Updated
02/22/2022

Foot Health and Wellness

Structure Of Your Feet

The structure of your feet can change and cause problems:

This handout explains some of the important concepts of the foot, but is not all-inclusive!

Your foot is made up of 26 bones; 33 joints; 107 ligaments that connect bones to each other; and tendons that connect muscles to the bones.

- **Bones can break**; but, if the alignment of the two broken pieces is appropriate, the bone may end up being stronger than before, after about 8 weeks of healing.
- **Joints can become inflamed and deteriorate** due to rheumatoid arthritis and/or **grow bigger** due to osteo arthritis; or be affected by other diseases/conditions.
- **Ligaments can have a "sprain"** which is when part of a ligament gets torn. The torn piece of ligament will curl up on itself and never get reattached. Weakened or completely torn ligaments can contribute to structural changes in your feet.
- **A partially torn tendon is a "strain."** The affected physical movement weakens with the progression of the tear and completely stops with a fully torn tendon.
- **The "normal" gait cycle** consists of two phases: The **"adaptive phase"** when the heel strikes the ground and the foot **"pronates"** making the inner longitudinal arch turn downward (1 of 3 movements) to allow the joints in the foot to become ***flexible*** so that the foot can step on different surfaces without causing damage; **as well as** the **"propulsive phase"** when the foot **"supinates"** making the outside length of the foot turn downward (1 of 3 movements) to allow the joints in the foot to become ***aligned and rigid*** so that the forefoot can propel the body forward.
- **The "abnormal" gait cycle with "over-pronation": The actual bio-mechanics** that allow part of the pronation to take place start in the **subtalar joint** between the calcaneous and tallus bones. **Excess stress and more affecting the sub-talar joint can cause the foot to "over-pronate"** in the adaptive phase, **pre-venting the foot from supinating** in the propulsive phase. *The flexible joints in the foot are unable to become aligned and rigid as* ***the arch remains flat in the weight-bearing foot****; also called* ***weakened ligaments.*** *This can result in:*
  - **Plantar fasciitis**, an inflammation in the non-stretchable plantar fascia due to the flattened arch when weight-bearing, causing the foot to becoming longer.
  - **Pain in the ankle, knee, hip joint, and/or the lower back** due to the unstable subtalar joint that causes the heel to turn inward with the over-pronation.
  - **Bunions, hammer-toes, crooked toes, and more** due to the unstable foot**.**
- The over-pronated foot resolves when it is at rest or with a proper orthotic that needs to mimic the shape of the foot's arch in a neutral, dangling position.

The following related handouts discuss the physical status and care: **Shoes; *Orthotics; *Corns, Calluses, Hammer-Toes, Bunions; *Nails; *Plantar Fasciitis; and *Arthritis.*