

Advanced Foot Assessment Lab

Objective: The student will become familiar with the form and procedures used to perform advanced foot assessments.

Materials:

1. Foot Pathology Assessment Form
2. Gloves
3. Goniometer
4. Discrepancy boards
5. Spirit Level

Procedure:

PTTD Assessment – Palpation

The palpation method is reliable for assessing possible Posterior Tibial Tendon issues. This method uses palpation of the Posterior Tibial Tendon pathway.

- The patient is instructed to sit with the leg suspended, knee slightly bent.
- The foot is loaded by the examiner. The pathway of the Posterior Tibial Tendon is palpated starting at the navicular.
- The Posterior Tibial Tendon is continued to be palpated moving to just below the malleoli.
- Care must be taken not to palpate the Posterior Tibial Tendon at the malleoli as this may cause injury to the patient.
- Finally, the Posterior Tibial Tendon is palpated superior to the malleoli.

PTTD Assessment – Single Heel Rise

A very popular test for Posterior Tibial Tendon Dysfunction is the single heel rise.

- While the patient is standing, ask them to perform the single heel rise test.
- While holding one foot off the floor, raise up on the ball of the other foot, lifting the heel off the floor.
- When the posterior tibial tendon is weak or ruptured, the midtarsal joint will be significantly unstable.
- If the patient is able to do the test, they are asked to repeat it.

Hallux Hyperextension Test

This test allows the clinician to determine possible mechanical coupling issues between the foot and the leg.

- This test is done with the patient in a weightbearing position.
- The clinician passively dorsiflexes the patient's hallux to end of its range of motion.
- Three observations should be made:
 - Dorsi-flexion of 1st MTPJ available beyond 20°
 - Rising of medial longitudinal arch
 - External rotation of tibia

- The test results are graded as follows:
 - Grade 0 No motion available
 - Grade 1 Dorsi-flexion of 1st MTPJ available beyond 20°
 - Grade 2 Dorsi-flexion of 1st MTPJ available beyond 20° with rising of medial longitudinal arch.
 - Grade 3 Dorsi-flexion of 1st MTPJ available beyond 20° with rising of medial longitudinal arch and external rotation of tibia

First metatarsal rise test

This test is linked to rupture of the posterior tibial tendon as well as the plantar ligaments.

- The test is performed with the patient weightbearing.
- The clinician proceeds to invert the heel of the symptomatic foot in a varus direction.
- When there is a dysfunction of the posterior tibial tendon, the clinician will see the first metatarsal rise off the ground as the heel is inverted.
- In the normal foot, supination of the rearfoot raises the height of the medial arch and the forefoot will remain plantigrade due to tensioning of the intact plantar ligaments.
- With absent or lax plantar arch ligaments, inversion of the heel causes no arch raise and the forefoot simply inverts with the rearfoot as one unit.

Lateral Block Test

Cavovarus deformities in the rear foot can result from a forefoot cavus deformity or an isolated plantarflexed first metatarsal.

- The test is performed with the patient weightbearing.
- The test is performed by placing the patient's foot on wood block, 2.5 to 4 cm thick, with the heel and lateral border of foot on the block and bearing full weight while the first, second, & 3rd metatarsals are allowed to hang freely into plantar flexion and pronation.
- The forefoot is "off-weighted" so that the rearfoot no longer has to compensate for a forefoot cavus.
- If heel varus corrects and becomes perpendicular while the patient is standing on the block, hindfoot is considered flexible;
- In rigid cavovarus foot, the deformity does not reduce.

Pelvic Obliquity and Limb Length Discrepancy

The purpose of this assessment is to identify pelvic obliquity and true limb length discrepancies.

- Patient should be weightbearing with shoes and socks removed, the knees fully extended, the feet together and facing away from the clinician.
- The clinician places a finger or two of each hand on each of the patient's iliac crests with a spirit level held with both thumbs
- Pelvic obliquity is present when the spirit level is not parallel to the floor.
- Leg length discrepancies should be investigated at this point.
- Relative height of the knees, presence of angular deformity, foot size and heel pad thickness should all be noted.
- Overall discrepancy can be assessed by having the patient stand with the short limb on graduated blocks until the pelvis is leveled.

- Leveling of the pelvis is more reproducibly assessed by comparing the position of fixed bony landmarks such as the top of the iliac crests or the posterior superior iliac spines with the spirit level.
- If a functional scoliosis is present, it will often be observed to straighten as the pelvis levels
- Examination is then performed with the patient prone, hips extended and knees flexed to 90 degrees.
- In this position the lengths of the femoral and tibial segments of the two limbs can be compared, and the relative contribution of the difference within each segment to the overall discrepancy can be determined grossly.
- The patient is next examined in supine position so that static measurements of the limb lengths can be performed. This is done with a tape measure.
- The distance from anterior superior iliac spine to medial malleolus represents the true length of the limb while that from umbilicus to medial malleolus the apparent length
- Tilting of the pelvis due to a lumbar scoliosis or to soft tissue contracture about the hips can create the appearance of limb shortening on the elevated side and will be reflected by a difference in the apparent length measure.
- Differences in the true length however, are absolute and represent actual lengthening or shortening of the limb

Hip Anteversion and Retroversion

This assessment is used to identify abnormal rotational malalignments of the femur in relation to the femoral neck.

- The patient should be viewed from the front with the knees facing forward.
- The clinician should observe abnormal toeing in or toeing out of the feet.
- A patient with increased femoral anteversion tends to stand with the limb in an internally rotated position, producing in-toeing.
- A patient with decreased femoral anteversion or femoral retroversion tends to stand with the limb in an externally rotated position, producing out-toeing.
- Next, perform a Craig's Test to estimate the amount of femoral anteversion present.
- The patient is placed prone with the ipsilateral knee flexed to 90 degrees.
- The clinician palpates the lateral prominence of the greater trochanter with one hand while controlling the rotation of the limb with the other.
- An imaginary vertical line serves as the reference for this test.
- The limb is then rotated until the lateral prominence of the greater trochanter is felt to be maximal.
- The angle made between the axis of the tibia and the vertical is considered an approximation of the femoral anteversion.
- Normal anteversion is between 8 degrees and 15 degrees.

Tibial torsion

Tibial torsion is the degree of rotation of the tibia along its long axis from the knee to the ankle.

- It is measured with the patient prone with his or her knees flexed to 90°.
- The clinician observes the feet from above for the angle between the line of axis of the thigh and the line along axis of foot.
- A normal finding is 10-15° of external rotation.

Metatarsus adductus

Metatarsus adductus is one of the most common pediatric abnormalities that responds well to early conservative treatment.

- It is measured with the patient supine.
- It is measured by comparing bisection lines through the heel and the forefoot. Normally a line bisecting the heel should continue on to pass close to the medial aspect of the 3rd toe. Adductus is present when this line passes lateral to the 3rd toe.
- The lateral border of the foot may be convex in appearance, and the 5th metatarsal head may be prominent.