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From Textbooks to Clinical Practice: Selecting and Implementing Outcomes Measures in Stroke Rehabilitation

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From Textbooks To Clinical Practice: Selecting And Implementing Outcome Measures In Stroke Rehabilitation

APTA NE Annual Conference 4/6/2024

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University of Nebraska Medical Center

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College of Saint Mary

BIO

Stacie ML Christensen, PT, DPT, NCS is an Assistant Professor with the Physical Therapy Program at the University of Nebraska Medical Center (UNMC) in Kearney, NE. Christensen received her Doctor of Physical Therapy in 2008 from UNMC and became a Board Certified Clinical Specialist in Neurologic Physical Therapy in 2020. She is an active member of the Academy of Neurologic Physical Therapy including the Stroke Special Interest Group. She is additionally an active member of the Nebraska State Stroke Taskforce which is working together with the American Heart Association Mission: Lifeline to improve stroke awareness, rural healthcare education, and support for survivors of stroke. Her clinical specialties include neurologic rehab, specifically stroke, brain injury, amputations and prosthetics, as well as seating and positioning.

Monica Dial, PT, DPT is an Assistant Professor for the College of Saint Mary Blended Doctor of Physical Therapy Program in Omaha, Nebraska. She received her Bachelor of Science degree from the College of New Jersey in Ewing, New Jersey, and her clinical Doctorate in Physical Therapy from Midwestern University in Glendale, Arizona. Dr. Dial received her APTA neurological clinical specialty certification in 2019 following residency training at A.T. Still University in Mesa, Arizona. Prior to joining the College of Saint Mary, Dr. Dial was employed in a variety of areas including acute care, inpatient rehabilitation, and outpatient rehabilitation treating neurologic and orthopedic conditions. She currently collaborates with academic partners to lead the neuro-clinical track curriculum of the CSM DPT program. She is completing a Doctor of Education Degree with a concentration in leadership and learning in organizations at Vanderbilt University with anticipated graduation in summer 2024. Dr. Dial's research interests include the interplay between learning and identity, and blended learning education.

DISCLOSURES

No Financial Disclosures for Stacie ML Christensen

No Financial Disclosures for Monica Dial

WHO ARE YOU?/
WHERE ARE WE STARTING?

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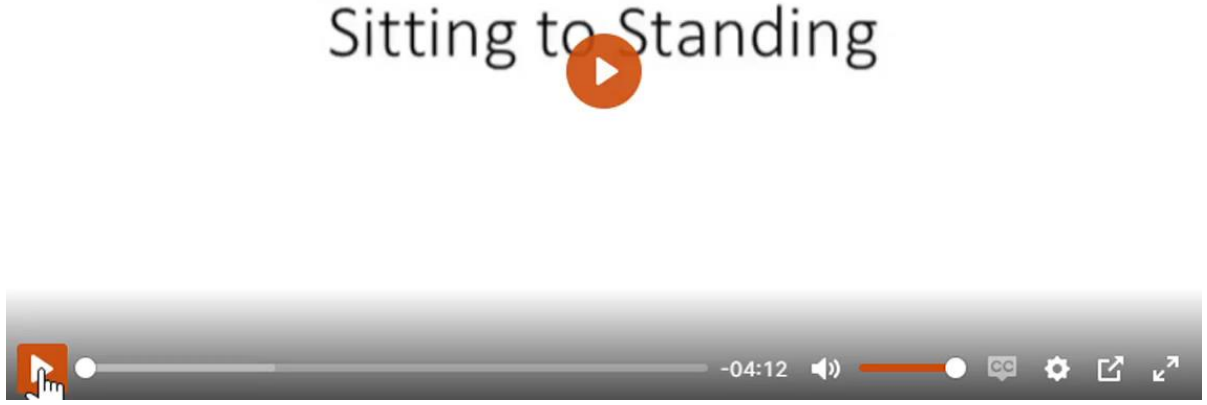
OBJECTIVES

1. Determine the purpose of an outcome measure in stroke rehab.
2. Understand the options available for outcome measures in stroke rehab based on practice area.
3. Practice using the highly recommended outcome measures in stroke rehab.
4. Understand the scoring of each outcome measure covered in this session.
5. Identify resources for obtaining outcome measures and their psychometric properties.

