Al-Mustaqbal University/Department of Biomedical Engineering

Barefoot Running

Medical Measurements Lab 2

Fourth Stage

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Barefoot Running

Barefoot running, also called "natural running", is the act of running without footwear. With the advent of modern footwear, running barefoot has become less common in most parts of the world but is still practiced in parts of Africa and Latin America. In some Western countries, barefoot running has grown in popularity due to perceived health benefits.

Scientific research into the practice of running barefoot has not reached a clear consensus regarding its risks or its benefits

While footwear might provide protection from cuts, bruises, impact and weather, proponents argue that running barefoot reduces the risk of chronic injuries (notably repetitive stress injuries) caused by heel striking in padded running shoes.

The barefoot movement has prompted some manufacturers to introduce minimalist shoes, thin-soled and flexible shoes such as traditional moccasins and huaraches for minimalist running.

Barefoot Running

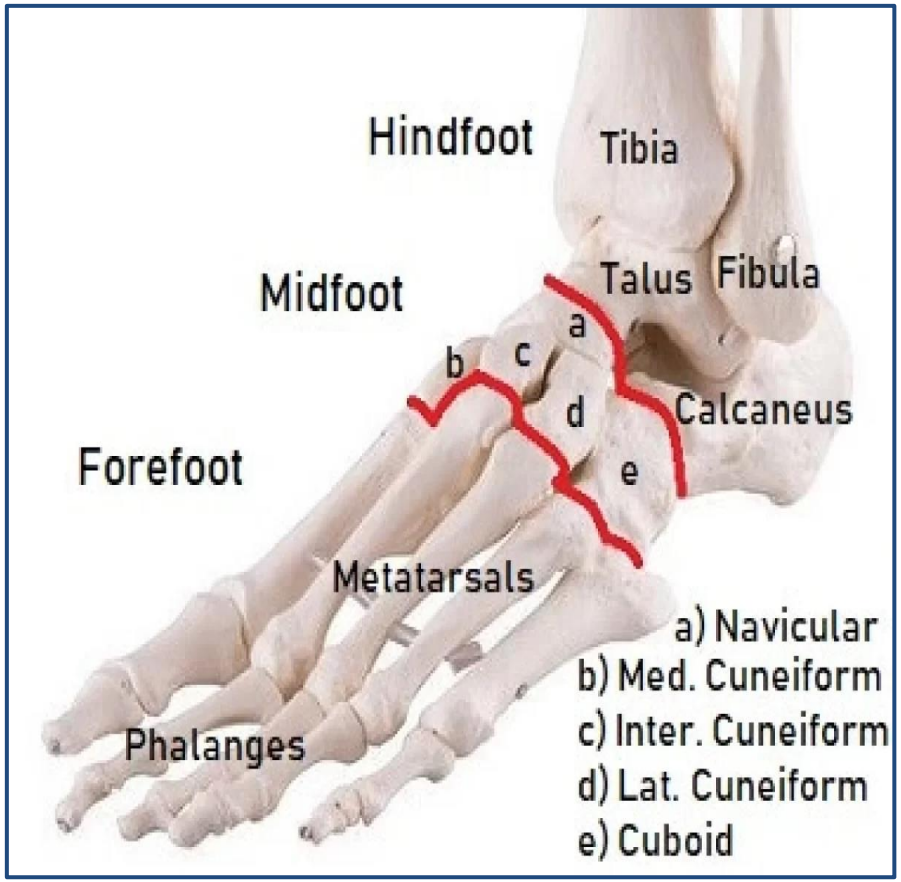
The human foot is designed that the toes are spread and extended. In well developed societies, the foot's natural shape has been changed by long wearing footwear which the heel is elevated above the forefoot, the toes become elevated and pinched together over time.

This deforms the foot, and leads to the foot problems, gait abnormalities, musculoskeletal pathologies. Several researches supported the claims that going barefoot was healthy and natural.

Barefoot running, minimalist running and natural running are all terms that describe running in a manner that allows the foot to function the way it is designed.

