ARCH HEIGHT OFF WEIGHTBEARING

• Evaluate arch height by placing a ruler from the heel to the first metatarsal head

• Compare arch height of one foot to the other

• Any digital deformities?
Low Arch
Cavus Foot – High Arch
Bleck’s Test

• Bisect the plantar heel
• Where does the ruler bisect the forefoot?
Metatarsus Adductus
HALLUX RANGE OF MOTION OFF WEIGHT BEARING

- Hallux range of motion off weight bearing
- Grasp the proximal phalanx and dorsiflex at 1st MPJ
First Ray Range of Motion

• Grasp forefoot so that thumb is under the metatarsal heads

• With your other hand grasp 1st metatarsal head
First ray range of motion - dorsiflexion
First Ray Motion - Plantarflexion
Plantarflexed First Metatarsal
Midtarsal Joint Range of Motion - oblique axis

- Supinate STJ
- Grasp foot just distal to the MTJ and put it through a range of motion
- (dorsiflex-abduct, plantarflex adduct)
Ankle Joint Range of Motion

- Bisect the lower lateral 1/3 of the leg and the lateral plantar aspect of the rearfoot
- Dorsiflex the ankle, keeping the STJ neutral and MTJ supinated
Ankle Range of Motion - Knee Extended
Ankle Dorsiflexion neutral versus pronated

Be sure STJ is neutral if you pronate foot (picture on right). It will appear that you have good range of motion but that is false.
Increased ankle joint dorsiflexion
Leg Length Evaluation

- Patient is supine
- Place hands on ASIS to make sure that pelvis is level
Leg Length Evaluation

- Compare the level of one malleolus to the other
Leg Length Evaluation

• Flex both hips and knees so that both heels are parallel with each other

• Compare knee heights
CHECK FOR SCOLIOSIS

ADAM’S FORWARD BEND TEST
Lumbosacral Area

- Patient had an underlying spinal tumor and unilateral cavus foot deformity
Netter’s Method of Assessing Femoral Anteversion  Ruwe et al JBJS 1992 74

- Patient is prone with knee flexed 90 degrees
- Palpate greater trochanter with one hand while opposite hand internally rotates hip
- At the point of maximum greater trochanter prominence, neck is parallel to the table
Clinical Measurement of Femoral Anteversion

• Angle formed between the tibia and true vertical represents the femoral anteversion
HIP ROTATION

Resseque
2017 (c)
EACH HOUR ON THE CLOCK REPRESENTS 30 DEGREES OF FEMORAL ROTATION
Hip Rotation - Extended

- Grasp leg behind knee and medially and laterally rotate from the hip
INCREASED MEDIAL FEMORAL ROTATION
Femoral Rotation

- Infants - 60 degrees lateral; 0-30 degrees medial
- 6 months of age - 50 degrees lateral; 30 degrees medial
- 1-4 years of age - 40-45 degrees lateral; 35-45 degrees medial
HIP ABDUCTION
(hip extended)
HIP ABDUCTION (hip flexed)
Tibial Torsion

- Place knee on the frontal plane

- Compare the medial malleolus to the lateral malleolus
Tibial Torsion

- Infant: 0-5 degrees
- 18 months: 9 degrees external
- 3 years: -12 degrees external
- 6 years: -18 – 23 degrees external
Tibial Torsion

Resseque
2017 (c)
MALLEOLAR POSITION

0 DEGREES

LESS THAN 0 DEGREES
What side is more severe? LEFT LEG
MEASUREMENT OF TRANSMALLEOLAR AXIS
Measuring malleolar position using tractograph
High Malleolar Position
High External Tibial Torsion
Hamstring Flexibility

- Hip and knee are extended
- Leg is raised to resistance
- 70 degrees of hip flexion should be obtained
POPLITEAL ANGLE

- With hip flexed 90 degrees, extend knee until firm resistance is met, acute angle between lower leg & imaginary line extending up from flexed femur

