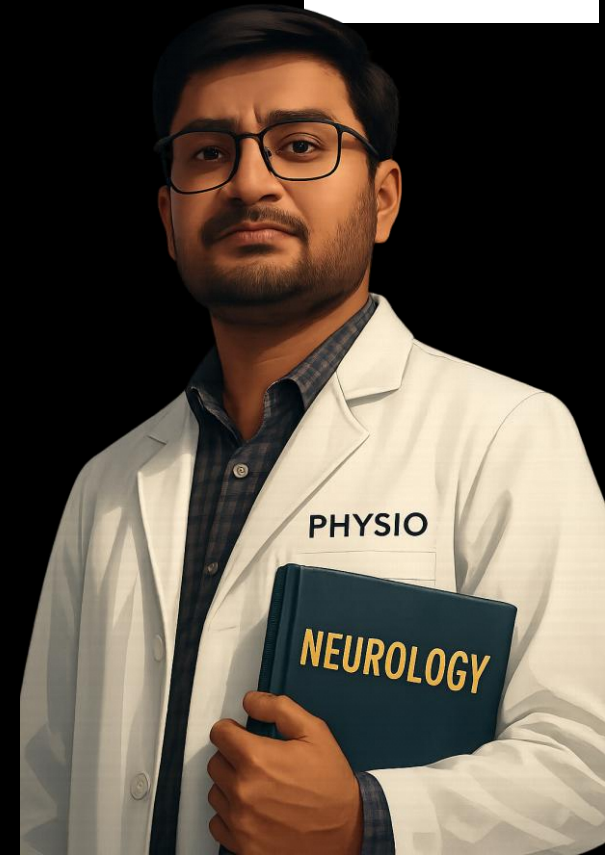




OUTCOME MEASURES & ASSESSMENT SCALES *IN NEUROLOGICAL PHYSIOTHERAPY*

Source: O'Sullivan & Schmitz — Physical Rehabilitation



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ICF Framework Classification

Scales organized by Body Function, Activity & Participation

01

SECTION

OVERVIEW: TWO CLASSIFICATION FRAMEWORKS

FRAMEWORK 1: ICF-BASED

BODY STRUCTURE & FUNCTION (Impairment)

Spasticity • Muscle Strength • Sensation
Coordination • ROM • Cognition • Arousal

ACTIVITY (Functional Performance)

ADL • Transfers • Gait • Balance
Ambulation • Upper Limb Use

PARTICIPATION (Quality of Life)

Community Reintegration • QOL
Roles & Social Engagement

FRAMEWORK 2: DIAGNOSIS-BASED



STROKE



PARKINSON'S DISEASE



MULTIPLE SCLEROSIS



TRAUMATIC BRAIN INJURY



SPINAL CORD INJURY



VESTIBULAR DISORDERS

RANKING SYSTEM — HOW SCALES ARE RATED IN THIS LECTURE

★★★★★ GOLD STANDARD

Highest evidence, universally validated, recommended as primary outcome in clinical trials and guidelines. Must-know for every neurological PT.

★★★★ HIGHLY RECOMMENDED

Strong psychometric properties, widely used across multiple diagnoses, routine clinical use. Excellent sensitivity to change.

★★★ RECOMMENDED

Good validity and reliability, population-specific, commonly used in clinical and research settings.

★★ USEFUL / SUPPLEMENTARY

Useful in specific contexts or for specific diagnoses. Moderate evidence. Supports primary outcome measures.

★ SPECIALIST USE

Used in specialist settings, research, or highly specific populations. Limited general clinical use.

Glasgow Coma Scale (GCS)



Gold standard for consciousness:

Eye opening (4), verbal (5), motor (6).

TBI, Stroke, Acute Neuro cases

Standard Cut off Scores:

- > 13 = Minor brain injury
- 9 - 12 = Moderate brain injury
- < 8 = Severe brain injury

BEHAVIOR	RESPONSE	SCORE
Eye opening response	Spontaneously	4
	To speech	3
	To pain	2
	No response	1
Best verbal response	Oriented to time, place, and person	5
	Confused	4
	Inappropriate words	3
	Incomprehensible sounds	2
	No response	1
Best motor response	Obeys commands	6
	Moves to localized pain	5
	Flexion withdrawal from pain	4
	Abnormal flexion (decorticate)	3
	Abnormal extension (decerebrate)	2
	No response	1
Total score:	<i>Best response</i>	15
	<i>Comatose client</i>	8 or less
	<i>Totally unresponsive</i>	3

	Acute Care	Inpatient Rehabilitation	Skilled Nursing Facility	Outpatient Rehabilitation	Home Health
TBI	LS	NR	NR	NR	NR
EDGE					

Rancho Los Amigos Scale (Levels of Cognitive Functioning) (RLAS/LOCF)



8 levels: I=No Response → VIII=Purposeful-Appropriate.
Describes cognitive-behavioral recovery progression post-TBI.
Guides PT goals by stage.
Level I-II=early acute; VI-VIII=community reintegration.

TBI

I. No Response

Patient appears to be in a deep sleep and is completely unresponsive to any stimuli.

II. Generalized Response

Patient reacts inconsistently and nonpurposefully to stimuli in a nonspecific manner. Responses are limited and often the same regardless of stimulus presented. Responses may be physiological changes, gross body movements, and/or vocalization.

III. Localized Response

Patient reacts specifically but inconsistently to stimuli. Responses are directly related to the type of stimulus presented. May follow simple commands such as closing eyes or squeezing hand in an inconsistent, delayed manner.

IV. Confused-Agitated

Patient is in a heightened state of activity. Behavior is bizarre and nonpurposeful relative to immediate environment. Does not discriminate among persons or objects; is unable to cooperate directly with treatment efforts. Verbalizations frequently are incoherent and/or inappropriate to the environment; confabulation may be present. Gross attention to environment is very brief; selective attention is often nonexistent. Patient lacks short- and long-term recall.

