Essentials of Foot Training

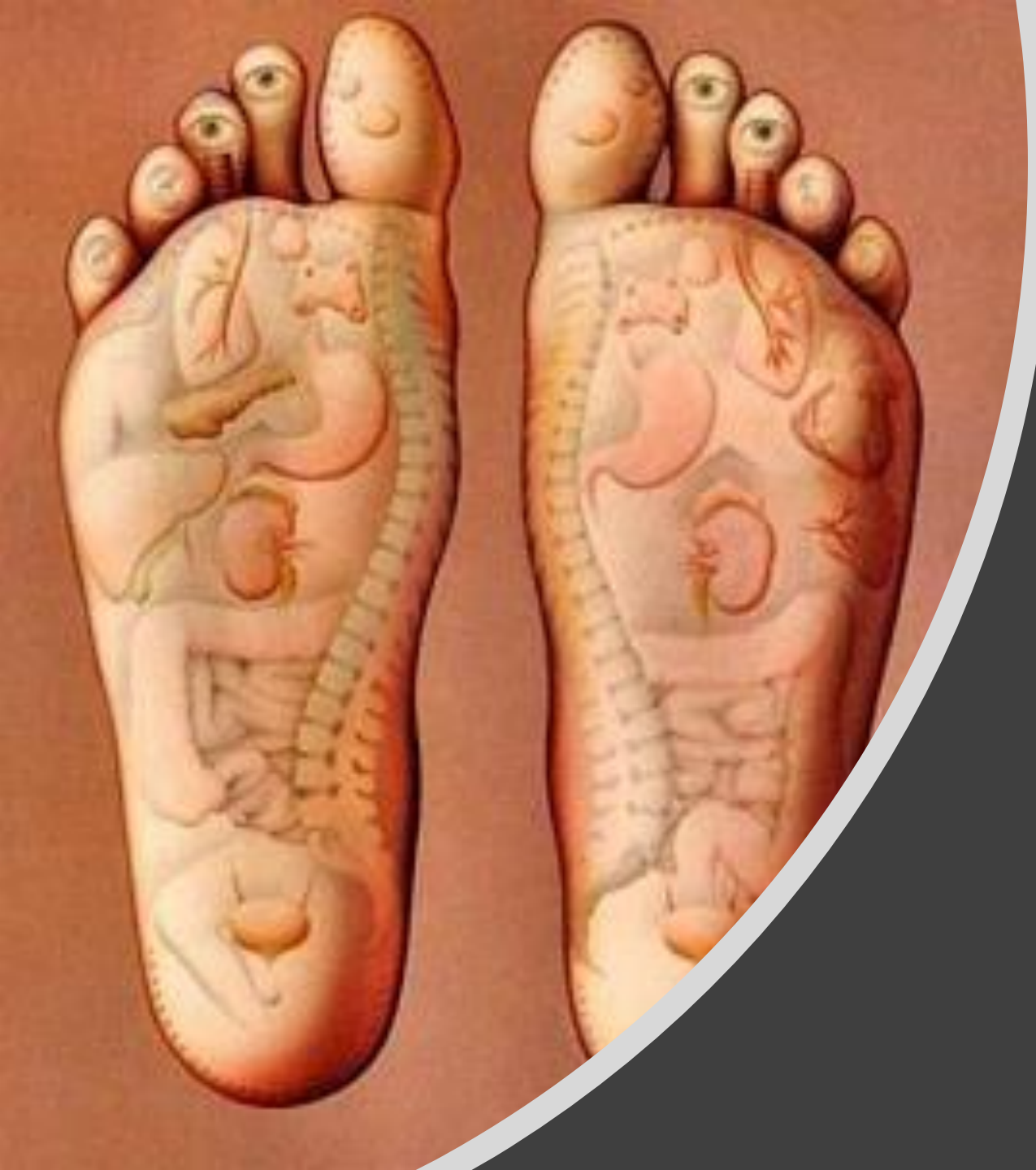
:*Covering the Practicality*

Dr. Junggi Hong

Perception

- Ask athletes which muscles are the most important to strengthen for a more efficient stride, and they will most likely tick off a list that includes quads, glutes, hamstrings, or calves. While these powerful movers are important for building strength and speed, they shouldn’t get *all* the glory.

- One of the most overlooked factors for better running is the health of your feet.



Foot Care

- “Taking care of our feet is just as important as the big muscle groups that move us to walk and run.”

