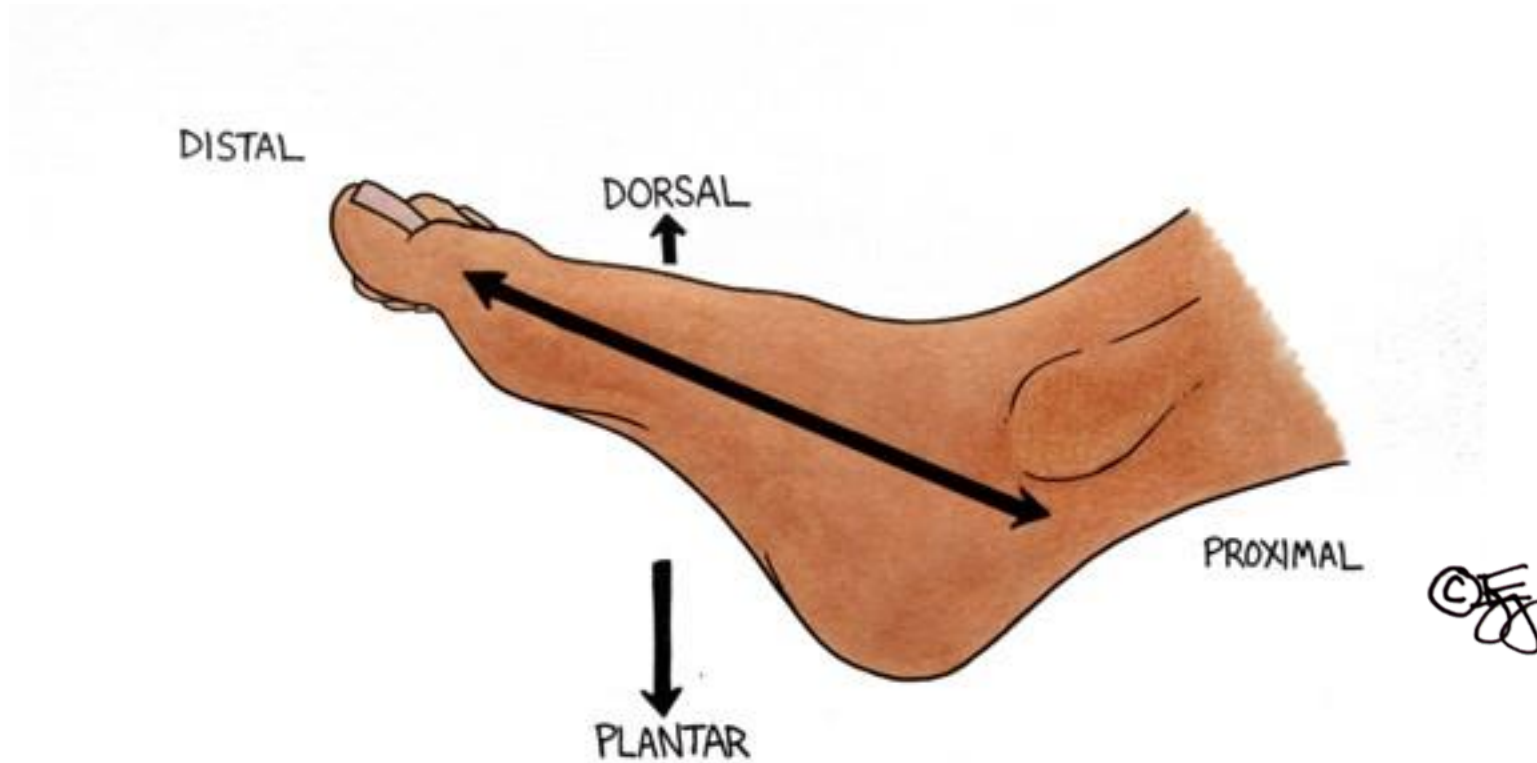


Biomechanical Pedorthic Terminology

Dorsal surface—top of the foot

Plantar surface— bottom of the foot



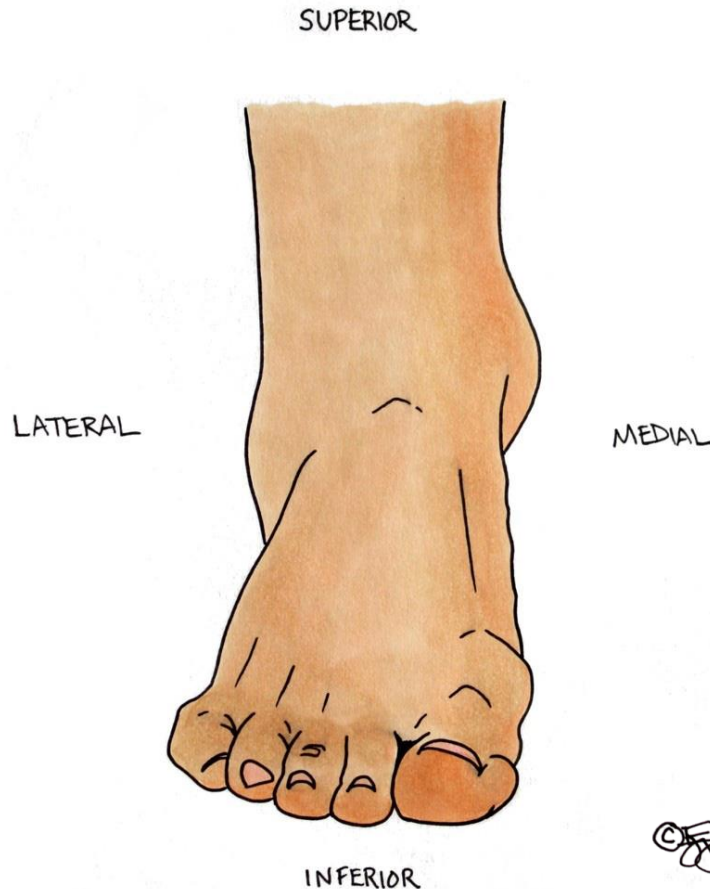
Proximal/Distal—
used to clarify a
location point or the
point of attachment

Proximal-closer to
the trunk or body

Distal-furthest from
point of reference

Superior—positioned above

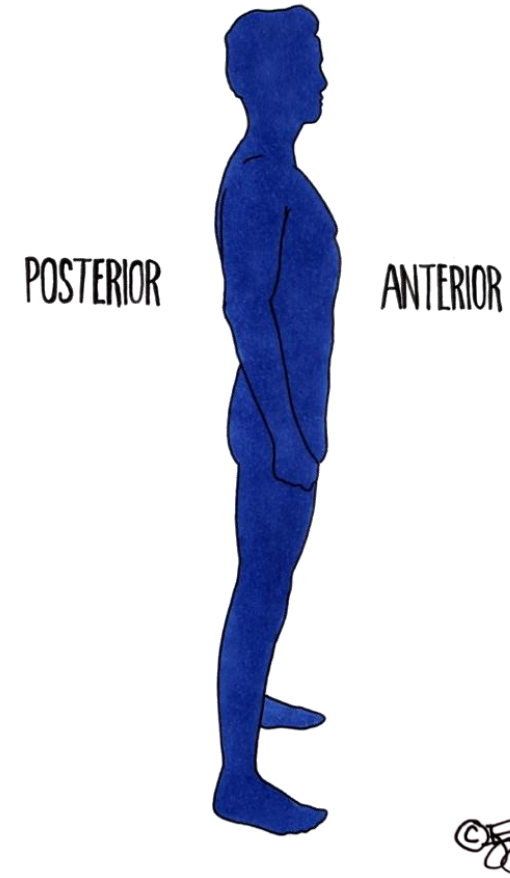
Lateral—Further away from the midline of the body. Describes the “outside” of the foot; smallest toe and fibular side



