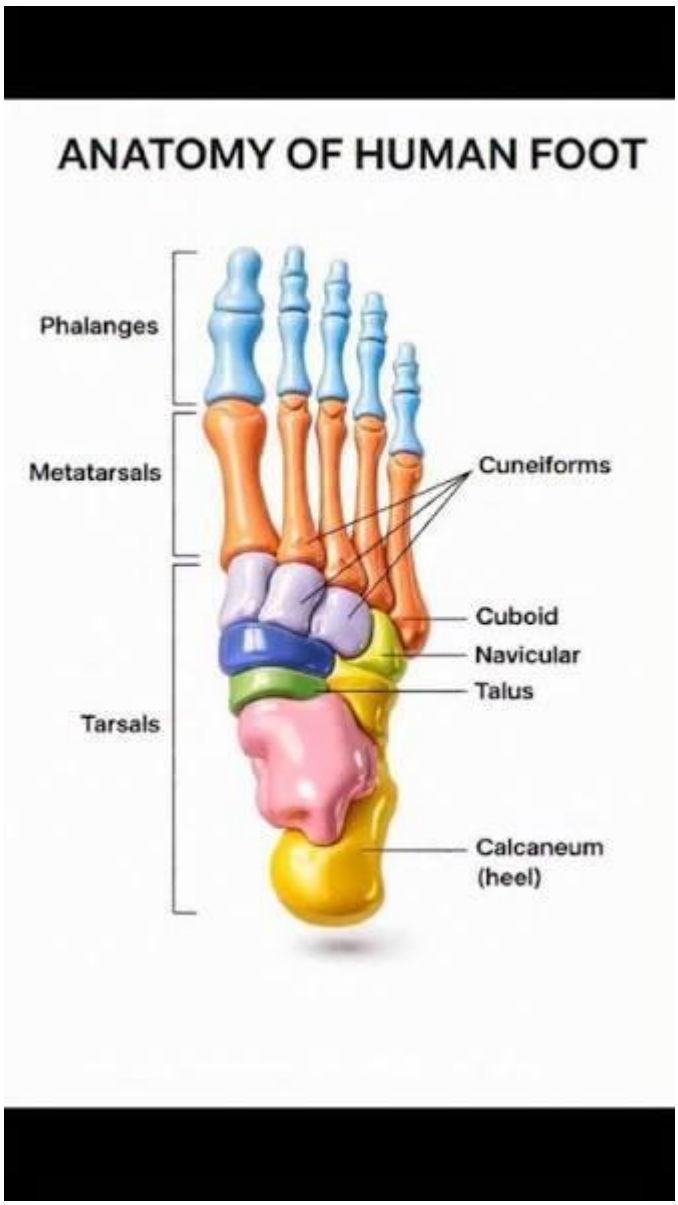
The foot is incredibly complex:

According to Dr. Keith Moore, who is the author of Clinically Oriented Anatomy 8th edition (yes textbooks have value still:) There are

26 bones

1. 7 Tarsals (talus and calcaneus included here)
2. 5 metacarpals (long bones in the midfoot)

3. 14 phalanges (toe bones)



29 Muscles

This total includes both 9 extrinsic muscles (originating from the lower limb, with long tendons that insert into the foot). They include

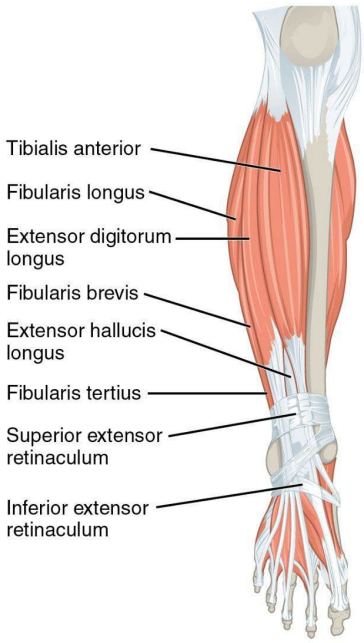
1. Tibialis Anterior
2. Tibialis Posterior
3. Fibularis Longus
4. Fibularis Brevis

5. Fibularis Tertius
6. Flexor Digitorum Longus
7. Flexor Hallucis Longus
8. Extensor Digitorum Longus
9. Extensor Hallucis Longus

