Functional Assessment

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Disclosure

I have no actual or potential conflict of interest in relation to any product or service mentioned in this program or presentation.

Learning Objectives

1. Describe the main components of a physical therapy evaluation.

2. Discuss practical tools that can be used for assessing bed mobility, gait, balance, transfers, functional strength, and community mobility.

3. Explain the utility of functional assessments as well as limitations.

4 Interpret clinical decision making with a focus on functional mobility.

Physical Therapy Evaluation at a Glance

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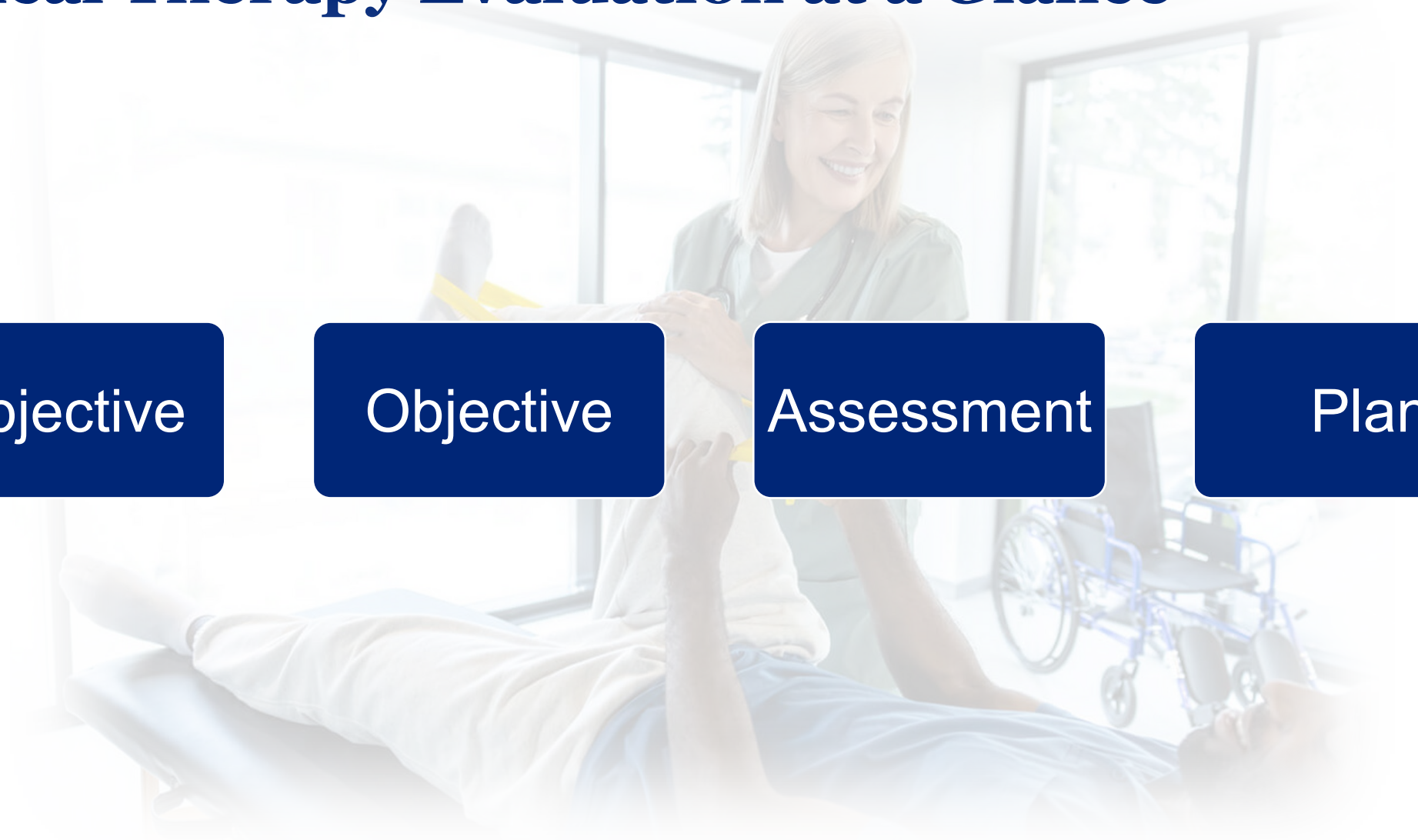


- Subjective
- Objective
- Assessment
- Plan

Physical Therapy Generic Evaluation at a Glance

Subjective	Objective	Assessment	Plan
Demographics	Observation/Posture	Clinical Impression/ PT Diagnosis	Interventions
Chief Complaint/Pain	Systems Review/ Neurological Screen	Contributing Factors	Home Exercise Program
History of Present Illness	Range of Motion	Prognosis	Freq/Duration
Past Medical/Surgical History	Strength Testing	Goals Short Term (2-4 weeks)	Referral/Collaboration
Medications	Palpation	Goals Long Term (6-8+ weeks)	
Social History	Special Tests		
Systems Review/Red Flags	Functional Tests		

Strength Testing

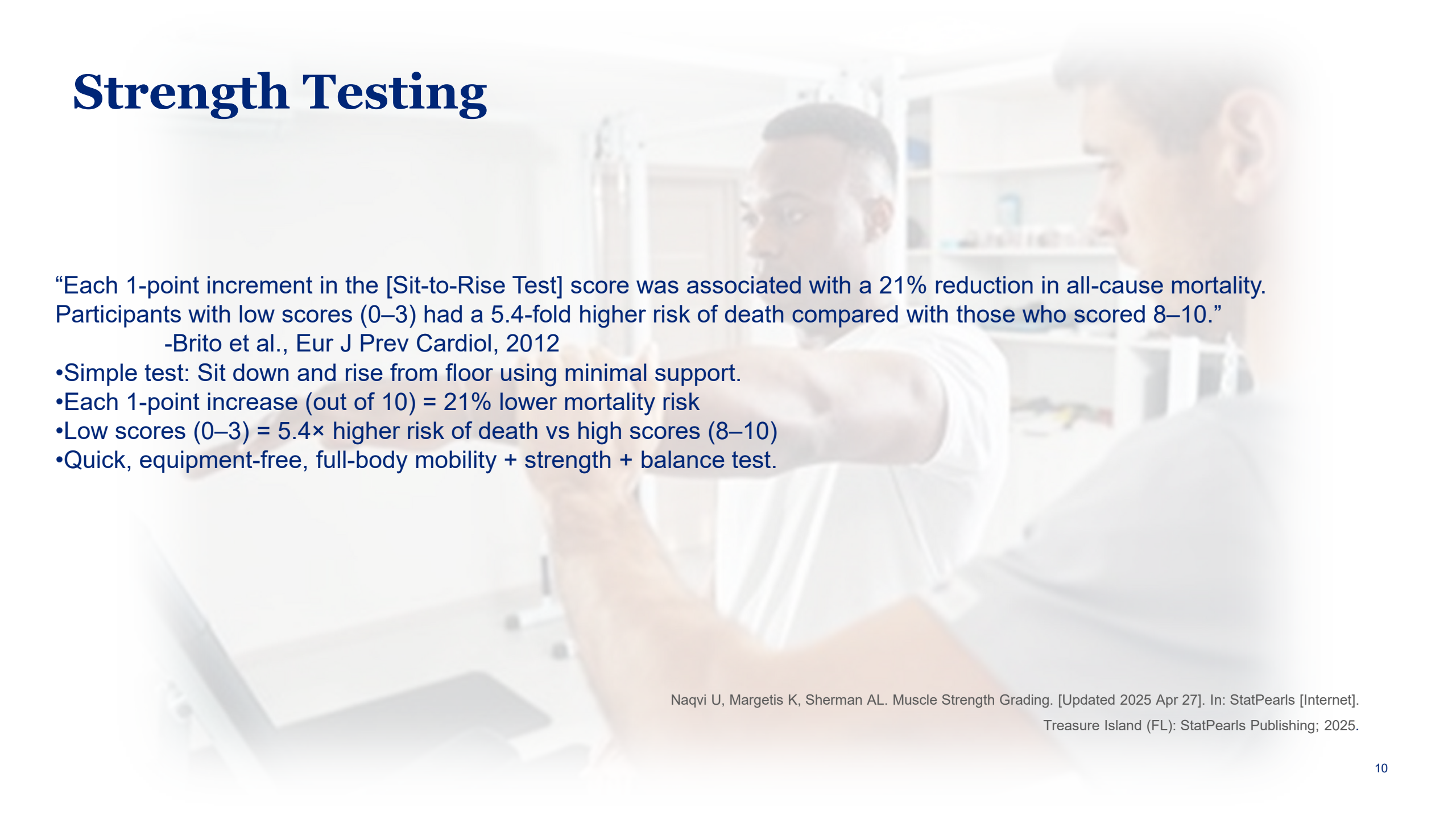
Muscle strength testing is used to detect weakness, aiding in evaluating neuromuscular, musculoskeletal, and neurological conditions; this testing modality plays a crucial role in diagnosing disorders, tracking disease progression, guiding rehabilitation, and evaluating treatment effectiveness.

“Both quadriceps and grip strength were strongly related to mortality. … This study confirms that measures of lower muscle strength, both quadriceps and grip, are strong and independent predictors of mortality in older adults.”
-Newman et al., J Gerontol A Biol Sci Med Sci, 2006

-Each 1 SD drop in quad strength (38 Nm):
-Men: 51% increased risk of death (HR 1.51, 95% CI 1.28–1.79)
-Women: 65% increased risk of death (HR 1.65, 95% CI 1.19–2.30)
-Muscle size did not predict mortality—only strength mattered.
-Study followed 2,292 U.S. adults aged 70–79 over ~5 years.