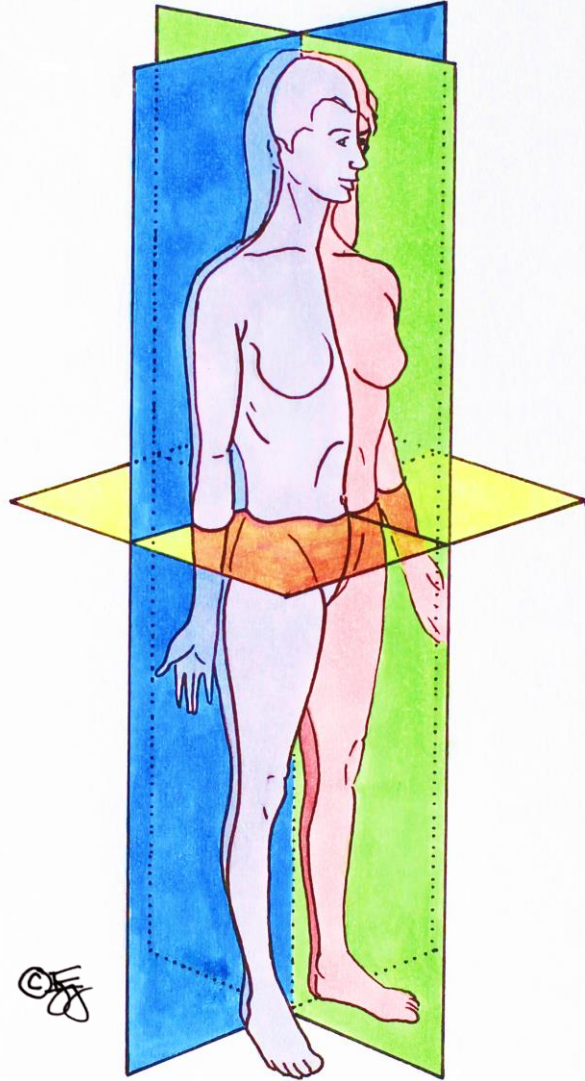
Medial—Closer to the midline of the body. Describes the “inside” edge of the foot; great toe and tibia

Inferior—positioned below

Posterior—refers to the rear



Anterior—refers to the front



The **anatomical position** is the point of reference for all movements of the body.

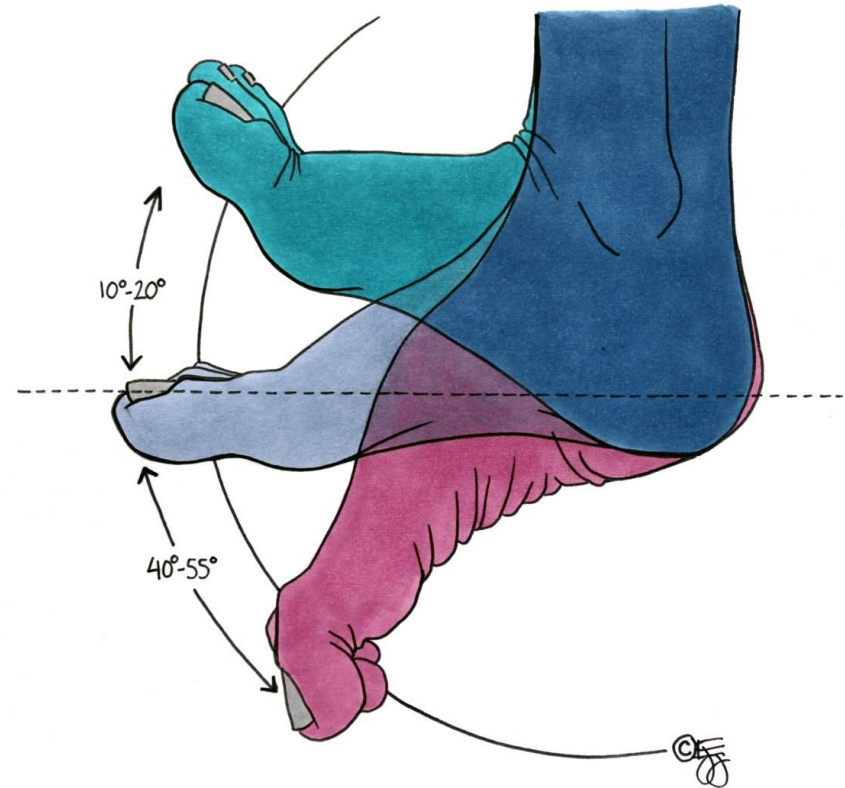
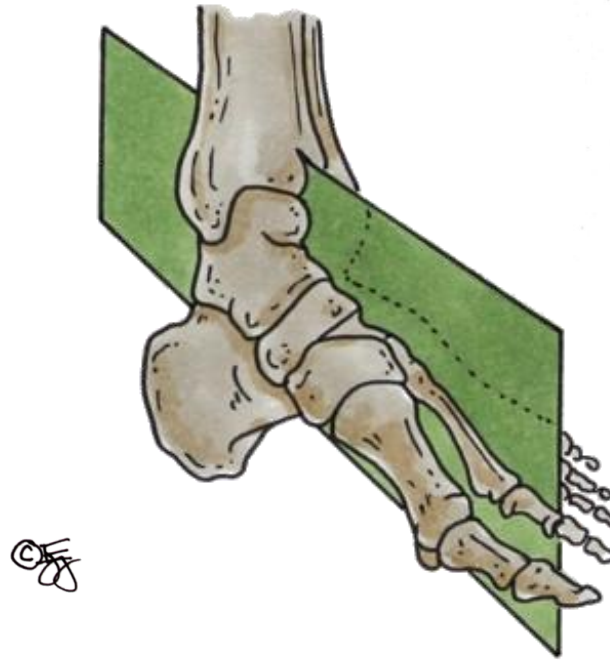
Cardinal Planes

- 3 basic planes of motion
- Divides the body with 3 imaginary lines
- Sagittal, Frontal/Coronal and Transverse

Sagittal Plane

Splits the foot into left and right half. Dorsiflexion (upward) and plantarflexion (downward).