- Birth- 2 yrs. 0-6 degrees

- 5 and older 0-25 degrees  full ROM
POPLITEAL ANGLE

- If popliteal angle close to 90 degrees (very tight), suspect pathology of nerve roots (spondylolesthesis, tumor, diskitis, syrinx)

Resseque
2017 (c)
Hip Flexors

- Patient is supine
- Flex both hips. While maintaining one hip flexed, extend the other hip. The extended leg should touch the supporting surface.
Subtalar Joint Neutral Position

- Bisect lower 1/3 of leg
- Bisect posterior calcaneus
- Place STJ in neutral position
Subtalar Joint Neutral Position

- Observe relationship between heel and lower leg
Subtalar Varus
Subtalar Joint Range of Motion

- Patient is prone.
- Rotate heel into maximum supination
Subtalar Joint Range of Motion

- Rotate heel into maximum pronation
- There should be a 2:1 relationship between supination and pronation. A young child may have a 3:1 or 4:1 ratio

Resseque 2017 (c)
Forefoot to Rearfoot Relationship

- Place STJ in neutral position
- Place thumb on 4th and 5th metatarsal heads and dorsiflex to resistance
Forefoot to Rearfoot Relationship

• Compare plane of metatarsals to heel bisection

• The plane of the metatarsals should be perpendicular to the heel bisection
Forefoot Varus

- Loading 4th & 5th metatarsal heads
- Note low arch contour
Forefoot Varus - left foot
Forefoot valgus - left foot
Stance Measurements
Genu Varum or Valgum

- Place patient’s feet so that ankles are as close together as possible
Genu Varum

- If ankles touch and knees can’t, a genu varum.

Resseque 2017 (c)
Genu Valgum

- If knees touch and ankles can’t, a genu valgum
Normal Ranges

• Birth – 1 ½ genu varum
• 1 ½ - 3 straight
• 3 – 6 genu valgum
• 6 – 12 straight
Ligamentous Laxity
Ligamentous Laxity
Ligamentous Laxity
Ligamentous Laxity
Ligamentous Laxity
Ligamentous Laxity
Beighton Scale
4 or > out of 9

2 pts. dorsiflexion of 5th MCP joint > or equal to 90 degrees

2 pts. Opposition of thumb to volar surface of forearm

2 pts. Hyperextension of elbows > or equal to 10 degrees

2 pts. Hyperextension of knee > or equal to 10 degrees

1 pt. Place hands flat on floor without bending knees
Lumbar Lordosis
Arch Height On Weight Bearing

Tell patient to take a few steps in place and then stop.

• This is their angle and base of stance

• Compare arch height of one foot to the other
Arch Height
Wide Base of Stance
3 year old hypotonic child
Hallux Range of Motion On Weight Bearing

- Place patient in angle and base of gait
- Dorsiflex hallux
- 15-20 degrees dorsiflexion
Relaxed Calcaneal Stance Position

• Have the patient take a few steps in place and then stop

• Compare the heel bissection to an imaginary perpendicular to the ground
Relaxed Calcaneal Stance Position - Valgus
Relaxed Calcaneal Stance Position - Varus
MIDTARSAL JOINT SUBLUXATION

Resseque
2017 (c)
Neutral Calcaneal Stance Position

- Patient is placed in angle and base of stance
- Place patient in neutral
- Compare heel bisection to imaginary perpendicular line
RELAXED CALCANEAL STANCE POSITION
Tibial Varum or Valgum

- Place subtalar joint in neutral
- Compare lower leg bisection to an imaginary perpendicular to the ground

Resseque 2017 (c)
Tibial Varum 1 year old
Malleolar Heights

• Have the patient take a few steps in place and then stop

• Compare the level of one malleolus to the other
Malleolar Heights

- The left foot is more pronated than the right because the left malleolus is lower
CONCLUSION