Naqvi U, Margetis K, Sherman AL. Muscle Strength Grading. [Updated 2025 Apr 27]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025.

Strength Testing



“Each 1-point increment in the [Sit-to-Rise Test] score was associated with a 21% reduction in all-cause mortality. Participants with low scores (0–3) had a 5.4-fold higher risk of death compared with those who scored 8–10.”

-Brito et al., Eur J Prev Cardiol, 2012

- Simple test: Sit down and rise from floor using minimal support.
- Each 1-point increase (out of 10) = 21% lower mortality risk
- Low scores (0–3) = 5.4× higher risk of death vs high scores (8–10)
- Quick, equipment-free, full-body mobility + strength + balance test.

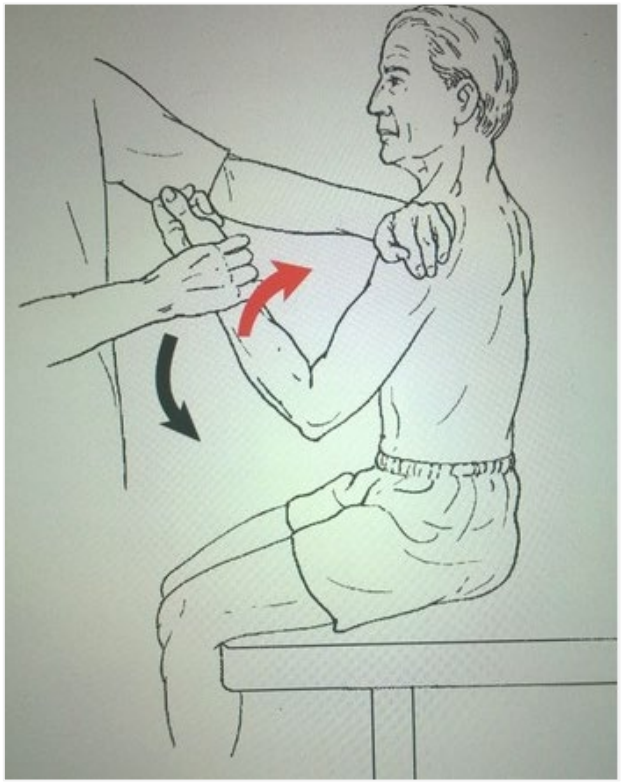
Naqvi U, Margetis K, Sherman AL. Muscle Strength Grading. [Updated 2025 Apr 27]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025.

Strength Testing

Oxford Scale (MMT) - aka Medical Research Council (MRC) Scale for Muscle Strength

- Most widely accepted method of grading muscle strength clinically
- Tests specific muscles against therapist's resistance
- Scoring is subjective; requires clinician training; patient effort can affect outcomes
- Graded (0-5)

0	No muscle activation
1	Trace muscle activation, such as a twitch, without achieving full range of motion
2-	Unable to hold against gravity; able to move through partial range in a gravity eliminated position
2	Muscle activation with gravity eliminated, achieving full range of motion
2+	Unable to hold against gravity; achieves only partial ROM against gravity; in a *gravity eliminated (GE) position
3-	Unable to hold against gravity; patient gradually falls from test position
3	Muscle activation against gravity, full range of motion
3+	Able to hold against gravity and resist minimal pressure before muscle failure; 1-24% effort from examine
4-	Able to hold against gravity and resist slight to moderate pressure before muscle failure; 25-49% effort from examiner
4	Muscle activation against some resistance, full range of motion; 50-74% effort from examiner
4+	Able to hold test position and resist moderate to strong pressure before muscle failure; 75-95% effort from examiner
5	Muscle activation against examiner's full resistance, full range of motion; > 95% effort from examiner



Strength Testing

- Dynamometer
- Return to sport readiness: side plank/holding single leg bridge
- Functional Strength
  - 5X Sit-to-Stand
  - 30 sec Chair Stand
- Isokinetic testing (Biodex)
  - Used in sports medicine and research
  - High cost/not practical for most settings
  - Force measured through given range of motion at constant speed

Physical Therapy Evaluation Joint Range of Motion

- Analog Goniometer
- Digital Goniometer/Inclinometer
- Bubble Inclinometer
- Smart Phone Apps/Mobile Inclinometer
- Wearable Devices
- Visual Estimation
- Tape Measure

Range of Motion

- Joint ROM
- Passive ROM
- Active ROM
- Active Assisted ROM
- Muscle Length Testing (1 vs. 2 joint muscles)

Typical length of hip flexors (negative test)

Shortness of both one-joint and two-joint hip flexors (positive test)

Joint Range of Motion Norms

Select Common Joints

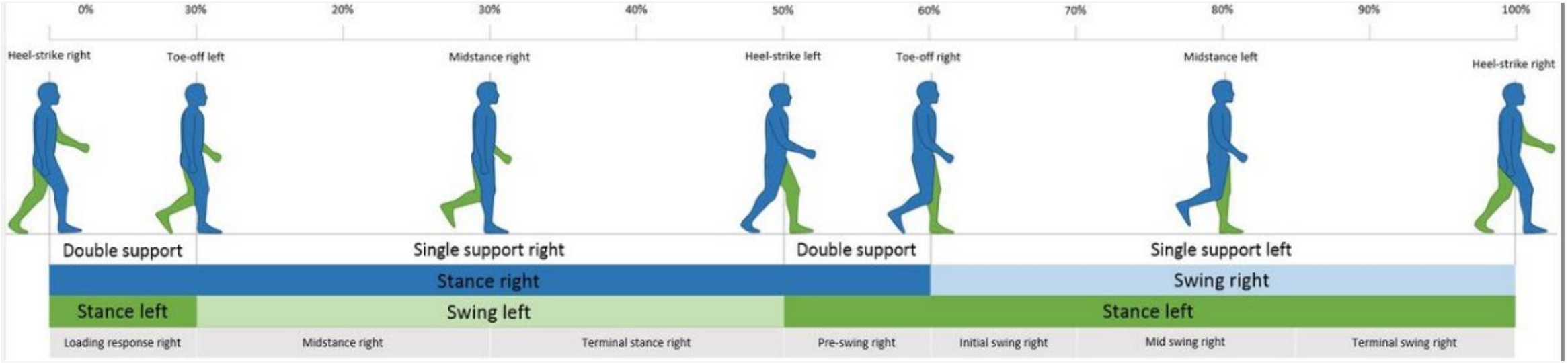
Joint/Direction	Range of Motion
Shoulder Flexion	150-180°
Shoulder Extension	50-60°
Shoulder Abduction	180°
Shoulder Internal Rotation	70-90°
Shoulder External Rotation	90°
Elbow Extension	0-10°
Elbow Flexion	140-150°
Wrist Flexion	60-80°
Wrist Extension	60-70°
Hip Flexion	100-120°
Hip Extension	20-30°

Joint/Direction	Range of Motion
Hip Abduction/adduction	40°/20°
Hip Internal Rotation	40-45°
Hip External Rotation	45-50°
Knee Flexion/Extension	150-0°
Ankle Dorsiflexion (dorsal extension)	20°
Ankle Plantarflexion	40-50°
Ankle Inversion	14-22°
Ankle Eversion	10-17°
Ankle Abduction	15-25°
Ankle Adduction	22-35°

Wem ROM by joint Available online: https://www.wikem.org/wiki/Range_of_motion_by_joint

Assessment of Gait

- 2 Phases:
  - Stance Phase - 60% of cycle
  - Swing Phase - 40% of cycle



https://www.physio-pedia.com/Joint_Range_of_Motion_During_Gait

Gait (Common Parameters)

"Gait speed slower than 0.8 m/s is associated with a 2–3× higher risk of falls, increased hospitalizations, and significantly higher mortality."
-Studenski et al., JAMA, 2011

Parameter	Definition	Mean Norm (healthy adult)
Velocity	Time taken to walk a given distance-expressed in (m/s)	~1.19 m/s
Cadence	Number of steps per minute	~112 steps/min
Step Length	Distance between heel contact of opposite feet	0.64m
Stride Length	Distance between heel contact of same foot	1.12m
Step Width	Lateral distance between midpoints of heel strikes	0.11m
Base of Support	Lateral distance between feet during double support	0.1m
Double Support Time	Time both feet are on ground at same time	0.29 sec