V. Confused-Inappropriate

Patient is able to respond to simple commands fairly consistently. However, with increased complexity of commands or lack of any external structure, responses are nonpurposeful, random, or fragmented. Demonstrates gross attention to the environment but is highly distractible and lacks ability to focus attention on a specific task. With structure, may be able to converse on a social automatic level for short periods of time. Verbalization is often inappropriate and confabulatory. Memory is severely impaired; often shows inappropriate use of objects; may perform previously learned tasks with structure but is unable to learn new information.

VI. Confused-Appropriate

Patient shows goal-directed behavior but is dependent on external input or direction. Follows simple directions consistently and shows carryover for relearned tasks such as self-care. Responses may be incorrect due to memory problems, but they are appropriate to the situation. Past memories show more depth and detail than recent memory.

VII. Automatic-Appropriate

Patient appears appropriate and oriented within the hospital and home settings; goes through daily routine automatically, but frequently robot-like. Patient shows minimal to no confusion and has shallow recall of activities. Shows carryover for new learning but at a decreased rate. With structure is able to initiate social or recreational activities; judgment remains impaired.

VIII. Purposeful-Appropriate

Patient is able to recall and integrate past and recent events and is aware of and responsive to environment. Shows carryover for new learning and needs no supervision once activities are learned. May continue to show a decreased ability relative to premorbid abilities, abstract reasoning, tolerance for stress, and judgment in emergencies or unusual circumstances.

RLAS-R.....AN UPDATED RLA 10 levels

Level	Cognitive response/need of assistance	Clinical Features
Level I	No response/total assistance	• No response to external stimuli
Level II	Generalised response/total assistance	• Respond inconsistently and non-purposefully to external stimuli • Responses are often the same regardless of the stimulus applied
Level III	Localised response/total assistance	• Respond inconsistently and specifically to external stimuli • Responses are directly related to the stimulus • Tend to be more responsive to familiar people (friends and family) than to strangers
Level IV	Confused and agitated/max assist	• In a hyperactive state with bizarre and non-purposeful behaviour • Demonstrate agitated behaviour that originates more from internal confusion than the external environment
Level V	Confused, inappropriate non-agitated/max assist	• Show an increase in consistency with following and responding to simple commands, their responses are non-purposeful and random to more complex commands • Behaviour and verbalisation are often inappropriate, and the patient can appear confused and often confabulates • Can perform an action or task if it is first modelled or demonstrated for them, they do not yet initiate tasks on their own • Memory is severely impaired and learning new information is difficult • Can show agitation to unpleasant external stimuli

Level VI	Confused, appropriate/ mod assist	• Able to follow simple commands consistently • Able to retain learning for familiar tasks they performed pre-injury (brushing teeth, washing face) but are unable to retain learning for new tasks • Demonstrate an increased awareness of self, situation, and their environment but are unaware of any specific impairments and safety concerns • Responses may be incorrect secondary to memory impairments but appropriate to the situation
Level VII	Automatic, appropriate/ min assist for ADLs	• Oriented in familiar settings • Able to perform a daily routine automatically with absent to minimal confusion • Demonstrate carry over for new tasks and learning in addition to familiar tasks • Can be superficially aware of diagnosis but unaware of specific impairments • Continue to demonstrate a lack of insight, decreased judgment and safety awareness • Beginning to show interest in social and recreational activities in structured settings • Require at least minimal supervision for learning and safety purposes
Level VIII	Purposeful, appropriate/ stand by assist	• Consistently oriented to person, place, and time • Can independently carry out familiar tasks in a non-distracting environment • Beginning to show awareness of their specific impairments and how they interfere with tasks, but they still require stand by assistance with compensatory skills • Able to use assistive memory devices to recall a daily schedule • Acknowledge other people's emotional states and require only minimal assistance to respond appropriately • Demonstrate improvement of memory and ability to consolidate past and future event • Often depressed, irritable, and demonstrate a low threshold to frustration

Level IX	Purposeful, appropriate/ stand by assist on request	• Able to shift between different tasks and complete them independently • Aware of and acknowledge their impairments when they interfere with tasks • Able to use compensatory strategies to cope • Able to independently anticipate obstacles that may arise secondary to any lingering impairments • Able to consider the consequences of actions and decisions with assistance • Continue to demonstrate depression and low frustration thresholds
Level X	Purposeful, appropriate/ modified independent	• Able to multitask in many different environments with extra time for task completion or devices to assist • Able to create their own methods and tools for memory retention • Can independently anticipate obstacles that may occur as a result of their impairments and take corrective actions • Able to independently make decisions and act appropriately but may require more time or compensatory strategies • May still demonstrate intermittent periods of depression and a lowered threshold for frustration when under stress • Able to appropriately interact with others in social situations

Mini-Mental State Examination (MMSE)



30-point scale:

11 simple questions or tasks grouped into 7 cognitive domains:

- 1) Orientation to time
- 2) Orientation to place
- 3) Registration of three words
- 4) Attention and calculation
- 5) Recall of three words
- 6) Language
- 7) Visual construction

Levels of impairment have been classified as (Tombaugh & McIntyre, 1992):

None: score = 24-30

Mild: score = 18-24

Severe: score = 0-17

**Stroke, PD,
General
Neuro**

 5–10 min

Fugl-Meyer Assessment (FMA)



Impairment-based, sequential recovery stages. 3-point ordinal scale (0=cannot perform, 2=fully performed).

Subtests:

UE (66), LE (34), Balance (14), Sensation (24), ROM/Pain (44).
Total = 226.

Gold standard for post-stroke motor recovery.

 30–40 min



$r=0.99$

reliability. UE subtest most used. Shortened version: FMA Motor Scale (UE+LE).

AGE RANGES

Adolescent

13-17

YEARS

Adult

18-64

YEARS

Elderly Adult

65+

YEARS

NIH Stroke Scale

(NIHSS)



15 items:

LOC, ability to respond to questions and obey simple commands, papillary response, deviation of gaze, extent of hemianopsia, facial palsy, resistance to gravity in the weaker limb, plantar reflexes, limb ataxia, sensory loss, visual neglect, dysarthria and aphasia severity.