WHAT ARE OUTCOME MEASURES?[1]

- Standardized tests used to determine baseline performance and/or track a patient's:
  - Functional status
  - Impairments of body functions and structures
  - Adverse outcomes and complications
  - Morbidity and mortality
  - Self-reported outcomes
  - Self-reported satisfaction

- Why do we use them?
- When do we use them?
- Who can use them?



CLINICAL PRACTICE GUIDELINES

A Core Set of Outcome Measures for Adults With Neurologic Conditions Undergoing Rehabilitation

A CLINICAL PRACTICE GUIDELINE

Moore, Jennifer L. PT, DHS, NCS; Potter, Kirsten PT, DPT, MS; Blankshain, Kathleen PT, DPT; Kaplan, Sandra L. PT, DPT, PhD; O'Dwyer, Linda C. MA, MSLIS; Sullivan, Jane E. PT, DHS, MS

J NPT
JOURNAL of NEUROLOGIC PHYSICAL THERAPY

- **Purpose: "to identify a core set of outcome measures for use with adults who have neurologic conditions"**

Moore J, et. al. 2018

CLINICIAN SURVEY

What are we measuring?

- Balance
- Gait
- Transfers
- etc

What are the Barriers?

- Time
- Cost
- Equipment
- Perceived patient burden
- Attitude/knowledge/skill of therapist

Moore J, et. al. 2018

RESOURCES

- Reference documents for neuropt.org
  - Quick Reference Guide for all Core OM
  - Environmental set-up guide
  - Report card to track changes

Scan me!

