



The structure of your feet can change and cause problems:

“This handout has a lot of information and is written for the people who like all the details”

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 **they can be damaged** from an injury.
- **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 attached to the other part again. Weakened ligaments can contribute to structural changes in your feet.
- **A partially torn tendon is a “strain.”** It will do the same as the ligament. However, the weaker the tendon, the more decrease in the physical movements.
- **The 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 all 33 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 to turn downward (1 of 3 movements), causing all 33 joints in the foot to become aligned and rigid to enable the forefoot propel the body forward.
- The actual **bio-mechanics** that allow the pronation to take place start in the subtalar joint between the calcaneous and talus bones where the heel is connected to the ankle. **Excess stress** and maybe other abnormalities affecting the **subtalar joint** can cause the foot to **over-pronate with adverse effects:**
 - **Bunions, hammer-toes, crooked toes and nails, and other structural problems** can develop when the foot **over-pronates** in the adaptive phase which prevents the flexible 33 joints in the foot to become aligned and rigid as the foot tries to **supinate** in the propulsive phase. The unstable foot together with the weight of the body can result in the above structural abnormalities.
 - **Pain in the ankle, knee, and hip joints, as well as the lower back** can be a result of the **Subtalar joint being stressed, weakened, etc.**, likely causing a misalignment between the talus bone and calcaneous bone.

*The following handouts provide more information about what you can do at home with the above problems; both with prevention and physical care: *Shoes; *Orthotics; *Bunions, Hammer-Toes, Corns, Calluses; *Nails; *Plantar Fasciitis; and *Arthritis.*