Normal Gait Review

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Quick Review of Normal Gait

- Why?
  - A thorough understanding of normal gait is absolutely essential in order to understand pathological gait.
  - Understanding the pathological gait and how it deviates from normal is critical in establishing a plan of care, selecting treatments, and/or prescribing appropriate orthotics to correct this pathology
3 Functional Tasks of Normal Gait

- Weight acceptance
  - Forward progression, shock absorption, stability
- Single limb support
  - Stability, forward progression
- Swing limb advancement
  - Foot clearance
  - Limb advancement

Phases of Gait Review

If you never really learned these (hopefully that is not the case), or if you just don’t remember them completely...

please take a second to study the following slides. Understanding this is critical for prescribing an appropriate orthosis!

Review based on Dr. Perry’s Gait Analysis
**Initial Contact (IC)**

- **Hip**
  - 20° flexion
  - Hamstrings on to slow limb, other extensors on

- **Knee**
  - Neutral
  - Quadriceps

- **Ankle**
  - Neutral
  - Pretibials

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**Loading Response (LR)**

- **Hip**
  - Still at 20°
  - Extensors and abductors

- **Knee**
  - 15° flexion
  - Quadriceps

- **Ankle**
  - 5° PF
  - Pretibials
  - Heel Rocker
Mid stance (MS)

- Hip
  - Neutral
  - Abductors
- Knee
  - Neutral
  - Quads initially, then no muscle activity
- Ankle
  - 5° DF
  - Calf
  - Ankle Rocker

Terminal Stance (TS)

- Hip
  - 20° hyperextension
  - No muscle activity
- Knee
  - Neutral
  - No muscle activity
- Ankle
  - 10° DF
  - Calf
  - Forefoot Rocker
- Toes
  - 20-30° extension
Pre Swing (PSw)

- Hip
  - 10° hyperextension
  - adductors
- Knee
  - 40° flexion
  - No muscle activity
- Ankle
  - 15° PF
  - No muscle activity
- Toes
  - 55-60° extension

Updates on Rockers

You may have learned of only 3 rockers. In Dr. Perry and Burnfield’s most recent edition of *Gait Analysis*, they discuss a 4 rocker system.
Initial Swing (Isw)

- Hip
  - 15° flexion
  - Flexors

- Knee
  - 60° flexion
  - Flexors

- Ankle
  - 5° PF
  - Pretibials

Mid Swing (MSw)

- Hip
  - 25° flexion
  - Flexors initially, then hams

- Knee
  - 25° flexion
  - Flexors

- Ankle
  - Neutral
  - Pretibials
Terminal Swing (TSw)

- Hip
  - 20° flexion
  - hamstrings
- Knee
  - Neutral
  - quads
- Ankle
  - Neutral
  - pretibials

Torque

Above, a flexion moment or torque is being generated at the knee because the body weight line (vector) is behind the knee joint.

An equal and opposite muscle action (of the quads) is necessary to keep knee from collapsing into greater flexion. Muscle action greater than the flexion torque is necessary to move knee toward extension.