Gait Disorders

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Disclosures

• NO SIGNIFICANT FINANCIAL, GENERAL, OR OBLIGATION INTERESTS TO REPORT
Learning Objectives

• Explain the normal development of gait
• Describe various gait disorders and recognize their cause and association with underlying neurological disorders
• Incorporate the observation of gait into your clinical examination
“If I had just one chance to make the diagnosis, I would choose the most important single part of the neurologic examination: watching the patient rise, stand, and walk.”

— William E. DeMyer, MD

• Technique of the Neurologic Examination
The Riddle of the Sphinx

“What goes on four legs at dawn, two legs at noon, and three legs in the evening?”

Man
Development of Walking

• Automatic or reflex stepping (0-2 months)
• Crawling (~7 months)
• Standing (~9 months)
• Cruising gait (~12 months)
• Toddler’s gait (12-18 months)
• Mature gait (~3 years)
What’s Important For Normal Gait?

• Motor system
• Sensory system (proprioception, light touch)
• Cerebellar system
• Visual system
• Vestibular system
• Bones, joints, ligaments, tendons...
Examination of Gait & Balance

- **Observation**
- How does the patient rise?
- Is initiation of gait normal?
- Evaluate stride
- Is heel and foot motion normal?
- Is the gait steady?
- Is the base narrow or wide?
- Is the patient swinging their arms?
- How do they turn?
- Can they walk in tandem?
Romberg Sign

• Will detect a lesion in either the vestibular system or somewhere along the pathways sub-serving proprioception
Gait Disorders Can Be Localized By:

- Characteristics of the gait disorder
- Identification of accompanying neurological symptoms and signs
Steppage Gait

• 2 causes
  – Severe foot drop
    • Inability to dorsiflex at ankle compensated by excessive flexion of hip and knee with each step
  – Severe proprioceptive loss
    • Lack of proprioception leading patients to strike foot down heavily with each step to cause pain
    • “slappage gait”
Localization

• In the case of foot drop:
  – Corticospinal pathway
  – L5 nerve root
  – Sciatic or peroneal (fibular) nerve
  – Severe generalized large fiber polyneuropathy

• In the case of “slappage gait”:
  – Dorsal columns
  – Severe generalized large fiber polyneuropathy
Vestibular Ataxia

- Acute lesions cause instability and tendency to veer toward side of lesion
- Base of support widened
Waddling Gait

• Seen with severe proximal leg muscle weakness (especially gluteii)
• Excessive drop of hip with each step
• Trunk tilts to side opposite foot planted
• Hips therefore oscillate up and down with each step
• Lumbar lordosis accentuated
Localization

• Most often seen in myopathies
• Can be seen with severe bilateral lumbosacral nerve root disease as well
• If unilateral, will see Trendelenburg sign
Gower’s Sign

1. Initial position
2. Lowering the body forward
3. Touching the ground or stretching to the feet
Spastic Gait

• Lesion of corticospinal tract
• Can be unilateral
• Will see “scissoring” if bilateral
Cerebellar Ataxic Gait
Cerebellar Ataxic Gait
Parkinsonian Gait

- Slowed initiation
- Stooped posture
- Slightly flexed knees
- Reduced arm swing
- Slow, short steps
- Festination
- Turn *en bloc*
Cautious Gait

- Poorly localizing
- Slight widening of base, short and slow stride
- Often seen in older people or those with a history of falls
- Can be sign of incipient more severe gait disorder
Cautious Gait
Frontal Gait Disorders

• Gait often described as magnetic
• Incorrectly called “apraxia of gait”
• Characterized by:
  – Slowed initiation
  – Feet glide along floor
  – Short steps
  – Arm swing preserved
  – Turns broken down into many steps
Normal Pressure Hydrocephalus

• Clinical triad of:
  – Frontal gait disorder
  – Dementia
  – Urinary incontinence

• Due to impaired CSF resorption from arachnoid granulations
Normal Pressure Hydrocephalus
Treatment of NPH

- Ventriculoperitoneal, ventriculoatrial, or lumboperitoneal shunting
- Rule of 1/3rds
Antalgic Gait

- Limp
- Generally indicates pain
- Important to consider non-neurological causes
Astasia-Abasia

• Psychogenic Gait

• 6 Key Features

  1. Moment-to-moment fluctuation
  2. Excessive slowness or hesitation
  3. Exaggerated sway on Romberg
  4. Postures that waste energy
  5. Extremely cautious steps (like walking on ice)
  6. Sudden buckling of the knees without falling
Questions?