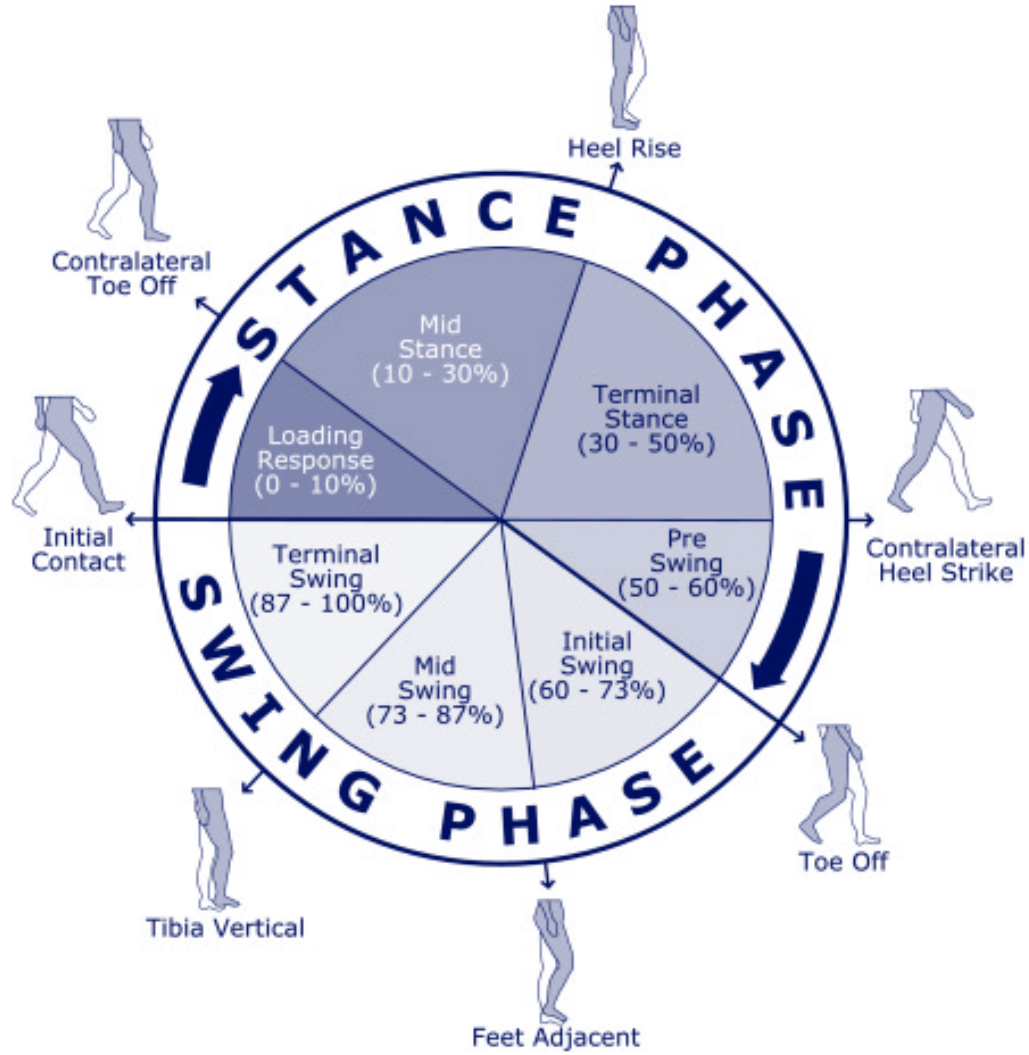
Other Parameters
(more advanced assessment)

Step Asymmetry
Swing Time
Trunk Obliquity
Pelvic Obliquity
Trunk Tilt
Pelvic Tilt
Pelvic Rotation
Height Variation
Knee Valgus-Varus Alignment
Center of Mass
Center of Pressure
Hip Flexion/Extension
Knee Flexion/Extension
Ankle Varus/Valgus
Toe Out Angle
Foot Clearance
Pes Planus
Pes Cavus

Assessment of Gait

8 Subphases

- Initial contact (heel strike)
- Foot flat (loading response)
- Midstance (single-leg support)
- Heel off (terminal stance)
- Toe off (pre-swing)
- Initial swing
- Mid swing
- Late swing (deceleration)



https://www.physico-pedia.com/Joint_Range_of_Motion_During_Gait

https://www.sciencedirect.com/topics/engineering/gait-cycle

Gait Analysis - ROM

	Initial Contact	Loading Response	Single Leg Support	Terminal Stance	Toe Off (pre-swing)	Early Swing	Mid Swing	Late Swing
Function	initiate weight acceptance (heel strike)	Weight acceptance and shock absorption	Single limb support and stability	Single limb support, stability, and propulsion	Final burst of propulsion	propel lower extremity forward/ shorten limb for foot clearance	clear the lower extremity from the ground	decelerate the lower extremity to establish contact with the ground
Hip ROM	Avg 20º flexion	15º flexion	0º neutral	10-20º extension	10-20º extension	20º flexion	30º flexion	30º flexion
Knee ROM	0º (full extension)	15º flexion	5º flexion	0º complete extension	30º flexion	60º flexion	30º flexion	0º complete extension
Ankle ROM	0º (neutral)	0-5º plantarflexion	5º dorsiflexion	0º neutral	20º plantarflexion	10º plantarflexion	0º neutral	0º neutral

https://www.physico-pedia.com/Joint_Range_of_Motion_During_Gait

Gait Description

A Few Commonly Documented Gait Abnormalities

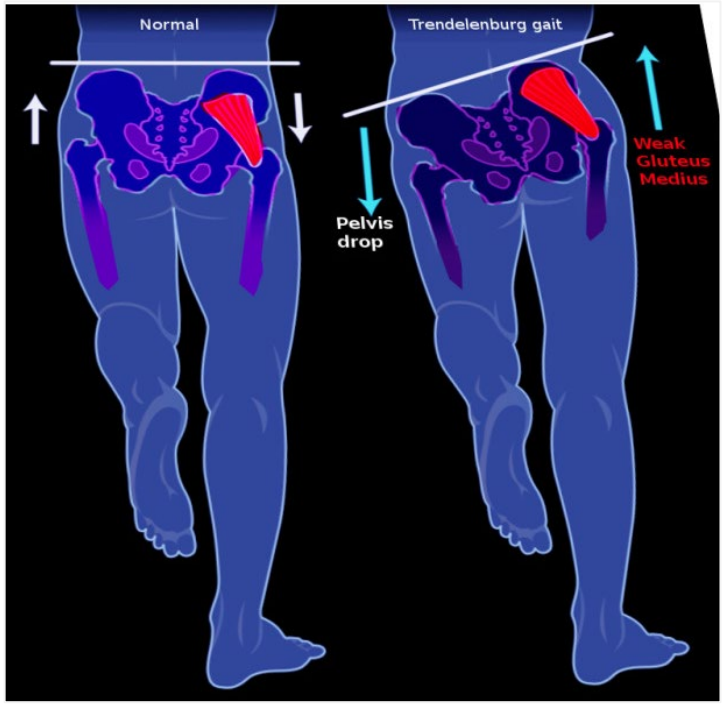
- Antalgic - typical ‘limp’, with decreased stance time on involved limb
- Trendelenburg - characteristic of paralysis of the gluteus medius muscle, marked by a listing of the trunk toward the affected side at each step
- Step to - swing limb does not advance past other foot (often seen when using walker or cane)
- Ataxic - An unsteady, uncoordinated walk, with a wide base and the feet thrown out, coming down first on the heel and then on the toes with a double tap; this gait is associated with cerebellar disturbances
- Circumduction - swing leg moves laterally in semi-circle pattern to clear ground
- Vaulting - excessive plantarflexion of stance leg, raising body up to ‘vault’ other leg forward
- Scissoring - each leg crosses mid-line with every step resulting in narrow base of support
- Parkinsonian - Observed reduced arm swing. A stooped posture and flexed knees are a common presentation; Bradykinesia resulting in small, shuffling steps; occurrences of freezing, or short rapid bursts of steps known as ‘festination’ and turning can be difficult

https://www.physio-pedia.com/Gait

Gait Description

Example:

- The patient uses a standard walker with a slow, cautious step-to gait. He also exhibits a slight Trendelenburg gait pattern with left sided pelvic drop, along with right lateral trunk lean during midstance phase on right leg.



https://www.ncbi.nlm.nih.gov/books/NBK541094/figure/article-30566.image.f3/?report=objectonly

Balance

Working definition:

Ability of an individual to maintain their center of gravity within their base of support; *must be maintained during static/dynamic activities to maintain one's "balance"

Systems Involved:

- Sensory (somatosensory, vision, vestibular) – gathers info about body position
- Central Nervous System - integration and coordination of sensory input
  - Ankle/hip/suspensory/stepping strategy in response to perturbation
- Neuromuscular-active response from CNS direction
  - Muscle strength, posture, latency, torque/power, flexibility, range of motion

*Many other factors influence ability to maintain balance (intrinsic/extrinsic)

- Age, cognition, frailty, medication, health related conditions, environment, FEAR

"Every year, 1 in 4 Americans aged 65+ falls. Of those who fall, 1 in 5 causes serious injury—such as broken bones or head trauma."

-CDC, 2024

-Falls are the leading cause of fatal and non-fatal injuries in older adults.

-Yet <50% tell their doctor they fell.

-Falls result in 3 million ER visits annually in the U.S.

Financial Impact

"In 2020, the total medical costs for falls in older adults exceeded $80 billion, with 67% covered by Medicare."

-CDC, 2023

-Each inpatient fall costs on average: $18,658

-Outpatient/ED fall averages: $1,112

-Projected lifetime fall-related medical spending:

-$101 billion by 2030 (up from $35B in 2012)

Balance (Sensory)

- Somatosensory
  - Sensory information from muscle, joint, tendons
  - Major contributor to postural control
    - Proprioception - often referred to as a “sixth sense”.
      - The ability to sense the body’s position in space
      - Kinesthetic sense - awareness of motion; appreciation of joint movement
      - Muscle spindle/Golgi tendon organ - contribute sense of ‘force’ (effort, tension)
      - Mechanoreceptors/proprioceptors in skin, joints, muscles
  - 2-point discrimination
  - Vibration sense

Balance (Sensory)

- Vision - helps orient body in space
  - Longer delays (150-200ms) allow for redundancies from other systems
    - Adaptations seen with visually impaired – reliance on other sensory inputs (Friedrich et. al.)