Approximate normal dorsiflexion is 20° /plantarflexion is 45°

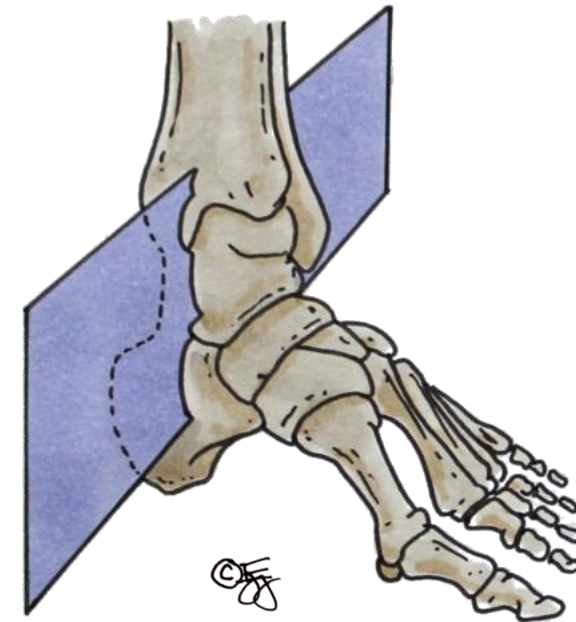
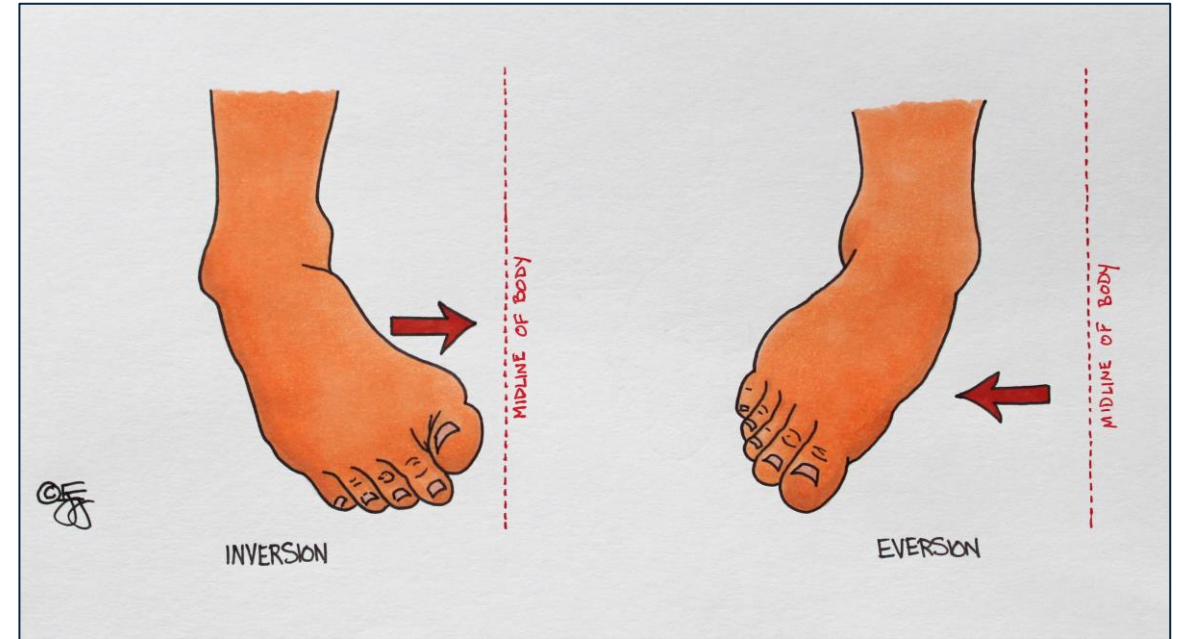


Frontal (Coronal) Plane

Divides the body into anterior and posterior.

Inversion: Turning the plantar surface of the foot toward the body.

Eversion: Turning the plantar surface of the foot away from the body.

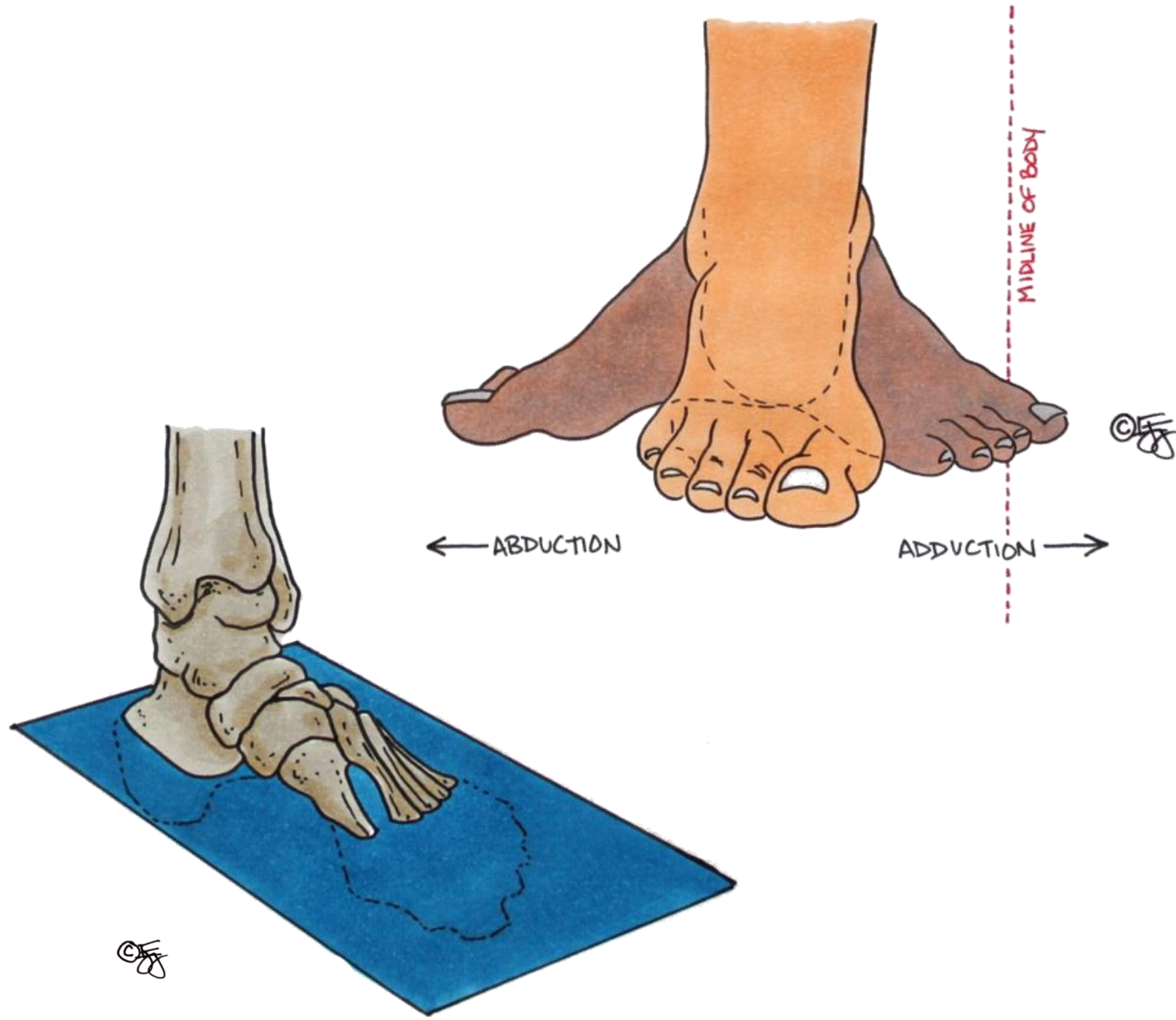


Transverse Plane

Divides the body into upper and lower section.