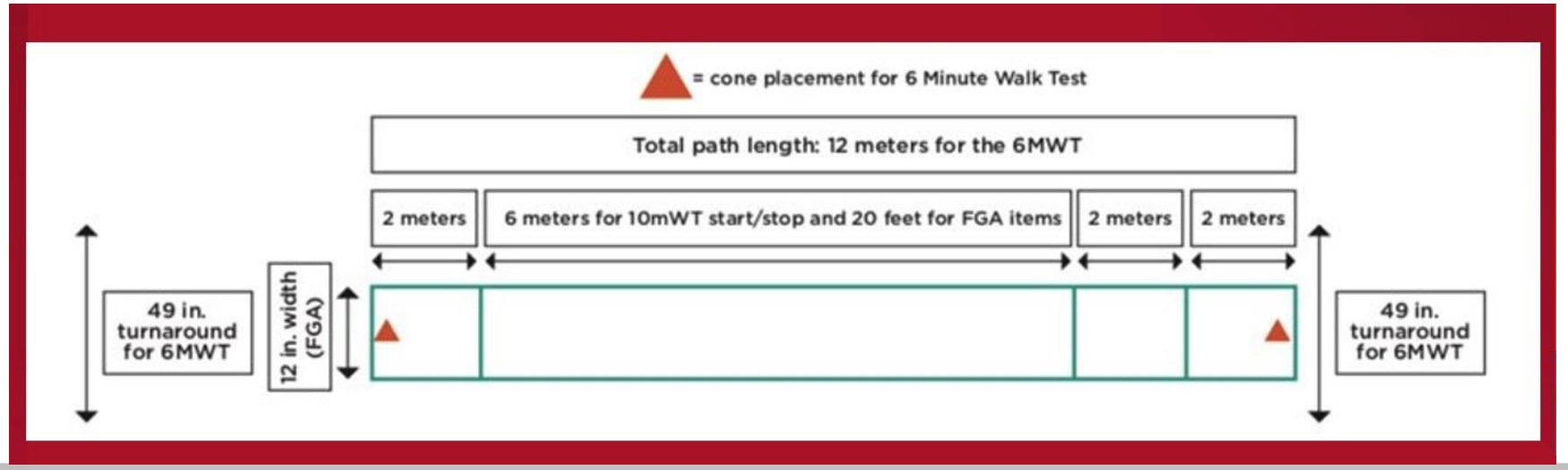
Moore J, et. al. 2018

CORE OM

Static balance Berg (15-20 min)	**Dynamic walking balance** FGA (5-20 min)	**Balance Confidence** ABC (5-10 min)
Transfers 5TSS (<5 min)	**Gait speed** 10 MWT (<5 min)	**Gait distance** 6MWT (6 min)

Moore J, et. al. 2018

IMPLEMENTATION: KNOWLEDGE TRANSLATION



Black: **6 MWT**

Green: **10 MWT**

Orange: **FGA**

OM station to go: Cut a string 12 meters + 98 inches, mark as indicated

PRACTICE: 6 CORE MEASURES

(AND MAKE YOUR OWN STRING)

Information on Standardized Assessment Tools Used in Stroke Rehabilitation

Tools in alphabetical order by category

Nebraska Stroke Task Force:
Rehabilitation Committee
6/12/2023

RESOURCES

- Standardized Assessment Tool

Scan me!

OUTCOME MEASURES IN THE SA TOOL

Movement Related

- ADLs
- Balance or Mobility
- Fine Motor or Arm Activity
- Motor Activity

Other

- Cognition
- Depression
- Perception & Vision
- Prognosis or severity
- Quality of Life
- Speech & Language
- Swallowing

BALANCE OR MOBILITY EXAMPLE

Standardized Assessments of Balance or Mobility	Purpose	Population Acuity (Acute, Subacute, Chronic)	Score Interpretation	Time to Administer	Source of Information
Berg Balance Scale (BBS)	A 14-item objective measure designed to assess static balance and fall risk in adult populations	Highly recommended for Subacute and Chronic Recommended for acute	14 items, 56 total points MCID = 8 points <45 = high risk of falling <40 = 100% risk of falling	15-20 minutes	Free http://www.rehabmeasures.org
Functional Gait Assessment (FGA)	Assesses balance during various walking tasks	Acute Subacute	Modified the Dynamic Gait Index to improve reliability and decrease the ceiling effect. 10-item test, each item is scored on an ordinal scale from 0-3 0: Severe impairment 1: Moderate impairment	5-20 minutes	Free http://www.rehabmeasures.org

OUTCOME MEASURES BY PRACTICE SETTING

RESOURCES

- Outcome measures reviewed by setting
  1. Acute Setting Recommendations
  2. Inpatient Rehab/Outpatient Setting Recommendations
  3. PDFs of "Demo-Do" measures
  4. Compendium of data for all recommended measures

Scan me!