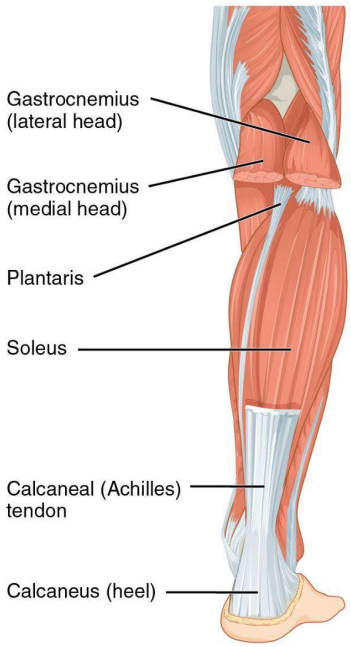
and 20 intrinsic muscles (located entirely into the foot). That are further grouped into dorsal and plantar structures

Dorsal

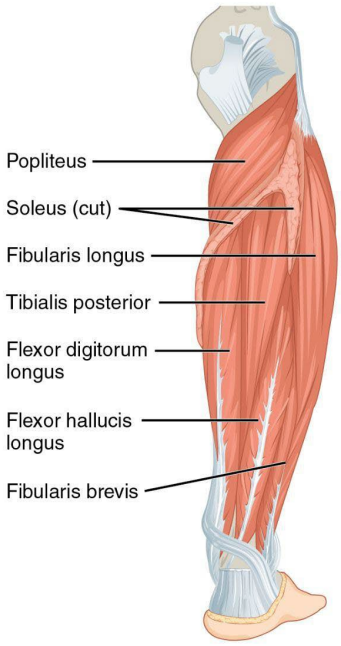
1. Extensor Digitorum Brevis
2. Extensor Hallucis Brevis



Superficial muscles of the right lower leg (anterior view)



Superficial muscles of the right lower leg (posterior view)



Deep muscles of the right lower leg (posterior view)

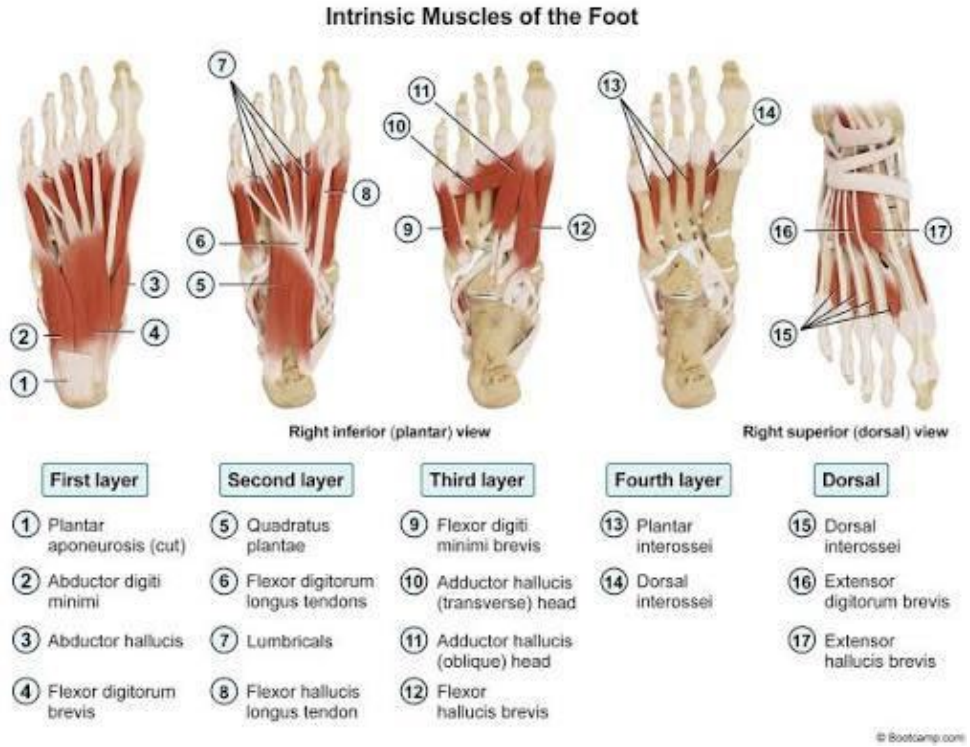
and 20 intrinsic muscles (located entirely into the foot). That are further grouped into dorsal and plantar structures

Dorsal

3. Extensor Digitorum Brevis
4. Extensor Hallucis Brevis

Plantar muscles are further grouped by depth on the plantar (sole) of the foot into 4 layers. Let's conceptualize structures from superficial-close to the ground to deep-closer to the interior of the foot:

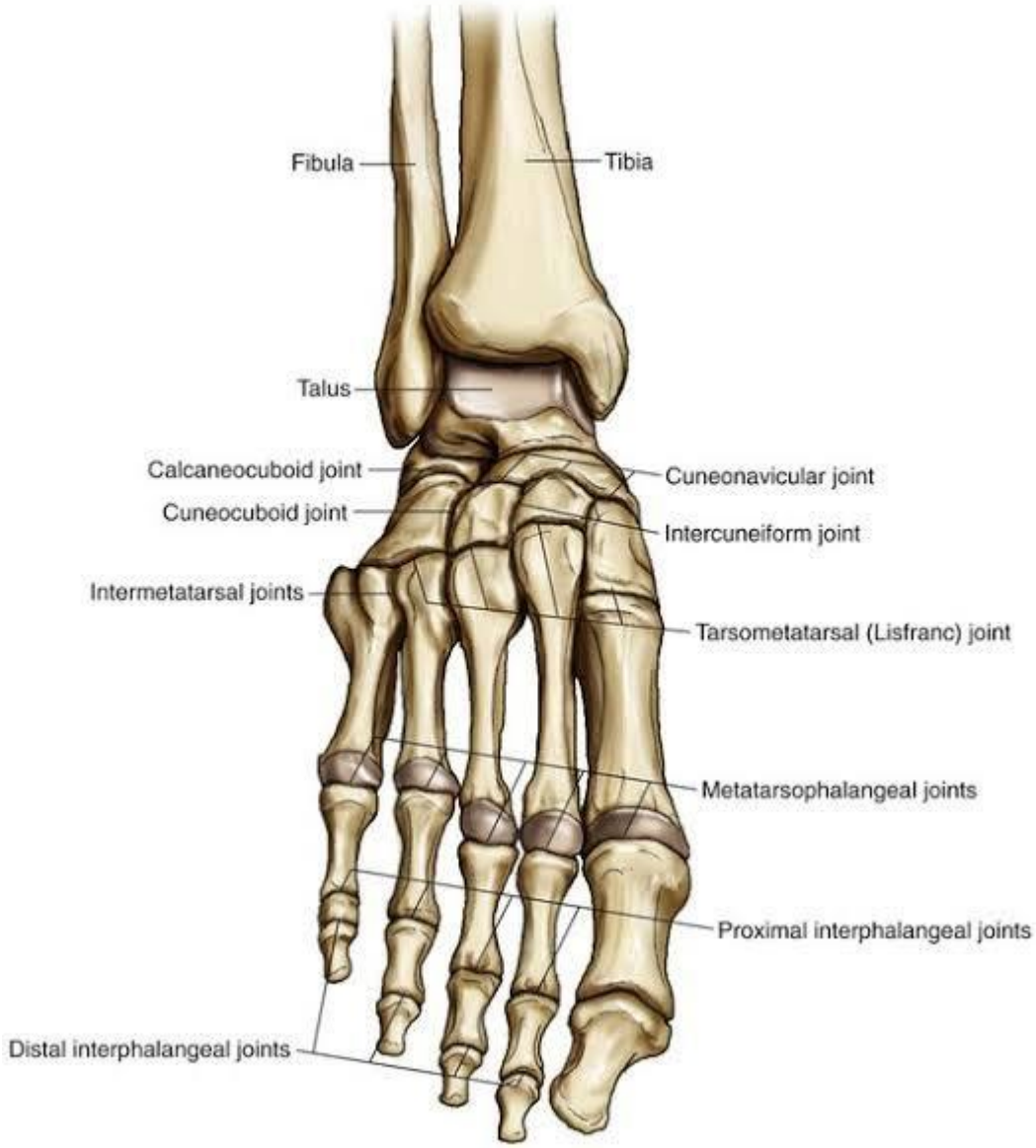
Layer I 1. Abductor Hallucis 2. Flexor Digitorum Minimi 3. Flexor Digitorum Brevis
L ayer II 1. Lumbricials 2. Quadratus Plantae
Layer III 1. Adductor Hallucis Oblique Head 2. Adductor Hallucis Transverse Head 3. Abductor Digit Minimi
Layer IV 1. Interossei