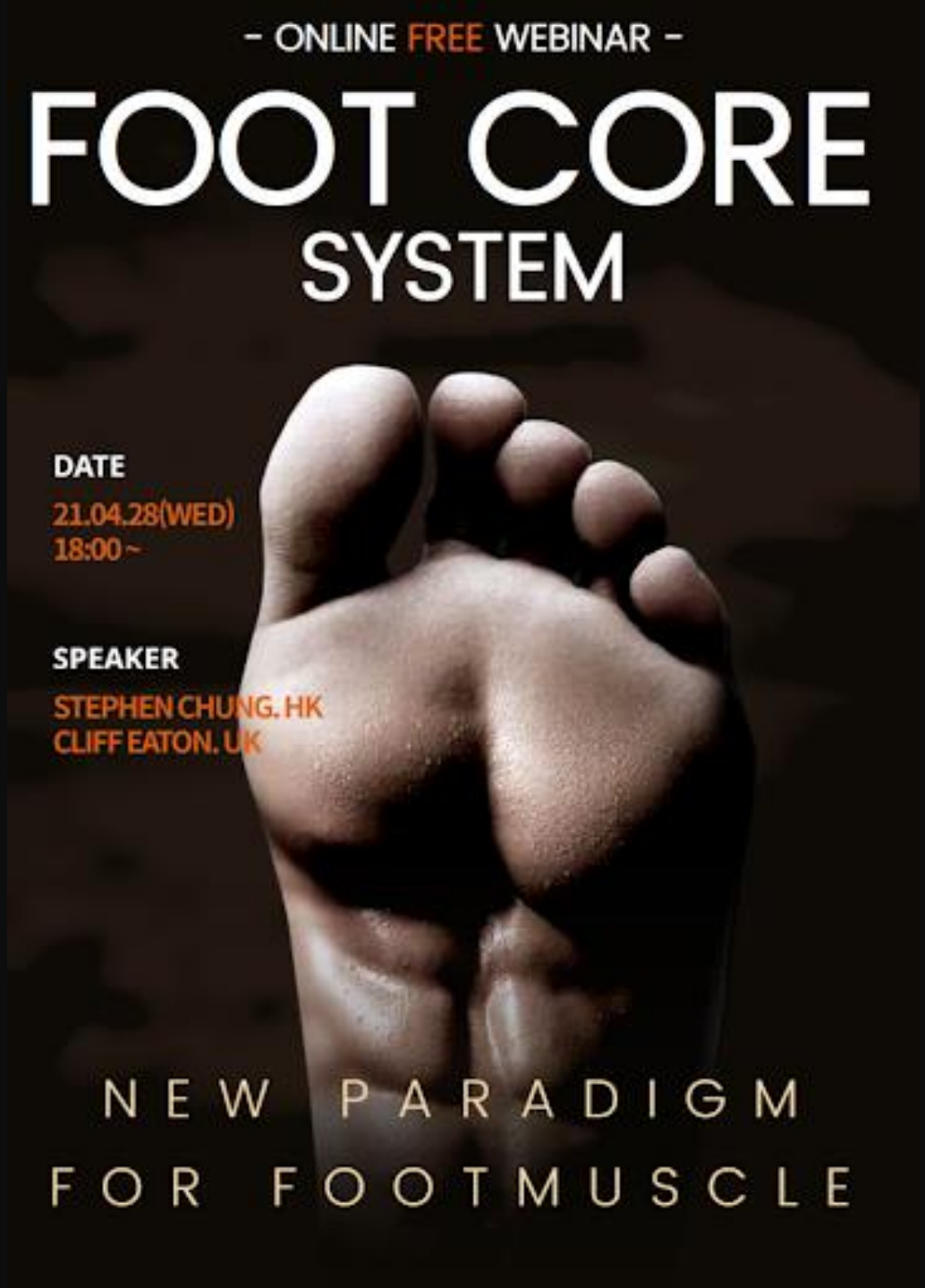
Is Foot Care Only Massage?

Most Overlooked Joint

Strength for Foot

- Strong feet are stable feet, and stable feet are less likely to experience an unhealthy level
of pronation or supination.

- Stability and mobility in our feet also play an important role in optimizing performance, and a lack of stability that starts in the foot can travel up the leg.



It All Comes Down to Foot Core System!