Scores 0–42

0=normal, 42=severe stroke.

 5–8 min

 Used to guide acute treatment decisions. Online scoring service available.

Interpretation

- 1) Very Severe: >25
- 2) Severe: 15 – 24
- 3) Mild to Moderately Severe: 5 – 14
- 4) Mild: 1 – 5

AGE RANGES

Adult

18-64

YEARS

<https://www.heart.org/-/media/Files/Affiliates/MWA/Nebraska-ML-Stroke/Hospital-Toolkit/NIHSS-One-page.pdf>

Acute		Subacute	Chronic
(CVA < 2 months post)		(CVA 2 to 6 months)	(> 6 months)
(SCI < 1 month post)		(SCI 3 to 6 months)	
(Vestibular < 6 weeks post)			
StrokEDGE	R	NR	NR

Mini-Mental State Examination (MMSE)



30-point scale:

11 simple questions or tasks grouped into 7 cognitive domains:

- 1) Orientation to time
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Severe: score = 0-17

**Stroke, PD,
General
Neuro**

 5–10 min

ICF: BODY FUNCTION | CO-ORDINATION



Part I: Nonequilibrium Coordination Tests

Key to Grading

- 4 *Normal Performance*
- 3 *Minimal Impairment:* Able to accomplish activity; slightly less than normal control, speed, and steadiness
- 2 *Moderate Impairment:* Able to accomplish activity; movements are slow, awkward, and unsteady
- 1 *Severe Impairment:* Able only to initiate activity without completion; movements are slow with significant unsteadiness, oscillations, and/or extraneous movements
- 0 *Activity Impossible*

Notations should be made under comments section if:

- Lack of visual input renders activity impossible or alters quality of performance
- Verbal cuing is required to accomplish activity
- Alterations in speed affect quality of performance
- Excessive amount of time required to complete activity
- Changes in arm position alters sitting balance
- Postural instability is evident: unsteadiness, oscillations, extraneous movements
- Fatigue alters consistency of response
- Performance affects patient safety; requires contact guarding

GRADE: LEFT	COORDINATION TEST	GRADE: RIGHT	COMMENTS
	Finger-to-nose		
	Finger-to-therapist's finger		
	Finger-to-finger		
	Alternate nose-to-finger		
	Finger opposition		
	Mass grasp		
	Pronation/supination		
	Rebound phenomenon		
	Tapping (hand)		
	Tapping (foot)		
	Pointing and past-pointing		
	Alternate heel-to-knee; heel-to-toe		
	Toe-to-examiner's finger		
	Heel-on-shin		
	Drawing a circle (hand)		
	Drawing a circle (foot)		
	Fixation/position holding (UE)		
	Fixation/position holding (LE)		

Part II: Postural Control And Balance Tests

Key to Grading

- 4 *Normal*: Able to maintain steady balance without handhold support (static)
Accepts maximal challenge and can shift weight easily within full range in all directions (dynamic)
- 3 *Good*: Able to maintain balance without handhold support, limited postural sway (static)
Accepts moderate challenge; able to maintain balance while picking object off floor (dynamic)
- 2 *Fair*: Able to maintain balance with handhold support; may require occasional minimal assistance (static)
Accepts minimal challenge; able to maintain balance while turning head/trunk (dynamic)
- 1 *Poor*: Requires handhold support and moderate to maximal assistance to maintain position (static)
Unable to accept challenge or move without loss of balance (dynamic)
- 0 *Absent*: Unable to maintain balance

Notations should be made under comments section if:

- Lack of visual input renders activity impossible or alters quality of performance
- Verbal cuing is required to accomplish activity
- Alterations in speed affect quality of performance
- Excessive amount of time required to complete activity
- Changes in limb position alters standing balance/postural stability
- Postural instability is evident: extraneous movements, unsteadiness, or oscillations
- Fatigue alters consistency of response
- Performance impacts patient safety, fall risk

GRADE	BALANCE TEST	COMMENTS
	Sitting in a normal comfortable position	
	Sitting, weight shifting in all directions	
	Sitting, multidirectional functional reach	
	Sitting, picking an object up off floor	
	Standing in a normal comfortable posture	
	Standing, feet together (narrow base of support)	
	Standing on one foot	
	Standing, with one foot directly in front of the other (tandem position)	
	Standing: eyes open (EO) to eyes closed (EC) (<i>Romberg Test</i>)	
	Standing in tandem position: EO to EC (<i>Sharpened Romberg Test</i>)	
	Standing, multidirectional functional reach	
	Walking, placing feet on floor markers	
	Walk: sideways	
	Walk: backwards	
	Walk: cross-stepping	
	Walk: in a circle, alternate directions	
	Walk: on heels	
	Walk: on toes	
	March in place	
	Walk with horizontal and vertical head turns	
	Step over or around obstacles	
	Stairclimbing with handrail	
	Stairclimbing without handrail	
	Stairclimbing: one step at a time	
	Stairclimbing: step-over-step	



Berg Balance Scale

(BBS) ★★★★★

SCORE: 0–56 (14 items, each 0–4)

Tests static and dynamic balance: sitting to standing, unsupported standing, transfers, standing EO/EC, reaching, picking up object, turning, tandem stance, single leg stance. Higher = better. Interrater ICC = 0.98.

🕒 <45 = fall risk in elderly; MCID = 7 pts (stroke), 5 pts (PD)

🕒 15–20 min | Stroke, PD, Elderly, General Neuro

Performance-Oriented Mobility Assessment

(POMA / Tinetti) ★★★★★

SCORE: Balance subscale (0–16) + Gait subscale (0–12) = Total 0–28

Balance subtest: 9 items (sitting balance, rising, immediate standing, standing, turning, sternal nudge, EO standing, tandem stance, one-leg stance). Gait subtest: 7 items (initiation, step height, length, symmetry, continuity, path, trunk, walk stance). Low score = greater fall risk.