Abduction: Rotation of the foot away from the midline.

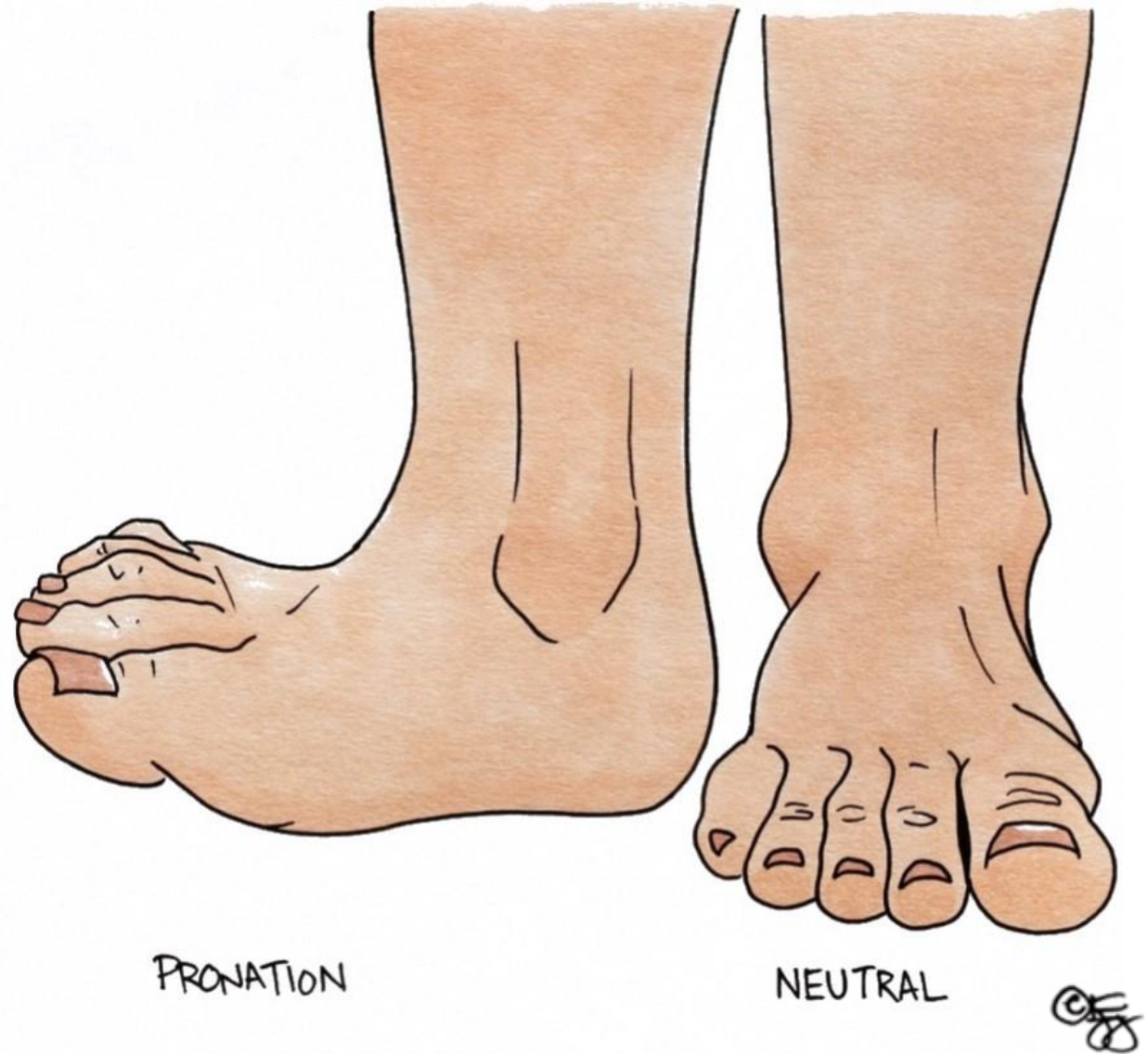
Adduction: Rotation of the foot towards the midline.



Pronation

Triplanar motion consisting of:

- Dorsiflexion in the Sagittal Plane
- Eversion in the Frontal Plane
- Abduction in the Transverse Plane