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The foot core system: a new paradigm for understanding intrinsic foot muscle function

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ABSTRACT
The foot is a complex structure with many articulations and multiple degrees of freedom that play an important role in static posture and dynamic activities. The evolutionary development of the arch of the foot was coincident with the greater demands placed on the foot as humans began to run. The movement and stability of the arch is controlled by intrinsic and extrinsic muscles. However, the intrinsic muscles are largely ignored by clinicians and researchers. As such, these muscles are seldom addressed in rehabilitation programmes. Interventions for foot-related problems are more often directed at externally supporting the foot rather than training these muscles to function as they are designed. In this paper, we propose a novel paradigm for understanding the function of the foot. We begin with an overview of the evolution of the human foot with a focus on the development of the arch. This is followed by a description of the foot intrinsic muscles and their relationship to the extrinsic muscles. We draw the parallels between the small muscles of the trunk region that make up the lumbopelvic core and the intrinsic foot muscles, introducing the concept of the foot core. We then integrate the concept of the foot core into the assessment and treatment of the foot. Finally, we call for an increased awareness of the importance of the foot core stability to normal foot and lower extremity function.

The human foot is a very complex structure, which allows it to serve many diverse functions. During standing, it provides our base of support. During gait, the foot must be stable at foot-strike and push-off. However, during mid-support, the foot must become a mobile adaptor and attenuate loads. It also possesses spring-like characteristics, storing and releasing elastic energy with each foot-strike. This is accomplished through the deformation of the arch, which is controlled by intrinsic and extrinsic foot muscles. There is evolutionary evidence that the foot arch architecture and musculature developed in response to the increased demands of load carriage and running. The stability of this arch, which we proposed to be the central 'core' of the foot, is requisite to normal foot function.

THE RELEVANCE OF CORE STABILITY TO THE FOOT

Core stability has received much attention in the clinical and athletic arenas. Interest has primarily been focused on the role of lumbopelvic-hip stability in normal lower extremity movement patterns.[1] The muscular system of the lumbopelvic hip complex, or core, has been described as consisting of local stabilisers such as the multifidus and transverse abdominis, and global movers such as latissimus dorsi.[2] The local stabilisers have small cross-sectional areas and small moment arms. Therefore, they do not produce large rotational moments at the respective joints that they cross. However, they do act to increase intersegmental stability. Proper function of local stabilisers provides a stable base on which the primary movers of the trunk, those with larger cross-sectional areas and moment arms, can act to cause gross motion. When core muscles are weak or are not recruited appropriately, the proximal foundation becomes unstable and malaligned, and abnormal movement patterns of the trunk and lower extremity ensue.[3] This can lead to a variety of overuse lower extremity injuries.[4–7]

We propose that the concept of core stability may also be extended to the arch of the foot. The arch is controlled with both local stabilisers and global movers of the foot, similar to the lumbopelvic core. The local stabilisers are the four layers of plantar intrinsic muscles that originate and insert on the foot. These muscles generally have small moment arms, small cross-sectional areas and serve primarily to stabilise the arches. The global movers are the muscles that originate in the lower leg, cross the ankle and insert on the foot. These muscles have larger cross-sectional areas, larger moment arms, are prime movers of the foot, and also provide some stability to the arch. With each footstep, the four layers of intrinsic muscles act to control the degree and velocity of arch deformation. When they are not functioning properly, the foundation becomes unstable and malaligned; and abnormal movement of the foot ensues. This may manifest in foot-related problems. Plantar fasciitis is one of the most common overuse injuries of the foot. It is recognised as a repetitive strain injury from excessive deformation of the arch.[8] The importance of the arch musculature in this prevalent foot injury is currently underappreciated. This is underscored by recent articles describing clinical evidence and guidelines for plantar fasciitis,[9] as well as posterior tibial tendon dysfunction,[10] medial tibial stress syndrome[11] and chronic lower leg pain[12] that have no mention of foot strengthening as a component of the interventions.

Therefore, our purpose was to propose a foot core system paradigm by (1) describing the evolution of the human arch for locomotion, (2) delineating the subsystems of the foot core, (3) reviewing assessment and treatment of the foot integrating the concepts of foot core stability and (4) finally discussing future research directions. Our overall goal was to propose a new paradigm by which to view foot function, assessment and treatment.