🕒 ≤18 = high fall risk; 19–23 = moderate risk; Barthel correlation = 0.67–0.76

🕒 10–15 min | Elderly, Frailty, Neurological conditions

Function in Sitting Test

(FIST) ★★★

SCORE: 0–56 (14 items, each 0–4)

Assesses static and dynamic sitting balance including reactions to perturbation. Items: leaning forward/backward/lateral, anterior/posterior reach, reactive balance (anterior, posterior, lateral). Useful for low-functioning or early rehab patients who cannot stand.

🕒 Reliable, valid, concurrent validity established

🕒 10 min | Stroke, SCI, TBI, Severe neurological impairment

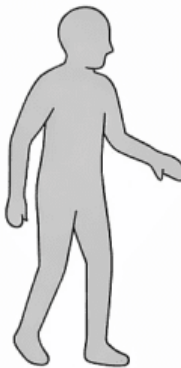
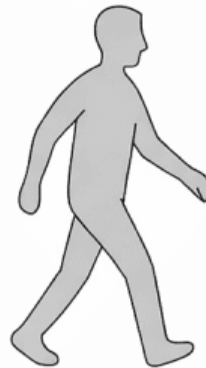
Brunnstrom Stages of Recovery



7-stage motor recovery framework post-stroke. Stage 1=flaccidity; 2=spasticity begins; 3=synergy dominance; 4=some out-of-synergy; 5=more complex voluntary movements; 6=individual joint control; 7=normal. Describes UE, LE, and hand separately.

 Formed theoretical basis for FMA. Useful for charting recovery trajectory.

 15 min

Stage 1	Stage 2	Stage 3	Stage 5	Stage 6	Stage 7
					
Complete flaccidity	Spasticity appears	Increased spasticity	Spasticity decreases	Spasticity disappears	Normal movement

Modified Ashworth Scale (MAS)



WHAT: 6-point ordinal scale (0, 1, 1+, 2, 3, 4) measuring resistance to passive movement. 0 = no increase in tone; 4 = rigid limb in flexion/extension.

USED

IN: Stroke, SCI, MS, TBI, Cerebral Palsy

 1–2 min |  No equipment

 Ordinal not interval; moderate inter-rater reliability

MAS Reliability: Moderate–Good (κ 0.47–0.86 depending on population & muscle group)

 Widely used, quick, no equipment

Grade	Description
0	No increase in muscle tone
1	Slight increase in muscle tone, manifested by a catch and release or by minimal resistance at the end of the range of motion when the affected part/s is/are moved in flexion or extension.
1+	Slight increase in muscle tone, manifested by a catch, followed by minimal resistance throughout the remainder (less than half) of the ROM.
2	More marked increase in muscle tone through most of the ROM, but affected part(s) easily moved.
3	Considerable increase in muscle tone, passive movement difficult.
4	Affected part(s) rigid in flexion or extension.

Budapest Criteria



BURNING NIGHTS

To receive a CRPS diagnosis under the Budapest Criteria, a person must have:

- Continuing pain, disproportionate to the original injury/event
- At least one sign at the time of the appointment in two (2) or more of the following categories
- At least one symptom in the patient history in at least three (3) or more of the following categories
- Also no other condition can better explain the symptoms

Sensory	• Allodynia (to light touch) • and/or temperature sensation • and/or deep somatic pressure • and/or hyperalgesia (to pinprick) • and/or Hypoalgesia (decreased sensitivity to pain) • and/or Hypoesthesia (abnormal decrease in sensitivity to stimuli of the sense / reduced sense of touch or sensation) • and/or Hyperaesthesia (increase in or excessive sensitivity to stimuli of the sense)
Vasomotor	• Temperature differences between the limb, • and/or skin colour changes • and/or skin colour changes between the limb
Sudomotor/Oedema	• Oedema (swelling) • and/or sweating changes • and/or sweating differences between the limbs
Motor / Trophic	• Decreased range of motion • and/or motor dysfunction (ie weakness, tremor or muscle spasm) • and/or trophic changes (hair and/or nail and/or skin changes)

10-Meter Walk Test (10MWT)



Speed in m/sec or m/min

Timed over middle 10 m of 14 m walkway. Self-selected and fast pace. Thresholds: <0.4 m/s=household; $0.4\text{--}0.8$ =limited community; >0.8 =community. MDC = 0.16 m/s in stroke.

 Stroke, MS, SCI, PD, All neuro

6-Minute Walk Test (6MWT)



Distance in meters (6 min)

Walking at comfortable pace for 6 min around two chairs 18 m apart. Measures endurance and functional mobility. Predicts community walking activity (46% variance in daily steps, stroke). Normative equations available by age/height/weight.

 Stroke, PD, ABI, Cardiac/Pulmonary

Timed Up and Go (TUG)



Time in seconds

Rise from standard chair, walk 3 m, turn, return, sit. Measures basic mobility and fall risk. Normal healthy adults <10 sec. >12 sec = risk for falls in community. Used in PD, stroke, older adults. MCID 2.9 sec in elderly.

 Stroke, PD, Elderly, All neuro

Dynamic Gait Index (DGI)



 **0–24 (8 items, 0–3 each)**

Tests gait adaptation: level surface, speed changes, head turns, obstacle stepping, pivot turns, stairs. Score $\leq 19 = 2.58\times$ increased fall odds (vestibular). Also 4-item DGI version (ICC=0.93). Used across stroke, PD, MS, vestibular disorders.

 Vestibular, Stroke, PD, MS

Functional Gait Assessment (FGA)



 **0–30 (10 items, 0–3 each)**

Modification of DGI. Adds narrow BOS walking, backward walking, eyes-closed gait. Addresses DGI ceiling effects. Threshold $\leq 20/30$ predicts falls. Intrarater ICC=0.83, interrater=0.84. Used in vestibular, PD, stroke.