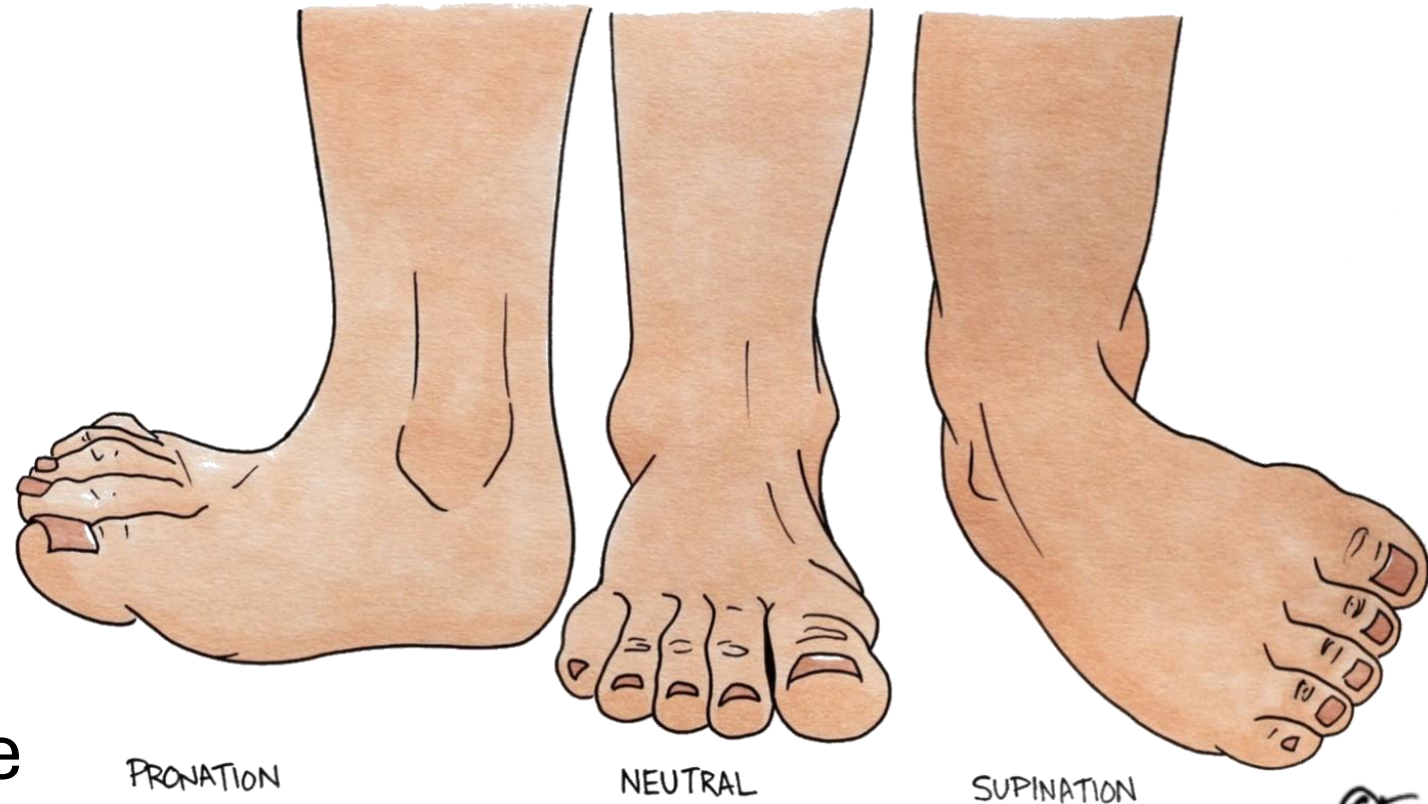
Supination

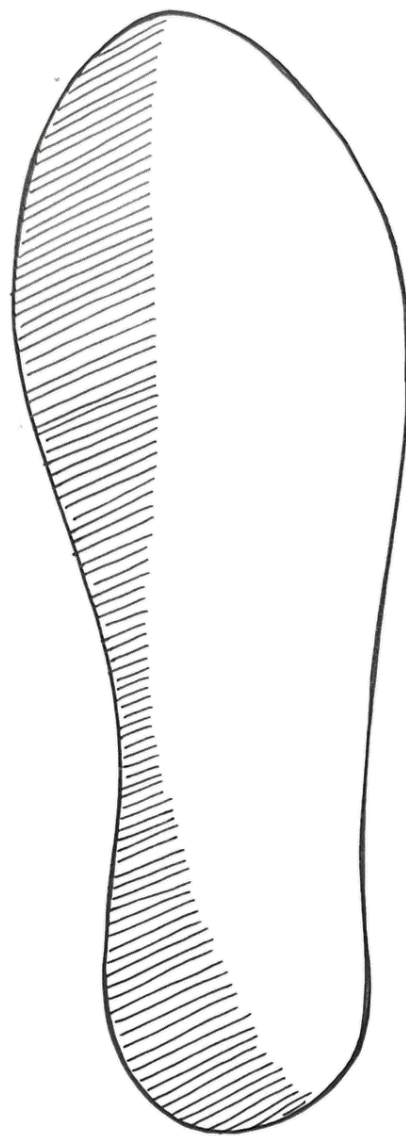
Triplanar motion consisting of:

Plantarflexion in the Sagittal Plane

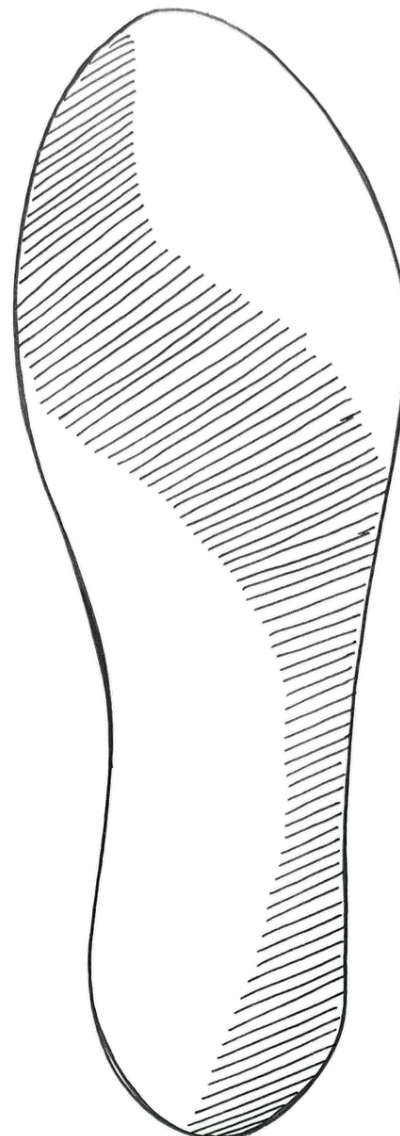
Inversion in the Frontal Plane

Adduction in the Transverse Plane





PRONATION



NORMAL

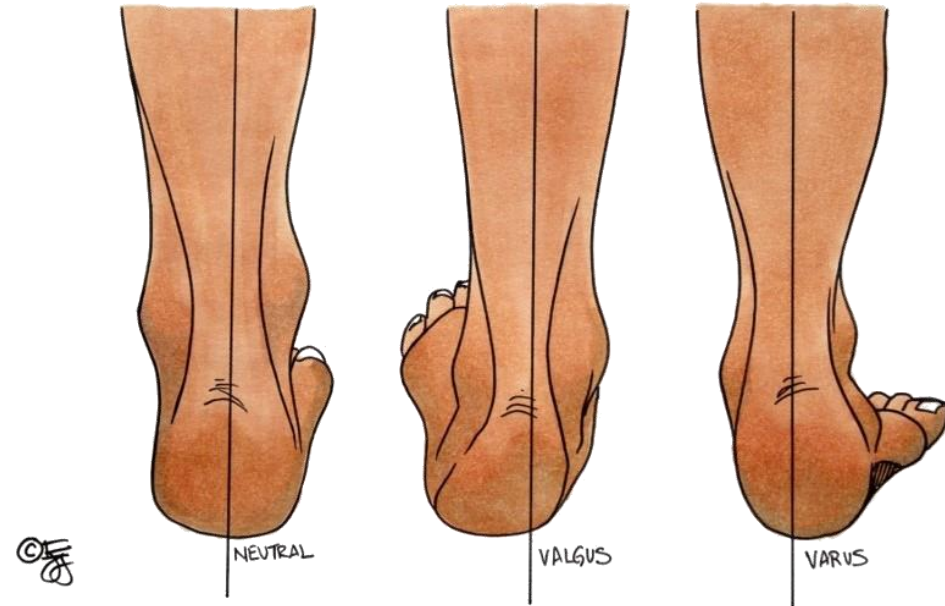


SUPINATION

© 

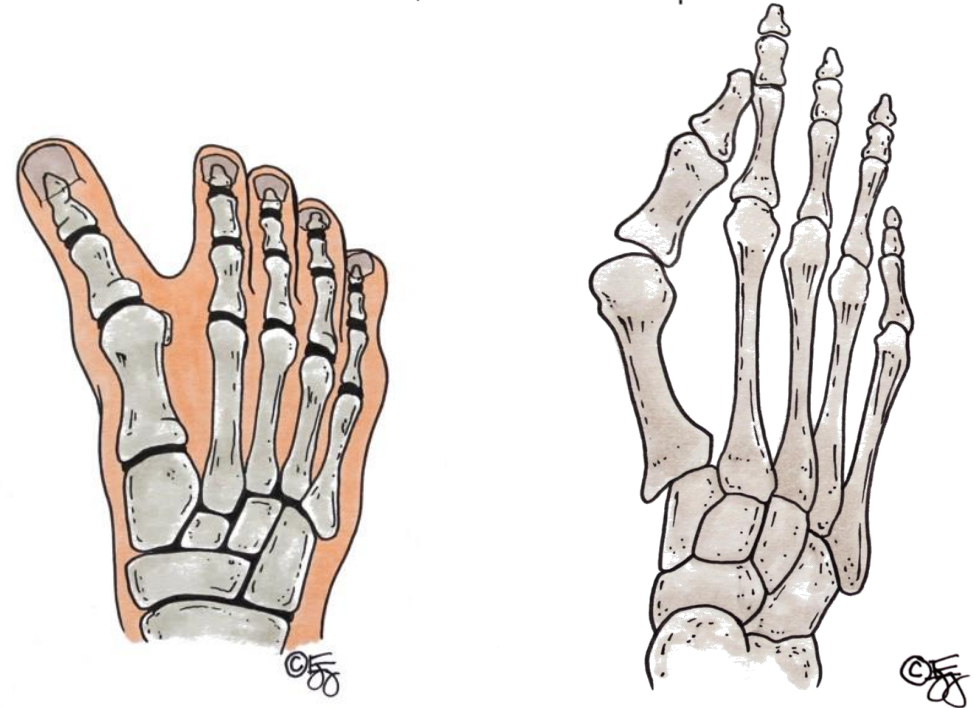
Varus

Deformity of a bone(s) of the leg or foot. A structural deformity of the foot. Part of the foot is **inverted** which is the anatomical position.



Valgus

Deformity of a bone(s) of the leg or foot. A structural deformity of the foot. Part of the foot is **everted** which is the anatomical position.



Gait-related Terminology

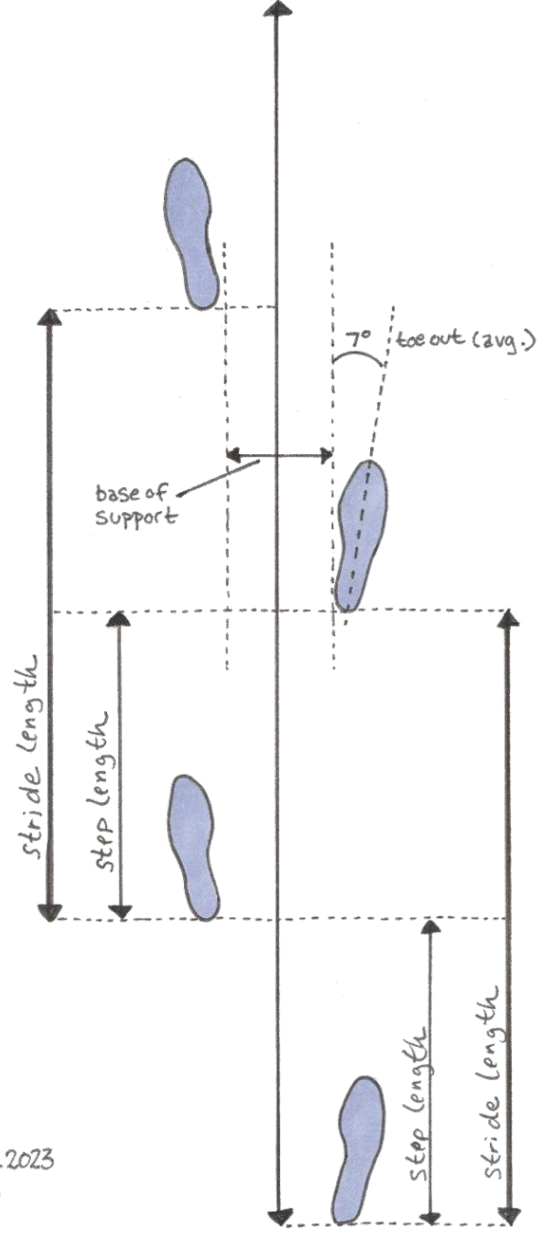
Gait-related Terminology

- *Gait* Gait is the pattern of movement of the limbs of animals, including humans, during locomotion over a solid substrate.
 - Normal gait must be rhythmic and soundless, having “springiness” in the feet - which work alternatively in a definite cyclic order.
- *Toe Out* In normal walking, the foot is placed on the ground at an angle taken from the center of heel to second toe.
 - Average “toe out” or “foot angle” is 7° .

Gait-related Terminology

- *Step Length* The distance between the heel strike of one lower limb to the heel strike of the other lower limb.
- *Stride Length* The distance between the heel strike of one lower limb to the next heel strike of the same lower limb.
- *Stride Duration* The time taken for completion of heel strike of one lower limb to the next heel strike of same lower limb (i.e. completion of one gait cycle).

left gait cycle



right gait cycle

Gait-related Terminology

- *Base of Support* The distance between a person's feet while standing and during ambulation.
- *Cadence* The Number of steps taken in one minute.
 - Average adult cadence is 90-120 steps/minute.
- *Walking Velocity* Speed of ambulation on a level surface.
 - Average adult walking velocity is 262ft/minute.

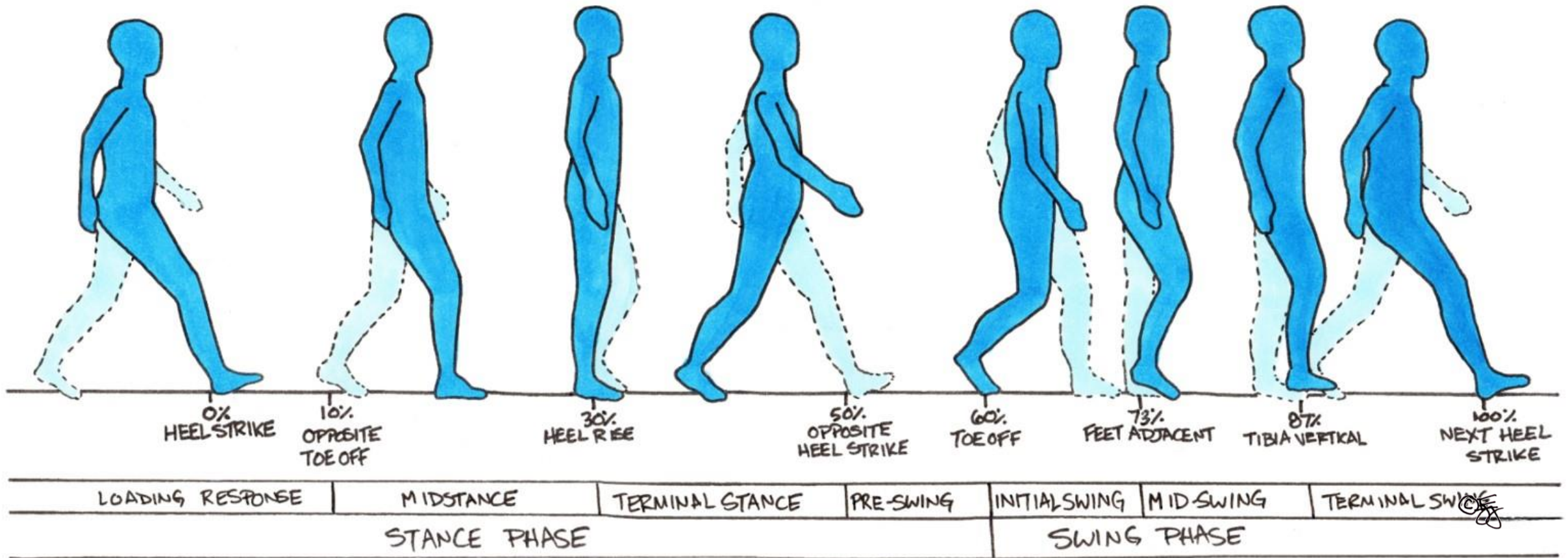
Balance Vs. Proprioception

- Balance is the body's ability to keep itself upright (function of the inner ear).
- Proprioception is the body's ability to know where it is in space and sense movement (function of the somatosensory system).