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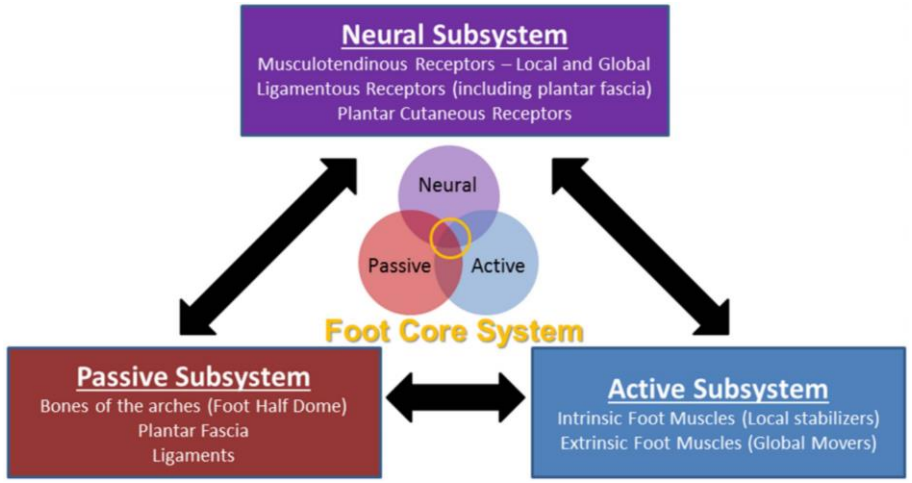