Human Foot and Functions

- ✓ The human foot is a complex structure consisting of bones, muscles, ligaments, and tendons, designed to support the body's weight, provide stability, and enable movement,
- ✓ The stability of foot during weight bearing derives from articulations and ligaments from the heel to the central metatarsal heads
- ✓ As well as being the firm supporting base, it needs to be flexible for propulsion and moving on the irregular surfaces
- ✓ The human foot is a complex structure with 26 bones, several joints, ligaments and soft tissues. It is divided into 3 parts; forefoot, midfoot and rearfoot.
- ✓ The forefoot, the most flexible part, includes five metatarsal bones and fourteen phalanges
- ✓ The midfoot includes five tarsal bones arranged in two rows.
- ✓ The rearfoot includes talus, which forms the pivot of ankle joint, and calcaneus which forms the heel



Human Foot and Functions

There are significant alterations to running pattern. Several studies have found consistent changes in barefoot running,

for example, decreased stride length, increased stride rate, decreased range of motion at the ankle, knee, and hip, and more ankle plantarflexion at foot strike which allowed weight bearing at the metatarsal heads instead of the heel.

Concluded that these changes in foot strike pattern were largely designed to reduce the impact forces

The potential benefits of barefoot running

- ✓ Reduction of ground reaction forces; Barefoot running reduced impact force when performed on a sufficient number of steps.

- ✓ Increased running economy; oxygen consumption during running increased as the amount of mass they added to the foot increased; shoes and orthotics representing 1% of body mass increased oxygen consumption by 3.1%.

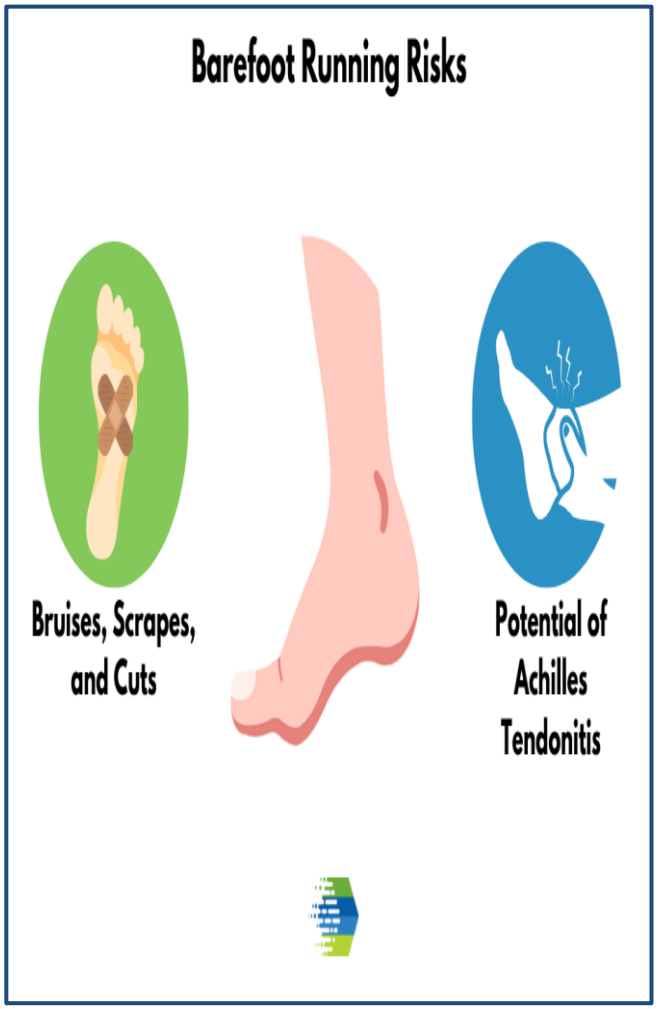
- ✓ Increased proprioceptive input; It has been suggested that footwear material densities affected periphearal sensory information.

- ✓ Increased muscle strength; evaluated of 2,300 Indian children between the ages of 4 and 13 and found that the incidence of flat feet was more than three times greater in shod than in unshod leading them to conclude that shoe-wearing in early childhood was detrimental to the development of a normal arch.