 Vestibular, PD, Stroke, Elderly

Functional Ambulation Categories (FAC)



 **0–5 ordinal scale**

0=non-functional ambulation; 1=needs constant support; 2=needs constant supervision; 3=independent on level surfaces; 4=independent with supervision on uneven terrain/stairs; 5=fully independent. Simple, reliable, commonly used in stroke and SCI trials. Quick to administer (observation only).

 Stroke, SCI, Neurological

Barthel Index (BI)



SCORE: 0–100 (10 items: feeding, bathing, grooming, dressing, bowel, bladder, toilet use, transfers,

Each item scored as dependent/needs help/independent. 0=total dependence; 100=fully independent. Most widely used ADL measure in neuro rehabilitation. Strong interrater reliability, good predictive validity for discharge destination.

5 min (interview/observation) | Stroke, MS, SCI, Neurological (all)

Thresholds & Evidence

<40 = severe dependence;
40–60 = moderate; 60–80 = mild; >80 = minimal/independent. MCID = 1.85 for stroke.

Functional Independence Measure (FIM™)



SCORE: 18 items, each 1–7. Motor subscale (13 items) + Cognitive subscale (5 items). Total 18–

7-level scale: 7=Complete independence; 6=Modified independence; 5=Supervision; 4=Minimal assist (≥75% effort); 3=Moderate assist (50–74%); 2=Maximal assist (25–49%); 1=Total assist (<25%). Motor items: self-care, sphincter, transfers, locomotion. Cognitive: communication, social cognition.

30–45 min | Stroke, TBI, SCI, MS, Neurological inpatient

Thresholds & Evidence

Interrater ICC = 0.88. Motor FIM has high concurrent validity with BI (ICC ≥0.83). Proprietary — requires training & licensure.

FIM + Functional Assessment Measure (FIM+FAM)



SCORE: FIM 18 items + FAM 12 items = 30 items total, each 1–7. Max = 210.

FAM adds: swallowing, car transfer, community access, reading, writing, speech intelligibility, emotional status, adjustment to limitations, employability, orientation, attention, safety judgment. Developed for TBI & stroke populations requiring broader cognitive/psychosocial coverage.

45 min | TBI, Stroke

Thresholds & Evidence

Rasch analysis: FAM extends cognitive range of FIM in TBI. Minimal added motor benefit over FIM alone.

Stroke Rehabilitation Assessment of Movement (STREAM)



 **Max 70 (UE: 20, LE: 20, Functional Mobility: 30)**

30 items across 3 subscales: UE voluntary movements, LE voluntary movements, basic mobility (rolling, bridging, sit-to-stand, standing, stepping, walking, stairs). 3-point UE/LE scale; 4-point mobility scale. Good construct validity & high reliability. Predicts discharge destination post-stroke.

 Stroke

Wolf Motor Function Test (WMFT)



 **17 timed tasks (time in sec) + functional ability score (1–5 per task)**

15 timed tasks + 2 strength tasks for upper extremity function in stroke. Tasks: forearm to table, forearm to box, extend elbow, hand to table side, weight to table, reach/retrieve, lift can, lift pencil, fold towel, turn key, stack checkers, flip cards, grip strength. Widely used in constraint-induced movement therapy (CIMT/EXCITE trial).

 Stroke, UE neurological impairment

Chedoke-McMaster Stroke Assessment (CMSA)



 **Impairment Inventory: 14 items (7-point scale, 6 areas). Activity Inventory: Gross Motor Function Index + Walking Index. 2-point walking distance score.**

Two components: Impairment Inventory (shoulder pain, postural control, arm/hand/foot/leg control) and Activity Inventory (bed mobility, transfers, Gross Motor Function, Walking). Well-validated, captures broad range of stroke recovery. Used in Canadian stroke rehab.



Stroke

Stroke Impact Scale (SIS)



 **59 items, 8 domains, 0–100 per domain. Final item: 0–100 perceived recovery.**

Self-report. 8 domains: strength, memory/thinking, emotions, communication, ADL, mobility, hand function, participation. Takes ~30 min. Valid, reliable, sensitive to change. Proxy responses accurate. Covers activity AND participation. [Available at www2.kumc.edu/coa/SIS](http://www2.kumc.edu/coa/SIS).



Stroke

Diagnosis-Based Classification

Stroke, Parkinson's, MS, TBI, SCI



02

SECTION

ICF: IMPAIRMENT

Fugl-Meyer (FMA)

Gold standard for UE/LE motor recovery



NIHSS

Acute stroke severity; 0–42



Modified Ashworth (MAS)

Spasticity; 0–4 scale



MMSE

Cognitive screen; ≥ 24 =normal



ICF: ACTIVITY

Barthel Index

ADL; 0–100; most widely used



FIM™

18 items; motor + cognitive; 1–7 scale



Berg Balance Scale

Balance; 0–56; MCID 7 pts



10MWT / 6MWT

Gait speed; endurance



TUG

Functional mobility; fall risk



FAC

Ambulation categories; 0–5



STREAM / CMSA

Stroke-specific motor + mobility



WOLF Motor Function

UE function; CIMT trials



ICF: PARTICIPATION

Stroke Impact Scale (SIS)

QOL + participation; 59 items



SF-36

General health QOL; 8 domains



PARKINSON'S DISEASE

Hoehn-Yahr Staging (H&Y)



Stages 0–5

0=No signs; 1=Unilateral; 1.5=Unilateral+axial; 2=Bilateral without balance; 2.5=Mild bilateral, recovers on pull test; 3=Mild-moderate bilateral, balance impaired; 4=Severe, can walk/stand; 5=Wheelchair/bed-bound. Classic staging for PD severity and PT goal-setting.

Unified Parkinson's Disease Rating Scale (UPDRS/MDS-UPDRS)



 **Part I: Non-motor (13 items); Part II: Motor experiences of daily living (13); Part III: Motor exam (18); Part IV: Motor complications (6). Each 0–4.**

Gold standard for PD clinical trials. MDS-UPDRS (revised) brings total to 65 items. Part III (motor exam) is most used in PT. Correlates well with PDQ-39 and H&Y. Admin ~30 min. High test-retest and inter-rater reliability.

