

INDE 420: MSK Physical Exam

Foot and Ankle Exam Notes

Gait and Stance:

Gait:

Once again, always start the exam as the patient walks into the room.

Observe the elements of Gait, namely **SPEED**

SYMMETRY

STRIDE LENGTH

As we discussed in the knee exam, observe the component parts of Gait:
Heel Strike, Foot Flat, Toe Off.

Watch the foot rolling from **Supination** at heel strike, to **Pronation** at toe-off

Next look at Stance:

Observe the width between the feet, the direction the feet are pointing. Malpositions such as in-toeing and out-toeing are usually due to more proximal deformities such as internal tibial torsion or arthritis of the hip which is preventing the patient from rotating their hips and legs properly.

Foot and Ankle Alignment:

Observed from behind, the heel lies in about 5 degrees of valgus, although a neutral heel is not unusual. Look at the height and symmetry of the medial longitudinal arch. A flattened arch is called **Pes Planus**. When combined with an externally rotated foot it becomes **Pes Planovalgus**. If the arch is painful or only flattened on one side, this may be a sign of **Posterior Tibial Tendinitis**. The posterior tibial tendon is the force which elevates the arch. When it begins to fail, the arch collapses. The patient complains of a painful flat foot. The classic sign of a Posterior tibial tendinitis is a unilateral flattened medial arch with “too-many-toes” sign.

A foot with a high arch is called a **Pes Cavus**. Patients again often complain of a painful arch which worsens with long periods of walking. The heel is often not in its usual valgus but in neutral or even varus. A reciprocal sign to the “too-many-toes” sign of the flat foot is seen in **Pes Cavus** and can be observed from in front of the patient, called a “peek-a-boo heel”. In this sign, the heel on the affected side sticks inward farther than the opposite heel.

When examining the patient from posteriorly, have them first walk on tip toes, then face a wall for support, then ask the patient to raise up on their toes (heel raise). Observe the normal heel inverting from its usual valgus position to neutral or varus. Then ask the patient to stand only on one leg, then do a single heel raise. In early posterior tibial tendon problems, this

may be the only sign of pathology. On the affected side, the patient will be unable to raise up onto their toes, often with reproduction of their pain.

When palpating the toes, spread them apart to look for lesions in the web spaces such as ulcers and callouses.

The Arches of the Foot:

Medial Longitudinal Arch (“The Arch of the Foot”). The flexibility of this arch is the main shock-absorber of the foot with walking. When the arch is too stiff, it will appear too high (Pes Cavus) and cannot absorb shock. Similarly, if it is too low (Pes Planus), it lacks the spring effect needed to absorb the shock of weight-bearing and can also cause pain.

Transverse Arch: This can be observed from the distal end of the foot when the patient is sitting on the exam table. Normally, the position of the toes makes a “frown”, Hallux and 5th toes lowest, central toes slightly elevated. If this reverses, (“smile”), the body weight is supported mainly by the central toes, often leading to forefoot pain or Metatarsalgia.

Lateral Longitudinal Arch: This is on the lateral side of the foot, parallel to the Medial arch. The lateral border of the foot normally lies flat on the ground. In Pes Cavus, sometimes the lateral arch is rolled under the foot as the patient is forced to shift their weight onto the outside border of the foot.

Hammer Toes and Mallet toes:□

Hammer Toes occur at the PIP joint. They can be either “fixed” (not passively reducible), or flexible (you can straighten them but they pull back into a hammered position when you release the toe).

Mallet Toes occur at the DIP joint. They are often accompanied by nail deformities due to the toe being unable to avoid ground forces against the toenail.

The 5th metatarsal is often fractured as the foot rolls into inversion, the same motion that causes most lateral ankle sprains. This is actually another “sprain” mechanism. As the foot rolls inward, the peroneal muscles (peroneus longus and brevis) will contract maximally to correct the foot position, to avoid an injury. At the point of failure, the peroneus brevis will avulse it’s attachment to the base of the 5th metatarsal, causing a fracture, because the tendon is generally stronger than it’s attachment to the bone.

Prone Limb Rotation:

While the patient is prone, flex the knees to 90 degrees, then moves the feet outward to internally rotate the hips, then cross them inward to externally rotate the hips. Look for any asymmetry. This is sometimes called Staheli's Test. In kids this is important with limb rotational abnormalities and Cerebral Palsy which can cause contractures a the hip.

Lisfranc's joint:

Metatarsals 1, 2, and 3 each have a corresponding Cuneiform bone (Medial, Middle and Lateral, sometimes also called the First, Second, and Third Cuneiform).

Metatarsals 4 and 5 share the Cuboid in their proximal joints.

More importantly, Metatarsal-Cuneiform joints are stationary, while Metatarsal-Cuboid joints have about 15 degrees up and down motion. This complex arrangement is what makes Lisfranc's joint so important and it's injuries so devastating. In addition, the 2nd metatarsal - middle cuneiform joint is set slightly proximally, acting as a "keystone" creating the stability of the midfoot at Lisfranc's joint.

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