- Helps maintain vertical alignment with movement throughout environment
  - Acuity - negotiate environment and avoid obstacles
  - Contrast - distinguish curbs/depressions from surrounding ground
  - Depth perception-spatial relationships - stairs, inclines
  - Peripheral vision

Balance (Sensory)

- Vestibular system
  - Eye/head coordination
  - Input for postural orientation
  - Input for angular/linear acceleration
    - Angular - semicircular canals
    - Linear - Utricle/saccule
  - Vestibular ocular Reflex
    - Stabilizes eye gaze during head movements
- Vestibulospinal reflex
  - Stabilizes body in response to stimuli that alter equilibrium

Khan S, Chang R. Anatomy of the vestibular system: a review. NeuroRehabilitation. 2013 Jan 1;32(3):437-43

Blausen.com staff (2014). " Medical gallery of Blausen Medical 2014 ". WikiJournal of Medicine, doi:10.15347/wjm/2014.010

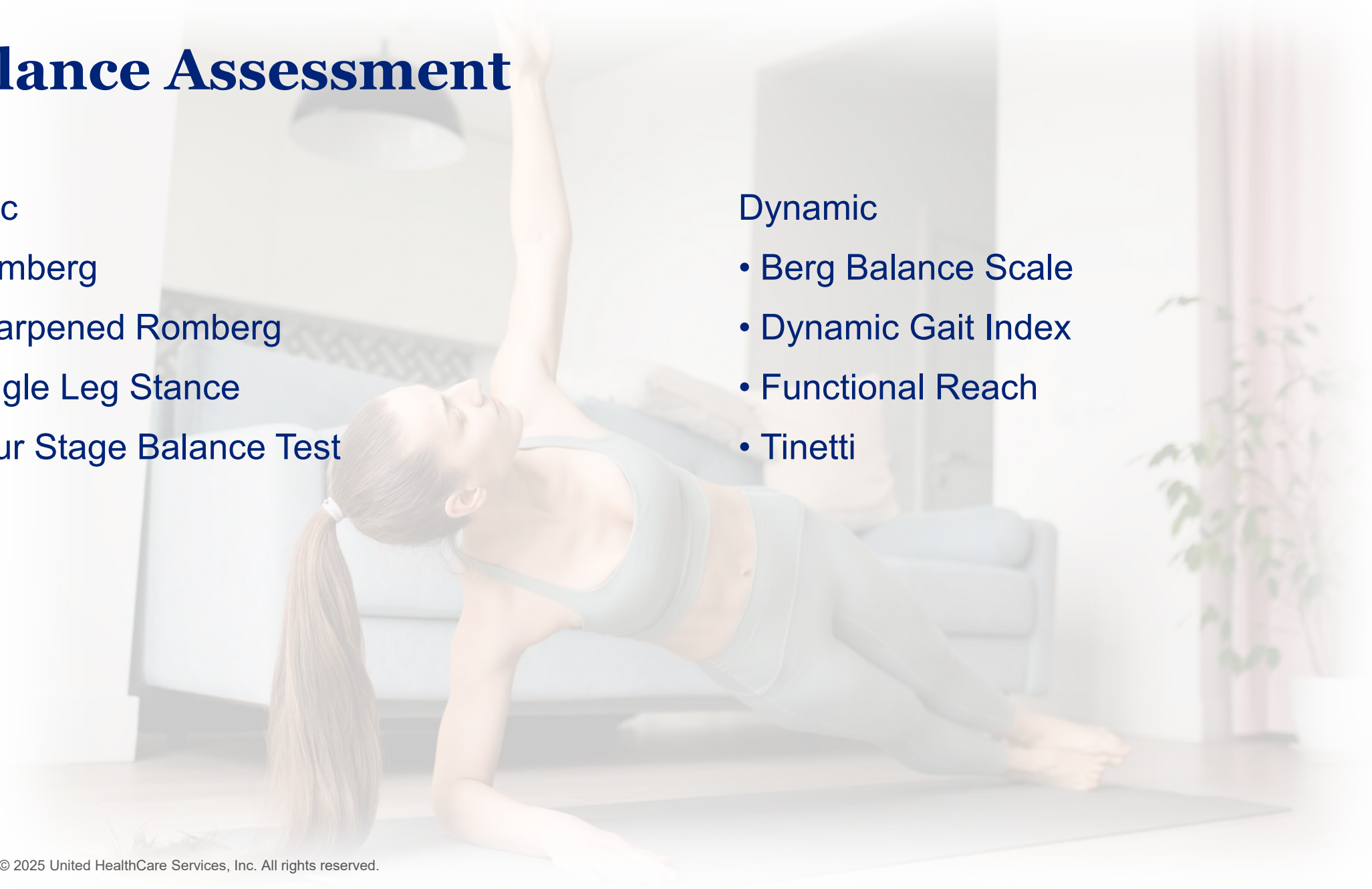
Balance (CNS/Neuromuscular)

- CNS - interpret/integrate sensory input while facilitating neuromuscular response
  - Cortex, thalamus, cerebellum, vestibular nucleus, basal ganglia, thalamus
  - Feedback/Feedforward control
- Strategies in response to perturbation
  - Ankle
  - Hip
  - Stepping
  - Reach
  - Suspensory

Balance (Risk Factors)

Intrinsic	Extrinsic	Modifiable	Unmodifiable
Muscle weakness	Uneven surface	Lower extremity weakness/ Reduced flexibility	Age
Poor balance	Clutter	Gait/balance decline	Male vs Female
Poor vision	Inadequate lighting	Uncorrected “correctable” vision	Cognition
Cognitive decline	Wet/slippery surface	Incontinence	History of falls
Impaired sensation	Inappropriate footwear	Hazards in the home (clutter/lighting)	Resources/access
Gender/Age	Narrow doorways	Improper footwear	Chronic disease
Chronic Disease	Polypharmacy	Orthostatic hypotension	Ethnicity
History of falls	Uneven surfaces	Dizziness/vestibular deficits	
Orthostatic Hypotension	Lack of safety equipment	Frailty	

Balance Assessment



Static

- Romberg
- Sharpened Romberg
- Single Leg Stance
- Four Stage Balance Test

Dynamic

- Berg Balance Scale
- Dynamic Gait Index
- Functional Reach
- Tinetti

Balance Assessment

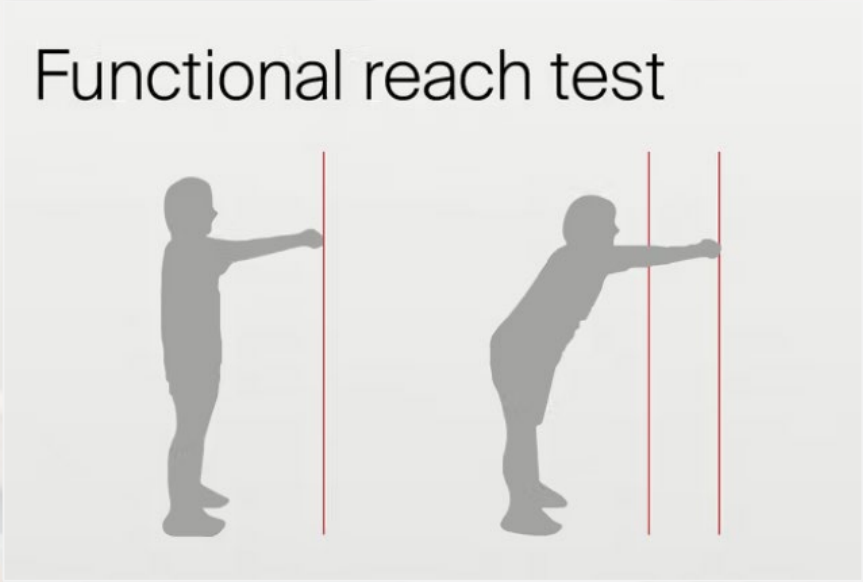
Static

- Romberg
  - minimal equipment (stopwatch)
  - must maintain balance with arms to side or crossed, eyes open then closed (60 sec)
- Sharpened Romberg
  - Romberg with feet together, semi tandem, tandem
- Single Leg Stance
  - <5sec indicates fall risk
- Four Stage Balance Test
  - progressively harder standing positions
    - side by side, touch big toe with opposite instep, tandem, single leg
    - progress if can hold stead 10sec. <10sec tandem indicates fall risk