Parkinson's Disease Questionnaire 39 (PDQ-39)



39 items, 8 dimensions, 0–100 (lower=better)

Self-report QOL: mobility, ADL, emotional well-being, stigma, social support, cognition, communication, bodily discomfort. Correlates with SF-36 and H&Y score. Disease-specific QOL measure. Well-validated for PD population.

Berg Balance Scale (BBS)



0–56

MCID = 5 points in PD (Steffen & Seney 2008). Detects fall risk. Commonly used in all Hoehn-Yahr stages. Assess at baseline, after intervention, and for progression monitoring.

Stage	Hoehn and Yahr Scale	Modified Hoehn and Yahr Scale
1	Unilateral involvement only usually with minimal or no functional disability	Unilateral involvement only
1.5	-	Unilateral and axial involvement
2	Bilateral or midline involvement without impairment of balance	Bilateral involvement without impairment of balance
2.5	-	Mild bilateral disease with recovery on pull test
3	Bilateral disease: mild to moderate disability with impaired postural reflexes; physically independent	Mild to moderate bilateral disease; some postural instability; physically independent
4	Severely disabling disease; still able to walk or stand unassisted	Severe disability; still able to walk or stand unassisted
5	Confinement to bed or wheelchair unless aided	Wheelchair bound or bedridden unless aided

MULTIPLE SCLEROSIS

Expanded Disability Status Scale (EDSS)



 **0–10 in 0.5 steps (0=normal; 10=death due to MS)**

Based on 8 Functional System Scores (FSS): pyramidal, cerebellar, brainstem, sensory, bowel-bladder, visual, cerebral, other. Steps 1–4.5: ambulatory; 5–9.5: increasing disability; 6.0=walking aid needed; 7.0=wheelchair. Most widely used in MS trials (Kurtzke, 1983). Standard for describing MS severity.

FIM™ (FIM)



 **18–126 (motor + cognitive)**

Used to track disability progression and rehabilitation outcomes in MS. Monitors ADL and mobility changes across disease course.

10MWT / 6MWT (10MWT / 6MWT)



 **m/sec or meters**

Primary gait measures for MS. 10MWT sensitive to change in walking speed. 6MWT reflects endurance. Both used in MS clinical trials. Nilsagard et al: TUG and timed walk tests relevant in MS.

Berg Balance Scale (BBS) (BBS)



 **0–56**

Fall risk identification in MS. Reliable balance measure across EDSS levels. Use with DGI and TUG for comprehensive fall risk profile.

Borg RPE Scale / Dyspnea Scale (Borg RPE)



 **6–20 (RPE); 0–10 (dyspnea)**

Perceived exertion and dyspnea monitoring during exercise in MS. Important given fatigue as primary MS symptom. Used alongside exercise prescription.

The Comprehensive Physiotherapy Assessment Toolkit



Musculoskeletal

- Manual Muscle Testing (MRC scale)
- Active/Passive ROM
- Joint contracture monitoring (ankles, knees, hips, elbows)
- Spinal alignment ('C' curve scoliosis evaluation)



Pulmonary

- Clinical vital capacity (ability to blow air at a distance)
- Single-breath number counting
- Chest expansion tape measurement (4th intercostal space)



Functional & Severity Scales

- North Star Ambulatory Assessment
- WeeFIM & Functional Mobility Scale
- Brooke Scale (Upper Extremity grading)
- Vignos Scale (Lower Extremity grading)



Mobility & Fall Risk

Timed Up and Go (TUG)

Time taken to stand, walk a short distance, turn, return, and sit.

Interpretation: High predictive validity for fall risk.



Gait Efficiency

10-Meter Walk Test (10MWT)

Walking speed over a set distance.

Interpretation: Direct metric of community ambulation viability and endurance.



Muscle Performance

Vigorimeter / Dynamometry

Hand-held dynamometry (highly reliable for polyneuropathies).

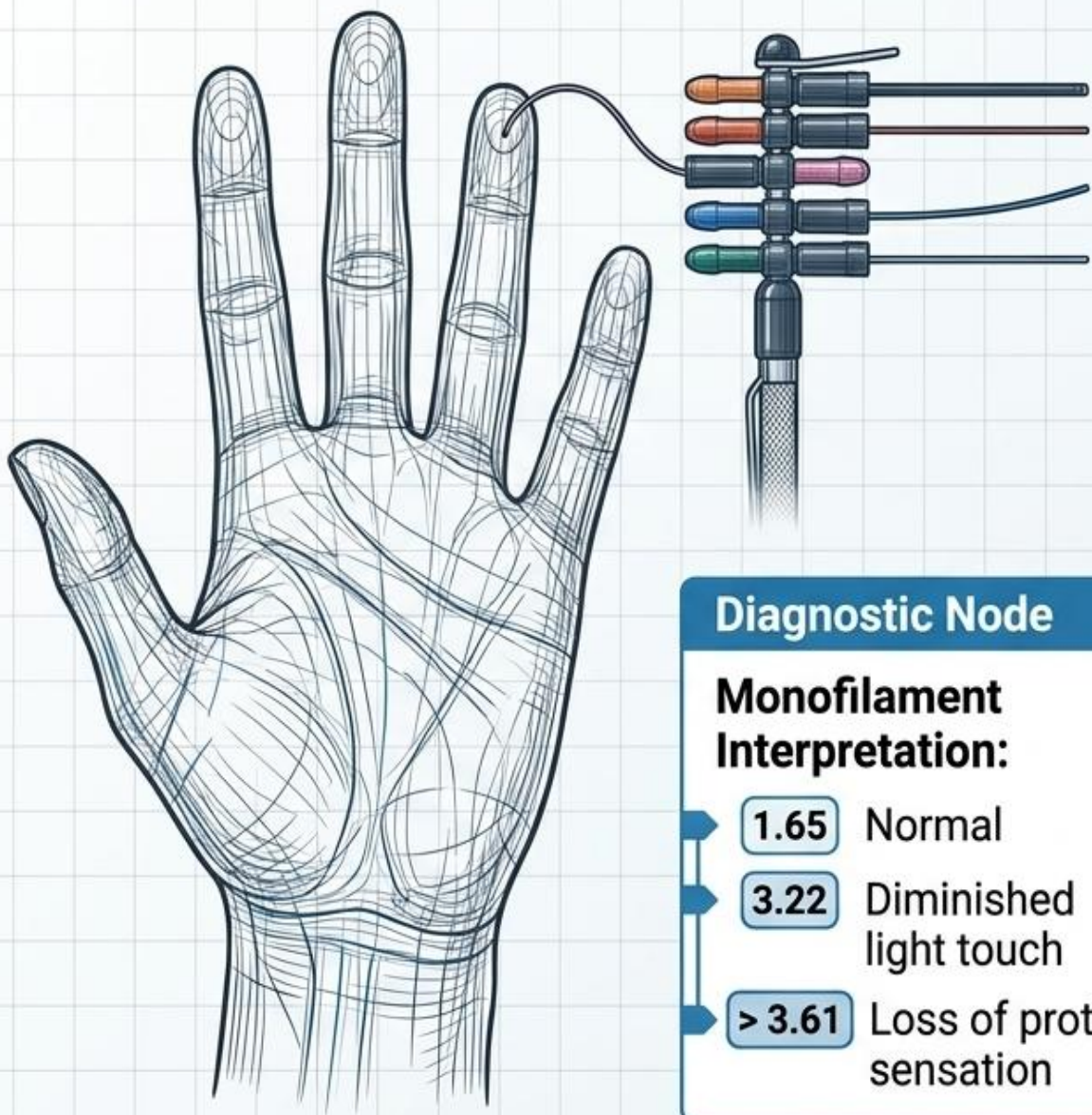
Interpretation: Objective tracking of distal motor denervation.



