# American College of Physicians - Internal Medicine Meeting 2026
# San Francisco, CA

Function-Focused Gait Assessment

## Faculty Information


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# Function-Focused Gait Assessment

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**This is an interactive workshop with the following goals:**

1. Reinforce your recognition of abnormal gait
2. Provide go-to clinical exams that provide quantitative data
3. Strengthen your documentation for longitudinal observations

**Presentations:**

- **Familiarize you with basic gait concepts (anatomy, biomechanics, normal gait pattern) and pathologic gait patterns**
- **Create framework for observing key features of gait assessment (Why, When, What, and Welcome to Medicare visit)**
- **Expand your knowledge with the role and utilization of physical therapy**

**Hands-on Practicum:**

- **Practical gait assessment techniques for clinical use**
- **Demonstration of mobility aids and orthotics**

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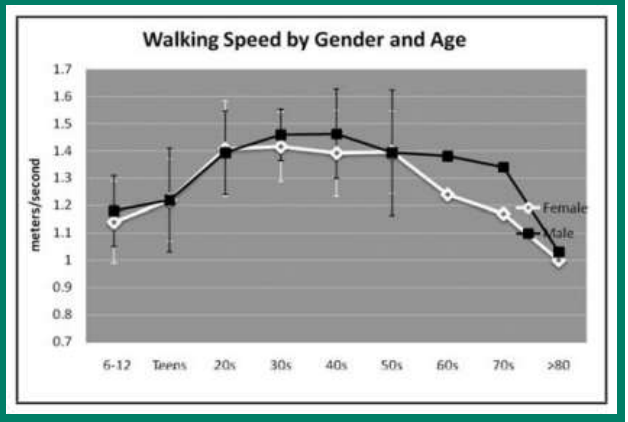
# What is Function-Focused Gait Assessment All About?

Universal activity generally taken for granted until altered or impaired

Walking falters for many reasons

Falls and predicting life expectancy




Fritz and Lusardi, Journal of Geriatric Physical Therapy, 2009

"Gait Speed and Survival in Older Adults" Studenski et al, JAMA 2011

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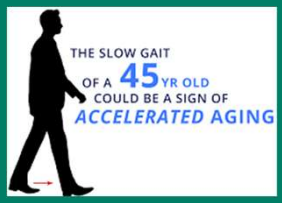
## Walking speed: the "6th vital sign"

>1.0 m/sec (2.2 mph)
Cross streets safely

< 0.8 m/sec (1.8 mph)
Household ambulatory
Need assistive device
High risk for hospitalization

< 0.2 m/sec (0.4 mph)
Discharge to SNF
Extremely frail




Fritz and Lusardi, Journal of Geriatric Physical Therapy, 2009
Rasmussen et al. JAMA Network Open, Oct. 11, 2019

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## Important Gait Concepts

Center of Gravity (Mass)
Step vs Stride
Gait Cycle
Primary Muscle Involvement
Joint Range of Motion

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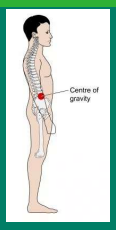
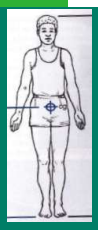
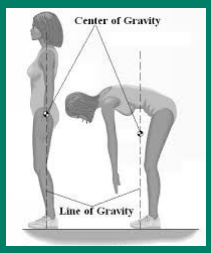
# Center of Gravity



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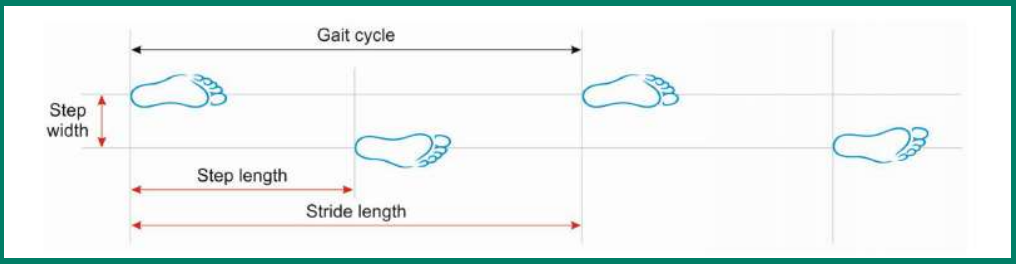
# Step versus Stride