Balance Assessment

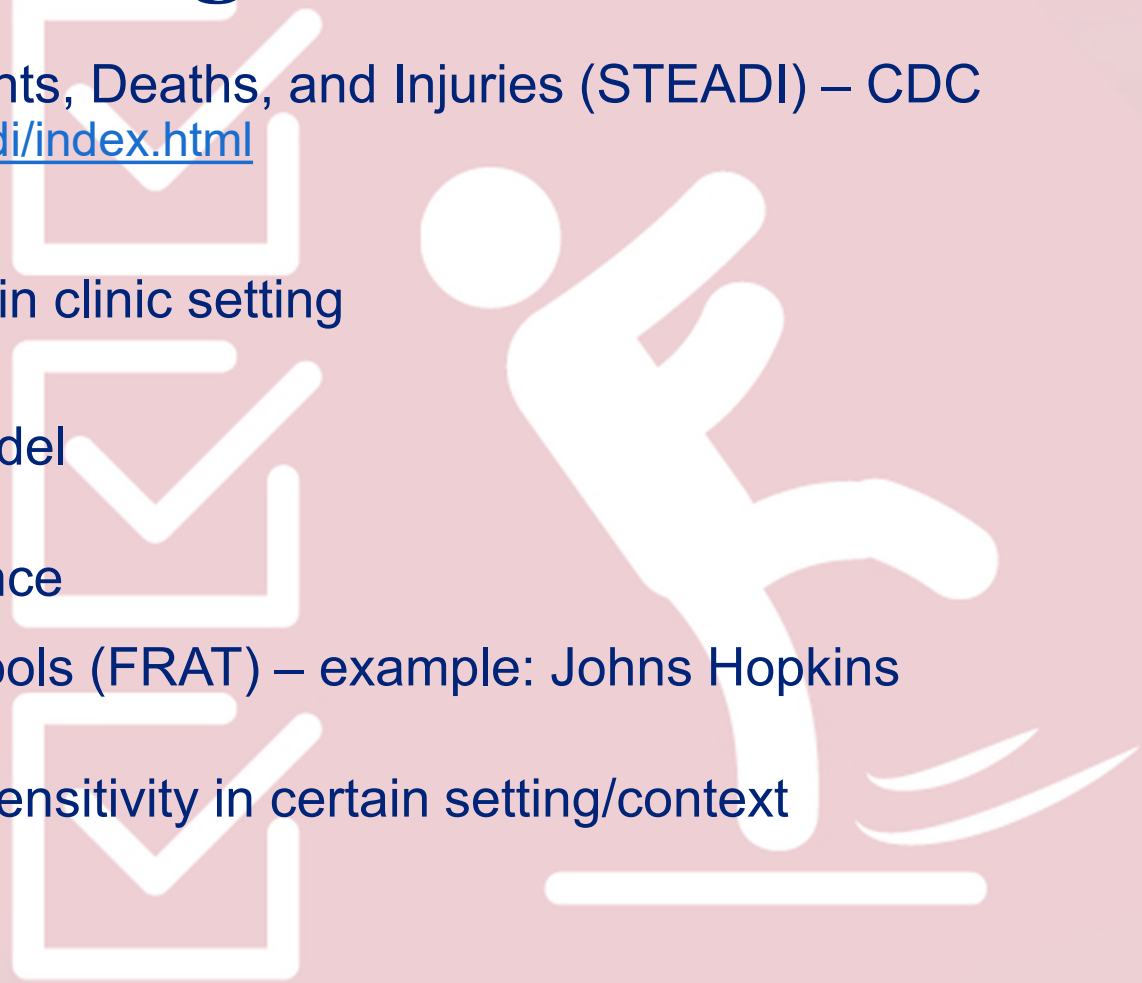
Dynamic

- Berg Balance Scale
  - Requires equipment (chairs, foot stool, stopwatch)
  - <45 indicates fall risk
- Dynamic Gait Index
  - Requires shoe box, cones, stairs
  - Typically performed in clinic setting
  - <19 indicates fall risk
- Functional Reach
  - Horizontal displacement measured at 3rd metacarpal (making fist); >10” low risk
  - in standing position, hold arm at 90 deg flexion
  - 6-10”: 2x greater fall risk
- Tinetti (later)



Fall Risk Screening Tools

- Stopping Elderly Accidents, Deaths, and Injuries (STEADI) – CDC
  - https://www.cdc.gov/steadi/index.html
- Morse Fall Scale (MFS)
  - Typically administered in clinic setting
  - Self report
- Hendrich II Fall Risk Model
  - Hospital setting
  - Self report + performance
- Fall Risk Assessment Tools (FRAT) – example: Johns Hopkins
  - Hospital setting
  - Conflicting specificity/sensitivity in certain setting/context



Poe S.S., Dawson P.B., Cvach M., Burnett M., Kumble S., Lewis M., Thompson C.B., Hill E.E. The Johns Hopkins Fall Risk Assessment Tool: A Study of Reliability and Validity. J. Nurs. Care Qual. 2018;33:10–19

Fall Risk Screening Tools

- CDC STEADI

Check Your Risk for Falling

Circle "Yes" or "No" for each statement below			Why it matters
Yes (2)	No (0)	I have fallen in the past year.	People who have fallen once are likely to fall again.
Yes (2)	No (0)	I use or have been advised to use a cane or walker to get around safely.	People who have been advised to use a cane or walker may already be more likely to fall.
Yes (1)	No (0)	Sometimes I feel unsteady when I am walking.	Unsteadiness or needing support while walking are signs of poor balance.
Yes (1)	No (0)	I steady myself by holding onto furniture when walking at home.	This is also a sign of poor balance.
Yes (1)	No (0)	I am worried about falling.	People who are worried about falling are more likely to fall.
Yes (1)	No (0)	I need to push with my hands to stand up from a chair.	This is a sign of weak leg muscles, a major reason for falling.
Yes (1)	No (0)	I have some trouble stepping up onto a curb.	This is also a sign of weak leg muscles.
Yes (1)	No (0)	I often have to rush to the toilet.	Rushing to the bathroom, especially at night, increases your chance of falling.
Yes (1)	No (0)	I have lost some feeling in my feet.	Numbness in your feet can cause stumbles and lead to falls.
Yes (1)	No (0)	I take medicine that sometimes makes me feel light-headed or more tired than usual.	Side effects from medicines can sometimes increase your chance of falling.
Yes (1)	No (0)	I take medicine to help me sleep or improve my mood.	These medicines can sometimes increase your chance of falling.
Yes (1)	No (0)	I often feel sad or depressed.	Symptoms of depression, such as not feeling well or feeling slowed down, are linked to falls.
Total _____		Add up the number of points for each "yes" answer. If you scored 4 points or more, you may be at risk for falling. Discuss this brochure with your doctor.	

To check your risk online, visit: www.bit.ly/3o4RiW8

This checklist was developed by the Greater Los Angeles VA Geriatric Research Education Clinical Center and affiliates and is a validated fall risk self-assessment tool (Rubenstein et al. J Safety Res; 2011: 42(6)493-499). Adapted with permission of the authors.

Home Safety Assessment

Home Safety Assessment

Entry	Living Room	Hallways	Kitchen	Bedroom	Bathroom
Sidewalk	Flooring/clutter	Access	Accessibility	Lighting at night	Access
Porch	Couches	Flooring/clutter	Cabinets/drawers	Closets	Tub
Threshold	Chairs	Lighting	Lighting	Flooring/clutter	Toilet
Door Frame	Devices/TV		Storage	Bed	Sink
Steps			Flooring	Dressers/furniture	Flooring/clutter
Ramps			Pantry		Faucets/knobs
			Appliances		Lighting

Home Safety

- CDC Home Safety Checklist
- Consider ADA Standards
  - Ramps 1:12
  - Doors 32”
  - Thresholds ½” beveled
  - Steps 4-7”H; 11”D
  - Handrails 34-38”H

Use this checklist to find and fix hazards in your home.

STAIRS & STEPS (INDOORS & OUTDOORS)

Are there papers, shoes, books, or other objects on the stairs?

- ☐ Always keep objects off the stairs.

Are some steps broken or uneven?

- ☐ Fix loose or uneven steps.

Is there a light and light switch at the top and bottom of the stairs?

- ☐ Have an electrician put in an overhead light and light switch at the top and bottom of the stairs. You can get light switches that glow.

Has a stairway light bulb burned out?

- ☐ Have a friend or family member change the light bulb.

Is the carpet on the steps loose or torn?

- ☐ Make sure the carpet is firmly attached to every step, or remove the carpet and attach non-slip rubber treads to the stairs.

Are the handrails loose or broken? Is there a handrail on only one side of the stairs?

- ☐ Fix loose handrails, or put in new ones. Make sure handrails are on both sides of the stairs, and are as long as the stairs.

FLOORS

When you walk through a room, do you have to walk around furniture?

- ☐ Ask someone to move the furniture so your path is clear.

Do you have throw rugs on the floor?

- ☐ Remove the rugs, or use double-sided tape or a non-slip backing so the rugs won’t slip.

Are there papers, shoes, books, or other objects on the floor?

- ☐ Pick up things that are on the floor. Always keep objects off the floor.

Do you have to walk over or around wires or cords (like lamp, telephone, or extension cords)?

- ☐ Coil or tape cords and wires next to the wall so you can’t trip over them. If needed, have an electrician put in another outlet.

KITCHEN

Are the things you use often on high shelves?

- ☐ Keep things you use often on the lower shelves (about waist high).

Is your step stool sturdy?

- ☐ If you must use a step stool, get one with a bar to hold on to. Never use a chair as a step stool.

BEDROOMS

Is the light near the bed hard to reach?

- ☐ Place a lamp close to the bed where it’s easy to reach.

Is the path from your bed to the bathroom dark?

- ☐ Put in a nightlight so you can see where you’re walking. Some nightlights go on by themselves after dark.

BATHROOMS

Is the tub or shower floor slippery?

