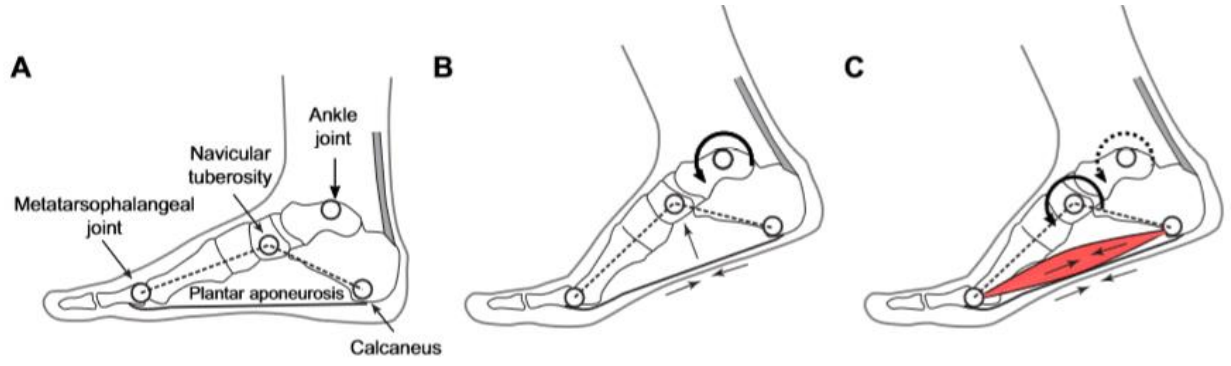
Triphasic Training: Speed Manual

Volume 1

In the world of sports, speed is king. Whether the goal is to break a collegiate record, compete at the international level or even move up just a few draft spots, athletes spend thousands of dollars every year training to become faster. Every hundredth of a second an athlete can shave off their times can potentially lead to thousands or even millions of dollars. This equation leads to athletes and coaches consistently searching for the best track workout or weight room exercise that can trigger an adaptative response that will lead to producing quicker times. However, too often they are overlooking the very structure that is solely responsible for transferring force and power into the field or track.

The foot.

The foot can be described as a densely muscular and rigid structure built to produce locomotion and propulsion. A highly functioning foot can withstand high amounts of forces during sprinting. The foot contains 26 bones and over 100 muscles all functioning in unison to propel our bodies forward when the demand is presented. It is the functional rigidity of the foot that determines how efficiently we move as humans. Our feet are designed with a number of arches that need to instantaneously respond under the demands of high-tension scenarios. It is these very arches that make bipedal locomotion unique and separate the function of the human foot from all other species on the planet. The feet and ankles are responsible for handling the impact forces of locomotion while creating a large rate of return energy for a repeatedly efficient push off. In order for this to happen the feet and toes must possess both mobility as well as stiffness under tension in order to limit leaks in energy as we move. This sequence of movements and feedback can be described as the Windlass Mechanism.



** Rethinking the evolution of the human foot: insights from experimental research Nicholas B. Holowka* and Daniel E. Lieberman*

Diagram A shows that the plantar aponeurosis attaches proximally to the calcaneus, and distally to the proximal phalanges, and the navicular tuberosity indicates the height of the longitudinal arch.

Diagram B is showing that during push-off, the metatarsophalangeal joints dorsiflex, and the plantar aponeurosis wraps around the heads of the metatarsals, creating tension that exerts a linear force that pulls the calcaneus forward and effectively raises the longitudinal arch. This makes the foot a stiff lever for effective power transmission from the ankle joint.

As the illustration transitions to Diagram C recent studies indicate that intrinsic foot muscles augment the windlass mechanism by actively stiffening the midfoot. These mechanisms enable the mid-foot joints to generate power that contributes to the push-off power produced at the ankle.

We can see from the basic diagram above how vital it is that the arches in our feet and toes are trained to function at an optimal level. It is becoming even more evident that we need to be training our feet and toes to not only function properly but also be able to withstand the large amounts of tension that is created from high velocity movements. Coaches are beginning to ask athletes to train barefoot or perform exercises prior to training sessions with the aim to increase neuromuscular activation in the foot and ankle. Today's trends in training seem to dictate that coaches are either attempting to increase neuromuscular activation, mobility or strengthen the ankle in order to address these needs in sport. However, we believe that we can do both and create a chain, starting with the big toe, that is highly adept to the transference of force from the body into the surface of the ground.

The question often arises, **"Is this the most optimal approach to building a spring in the foot capable of transmitting the high levels of force our bodies create?"**

The answer is not quite a simple yes or no. Before we can take the dive in and discuss what methods and practices, we have found to be the most effective it is a necessity that we bring to light the primary functions of the foot that may be overlooked or underappreciated. The old saying goes, "You can't shoot a cannon out of a canoe".

Bottom line.

We need our feet to efficiently transfer force in order elicit all of the work completed in training and the power our bodies generate.