Abnormal Gait
Review Last Lecture

• Definition of Gait?
• What are the 2 phases of gait?
• 5 parts of stance phase?
• 3 parts of swing phase?
Abnormal Gait

- An altered gait pattern reflecting
  - any lower extremity defects or injuries
    - joints
    - muscles
Gait Deviations

• Normal gait requires adequate strength & ROM of all participating joints, proprioception & balance

• The body can adapt during injury or pathology by making certain biomechanical compensations (often subconsciously)

• Often patients show a very characteristic gait deviation that is assoc with either compensation or a consequence of a specific impairment
Weak Dorsiflexors

Compensations / Consequences

- landing with flat foot instead of heel
- equinnus gait
- foot slap
- drop foot
- steppage gait
Weak Quads

• Normally, during early stance as weight is being shifted onto the stance leg, the line of force falls behind the knee requiring quad contraction to prevent buckling of knee.

• With quad weakness, patient leans forward at hip, causing COG to be shifted forward so line of force falls anterior to knee, forcing it into extension
Hamstring Weakness

• What may happen:
  – During the deceleration part of the swing phase, without the hamstrings to slow down the swinging forward of the lower leg, the knee will snap into extension
Genu Recurvatum

- Caused by quadriceps paralysis, plantarflexion contracture, or hamstring weakness
- Results in excessive hyperextension of knee during stance phase
Weak Hip Abductor

• 2 things happen:
  – The contralateral side of the pelvis drops b/c the weak glut. med. is unable to stabilize the pelvis
  – The trunk leans over the ipsilateral side during stance phase

• This is referred to as a “Trendelenburg gait”
Weak Gluteus Maximus

- Weak hip extensors
- You will see backward lean of the trunk during early stance phase
- Which shifts the line of gravity posterior to the hip reducing the demands of the hip extensor muscles
Weak Gastroc/Soleus

- There is no heel rise at push off
- Resulting in a shortened step length on the unaffected side
- Noticeable on level ground, but most pronounced when walking up an incline
Hip or Knee Flex Contracture

- Patient has flexed position of hip & knee during stance phase
- Will often see increased lumbar lordosis and reduced stride length
- Often referred to as a “crouched gait”
Hip Hiking

• Caused by any impairment that limits the ability of the LE to functionally shorten
• Example: weak hip flexors
• So, the contralateral pelvis elevates during swing phase to provide for extra clearance for the advancing leg
Hip Circumduction

• Compensation may be seen with any impairment of the LE that reduces the ability to reduce the length of advancing limb

• You will see the swing leg advance in a semi-circular arc, which creates extra clearance for the advancing leg

• Which muscles, then, need to be adequate enough to accomplish this?
Vaulting

• Compensation may be seen with any impairment of the LE that reduces the ability to reduce the length of advancing limb
• Ex: inability to flex hip or knee
• Rising up on the toes of stance foot so that advancing limb can clear the floor
Hemiplegic Gait

- This gait pattern will vary depending on the severity and the amount of spasticity present.
- Generally, with spasticity, there is an extension synergy in the LE (hip add, ext, IR & ankle PF, inv).
- Usually no reciprocal arm swing.
- Step length tends to be lengthened on involved side and shortened on uninvolved side.
Ataxic Gait

• Due to cerebellar dysfunction
• The patients lack coordination, which leads to jerky, uneven movements
• Balance tends to be poor
• So, the patient walks with a ________ BOS
• The patient usually has difficulty walking in a straight line & tends to stagger
• All movements appear exaggerated
Parkinsonian Gait

- LE & trunk tend to be flexed
- Elbows partially flexed with little or no arm swing
- Stride length greatly diminished
- Shuffling gait with flat feet & weight mostly forward on the toes
- Gait tends to start slowly and increase in speed, with difficulty stopping
- Festinating gait: feet trying to keep up with forward leaning trunk
Scissors Gait

- Caused by hip adductor spasticity
- Most evident during swing phase
- BOS is _______________
- The trunk may lean over the stance leg as the swing leg attempts to swing past it
Antalgic Gait

• When any LE joint is painful, the tendency is to shorten the stance phase

• A shortened, often abducted, stance phase on the involved side results in a rapid and shortened step length of the uninvolved side
Leg Length Discrepancy

• Unequal leg length
• Compensations include dropping the pelvis on the shortened side or leaning over the shorter limb
• If LLD is too great to be compensated with above, then you will see an equinnus gait
• If LLD still too great, may need to also flex knee of longer leg
Recap of Lecture

• Weak dorsiflexors?
• Vaulting?
• Hip hiking?
• Weak hip abductors?
• Hip circumduction?
• Ataxic gait?
• Antalgic gait?
Looking Forward

• Gait with Assistive Devices
Questions???

• Mansfield, P.J., Newmann, D.A., (2009), Essentials of Kinesiology for the Physical Therapist Assistant, Mosby: St. Louis, MO.