Joints of the foot, include

1. Talocural
2. Subtalar

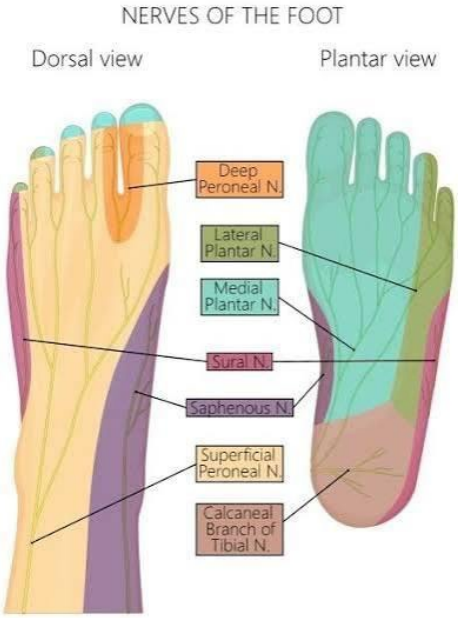
3. Talocalcaneonavicular
4. Calcaneocuboid
5. Cuneonavicular
6. intercuneiform
7. Tarsometatarsal
8. Metatarsophalangeal

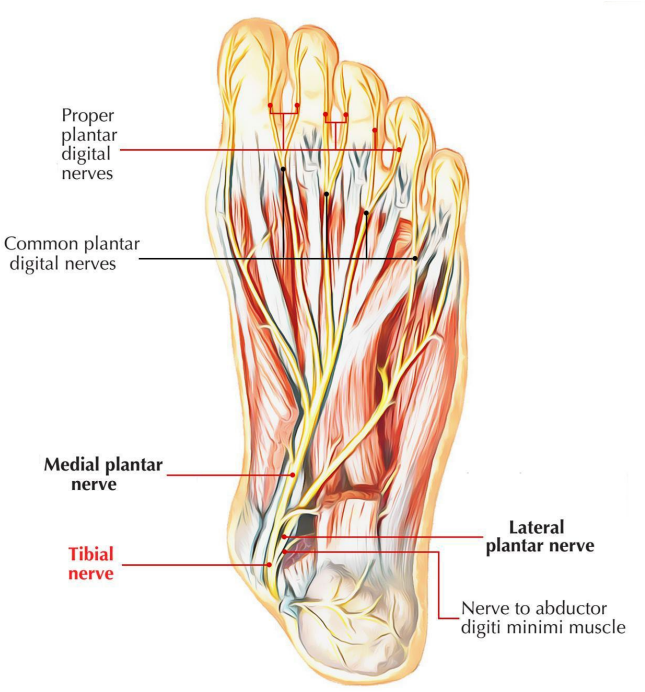


Nerves of the foot,include

1. Tibial
2. Deep Fibular
3. Superficial Fibular

4. Saphenous
5. Lateral Plantar
6. Medial Plantar
7. Sural





All of these structures must coordinate seamlessly to allow the human body to perform both static and dynamic movement.

Yet despite this complexity, we simplify it… or worse, ignore it.

What Clinical Practice Has Taught Me

In my clinical practice, patients present with a variety of musculoskeletal complaints. One consistent pattern I have recognized is this:

If you are not assessing the foot and ankle, you are missing part of the problem.

Whether it's knee pain, hip dysfunction, or even low back discomfort, I have found within my 26 years of clinical practice that evaluating foot and ankle function is essential—not only to resolve the issue, but to:

- Mitigate future injury
- Improve movement efficiency
- Enhance over performance

The foot is not an isolated structure—it is the foundation of the kinetic chain. Dysfunction at the foot and ankle has been shown to influence knee mechanics, pelvic alignment, and even spinal loading (Khamis & Yizhar, 2007; Barton et al., 2010).

If we are not assessing the foot and ankle, we are missing part of the problem. Evidence suggests that foot posture and function are directly linked to injury risk, movement efficiency, and overall performance outcomes (Neal et al., 2014; Kelly et al., 2014).

To truly resolve dysfunction, mitigate injury risk, and optimize performance, evaluation of the foot and ankle is not optional—it is essential as the foot is not isolated, it influences everything above it.

The foot is not isolated—it influences everything above it. Alterations in foot posture and mechanics have been shown to impact movement patterns throughout the kinetic chain, including the knee, hip, and pelvis. For example, Barton et al. (2010) demonstrated that changes in rearfoot posture are associated with altered lower limb kinematics in individuals with patellofemoral pain, noting that "rearfoot posture influences lower limb alignment and motion" (Barton et al., 2010). Similarly, Khamis and Yizhar (2007) found that excessive foot pronation can lead to measurable changes in pelvic alignment, reporting that "hyperpronation of the feet affects pelvic position in standing" (Khamis & Yizhar, 2007).