Quality of Life & Fatigue

Fatigue Severity Scale (FSS) & SF-36

Interpretation: Quantifies systemic impact, mental health, and role functioning.



Diagnostic Node

Monofilament Interpretation:

- **1.65** Normal
- **3.22** Diminished light touch
- **> 3.61** Loss of protective sensation

Quantitative Sensory Testing (QST)

Small Fiber

(Unmyelinated / Thinly Myelinated)

Sensation:



Pain & Temperature

Clinical Tool:



Safety pin (HPDT)
Hot/cold water tubes

Large Fiber

(Heavily Myelinated)

Sensation:



Vibration
Proprioception
Light Touch

Clinical Tool:



Tuning fork (VDT)
Passive movement
by examiner
Monofilaments

TRAUMATIC BRAIN INJURY (TBI)

Glasgow Coma Scale (GCS) **3–15 (Eye 4 + Verbal 5 + Motor 6)**

Gold standard for TBI severity classification. ≥ 13 =mild; 9–12=moderate; ≤ 8 =severe TBI (coma). Used acutely and in serial monitoring. Simple, universal, reproducible.

Rancho Los Amigos Scale (RLAS) **Levels I–VIII**

Cognitive-behavioral recovery scale. Level I=No Response; II=Generalized; III=Localized; IV=Confused-Agitated; V=Confused-Inappropriate; VI=Confused-Appropriate; VII=Automatic-Appropriate; VIII=Purposeful-Appropriate. PT

Disability Rating Scale (DRS) **0 (no disability) – 29 (vegetative state)**

8 items: eye opening, best verbal, best motor (GCS-based), cognitive ability for feeding/toileting/grooming, level of functioning, employability. Sensitive to change across broad TBI severity range.

FIM + FAM (FIM+FAM) **30 items, 1–7 each**

FIM (18) + FAM (12). Extends beyond FIM to capture cognitive/psychosocial recovery unique to TBI: employability, community access, safety judgment, attention. FAM adds cognitive range beyond FIM motor subscale.

HiMAT (HiMAT) **0–54 (13 items, 0–4/0–5)**

High-Level Mobility Assessment Tool. For independent ambulators post-TBI. Tasks: walking (forward/backward/toes/obstacle/figure 8), running, skipping, hopping, bounding, stairs. ICCs=0.99.

SPINAL CORD INJURY (SCI)

ASIA Impairment Scale (AIS) (AIS/ASIA)



A–E classification

A=Complete (no motor/sensory S4–S5); B=Incomplete sensory only; C=Incomplete, motor preserved >50% key muscles <grade 3; D=Incomplete, motor preserved ≥50% key muscles ≥grade 3; E=Normal. Standard SCI classification worldwide. Determines PT prognosis and goals.

FIM™ (Motor subscale) (FIM Motor)



13–91 (motor items only)

Primary functional outcome in SCI rehabilitation. Motor FIM tracks ADL and mobility changes. Predicts discharge destination and long-term care needs. Used at admission, discharge, and follow-up.

Walking Index for Spinal Cord Injury (WISCI)



0–20

0=Unable to walk; 20=Walks ≥10 m without device/orthosis/assistance. 21 levels reflecting combinations of assistive device, orthosis, and physical assistance needed. Validated for clinical trials in incomplete SCI.

10MWT / 6MWT (10MWT/6MWT)



m/sec or meters

Gait speed and endurance in incomplete SCI. Used to assess functional ambulation capacity and monitor rehabilitation progress. PCI (Physiological Cost Index) also used for energy efficiency in SCI gait.

Patient Name _____ Date/Time of Exam _____

Examiner Name _____ Signature _____

RIGHT

MOTOR
KEY MUSCLES

SENSORY
KEY SENSORY POINTS
Light Touch (LTR) Pin Prick (PPR)

UER
(Upper Extremity Right)

Elbow flexors C5
Wrist extensors C6
Elbow extensors C7
Finger flexors C8
Finger abductors (ring finger) T1

Comments (Non-key Muscle? Reason for NT? Pain?)