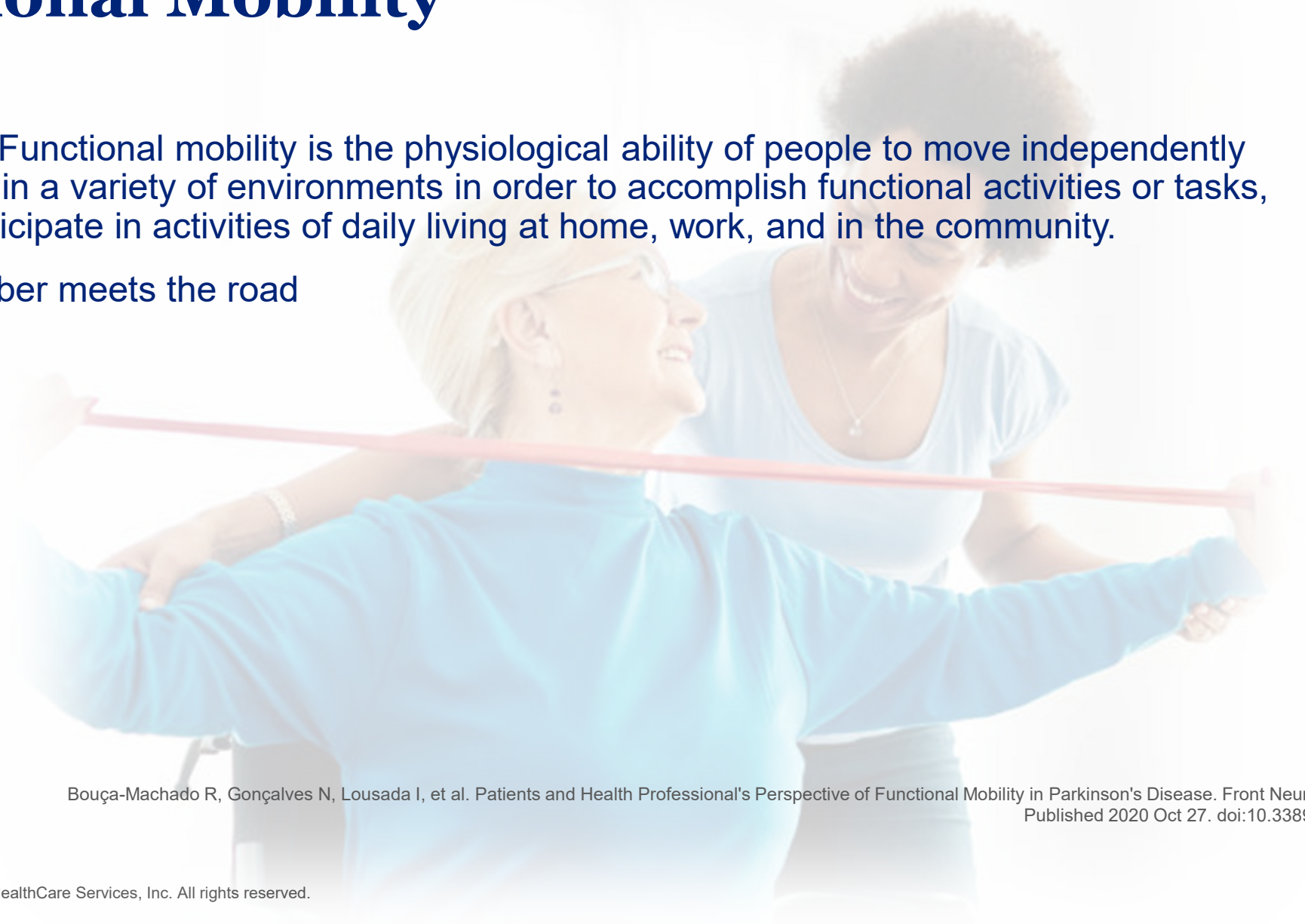
- ☐ Put a non-slip rubber mat or self-stick strips on the floor of the tub or shower.

Do you need some support when you get in and out of the tub, or up from the toilet?

- ☐ Have grab bars put in next to and inside the tub, and next to the toilet.

Functional Mobility

- Definition: Functional mobility is the physiological ability of people to move independently and safely in a variety of environments in order to accomplish functional activities or tasks, and to participate in activities of daily living at home, work, and in the community.
- Where rubber meets the road



Bouça-Machado R, Gonçalves N, Lousada I, et al. Patients and Health Professional's Perspective of Functional Mobility in Parkinson's Disease. Front Neurol. 2020;11:575811. Published 2020 Oct 27. doi:10.3389/fneur.2020.575811

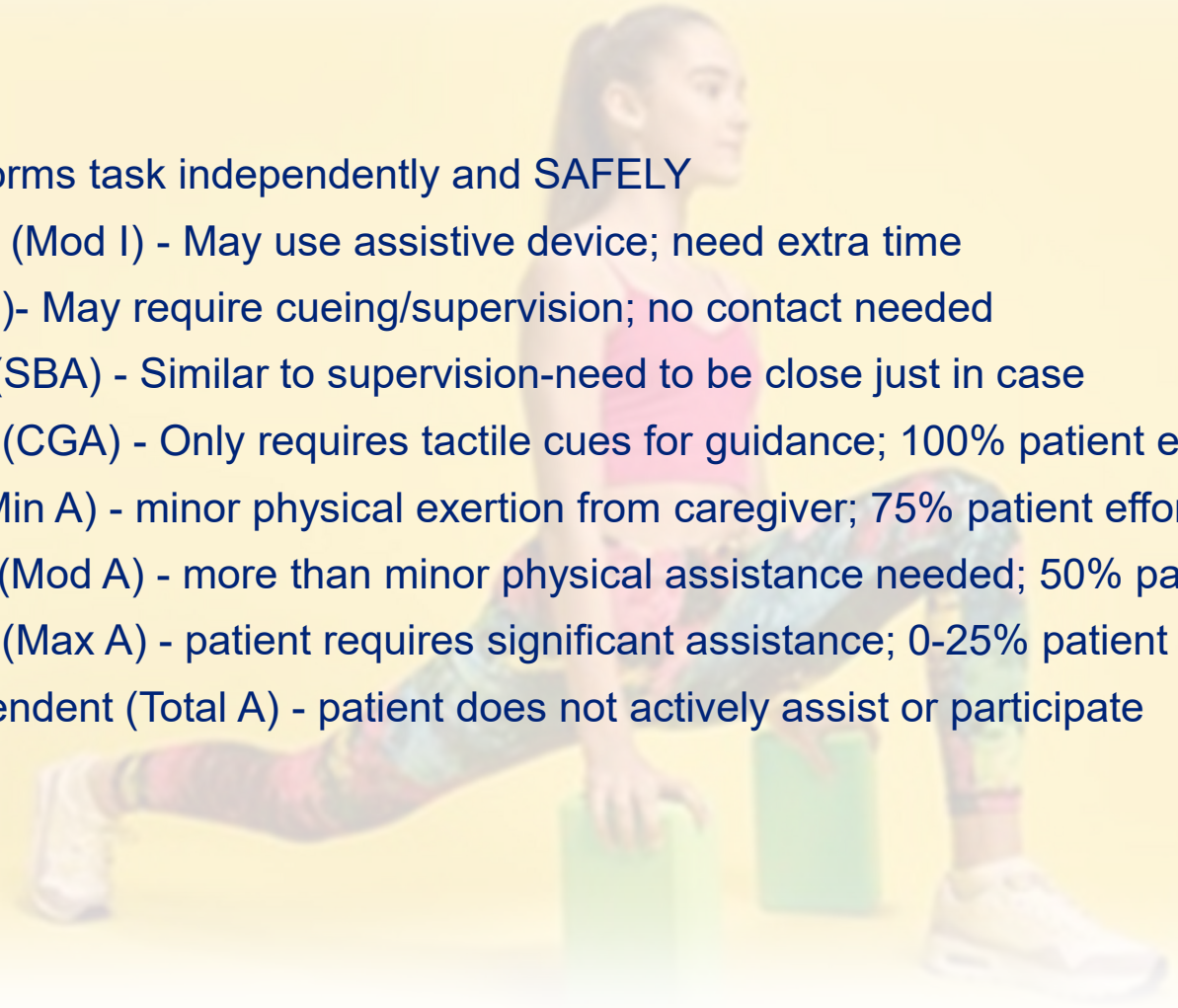
Functional Mobility

- Bed Mobility
- Transfers
- Sit to Stand
- Timed Up and Go
- AM-PAC ‘6-Clicks’ (computer adaptive testing CAT vs short form)
- Gait Speed
- 6 Minute Walk Test
- Dynamic Gait Index (mentioned earlier)
- Functional Independence Measure (FIM)
- Tinetti Performance Oriented Mobility Assessment

Functional Mobility - Range of Motion

Task	Joint	Motion	ROM (Req)	Task	Joint	Motion	ROM (Req)
Bed Mobility	Shoulder	Flexion	90º	Toilet Transfer	Shoulder	Extension	30º
	Shoulder	Ext Rotation	45-60º		Hip	Flexion	105º
	Hip	Flexion	90º		Knee	Flexion	100º
	Knee	Flexion	90º	Bathtub Entry	Shoulder	Flexion	120º
	Ankle	DF/PF	20º ea		Hip	Flexion	120º
Sit-Stand	Shoulder	Extension	30º		Hip	Abduction	40-50º
(Chair)	Hip	Flexion	110º		Hip	Ext Rotation	40-50º
	Hip	Extension			Knee	Flexion	110º
	Knee	Flexion	90-110º		Ankle	Dorsiflexion	15-20º
	Ankle	Dorsiflexion	10-15º	Stairs	Hip	Flexion	65-70º
Sit-Stand	Hip	Flexion	110-120º	(ascend/descend)	Knee	Flexion	83-100º
(couch)	Knee	Flexion	100-120º		Ankle	Dorsiflexion	10-20º
	Ankle	Dorsiflexion	15º				