From an injury and performance perspective, Neal et al. (2014) further support this relationship, concluding that "foot posture is a risk factor for lower limb overuse injury," highlighting the role of the foot in both movement efficiency and injury development (Neal et al., 2014).

Together, these findings reinforce that dysfunction at the foot and ankle does not remain local—it propagates through the system. Assessing and addressing foot function is therefore essential not only for resolving pain, but for improving movement efficiency and enhancing overall performance.

Where Education Falls Short

As I reflect on my professional education, the foot was briefly discussed, with minimal emphasis on its true complexity and importance.

Much of the information was:

- Fragmented
- Superficial
- Lacking integration

This was frustrating.

Through curiosity and a desire to truly understand—not just memorize—I began to explore:

- Current research on foot and ankle function
- The evolution of gait
- Exercise strategies
- The interconnected anatomy that drives performance

This shift in perspective changed everything.

Building Your B.A.S.E

This journey has been fascinating.

By filling in the gaps left in my education, I have developed a stronger command in managing musculoskeletal complaints—from the ground up. The result?

Humans (athletes and athletes of life) increase their ability to get better, faster and perform at a higher level.

Emerging evidence supports that targeted foot and intrinsic muscle training can directly improve movement mechanics and performance outcomes. Recent findings indicate that intrinsic foot muscle strengthening “effectively improving strength, running mechanics and subjective function in athletes” (Ahmed et al., 2024).

Additionally, specific foot-focused interventions have been shown to produce measurable performance changes, including improvements in reactive strength and force production, with one study reporting increases in toe strength and reactive strength index following foot training (Nakai et al., 2024).

Collectively, these findings suggest that when the foot is trained with intent, athletes don’t just feel better—they move more efficiently and have the capacity to perform at a higher level.

Building your **B.A.S.E** is about respecting the foundation:

- Understanding structure
- Training function
- Reinforcing movement from the ground up

A Call to Coaches, Clinicians, and Athletes

If you are a trainer, coach, or clinician working with humans (who all happen to have feet), or simply someone interested in improving your movement and performance:

Stay **FOOTcused**.

In upcoming articles, I will break down how to:

- Assess foot function
- Strengthen key structures
- Integrate foot training into your programs

All with the goal of helping you **BUILD your B.A.S.E**.

Part 1 – Assessing Foot Function

In many performance and clinical environments, we assess outcomes—range of motion, strength, or pain—without fully understanding the system that supports them. The result is often a disconnect between what an athlete can do and what they can consistently control.

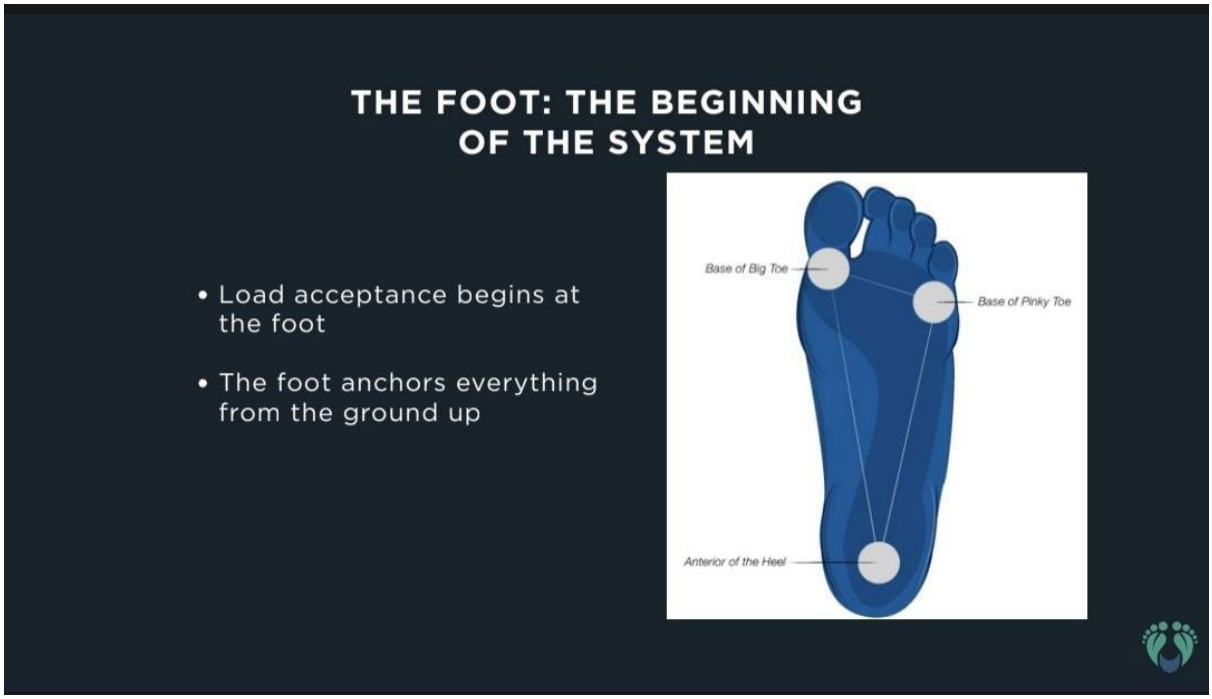
Ignore the fact that I am foot obsessed and I actually think about how well an athlete can access, control, and express movement starts from the ground up.