Gait disorders in adults and the elderly, 2017

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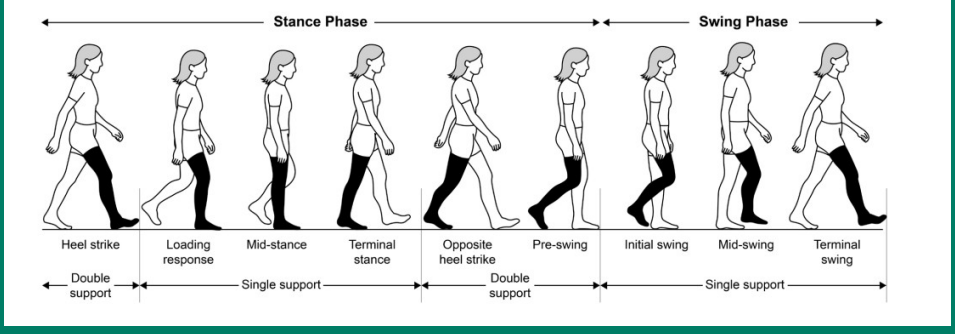
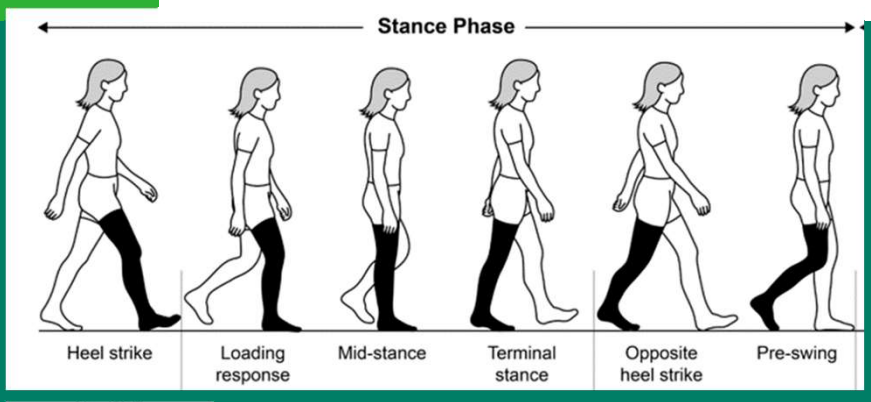


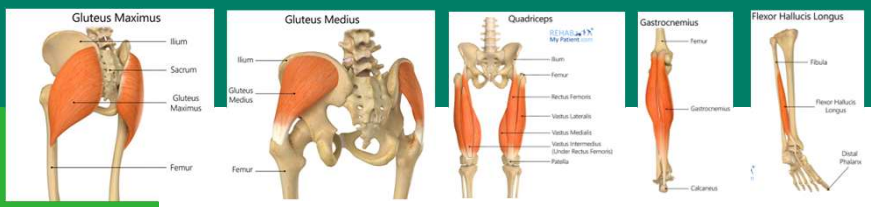

# Gait Cycle

Osevala and Hills, Geriatric Review Syllabus, 11th Ed. 2022

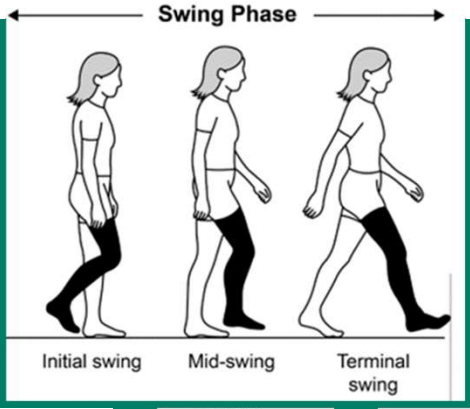


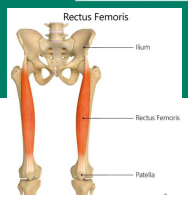
# Gait Cycle: Primary Muscles in Stance Phase