LER
(Lower Extremity Right)

Hip flexors L2
Knee extensors L3
Ankle dorsiflexors L4
Long toe extensors L5
Ankle plantar flexors S1

(VAC) Voluntary Anal Contraction
(Yes/No) ☐

RIGHT TOTALS
(MAXIMUM) (50) (56) (56)

MOTOR SUBSCORES

UER ☐ + UEL ☐ = UEMS TOTAL ☐
MAX (25) (25) (50)

1. SENSORY ☐ R ☐ L
2. MOTOR ☐ R ☐ L

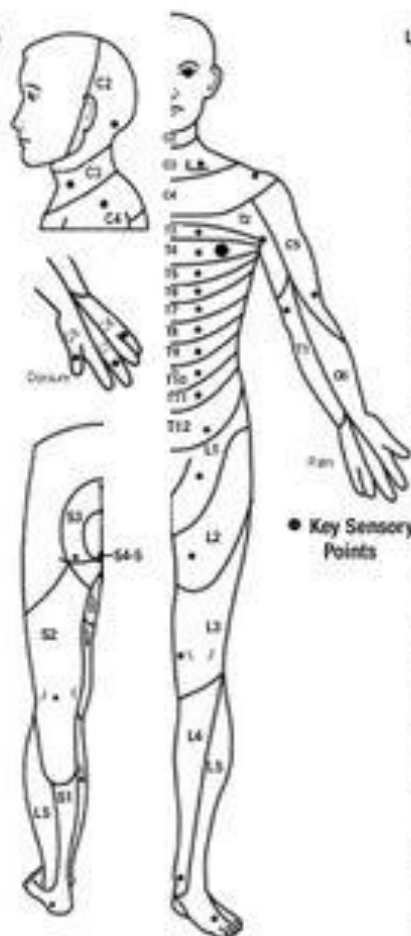
3. NEUROLOGICAL
LEVEL OF INJURY (NLI) ☐

4. COMPLETE OR INCOMPLETE?
Incomplete = Any sensory or motor function in S4-S5

5. ASIA IMPAIRMENT SCALE (AIS) ☐

(In complete injuries only)
**ZONE OF PARTIAL
PRESERVATION**
Most rostral level with any preservation

SENSORY ☐ R ☐ L
MOTOR ☐ R ☐ L



• Key Sensory Points

SENSORY
KEY SENSORY POINTS
Light Touch (LTR) Pin Prick (PPR)

MOTOR
KEY MUSCLES

LEFT

C5 Elbow flexors
C6 Wrist extensors
C7 Elbow extensors
C8 Finger flexors
T1 Finger abductors (ring finger)

UEL
(Upper Extremity Left)

MOTOR
(SCORING ON REVERSE SIDE)

0 = total paralysis
1 = palpable or visible contraction
2 = active movement, gravity eliminated
3 = active movement, against gravity
4 = active movement, against some resistance
5 = active movement, against full resistance
5+ = normal corrected for pain/stroke
NT = not testable

SENSORY
(SCORING ON REVERSE SIDE)

0 = absent
1 = altered
2 = normal
NT = not testable

L2 Hip flexors
L3 Knee extensors
L4 Ankle dorsiflexors
L5 Long toe extensors
S1 Ankle plantar flexors

LEL
(Lower Extremity Left)

(DAP) Deep Anal Pressure
(Yes/No) ☐

LEFT TOTALS
(MAXIMUM) (50) (56) (56)

SENSORY SUBSCORES

LTR ☐ + LTL ☐ = LT TOTAL ☐ PPR ☐ + PPL ☐ = PP TOTAL ☐
MAX (56) (56) (112) MAX (56) (56) (112)

**NEUROLOGICAL
LEVELS**
Steps 1-5 for distribution
as on reverse

Master Reference Table

All scales compared side by side

03

SECTION

Scale	Abbr	ICF Domain	Score	Diagnosis
Modified Ashworth Scale	MAS	Body Function	0–4 (6 pts)	Stroke, SCI, MS, CP
Fugl-Meyer Assessment	FMA	Body Function	0–226	Stroke
Brunnstrom Stages	Brunnstrom	Body Function	Stages 1–7	Stroke
NIH Stroke Scale	NIHSS	Body Function	0–42	Stroke (acute)
Glasgow Coma Scale	GCS	Body Function	3–15	TBI, Acute Neuro
Rancho Los Amigos Scale	RLAS	Body Function	Levels I–VIII	TBI
MMSE	MMSE	Body Function	0–30	Stroke, PD, General
Hoehn-Yahr Staging	H&Y	Body Function	0–5	Parkinson's Disease
UPDRS / MDS-UPDRS	UPDRS	Body Function	0–260	Parkinson's Disease
EDSS	EDSS	Body Function	0–10	Multiple Sclerosis
ASIA Impairment Scale	AIS	Body Function	A–E	Spinal Cord Injury
Berg Balance Scale	BBS	Activity	0–56	Stroke, PD, Elderly
Tinetti / POMA	POMA	Activity	0–28	Elderly, Fall Risk
Timed Up and Go	TUG	Activity	Seconds	All Neuro, Elderly

Scale	Abbr	ICF Domain	Score	Diagnosis
10-Meter Walk Test	10MWT	Activity	m/sec	All Neuro
6-Minute Walk Test	6MWT	Activity	Meters	Stroke, PD, General
Dynamic Gait Index	DGI	Activity	0–24	Vestibular, Stroke
Functional Gait Assessment	FGA	Activity	0–30	Vestibular, PD
FAC	FAC	Activity	0–5	Stroke, SCI
Barthel Index	BI	Activity	0–100	Stroke, MS, SCI
FIM™	FIM	Activity	18–126	All Neuro
STREAM	STREAM	Activity	0–70	Stroke
CMSA	CMSA	Activity	14 items + Activity	Stroke
WISCI	WISCI	Activity	0–20	SCI
Stroke Impact Scale	SIS	Participation	0–100/domain	Stroke
PDQ-39	PDQ-39	Participation	0–100	Parkinson's Disease