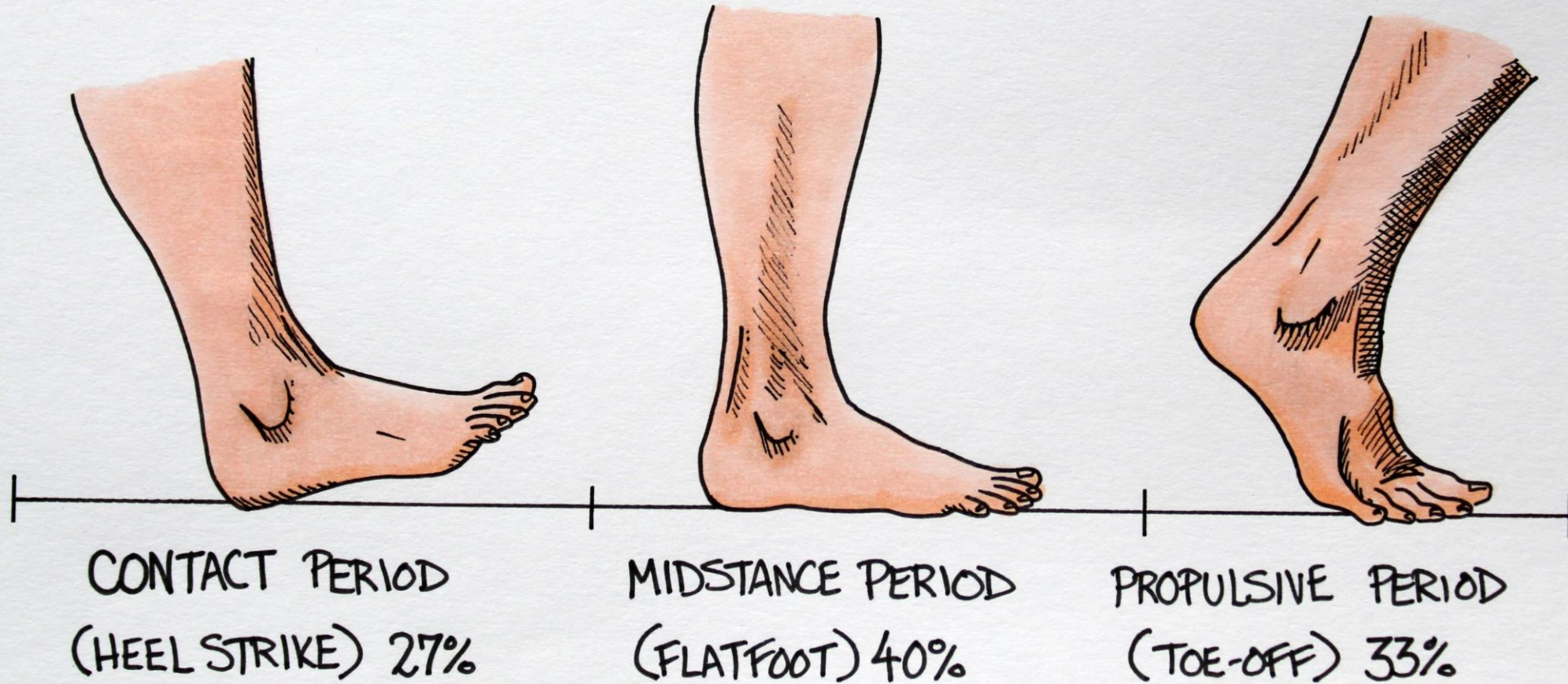
Gait Cycle

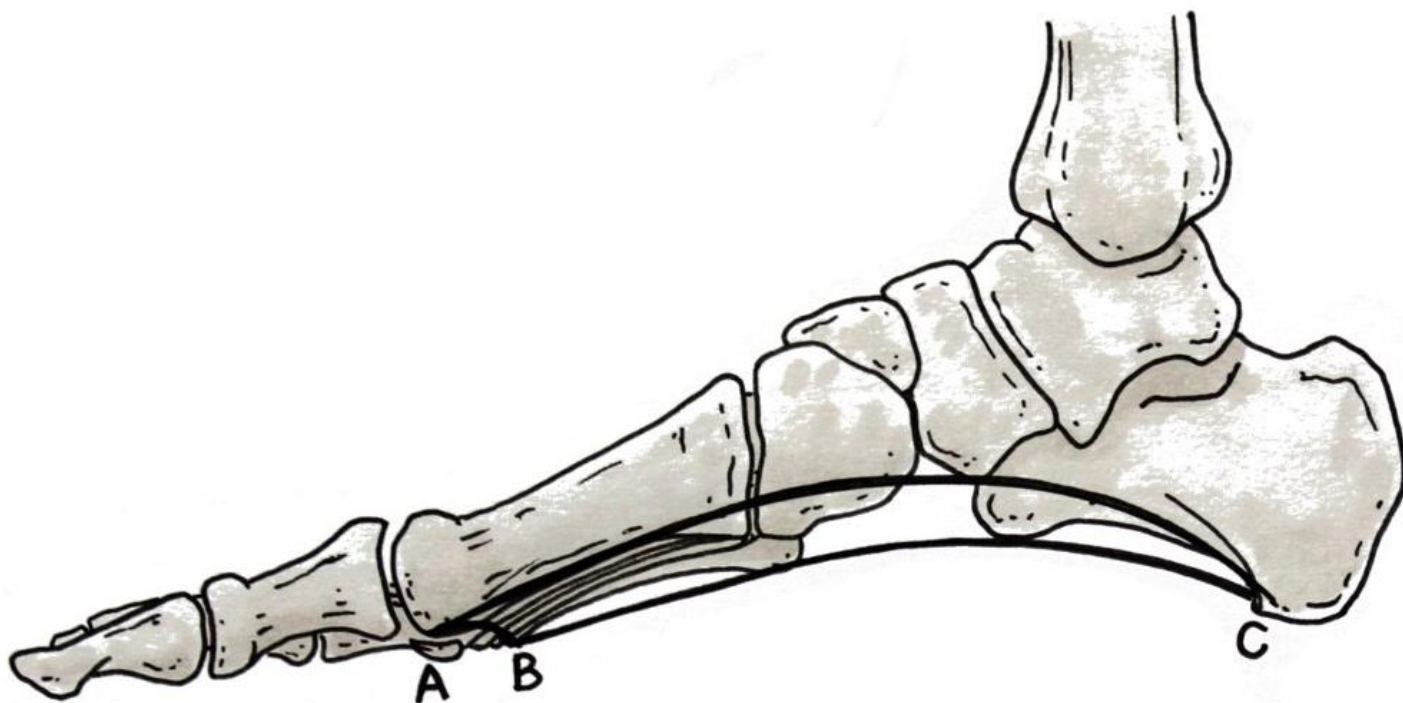
- The basic unit of measure for gait analysis is the *gait cycle*.
- A gait cycle is broken into two phases for each extremity:
 - Stance phase (foot is on the ground) – 60% of gait cycle
 - Swing phase (foot is off the ground) – 40% of gait cycle