Functional Mobility

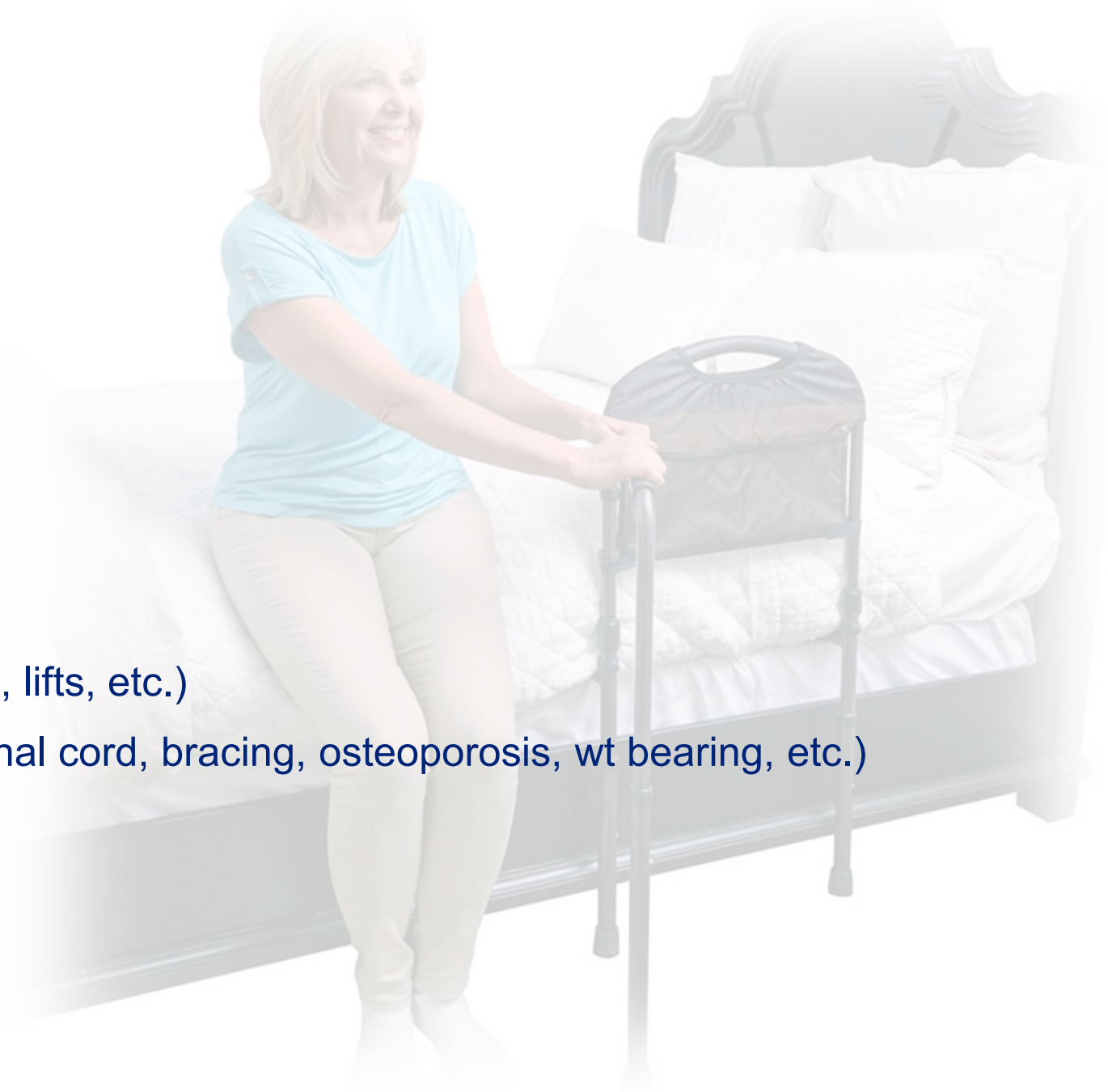


- Levels of Assistance
  - Independent (I)- Performs task independently and SAFELY
  - Modified Independent (Mod I) - May use assistive device; need extra time
  - Supervision/Set up (S)- May require cueing/supervision; no contact needed
  - Stand By Assistance (SBA) - Similar to supervision-need to be close just in case
  - Contact Guard Assist (CGA) - Only requires tactile cues for guidance; 100% patient effort
  - Minimal Assistance (Min A) - minor physical exertion from caregiver; 75% patient effort
  - Moderate Assistance (Mod A) - more than minor physical assistance needed; 50% patient effort
  - Maximum Assistance (Max A) - patient requires significant assistance; 0-25% patient effort
  - Total Assistance/Dependent (Total A) - patient does not actively assist or participate

Bed Mobility

- Rolling
- Scooting
- Supine to Sit
- Sit to Supine
- Bridging

- Assistive devices used (trapeze, bed rails, lifts, etc.)
- Precautions (hip approach, spinal Sx, spinal cord, bracing, osteoporosis, wt bearing, etc.)



Transfers | Sit to Stand

- Precautions
- Body Mechanics
  - Minimize excessive use of energy while employing safe technique for assessing clinician and patient
    - Basic moving/lifting techniques
    - Have a plan (start with end in mind)
    - Avoid twisting/rotation of spine
    - Face in direction of movement
    - Keep close to patient
    - Neutral spine/wide stance

https://www.drugs.com/cg/how-to-transfer-a-person-safely.html

Transfers | Sit to Stand

- Approaches to Transfers - driven by patient presentation; keep in mind efficiency and safety
  - Slide Board
  - Squat Pivot
  - Stand Pivot
  - Stand Step
  - Sit to Stand
- Tied to function (kitchen chair with arm rails vs. low couch)
- Levels of assistance
- Assistive devices (slide sheets, sliding boards, gait belts, sit/stand devices/lifts, etc.)

*Workplace injuries – 1/3 of injuries to staff occur when transferring patients

Transfers | Sit to Stand

- Typical movements (member driven)
- Vehicle
- Wheelchair
- Kitchen
- Living Room
- Bedroom
- Bathroom
- Individualized tasks
- *Be descriptive
  - Example: Transfers: Min A ???

Functional Mobility

- Functional Strength

	5 x Sit to Stand	30 Second Chair Stand
Intent	Adults 18+; Leg strength; dynamic balance; fall risk	Same- with added endurance aspect
Measured Outcome	Time to complete 5 full sit to stands	Number of sit to stands within 30 seconds
Target Participant	Geared to towards older adults; often in clinic/rehab setting	Higher level participants who are community dwelling; outpatient setting
Equipment	Standard chair (don't use arms)	Standard chair (don't use arms)
Scoring	Cut off for fall risk: >15 seconds	Age range stratified; below avg indicates fall risk
Strengths	Predictor of fall risk; good standardization; correlates with gait speed	Can reflect real world endurance
Weaknesses	Ceiling effect for higher level participants; can be challenging	Decreased sensitivity to subtle variations; less standardization

Functional Mobility

- Timed Up and Go
  - Person begins by sitting in armchair; when instructed to “go”, they will:
    1) stand from chair
    2) walk to predetermined line 3 meters (10ft)
    3) turn around
    4) walk back to chair
    5) sit back down

    *Timed from “go” to when person sits back down
  - May use assistive device/make notation
  - Normal: <10sec
  - Increased risk of falls: ≥12sec

The Timed Up and Go (TUG) Test

STEADI Stopping Elderly Accidents, Deaths & Injuries

Functional Mobility

- AM-PAC “6-Clicks”
  - Administered in facilities historically; can be used in home health
  - Assesses functional outcomes based on 6 questions
  - Multiple domains for each group of questions
  - Basic Mobility Domain
    - Bed mobility
    - Sit to stand; stand to sit
    - Supine to sit
    - Seated transfers
    - Ambulation
    - Ascending Stairs
      - Assistance needed:
      - A lot; a little; none; unable

How much difficulty does patient currently have….	**Unable**	**A lot**	**A Little**	**None**
1. Turning over in bed (including adjusting bed clothes, sheets and blankets)?	☐1	☐2	☐3	☐4
2. Sitting down on and standing up from a chair with arms (e.g., wheelchair, bedside commode etc.)	☐1	☐2	☐3	☐4
3. Moving from lying on back to sitting on the side of the bed?	☐1	☐2	☐3	☐4
How much help from another person does patient currently need….	**Unable**	**A lot**	**A Little**	**None**
4. Moving to and from a bed to a chair (including a wheelchair)?	☐1	☐2	☐3	☐4
5. Need to walk in room?	☐1	☐2	☐3	☐4
6. Climbing 3-5 steps with a railing?	☐1	☐2	☐3	☐4
	Raw Score: ____/ 24			

https://www.tendertouch.com/wp-content/uploads/user_uploads/Training%20admin/1629903823_AM-PAC-Activity-Measure-Post-Acute-Care-Score-Sheet.pdf

Functional Mobility

- Gait Speed
  - Speed=distance/time
    - Common distances of 2.4m to 15m used; 4m most common distance
  - Have person walk as brisk as possible while being safe; can use assistive device
  - For 4m measurements: allow for additional 2.5m on either side for acceleration/deceleration
  - Record time of middle 4m
  - Perform 2 trials

  - Linked to frailty - <0.6m/s
  - Function/community implications - 1.2-1.4m/s for normal community ambulation
  - Increased fall risk associated with slower gait speeds- <0.7m/s

Functional Mobility

- 6 Minute Walk Test
- Usually performed in clinics/office setting
- Mark off 30m, placing cones at each end
- Person walks briskly back and forth for 6 minutes while clinician marks distance

- Supported by literature for many conditions
- May not be practical in-home setting, or if with significant disfunction; significantly deconditioned