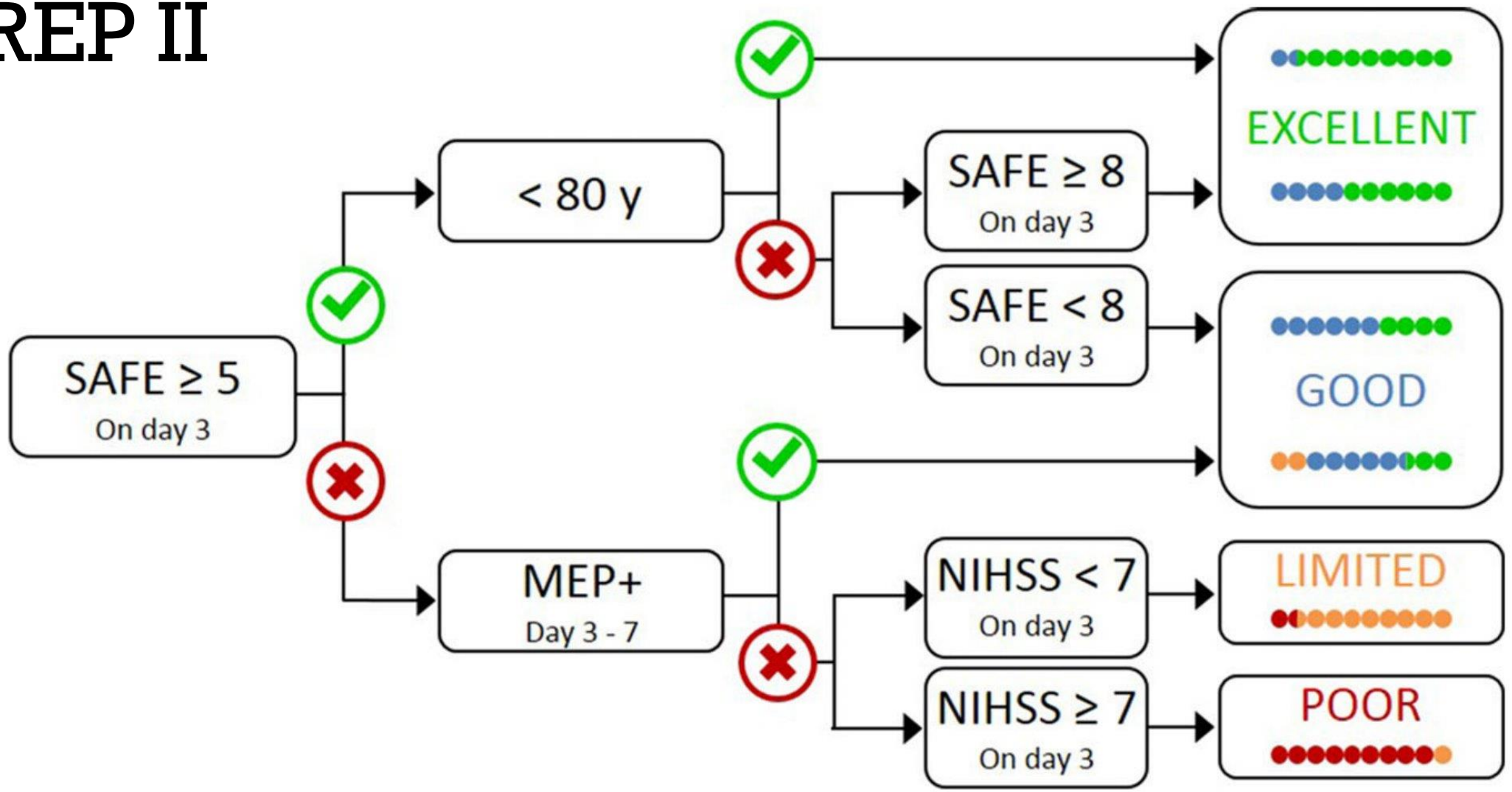
ACUTE/SUBACUTE STAGES

Impairment of body structure or function			
Stroke Rehabilitation Assessment of Movement (STREAM)	Motor functioning s/p stroke	30 items across 3 domains: 1. Upper limb movements – MCID 2.2 2. Lower limb movements – MCID 1.9 3. Basic mobility items – MCID 4.8 Each item scored on ordinal scales 0-2 limbs, 0-3 for mobility Lower scores indicate increased challenges with movement and mobility	15 minutes
Fugl-Meyer Assessment of Motor Recovery after Stroke (FMA)	Motor functioning, sensory functioning, balance, joint ROM, and pain s/p stroke	5 domains scored on 0-2 ordinal scale, higher scores = better motor control 1. Motor function – UE and LE 2. Sensory function 3. Balance 4. Joint ROM 5. Joint pain	30 minutes
Functional status			
Postural Assessment Scale for Stroke (PASS)	Assesses and monitors balance and postural control following stroke.	12 items of increasing difficulty which measure balance in lying, sitting and standing; max score of 36; most responsive to change before day 90 post stroke. Score >12.5 points is predictive of a patient more likely to be ambulatory at discharge	10 minutes