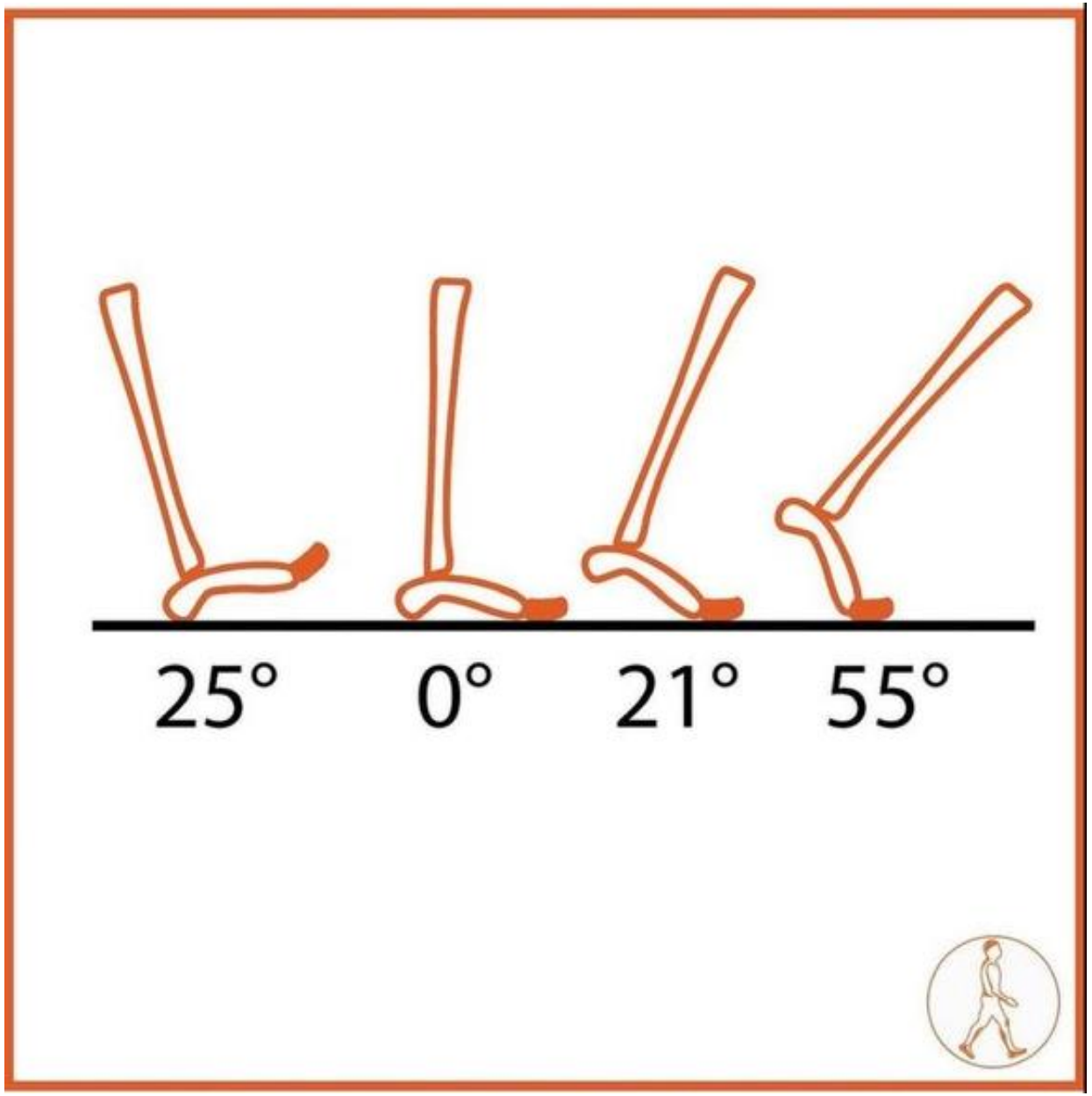
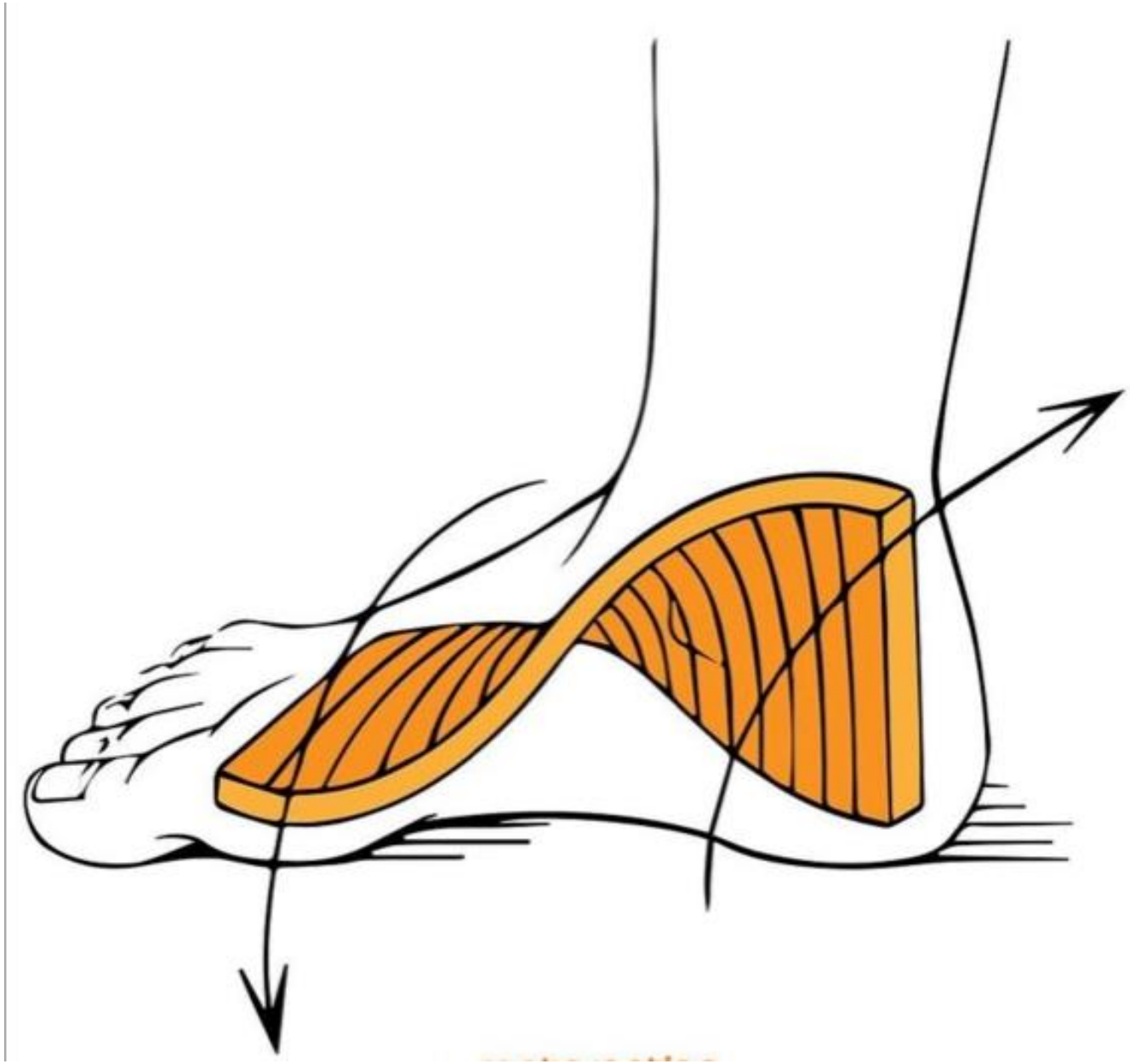