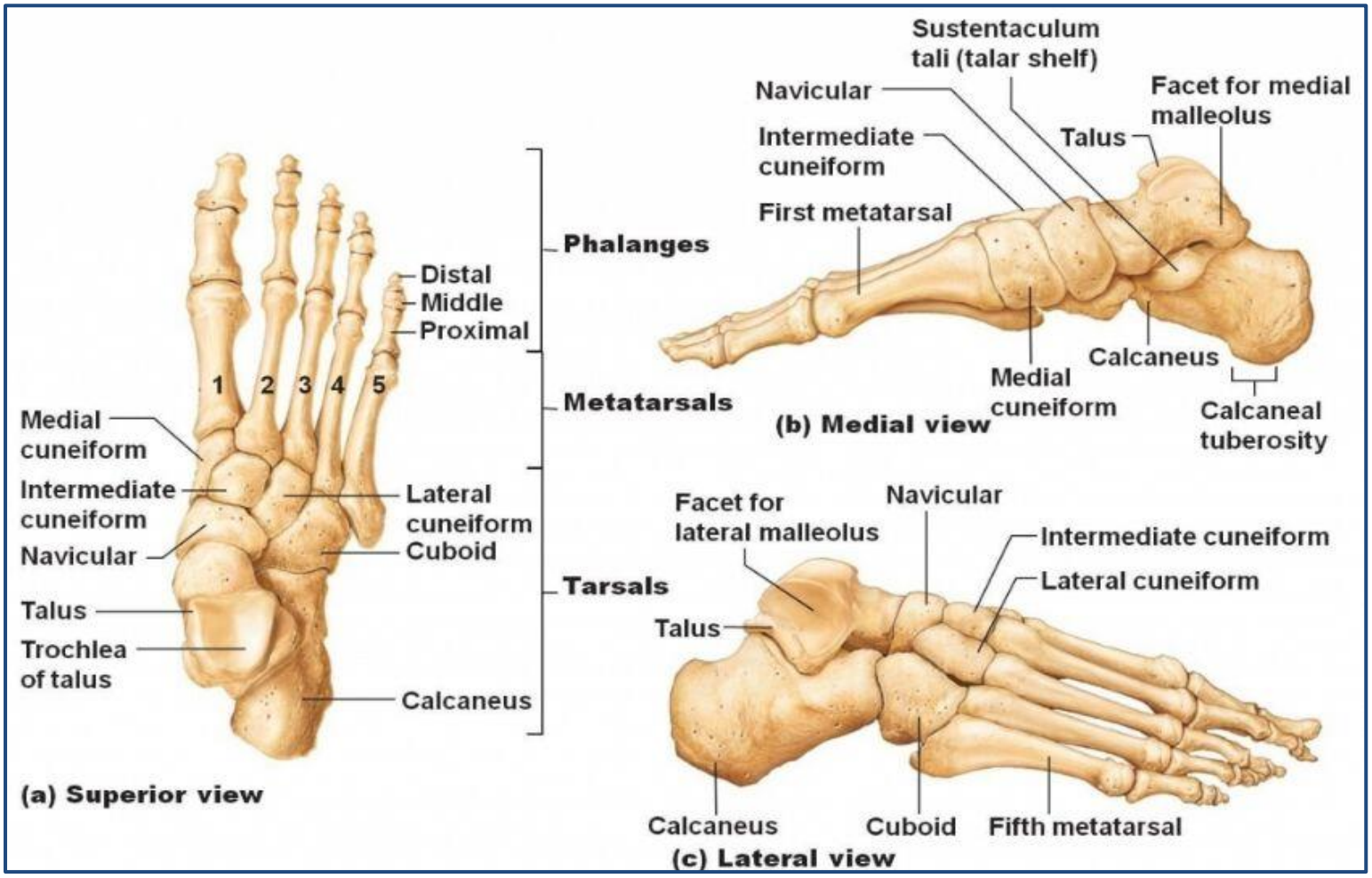
- ✓ Decreased risk of foot deformities; There were several studies concerned with the increasing of hallux valgus and flatfoot in modern societies based on the assumption of inadequate footwear's consequences

The potential harms of barefoot running

- ✓ 1. Injuries from running surfaces; The skin of the foot is exposed to debris such as glass, nails, rocks and thorns and have a chance to injure.
- ✓ 2. Exposure to microorganisms/infectious agents; Cracks, blisters, or scrapes on the feet will have a higher risk of infection.
- ✓ 3. Lack of support; Less cushioning and a thinner heel shoes should be used with caution and awareness of the possible increased injury risks.
- ✓ 4. Poor running pattern; causes muscle strains.



Human Foot and Functions



Bony Anatomy of the Foot


Thank
You!