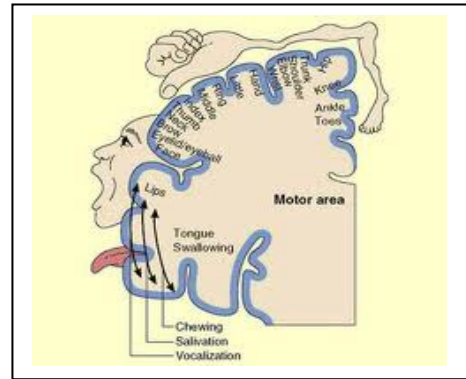


# The Growing Trend of the Minimalistic Shoe Wear: Running or Walking, What This Means For Your Foot.

**Paradigm Shift:** Your foot is not a passive base of support. It is a complex, sensitive, muscular appendage that interacts with the ground, engaging the ground driving you forward. Let us explore how to facilitate that.

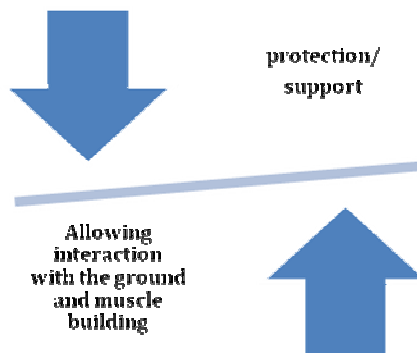
**Basic Premise:** We believe that most of our feet are weak and lack intrinsic musculature due to the fact that early on we are in foot wear and that in many cases are constrained by our foot wear. Not only does this affect the strength of our feet, but also the foot's motor representation in the brain. Many of us lift weights to strengthen our arms, legs, and back, but what about our feet?

**The homunculus:** A representation of your virtual body on your brain. Note the large size of the hand and position of the foot. The Homunculus is an area of the brain that demonstrates plasticity, meaning it can change. With training the representation of the foot on the brain can grow resulting in better strength, balance and tactile discrimination of that area.



What would happen to that virtual representation in the case that your hand or foot was immobilized in a surgical boot, a cast, or a shoe?

**The Research:** (performed on hands, but in my opinion applicable to feet)  
-After 72 hours of immobilization, the participant's dominant hand lost strength, dexterity, and tactile discrimination as well as decreased cortical activation (activation of the brain areas associated with the hand).<sup>3</sup>  
-After 2-3 weeks of having an arm and hand casted the participant showed decreased finger representation in the somatosensory cortex (representation of the hand in the homunculus). This returned to normal after 2-3 weeks after cast removal.<sup>2</sup>



**Shoes: The Double Edged Sword.**

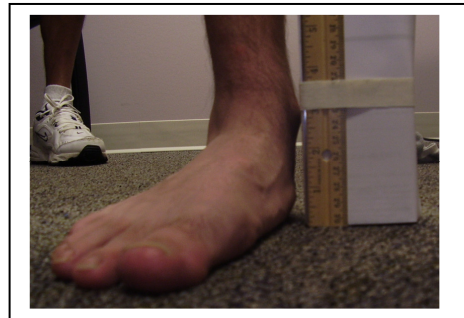
For the runner or walker seeking to be a bare foot athlete or the athlete seeking to train in a more minimalistic shoe we recommend a progression of decreasing the support your shoe offers over time. In fact when you buy a less supportive shoe, train by switching it back and forth with your previous shoe day to day to allow your foot to adapt.



(The author of this presentation does not support any one shoe company. The above are examples only)

Barefoot running may not be desirable or attainable for all runners, but finding the balance between support and interaction with the ground is. Some athletes with a significantly pronated foot, which can have negative effects at the hip, knee, lumbar spine and pelvis, may need a more supportive shoe to running and walk efficiently. Some athletes may need to be treated by their Physical Therapist to change the mechanics of the inefficient body regions mentioned above. Remember the goal is not to be normal as that implies average. The goal is to be efficient!

### Pronated foot



### Barefoot Running<sup>1</sup>

PROS	CONS
Decreased impact forces	Injury from the running surface
Improved running economy	Lack of places to run
Improved proprioceptive ability	**Increased shock at impact(see below)
Increased muscular strength	Mild exposure risk to microbes
Decreased risk of foot deformity (children)	Some runners require mechanical control of motion

Claims of decreased injury and improved performance are NOT supported by the research.

**\*\*CAUTION! CAUTION! CAUTION! CAUTION! CAUTION! CAUTION!**

Just because you are in a minimalistic shoe does not mean you automatically run with barefoot form. If you continue to have a heavy heel strike you will increase ground reaction forces and therefore likelihood of injury.

**CAUTION! CAUTION! CAUTION! CAUTION! CAUTION! CAUTION!**

## What is good running form?

- ✓ Relaxed face, hands, and shoulders(not elevated)
- ✓ Slight forward tilt of the trunk. Avoid climbing a tree!
- ✓ Neck in a neutral alignment with the rest of the spine
- ✓ During stance phase of running the ankle knee and hip should be stacked on top of one another
- ✓ Active propulsion from the foot and ankle
- ✓ **DRIVEN BY THE PELVIS**

## How does barefoot running change form?<sup>1</sup>

- Decreased stride length
- Increased stride frequency
- Decreased range of motion of the hip, knee and ankle joints
- A more plantar flexed foot at ground contact (meaning less heel strike)
- Decreased contact and flight times

Please note that some athletes with enough mechanical inefficiency, inflammation, or pain with running would benefit from cross training on the bike and ultimately may need treatment.



Your brain with an increased representation of the foot and increased activation of these areas of the brain. Imagine the improved balance, tactile discrimination, and strength that could occur. Imagine how this additional information could improve your core response to the terrain you are negotiating. It is my belief that minimalistic foot wear can assist with achieving the above effects.

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Resources

- 1) Jenkins DW, Cauthon DJ. Barefoot running claims and controversies: a review of the literature. *J Am Podiatr Med Assoc.* 2011;101(3):231-46.
- 2) Lissek S, Wilimziq C, Stude P, et al. Immobilization impairs tactile perception and shrinks somatosensory cortical maps. *Curr Biol.* 2009;19(10):837-42.
- 3) Weibull A, Flondell M, Rosen B, et al. Cerebral and clinical effects of short-term hand immobilization. *Eur J Neurosci.* 2011 Feb;33(4):699-704.
- 4) Homunculus. [Online image] available at <http://www.google.com/imghp?hl=en&tab=wi>