# Gait Cycle: Primary Muscles in Swing Phase






www.rehabmypatient.com/

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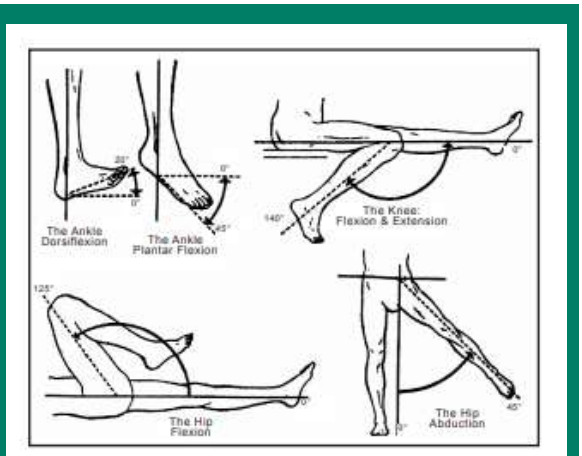
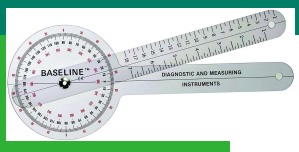
# Range of Motion

| | |
|---|---|
| Hip Flexion | 120 - 125° |
| Extension | 10 - 20° |
| Abduction | 35 - 45° |
| IR/ER | 45° |
| Knee Flexion | 135 - 145° |
| Extension | 0 - 5° |
| Ankle Plantarflexion | 45 - 55° |
| Dorsiflexion | 15 - 25° |




Merck Manual; NCBI
www.physio-pedia.com/Gait

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# End of Basic Gait Concepts


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# Promoting a Functional Gait

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## Objectives

- Learn when to refer a patient to your local PT for gait evaluation
- Learn how to choose an ambulatory device or an orthotic for a pathologic gait pattern to promote an improved functional gait
- Learn importance of getting to know your local PT

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## Indications for Physical Therapy Referral

- Strengthening
- ROM
- Pain (musculoskeletal)
- Balance training
- Functional mobility
- Vestibular therapy
- Neuromuscular re-education
- Gait training/fall prevention
- **DME needs – ambulatory device vs. orthotic**

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# Durable Medical Equipment (DME)

Medicare Guidelines

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## DME Life Expectancy

- 5 years
- Unless lost, stolen, or accidentally damaged beyond repair (includes natural disasters)
- Or, change in patient's condition

www.medicare.gov
www.medicareinteractive.org

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## Hemiplegic Gait

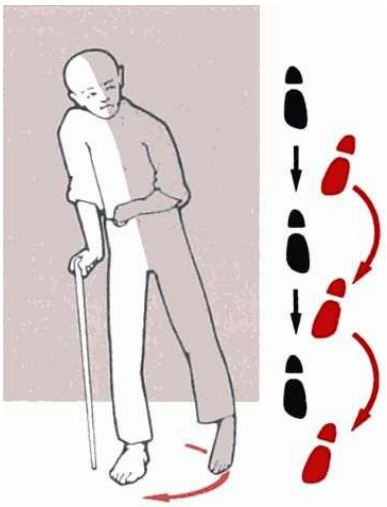

Image: Researchgate.net, Pinterest

- One sided deficit due to paresis
- Impaired natural swing at the hip and knee with leg circumduction

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## Possible Hemiplegic Gait Devices

Platform Rolling Walker

Hemi-walker

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## Hemiplegic Gait Devices cont…

Quad Cane | Hurry cane | Single Point Cane

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## Molded Ankle Foot Orthosis (MAFO)

Eligibility:

- Expected need is to be > 6 months
- Need for control > 1 plane of movement at the knee, ankle, or foot
- Could not be fitted with pre-fabricated orthotic

Image: researchgate.com

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## MAFO continued

Image: IndiaMART.com

Pros:

- Customized
- Modifiable after fabrication
- Controls multiple planes of movement
- More stability

Cons:

- Little energy return
- Doesn't allow for fluctuating edema
- Less mobility

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## Neuropathic Gait

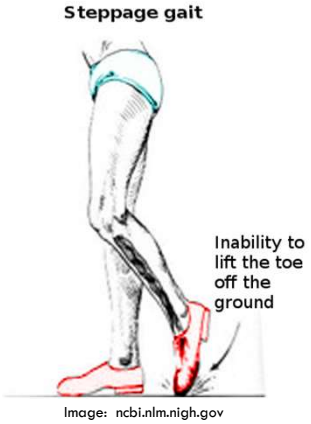


Image: ncbi.nlm.nigh.gov

- Foot drop/Steppage gait
- Weakness of muscles in the distal limb, typically dorsiflexors due to nerve damage
- AFO, MAFO, Functional Electrical Stimulation

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## Ankle Foot Orthosis (AFO)

Eligibility:

- Ambulatory
- Diagnosis of weakness/deformity of foot & ankle – need for stabilization
- Potential to benefit functionally
- Condition is permanent or longstanding duration

Image: restorahealthcare.com

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## AFO continued

Carbon Fiber

Pros:

- Stronger
- Lighter
- Minimalist design
- Increased kinetic energy

Cons:

- Less customized
- Less medial/lateral stability
- Minimal to no modification after fabrication

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## Myopathic Gait

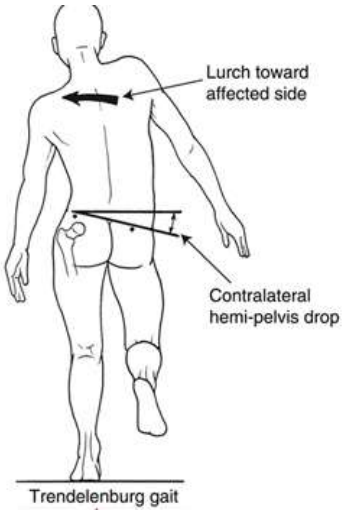


Image: BMJ, pemplaybook.org

- Waddling gait or Trendelenburg gait
- Due to hip weakness

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## Possible Myopathic Gait Devices

Rolling walker

- 5-7 lbs.
- Typical max capacity: 300 lbs.
- Typical wheel size: 5” diameter

Rollator

- 11-21 lbs.
- Typical wheel size: 6-8” diameter

Offset Cane

- Allows for mild weight bearing

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## Stooped Posture

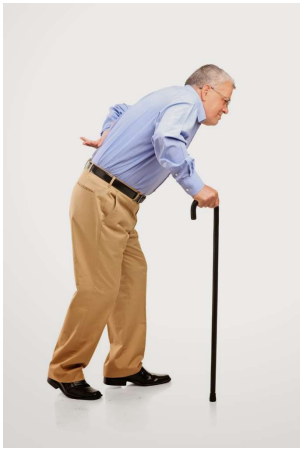

Image: hiltonbmenz.com

- Lumbar flexion
- Thoracic kyphosis
- Wide base of support

Upright Walker??

Image: oassispace.com

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## In Summary: Things to Consider When Ordering DME

- Lifting restrictions?
- Live alone?
- Stairs?
- Cognitive impairment?
- Be specific with your prescription:
  - Rollator walker with 4 wheels and a seat
  - Bariatric
  - Pediatric
  - Narrow based vs. wide based quad canes

When in doubt, consult your local PT:

"PT Eval for ambulatory device or PT eval and treat gait/balance/fall prevention"

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# Thank You!