What is "Foot Function" in a Performance Context?

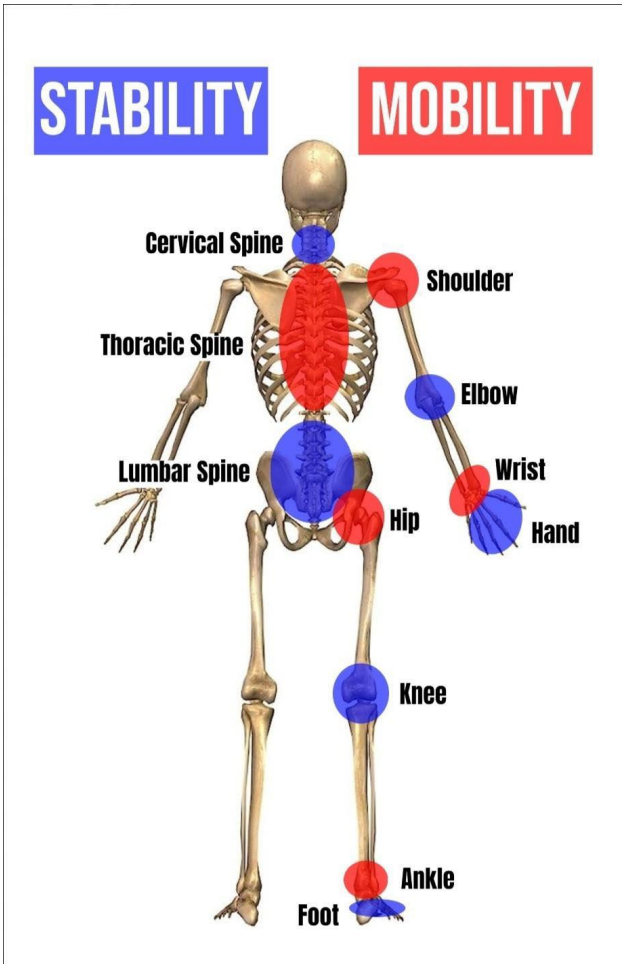
From a BASE (Building an Athletic Structure for Exercise) perspective, foot function is not just about structure or mobility. It is the ability to:

A. Sense the ground (sensory input)
B. Organize load through the foot tripod (coordination)
C. Control position under varying demands (stability)
D. Transfer force efficiently up the chain (propulsion)

A.


THE FOOT: THE BEGINNING OF THE SYSTEM
• Load acceptance begins at the foot
• The foot anchors everything from the ground up
Base of Big Toe
Base of Pinky Toe
Anterior of the Heel

C.


STABILITY
MOBILITY
Cervical Spine
Shoulder
Thoracic Spine
Elbow
Lumbar Spine
Wrist
Hip
Hand
Knee
Ankle
Foot

Without these elements, higher-level movement becomes a compensation strategy rather than a controlled expression.

