

## Lower Extremity Biomechanics and Treatment

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- Balance starts from the feet up; 92.2% of people have structural changes or instabilities.
- You must understand that your foot is very similar to your hand.
- 48-50% of all sports injuries are of a knee strain/sprain due to ankle instabilities.
  
- The problem with ankle and knee conditions is that the medical doctors stabilize the dysfunctional joint rather than correcting the biomechanics first then stabilizing the joint to allow it to heal in a normal position. The same when surgery is performed on an injured ligament without changing the biomechanics of the structure, the outcome is poor because the joint is still misaligned increasing stress to the repaired ligament.
- One needs to establish the normal mechanics of any joint before surgery is performed.
- \*\*\* The leg is a pillar starting from the bottom/ ankle foot. Inversion of the ankle/ talus is the most common, the knee counter stresses into external rotation, the hip/ femur head counter stresses rotating medial and anterior.
- So an athlete may have a knee condition but the other areas must be addressed as well to stabilize the knee.
  
- **Shin Splints**- with inversion of the talus, the distance becomes wider causing greater strain on the ligaments leading to shin splints. It is not from shearing of interosseous membrane as once thought. It is due to periostitis which attacks the membrane. You must correct the hind foot / ankle to correct shin splints.

#### Assessing the Knee

- Draw a dot at the patella and a dot on the tibial tuberosity.
- When the leg is extended, the dots should line up.
- When the knee is also at 90 degrees, the dots should line up.
- You can check the rotation of the tibia when the knee is at 90 degree angle are the dots aligned? If not it shows the amount of tibia rotation.
- The knee counter-torques to the foot.
  
- **Osgood Schlatters**- external rotation of the tibia, the growth centers are irritated, and pain at the patella which also leads to an **Ilio- tibial band syndrome**
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- **IT Band syndrome**- The IT Band attaches to the lateral tibia condyle. When it contracts adhesions form,\*\*\* stretching will only make it worse. Mostly due to knee subluxations.
  
- **Meniscal migration**- the medial condyle is much larger than the lateral condyle. The medial lateral ligament also attaches to the medial meniscus. Inversion of the talus externally rotates the tibia which increases the stress to the medial meniscus

- resulting in the breakdown of the meniscus. Torque injuries damage the medial condyle. \*\*\* Most knee injuries are a result of torque.
- Lateral condyle ligament does not attach to the lateral condyle, it attaches to the popliteal muscle. Hyperextension injuries would affect the lateral condyle
  - **Runner's knee** is a lateral deviation of the patella which causes more stress and irritation to the nerve creating a callous.
  - Medical surgery involves cutting the lateral patellar retinaculum ligament. Never taking in consideration the changes in mechanics.
  - The callous compresses on the nerve and leads to a **Compartment Syndrome**.
  - When looking at the x-ray of a knee, the distances of the knee should be the same, medial and lateral.
  - If the distance recedes it is tibial torsion.
  - **As chiropractors we improve spinal/extremity biomechanics**
  - Like anything, life is a game.
  - The patient has to do their homework to rehabilitate and support the injured joint.
  - **Structure = Function**
  - Improving structure, improves function
  - The body has amazing recuperative powers. By allowing the body to begin to work correctly, it allows the body to heal quicker
  - **Intensive care, initially, to get out of the pain**
  - **Reconstructive care, to keep it working correctly**
  - **Wellness care, to prevent destruction and protect the area of instabilities.**