ACUTE/SUBACUTE STAGES

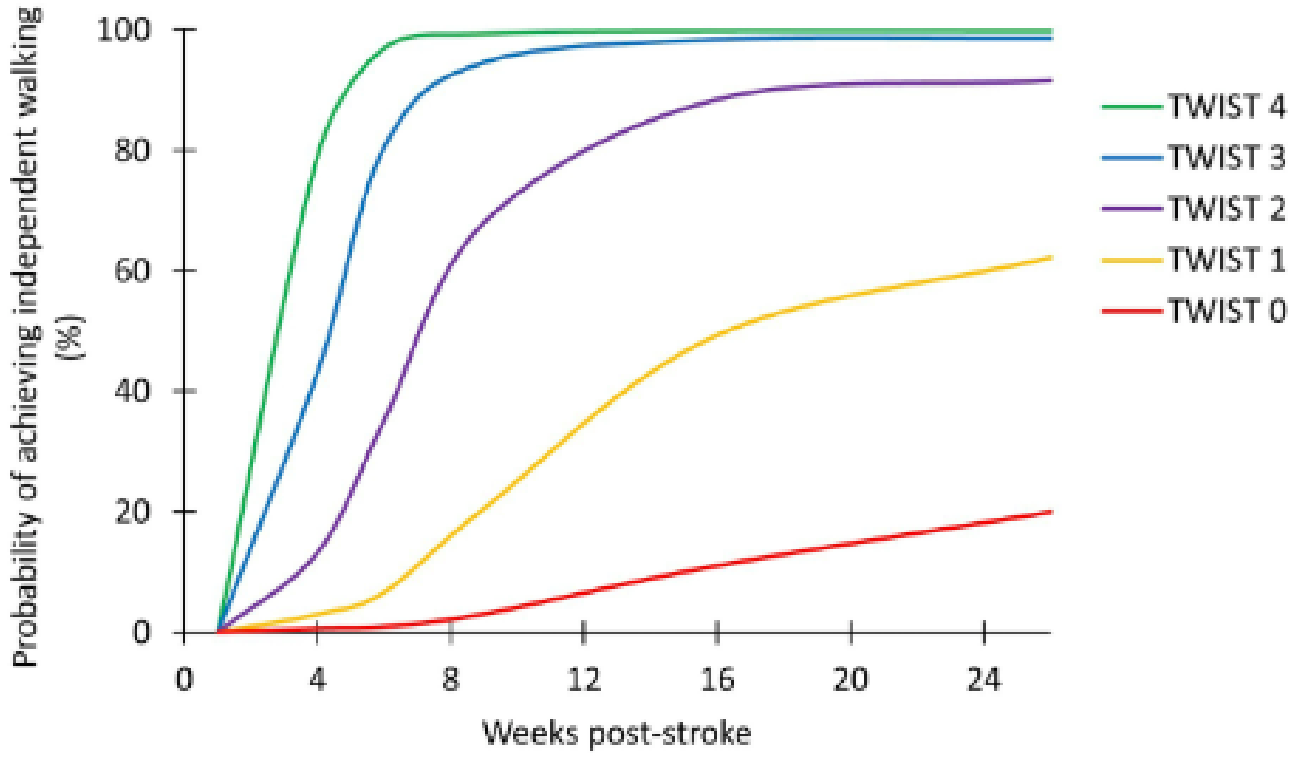
Prognostic			
UE: Predicting Recovery Potential (PREP II)	Predicts hand and arm function from day 3 scores for potential recovery within 3 months	Looks at day 3 shoulder abduction and finger extension motor scores, age, motor evoked potential via TMS, and NIHSS scores SAFE scores >/= 5 and age <80 = excellent prognosis Lower SAFE scores and higher age have less recovery potential	5 minutes
Time to Walking Independently post STroke (TWIST)	Predicts independent walking within 26 weeks post stroke	Using BERG scores, age, and knee extension strength Scored 0-4, with higher scores indicating higher likelihood to walking earlier after diagnosis Accuracy: at least 83% for all time points	5 minutes
Henderson et al 2022	Predicts independent walking at discharge from IRF post subacute stroke for patients who are non-ambulatory	Using Berg scores, strength scores hip flexion/extension, knee flexion/extension, dorsiflexion/plantarflexion Input scores into prediction calculator to get ambulation probability	5 minutes