Passive Subsystem

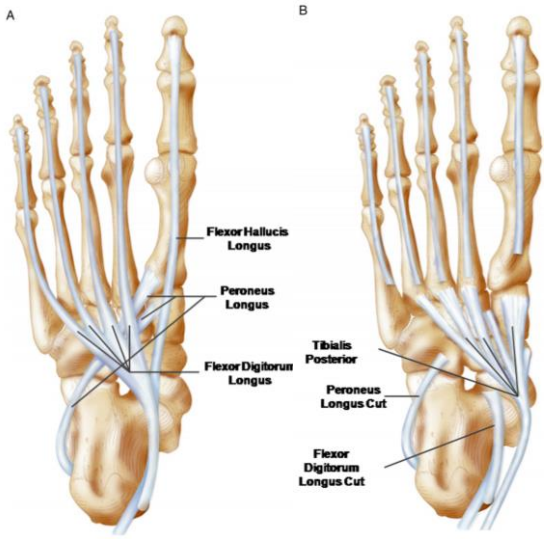
Passive Subsystem



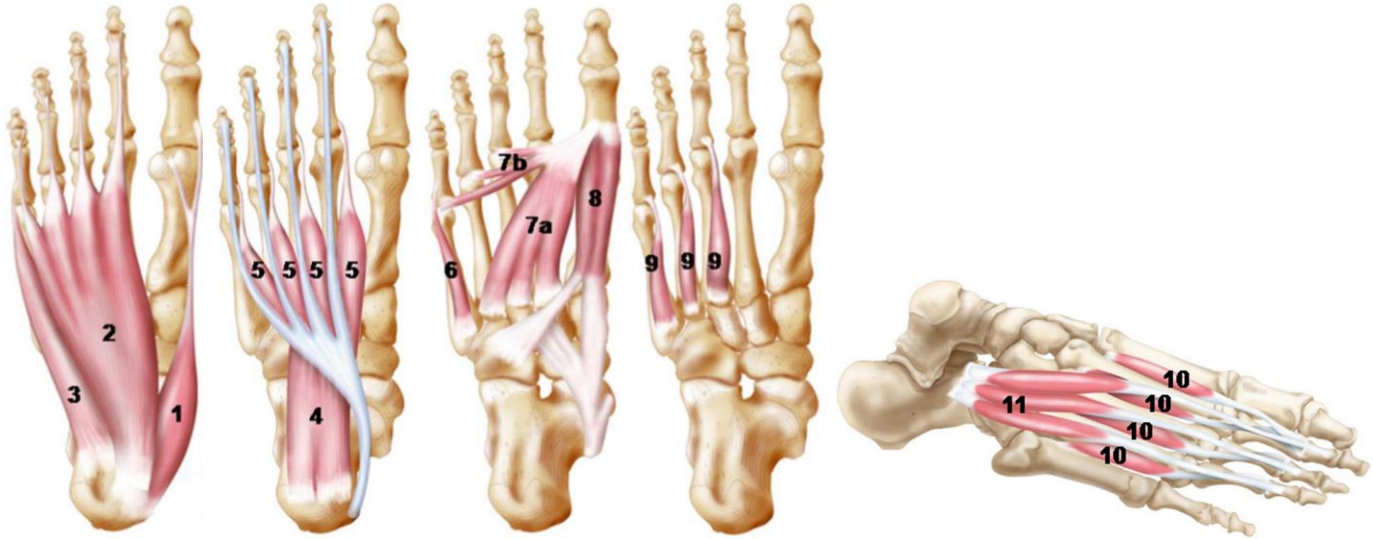
Passive Subsystem



Active Subsystem

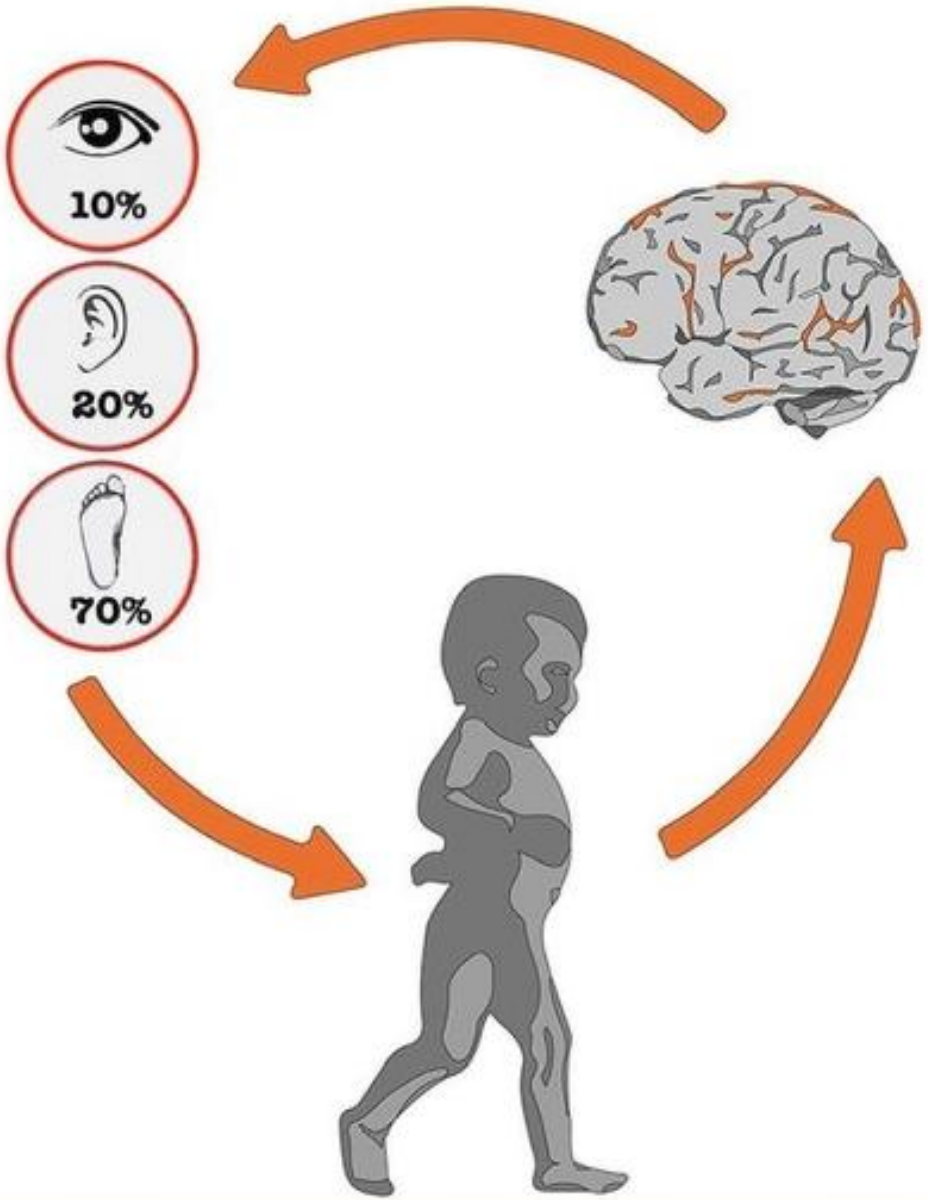


Extrinsic Muscle Tendon



Intrinsic Muscle

Neural Subsystem



Practicality

- Mobility
- Endurance
- Strength and Power
- Neuro, Neuro, Neuro
- Coordination

Mobility

- Arches and Toes
- Metatarsals
- Tarsals
- Talocrural Jt.
- Subtalar Jt.

Mobility Works

- Toe Stretches (Spreads)
- Toe-ga Flow
- Toe Flex Rhythm
- Metatarsal Glide in Sitting and Standing
- Tarso-Metatarsal Stretches on the Wall
- Sit and Apology
- Sit on Toes
- Ninja Holds

Mobility Works for Ankle

- Dorsi Dumbbell Sequence
- Inversion Drills in Squat Position (Single Leg Side Push)
- Ankle Rockers
- Ankle Circles on the Floor
- Tib-Fib Circles on the Floor

Mobility Works for Foot & Ankle

SSL Pipe Sequence

SSL Balance Disks Sequence

SSL Slant Board Sequence

Strength Works

- Toe Lifts and Toe Lifts Pushing Down
- Toe Spreads
- Dorsal Foot Holds
- Short Foot
- Bands Works (Great Toes and Toes)
- Foot Crawling
- Bridge the Gap Move

TFC Foot Beam Works

- Single Leg Stance
- Double Leg Stance
- Fencer’s Stance
- Ninja Stance

SSL ISO & SuperCat Works

Iso works

Supercat Works

Strength Works for Special Toe Problems

Ball	Ball Lifts for Bunions
Pencil	Pencil Touches
Toe	Big Toe Twists
Wall	Wall Lunges for CKC Inversion and Eversion
Push Off	Push Off Correction(Single Leg Standing with the Hip Hikes)
Wall	Wall Dorsi Flexion Works
Heel Up	Heel Up and Inversion