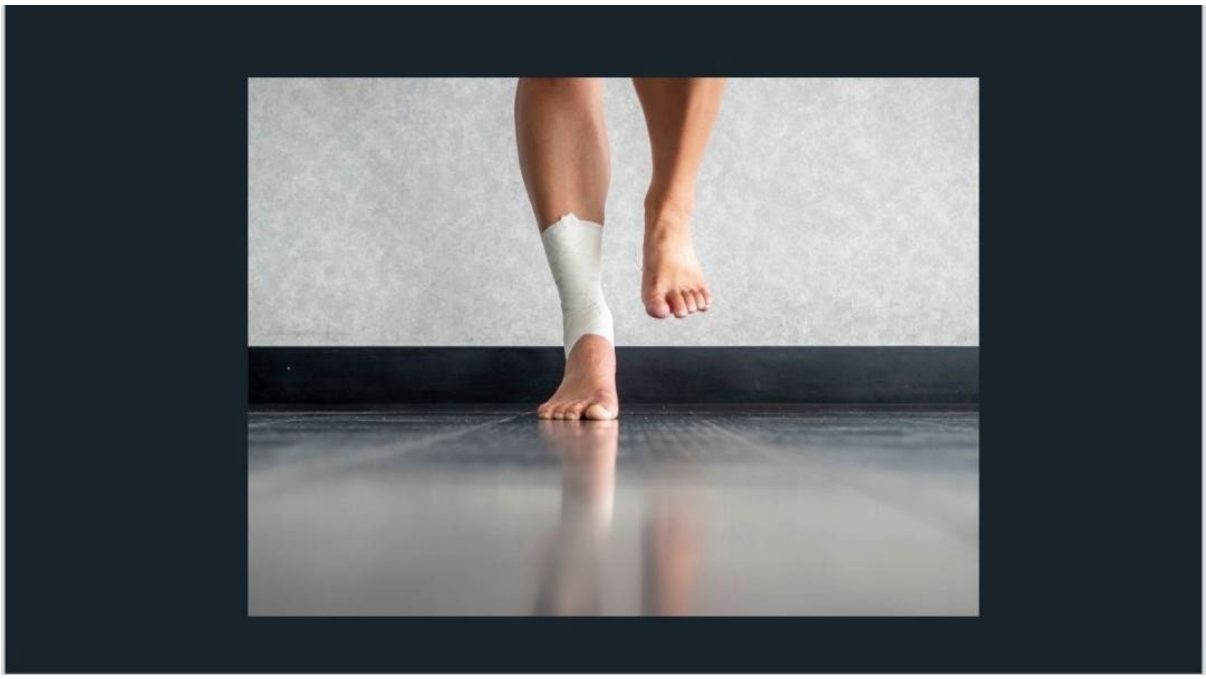
Practical Application: A Simple Foot Function Assessment

To bring this into practice, coaches and clinicians need a repeatable way to observe foot function under load.

Assessment: Supported Single-Leg Stance with Foot Control

Setup:

1. Athlete stands barefoot or in minimal footwear
2. Hands supported lightly (e.g., wall or dowel) to reduce balance noise
3. One leg lifted, stance leg slightly flexed



What to Observe (BASE Lens):

1. Tripod integrity
2. Toe contribution
3. Arch Behaviour
4. Ankle strategy
5. Global Compensation

1. Tripod Integrity

Can the athlete maintain contact through:

Heel
Base of GOAT toe (1st metatarsal)
Base of 5th metatarsal
Or do they collapse medially/laterally?

2. Toe Contribution
Is there active toe engagement, especially at the hallux?

Toe Contribution — What is ***good*** active toe engagement?

Active toe engagement refers to the athlete's ability to use the toes—especially the hallux (big toe)—to assist in stabilizing and organizing load through the foot. According to Goldman et al. (2013) optimal effectiveness in strengthening toe muscles occurs when the toe muscles are exercised in the their lengthening positions. These authors found that assessing toe contribution for performing exercises with toe extended produces greater strength gains that those achieved with conventional toe flexion exercises.

- The hallux (and all toes) should remain in contact with the ground, applying light, controlled pressure
- The toes should appear long and relaxed, not gripping or clawing
- There should be subtle activation, not aggressive pressing or lifting

🔴What you don't want to see:

- Toes lifting off the ground (loss of sensory input and stability)
- Clawing or gripping (overcompensation strategy)
- Passive toes with no contribution

Observe and think: engaged tissue, not aggressive shortened tissue.

3. **Arch Behaviour — What Should You Be Looking For?**

Arch behaviour refers to the athlete's ability to control the position of the arch under load—

not just hold it. Can the athlete subtly raise and lower the arch allowing for access to it? “Access” here refers to the athlete’s ability to actively move into and out of a position with control.

In the context of the assessment regarding arch behavior:

- Can the athlete slightly raise (supinate) and lower (pronate) the arch on demand?
- Can they find and control these positions, or are they stuck in one?

At BASE we value ‘access’ to mobility more importantly than mobility on it;s own because the it is far more necessary to have: **controlled, usable mobility.**

If they can’t access it, they can’t load it. If they can’t load it, they can’t use it.

You are assessing whether the athlete can:

- Maintain a **supported arch position** (not collapsed, not rigid)
- Demonstrate **subtle movement** of the arch in response to load

🔴**What you don’t want:**

- A collapsed arch with no control (loss of structure)
- A rigid, high arch that does not adapt (loss of function)

The arch should behave like a spring—responsive, not stuck.