PREP II



Resource: https://presto.auckland.ac.nz/how-prep2-works/

TWIST



TWIST Score		
Age	≥ 80 y	0
	< 80 y	1
Knee extension strength	< 3	0
Medical Research Council grade	≥ 3	1
Postural Control	< 6	0
Berg Balance Test	6–15	1
	≥ 16	2
	Total	/4

TWIST score	4 weeks	6 weeks	9 weeks	16 weeks	26 weeks
0	1 (1-1)	1 (1-1)	3 (3-3)	11 (11-11)	20 (20-20)
1	3 (2-9)	7 (4-17)	21 (12-60)	49 (31-100)	62 (42-100)
2	13 (5-63)	35 (18-81)	68 (37-99)	88 (62-100)	92 (68-100)
3	43 (14-97)	81 (51-99)	95 (72-100)	98 (85-100)	99 (86-100)
4	79 (33-100)	97 (83-100)	99 (92-100)	100 (95-100)	100 (95-100)

Henderson

Predicting likelihood of independent (≥ contact guard) ambulation at discharge from inpatient rehablitation

Participants admitted with subacute (≤ 6 months) stroke

Admit measures collected within the first week of admission (Day # 1-8)

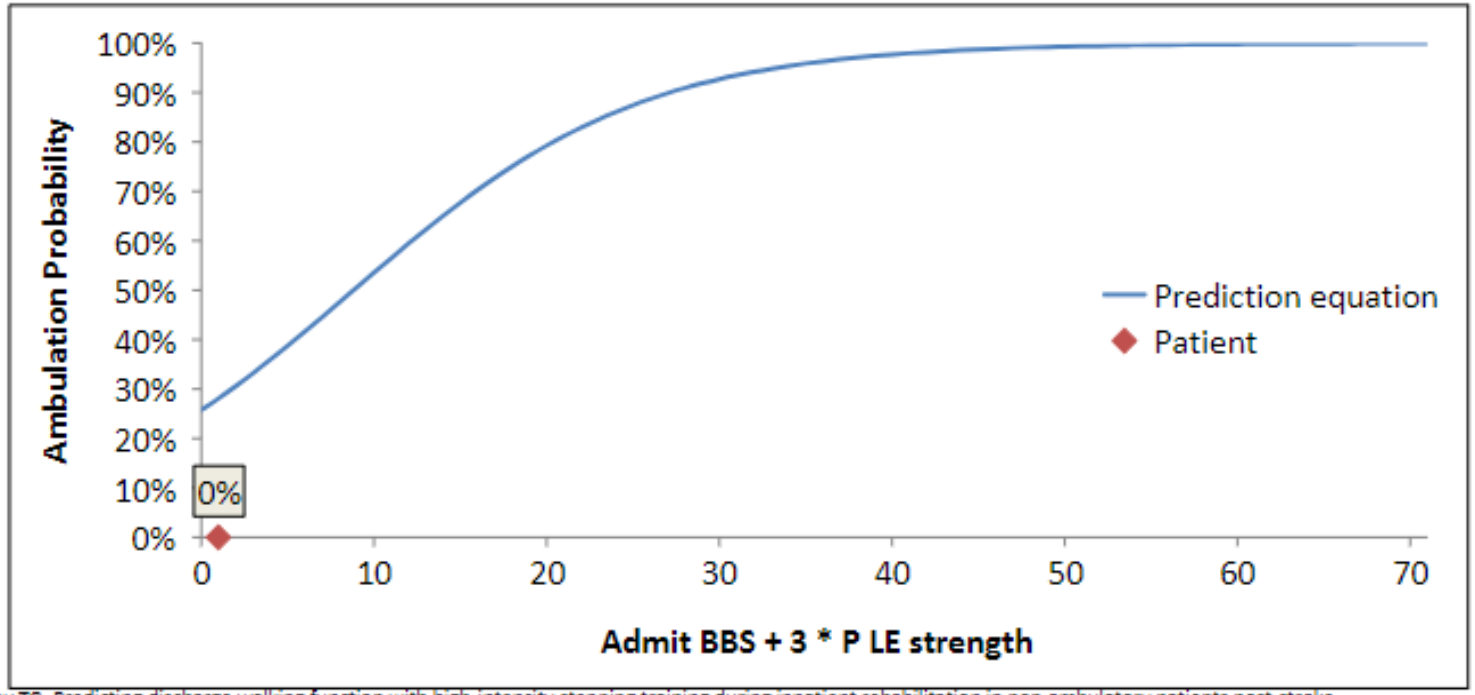
Berg Balance Scale

Total score

Available Paretic LE strength (scored out of 5)

Hip flexion
Hip extension
Knee extension
Knee flexion
Dorsiflexion
Plantarflexion

Enter Berg Score and available paretic lower extremity strength scores



iKT institute for KNOWLEDGE TRANSLATION

For questions, contact Chris Henderson at
chende@knowledgetranslation.org

Data from: Henderson CE, Fahey M, Brazg G, Moore JL, Hornby TG. Predicting discharge walking function with high-intensity stepping training during inpatient rehabilitation in non-ambulatory patients post-stroke. Arch Phys Med Rehabil. 2020; Nov 20; S0003-9993(20)31230-2. doi: 10.1016/j.apmr.2020.10.127.

version 4.14.2021

DEMO: PASS

INPATIENT SETTING

Functional status			