Neuro, Neuro, Neuro

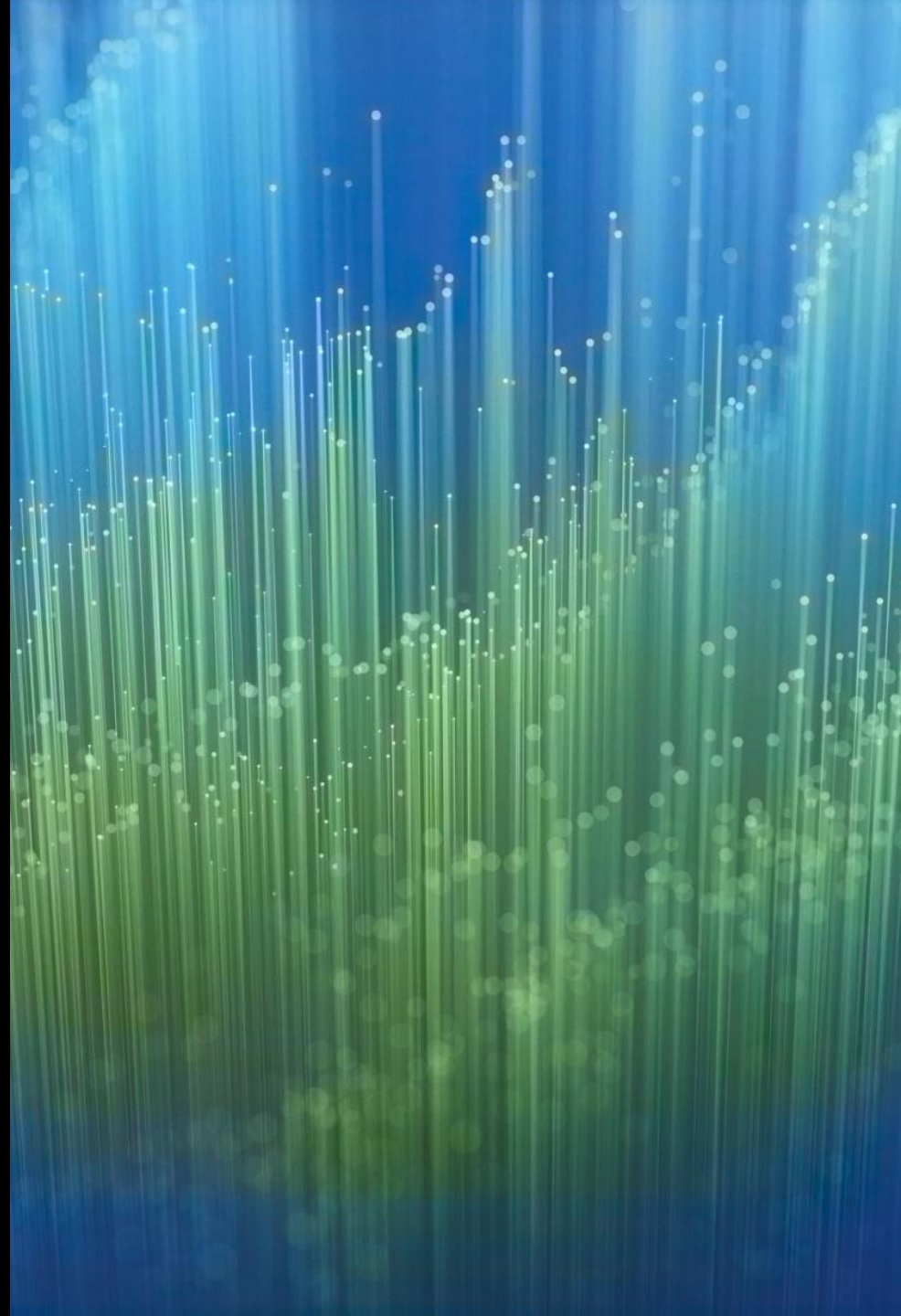
- Foot Taps
- Twists
- Moon Walks and Ball Sweeping
- Foot Zig Zag on the rocks
- Jump Boards

Neuro, Neuro, Neuro

Balance Works Sequence

Foot Coodination Works

Foot	Foot Drills
Foot	Foot Togo
Foot	Foot Plyo Sequence



Thank Your Foot