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# The Why, When, and What of Gait Assessment

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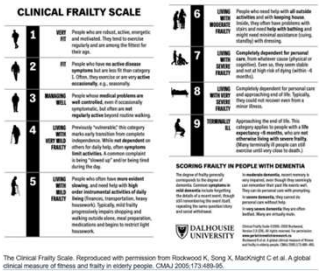
## Framing your perspective on gait assessment

- Like most diseases, risk of gait impairment increases with age and is associated with increased morbidity and mortality
- Slowed walking speed (along with weakness, low physical activity, low energy and weight loss) is one of the 5 phenotypic components manifest in frailty syndrome (physiologic state of heightened vulnerability for older adults)
  - Clinical Frailty Scale
  - FRAIL Scale




The Clinical Frailty Scale. Reproduced with permission from Rockwood K, Song X, MacKnight C et al. A global clinical measure of fitness and frailty in elderly people. CMAJ 2005;173:489-95.

| | QUESTION | SCORING | RESULT |
|---|---|---|---|
| F | **FATIGUE**<br>How much of the time during the past 4 weeks did you feel tired?<br>A = All or most of the time<br>B = Some, a little or none of the time | A = 1<br>B = 0 | |
| R | **RESISTANCE**<br>In the last 4 weeks by yourself and not using aids, do you have any difficulty walking up 10 steps without resting? | Yes = 1<br>No = 0 | |
| A | **AMBULATION**<br>In the last 4 weeks by yourself and not using aids, do you have any difficulty walking 300 metres OR one block? | Yes = 1<br>No = 0 | |
| I | **ILLNESS**<br>Did your Doctor ever tell you that you have?<br>☐ Hypertension<br>☐ Diabetes<br>☐ Cancer (not a minor skin cancer)<br>☐ Chronic lung disease<br>☐ Heart attack<br>☐ Congestive heart failure<br>☐ Angina<br>☐ Asthma<br>☐ Arthritis<br>☐ Kidney disease | 0 – 4 answers ✔ = 0<br>5 – 11 answers ✔ = 1 | |
| L | **LOSS OF WEIGHT**<br>Have you lost more than 5kg or 5% of your body weight in the past year? | Yes = 1<br>No = 0 | |
| | | TOTAL SCORE | |
| | SCORING: ROBUST = 0 PRE-FRAIL = 1-2 FRAIL = >3 | | |

- Identification of gait impairment creates an opportunity for further gait and functional assessment, education, and management of contributing conditions
- Severely impaired mobility is a red flag that should prompt a frailty assessment

https://efrailty.hsl.harvard.edu/ToolClinicalFrailtyScale.html

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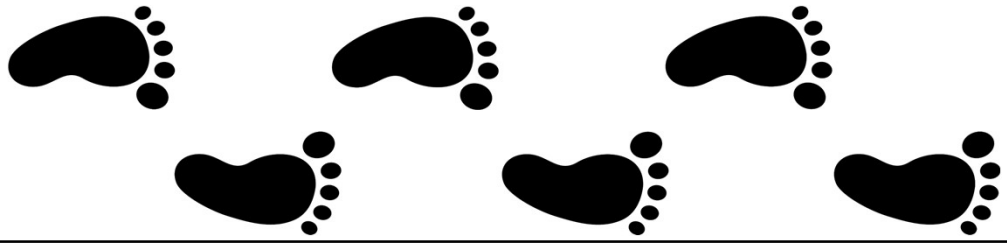
## Why perform a gait assessment?

- Gait and balance disorders increase with age from 10% at age 60-69 to more than 60% in those >80 years old
- Community-dwelling older adults with gait disorders, especially neurologically abnormal gait disorders, are at highest risk for institutionalization and death
- Gait impairment negatively impacts quality of life, threatens preservation of functional independence, and is associated with falls
- Complications from falls are the leading cause of death from injury in adults ≥65 years old



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## When to inquire about and assess gait?

- The “Welcome to Medicare” visit
- Annual visit
- After a surgery (elective or urgent)
- After hospitalization
- During and following an acute illness

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## What questions can indicate current or impending gait disturbances?

- Do you limit leaving your home due to difficulty walking?
- Do you hold onto furniture or walls when moving around your home?
- Do you use an assistive device?
- If you use an assistive device, was it prescribed by a physical therapist?
- Are you fearful of falling or have you fallen?
- Is it difficult to rise from a chair or walk across a room?

- A “yes” to any of these questions should prompt a formal gait assessment

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