Inpatient Rehabilitation Facility – Patient Assessment Instrument (IRF-PAI)	Section GG – functional abilities and ADLs	PT usually covers all items in bed mobility, transfers, and mobility (walking vs WC). Scored 1-6 point scale for each item, higher scores = more independence 1: dependent 2: substantial/maximal assist (helper does more than half the work) 3: partial/moderate assist (helped does less than half the work) 4: supervision/touching assist (verbal cues or steadying assist 5: setup or clean up 6: independent	20-30 minutes PT related tasks
Prognostic			
Orpington Prognostic Scale (OPS)	Assessment of stroke severity, with optimal predictive power for recovery potential when administered **2 weeks** post stroke	Total score = 1.6 + motor + proprioception + balance + cognition • Scores < 3.2 indicate a high likelihood of returning home. • Scores that fall between 3.2 and 5.2 generally respond better to rehabilitation. • Patients with scores > 5.2 are typically dependent with an increased risk of institutionalization.	10 minutes

DEMO: OPS

CHRONIC STAGES

Self-Reported			
Stroke Impact Scale – 16 (SIS-16)	Assess perceived physical functioning following stroke Based off SIS 3.0	16 items from 4 physical domains scored 1-5, higher scores indicating no difficulty at all 1. Strength 2. Hand function 3. Mobility 4. ADL/IADLs MCID Subacute stroke: 9.4-14.1	5-10 minutes
Stroke Specific Quality of Life (SS-QOL)	Assess perceived quality of life across 12 domains	49 items across 12 domains scored 1-5, higher scores indicating more independence 1. Mobility 2. Energy 3. UE function 4. Work and productivity 5. Mood 6. Self-care 7. Social roles 8. Family roles 9. Vision 10. Language 11. Thinking 12. Personality	20-25 minutes