4. Ankle Strategy

Ankle strategy is really about where the control is coming from. Is control coming from the foot? Or is the athlete relying on excessive ankle or hip movement to stabilize? To the untrained eye you can also observe accurately what you're observing for when you ask yourself these questions:

Is the foot doing the work?
Or is the athlete “escaping” the task?

🟢**Good ankle/foot strategy:**

- Subtle adjustments at the foot
- Controlled ankle motion without excessive sway
- Foot remains the primary point of control

🟡**Compensatory strategy:**

- Excessive ankle wobbling
- Over-reliance on hip shifting or trunk movement

- Loss of foot position while “saving” balance

If the foot can’t control it, something else will try to.

5. Global Compensation

Observe for trunk sway, hip shift, or ***gripping strategies***. Gripping strategies refer to the athlete’s attempt to create stability by excessively using the toes particularly through *flexion or clawing*, rather than organizing load through the foot tripod and intrinsic control. This is a compensatory strategy, not true control. From a BASE perspective, gripping is the body’s way of saying:

> *“I don’t have enough control at the foot, so I’m going to create tension to feel stable.”*

These indicate a lack of local foot control, especially gripping strategies. This matters because these are not balance issues—they are control issues at the foot. The body is finding stability somewhere else because it cannot create it locally. The intrinsic foot muscles play a key role in stabilizing the foot and supporting the arch, allowing for efficient load management during movement (Ridge et al., 2022; Ferrari et al., 2020). When these muscles are insufficient, individuals often compensate by increasing reliance on extrinsic toe flexors, which can present as toe clawing or gripping strategies. This reflects an attempt to maintain stability, but reduces the foot’s ability to adapt and function efficiently under load.

What does 🟢“good” gripping strategy look like aka *True Foot Control?*

A well-organized foot will show:

- Toes long, relaxed, and in contact with the ground
- Subtle pressure through the hallux, not aggressive gripping
- The arch responds, not locks or collapses
- Stability appears effortless, not tense

The foot is stabilizing through intrinsic muscle coordination, not brute force ***Control is quiet. Compensation is loud.***

What does 🔴 “bad” gripping strategy look like aka compensation?

This is what you will commonly see:

- Toe clawing (visible flexion at the interphalangeal joints)

- Toes digging into the ground aggressively
- Shortened, “scrunched” toes instead of long and relaxed
- Increased tension through the plantar surface
- Often paired with:
    - Arch collapse or over-rigidity
    - Ankle stiffness or wobbling
    - Trunk or hip compensation

This indicates over-reliance on extrinsic toe flexors (e.g., flexor digitorum longus) rather than intrinsic foot stabilizers

Why it matters:

- It creates false stability
- Reduces adaptability of the foot
- Limits efficient force transfer

Global compensation is a reflection of local deficiency.

This assessment is not about balance, it’s about control. And more specifically, whether the athlete can create and manage load from the ground up.

Grading the Assessment (BASE-Inspired)

🟢ATP (Able To Perform): Maintains tripod, controlled arch, active toes, minimal compensation

🟡PWC (Performs With Correction): continuous correction that includes support or cueing to maintain position.

🔴 CNP (Cannot Perform): Unable to organize foot or maintain control

Coaches This should matter to you because…

If an athlete cannot organize and control load at the foot, every step, cut, or landing becomes less efficient and more variable. Over time, this variability can influence both performance and injury risk. Neal et al. (2014) further support this relationship, concluding that “foot posture is a risk factor for lower limb overuse injury,” highlighting the role of the foot in both movement efficiency and injury development.

By starting with the foot, we are not isolating it, we are improving the integrity of the entire system.

How the Untrained Eye Can Spot It

Look at the **toes first**

- If they are **curling, clawing, or lifting** → compensation
- If they are **flat, quiet, and responsive** → control

Then look at the **effort level**

- Excessive tension = gripping strategy
- Minimal visible effort = efficient control

Key Steps for Coaches & Clinicians

Before progressing to complex drills or higher-load training, ask:

"Can this athlete control the foundation they're building from?"

If the answer is no, the intervention is not more complexity, more equipment, or collection of data. It is to provide an environment for better access, awareness, and control at the foot.
This is the first step in a broader approach to movement quality. In the next part, we will explore how to develop foot function once deficits have been identified.

Final Step

Feet have muscles too. Train them like they matter—because they do.

Follow @__b.a.s.e on IG for tips, drills, and strategies to strengthen your foundation.

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