Gait Cycle: Stance Phase-Swing Phase

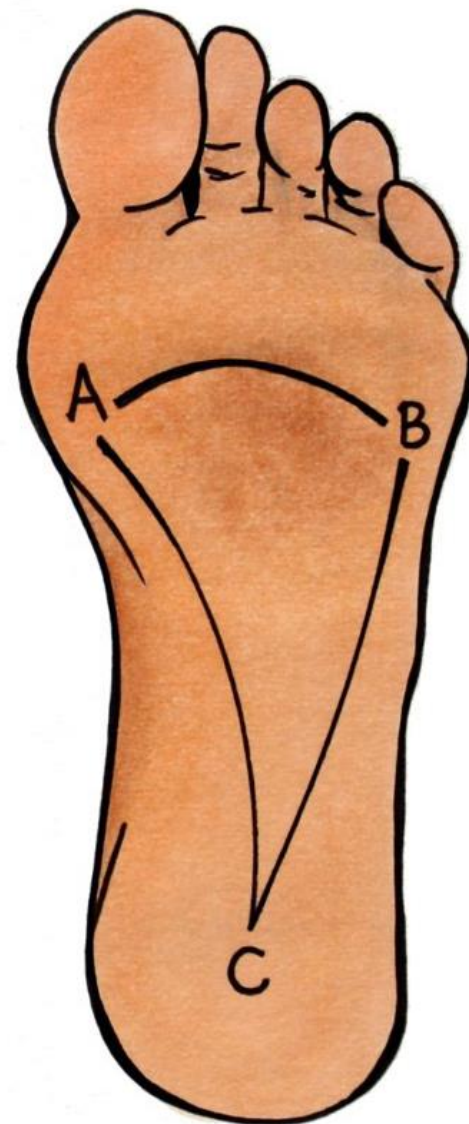


3 Periods of Stance Phase





$A \leftrightarrow C$ MEDIAL LONGITUDINAL ARCH
 $B \leftrightarrow C$ LATERAL LONGITUDINAL ARCH
 $A \leftrightarrow B$ ANTERIOR TRANSVERSE ARCH



© [Signature]

3 Types of Medial Longitudinal Arch

Pes Rectus—a foot with a normal arch; allows for shock absorbency



PES RECTUS

Pes Cavus—a foot with a high arch which does not flatten on weight bearing; weight is generally distributed to the lateral side of the foot



PES CAVUS

Pes Planus—flatfoot; a condition in which the arch has not developed normally and is flat



PES PLANUS

Additional Terminology

- Accessory bone: extra bone; e.g., accessory navicular
- Acquired condition: developed after birth (see congenital)
- Acute: refers to a disease with rapid onset, usually with recovery, not long lasting (see chronic)
- Apex: highest point or edge of a supporting element
- Arthrodesis: the surgical fusion of a joint
- Arthroplasty: the surgical reconstruction or replacement of a joint
- Arthroscopy: a surgical technique in which a tube-like instrument is inserted into a joint to inspect, diagnose, and repair tissues
- Atrophy: wasting or decrease in size of a part of the body because of disease or lack of use
- Avascular: characterized by lack of blood vessels

Additional Terminology

- Bilateral: referring to both right and left sides
- Biomechanical: the study of the principles and relations involved in musculoskeletal activity
- Cheilectomy: surgical procedure to remove bone spurs from base of great toe
- Chronic: refers to the disease most often beginning with a slow onset, usually without recovery and of long duration (see acute)
- Comminuted fracture: a fracture where a bone breaks into more than two pieces
- Compound fracture: a fracture wherein a broken piece of bone pierces the skin; open fracture
- Congenital: a condition present at birth
- Contracture: permanent shortening of the muscles and tendons adjacent to a joint; interferes with normal movement around the affected joint and, if left untreated, the affected joint can become fixed
- Contraindicated: an inadvisable treatment or procedure that poses risk of injury
- Contusion: bruise

Additional Terminology

- Crepitus: a grinding or cracking noise or sensation
- Deformity: any departure from normal shape, alignment or form
- Dislocation: injury or condition caused when the normal position of a joint is disturbed
- Doff: to take off or remove a piece of clothing
- Don: to put on a piece of clothing
- Dynamic: in motion; showing force (opposite of static)
- Exostosis: bony growth
- Genu: knee
- Genu recurvatum: hyperextension of the knee
- Genu valgum: condition where the legs are bowed medially in the standing position; bowing occurs at or around the knee, so when the knees are together, the feet are apart; also known as knock-kneed
- Genu varum: condition where the legs are bowed laterally in the standing position; also known as bow-legged

Additional Terminology

- Hematoma: a solid swelling of clotted blood within tissue
- Heterogenous: diverse in character or content
- Homogeneous: of the same kind; alike
- Hyperemia: an excess of blood in the vessels supplying an organ or body part
- Hyperhidrosis: excessive perspiration
- Hypermobility: excessive motion that occurs at a time when the segment should be stable
- Hypertonic: having increased muscle tone
- Hypotonic: state of abnormally low muscle tone
- Inflammation: the body's reaction to injury or infection characterized by edema, increased temperature, pain, erythema (redness) and avoidance of use of the affected body part

Additional Terminology

- Ischemia: inadequate blood supply to an organ or body part
- Lesion: an injury or wound; any abnormal change
- Macerated: moist whitish appearing skin from excessive moisture
- Necrosis: an area of dead tissue on or within the body
- Neurogenic: caused or controlled by the nervous system
- Neurotrophic: relating to or dependent on the influence of nerves on the health of tissue
- Osteoarthritis: progressive wearing down of opposing joint surfaces resulting in degeneration of a joint
- Osteomyelitis: infection of bone
- Osteopenia: reduced bone mass; less severe than osteoporosis
- Osteoporosis: a condition in which bones become fragile and brittle
- Palpation: feeling a part of the body to assess it; examine by use of the hands

Additional Terminology

- Pitting edema: swollen skin area that, when pressed with fingers, indents and holds the indentation after the fingers are removed
- Proprioception: sense of body position, orientation and movement
- Shear: strain within a structure produced by pressure when its layers are shifted in relation to each other
- Spastic: relating to or affected by muscle spasm
- Splay: to spread out
- Static: at rest; not in motion (opposite of dynamic)
- Stress fracture: small, nondisplaced crack in a bone caused by excessive stress
- Subluxation: partial dislocation
- Superficial: closer to the surface
- Tendinitis: inflammation and pain of tendons and surrounding coverings
- Tone: level of firmness or slight contraction in a resting muscle

The End