DEMO: SIS - 16

OTHER NOTABLE MEASURES - ALL STAGES

Impairment body structure or function			
Trunk Impairment Scale (TIS)	Assesses sitting balance in steady state and dynamic conditions, coordination	17 items, 3 subscales: all items performed in sitting, up to 3 times, keep highest score. 1. Static sitting 2. Balance 3. Dynamic Sitting & Coordination Score 0-23, lower score less likely to be ambulatory	20 minutes
Mini-BEST Test	Assesses vestibular and non-vestibular balance considering multiple components of balance	14 items in 4 constructs of balance assessed with 0-3 scoring for each item; total score 28 1. Anticipatory postural adjustments 2. Reactive postural control 3. Sensory orientation 4. Dynamic Gait Cut Score <17.5 identifies those with fall history	15 minutes
Function in Sitting Test (FIST)	Measure of non-vestibular balance	14 item scale, in standard sitting position at edge of bed, assessing need for assist or use of UEs for a variety of seated tasks. MDC 5.63	<15 minutes

OTHER NOTABLE MEASURES - UE

Impairment body structure or function: UE			
9 Hole Peg test	Assess Dexterity/Fine motor control of UE	Client moves pegs from a container, one at a time, and places them into holes on the board as quickly as possible; then return them one at a time to the container. MDC: 32.8 seconds Normative Data available based on time since stroke	<5 minutes
Activity Restriction: UE			
Functional Upper Extremity Levels (FUEL)	Classification system to illustrate/simplify UE motor performance	Classify how patient incorporates affected UE into an activity + amount, type, reason for cuing • Nonfunctional • Dependent stabilizer • Independent stabilizer • Gross assist • Semifunctional assist • Proximal dependent semifunctional assist • Functional assist • Fully functional	≥5 minutes (can be scored concurrent with ADLs)

HOW TO FIND MEASURES

- Demo:
  1. https://www.sralab.org/
  2. https://strokengine.ca/en/assessments-by-topic/

Shirley Ryan Abilitylab

STROKE ENGINE

- Audience:
  - What do you want to measure?

WHERE ARE WE ENDING?

Log in to Poll Everywhere

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QUESTIONS

REFERENCES

1. APTA Guide to Physical Therapist Practice 4.0. American Physical Therapy Association. Published 2023. Accessed 10.15.23. https://guide.apta.org
2. Calajo A, Feld-Glazman R, Dicembri A, Capasso N, Geller D, Van Lew S. Convergent Validity for the Functional Upper Extremity Levels (FUEL) in Stroke Rehabilitation. American Journal of Occupational Therapy. 2023;77(3)
3. Fell DW, Lunnen KY, Rauk RP. eds. Lifespan Neurorehabilitation: *A Patient-Centered Approach from Examination to Intervention and Outcomes*. McGraw Hill; 2018. Accessed August 17, 2023. https://fadavispt.mhmedical.com/content.aspx?bookid=2327&sectionid=182071911
4. Moore JL, Potter K, Blankshain K, Kaplan SL, O'Dwyer LC, Sullivan JE. A Core Set of Outcome Measures for Adults With Neurologic Conditions Undergoing Rehabilitation: A CLINICAL PRACTICE GUIDELINE. *J Neurol Phys Ther*. 2018;42(3):174-220.
5. Moore, JL., Virva, R., Henderson, C., Lenca, L., Butzer, JF., Lovell, L., … & Hornby, TG. Applying the knowledge-to-action framework to implement gait and balance assessments in inpatient stroke rehabilitation. *Archives of physical medicine and rehabilitation*, 2022;103(7), S230-S245.
6. O'Sullivan Sb, Schmitz Tj, Fulk G. Eds. *Physical Rehabilitation*, 7e. McGraw Hill; 2019. Accessed August 12, 2023. Https://Fadavispt.Mhmedical.Com/Content.Aspx?Bookid=2603&sectionid=214784557potter Et Al. 2011.
7. Rose, D, Pinto-Zipp, G. StrokEDGE II Outcome Measures. 2021. Accessed August 17, 2023. https://www.neuropt.org/practice-resources/neurology-section-outcome-measures-recommendations/stroke