Functional Mobility

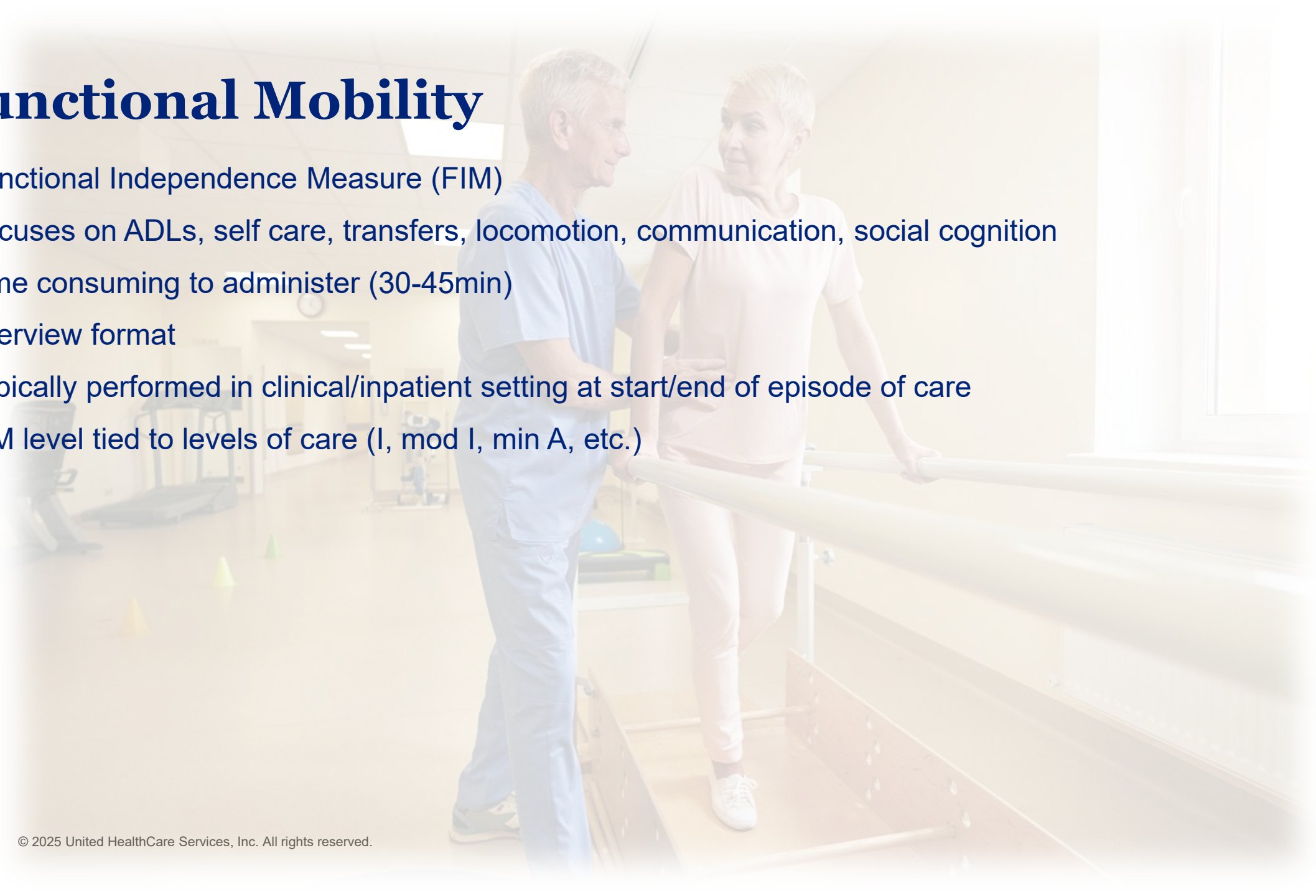
- Dynamic Gait Index
  - Includes vestibular (head turning)
  - Requires equipment (cones/box/steps) and 20ft of space
  - Could be too high level for frail members
  - 8 components for scoring
    - Gait on level surface
    - Change in gait speed
    - Gait with horizontal head turn
    - Gait with vertical head turn
    - Gait with pivot turn
    - Stepping over obstacle
    - Step around obstacle
    - Steps

Grading:

- 3) Normal
- 2) Mild impairment
- 1) Moderate impairment
- 0) Severe

Functional Mobility

- Functional Independence Measure (FIM)
- Focuses on ADLs, self care, transfers, locomotion, communication, social cognition
- Time consuming to administer (30-45min)
- Interview format
- Typically performed in clinical/inpatient setting at start/end of episode of care
- FIM level tied to levels of care (I, mod I, min A, etc.)



Functional Mobility

- Tinetti Performance Oriented Mobility Assessment
- Good reliability
- No equipment needed
- Scored on 16 items
- Gait and balance component (top score 28; 16 gait/12 balance)
- Cut off for fall risk is generally accepted at <20;
- Moderate risk: score range of 19-23
- Better suited for lower level/frail individuals
- Lacks sensitivity due to Likert scaling style (3-point scale of 0,1,2)
- Should be administered by trained clinician

Functional Mobility

- Tinetti Performance Oriented Mobility Assessment

For both assessments, enter the date of each exam and circle your rating for each item. Indicate totals at the bottom of each section.

BALANCE ASSESSMENT

To perform this assessment, seat the patient in a hard, armless chair.

Evaluated Function	Description of Behavior	Date: ___	Date: ___
Sitting Balance	Leans or slides in chair	0	0
	Steady, safe	1	1
Rises From Chair	Unable to rise without help	0	0
	Able to rise using arms to help	1	1
	Able to rise without using arms to help	2	2
Attempts To Rise	Unable to rise without help	0	0
	Able to rise, requires more than one attempt	1	1
	Able to rise, requires one attempt	2	2
Standing Balance (1st 5 Seconds)	Unsteady (staggers, moves feet, trunk sways)	0	0
	Steady, but uses walker or other support	1	1
	Steady without walker or other support	2	2
Standing Balance	Unsteady	0	0
	Steady, but with wide stance and uses support	1	1
	Narrow stance without support	2	2
Nudged	Begins to fall	0	0
	Staggers, grabs, catches self	1	1
	Steady	2	2
Eyes Closed	Unsteady	0	0
	Steady	1	1
Turning 360 Degrees	Discontinuous steps	0	0
	Continuous steps	1	1
	Unsteady (grabs, staggers)	0	0
	Steady	1	1
Sitting Down (Getting Seated)	Unsafe (misjudged distance, falls into chair)	0	0
	Uses arms or not a smooth motion	1	1
	Safe, smooth motion	2	2
	Balance Score Potential Points: 16	16	16

GAIT ASSESSMENT

Stand with the patient. Walk across the room (+/- aids) at a usual pace, then rapidly

Evaluated Function	Description of Behavior	Date: ___	Date: ___
Indication of Gait	Any hesitancy or multiple attempts	0	0
	No hesitancy	1	1
Step Length & Height	Step to	0	0
	Step through right	1	1
	Step through left	1	1
Foot Clearance	Foot drop	0	0
	Left foot clears the floor	1	1
	Right foot clears the floor	1	1
Step Symmetry	Right and left step length are not equal	0	0
	Right and left step length appear equal	1	1
Step Continuity	Stopping of discontinuity between steps	0	0
	Steps appear continuous	1	1
Path	Marked deviation	0	0
	Mild/moderate deviation or uses a walking aid	1	1
	Straight without a walking aid	2	2
Trunk	Marked sway or uses a walking aid	0	0
	No sway, flexes knees/back/uses arms to balance	1	1
	No sway, no flexion of knees or back use of arms, or walking aid	2	2
Walking Time	Heels apart	0	0
	Heels almost touching while walking	1	1
	Gait Score Potential Points: 12	12	12

Combined Score Potential Points For Balance & Gait	28	28

PT, Tinnetti Balance Assessment: 7/09

Risk of Falls: 18 Points or Less = High Risk, 19-23 Points = Moderate Risk, 24 or More Points = Low Risk

AFFIX STICKER

Case Study

- Patient: 62-year-old female
- Height/Weight: 5’4”/152 lbs.
- Diagnoses: B knee OA (R worse than L), DM II, peripheral neuropathy, HTN, hyperlipidemia, PAD, PVD, CHF
- Hx: Poor history, lives alone
  - Reports using single point cane and rolling walker when out in community
  - Enjoys walking around Target and the mall; Hx of recent fall while using cane walking to front porch from vehicle
  - Went to PCP that day - no injury noted other than mild abrasion to R knee and is well healed
  - Often seen wearing slippers around house
  - Reports new fear of falling
  - No other history of falls reported
- Noted to have weakness and “often needs assistance ambulating”
- Pain: 2/10 at rest progressing to 6-7/10 throughout day with activity
- Swelling: minimal; no measurements taken
- Medications: Metformin, Lisinopril, Furosemide, Atorvastatin, low dose aspirin, amlodipine, acetaminophen prn
- No prior surgery

Case Study

- Prior level function/ADLs:
  - Reported to be independent with single point cane; sometimes “had trouble getting up from couch”
- Strength deficits:
  - Hip B flexion/extension/abduction 4
  - Knee L extension/flexion 4; R extension 3+; flexion 4-
  - Ankle B plantarflexion/dorsiflexion 4
- ROM deficits:
  - Knee R extension -3^{o}, flexion 105^{o}
  - Ankle R dorsiflexion 8^{o}

Case Study

- Balance:?
- Gait: Walks CGA with single point cane; notably slow, cautious gait pattern with decreased R stance time during mid stance, reduced terminal knee extension at heel strike, and reduced push off on right side; multiple verbal cuing for proper use of cane throughout gait cycle; cane length is also notably excessively long
- Functional Mobility:
  - Bed mobility - Independent
  - Transfers sit to stand: SBA; Stand to sit-verbal cuing
  - ?
- Functional Tests: ?

* Special tests

Conclusion

Q&A

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