

Appendix 3 - Fugl-Meyer assessment of sensorimotor recovery after stroke (motor function)*

Motor Function Upper extremity			
Test	ITEM	SCORING CRITERIA	SCORE
I. Reflexes	Biceps	0-No reflex activity can be elicited 2-Reflex activity can be elicited	
	Triceps		
II. Flexor Synergy	Elevation	0-Cannot be performed at all 1-Performed partly 2-Performed faultlessly	
	Shoulder retraction		
	Abduction (at least 90°)		
	External rotation		
	Elbow flexion		
	Forearm supination		
III. Extensor synergy	Shoulder add./int. rot.	0-Cannot be performed at all 1-Performed partly 2-Performed faultlessly	
	Elbow extension		
	Forearm pronation		
IV. Movement combining synergies	Hand to lumbar spine	0-No specific action performed 1-Hand must pass anterior superior iliac spine 2-Performed faultlessly	
	Shoulder flexion to 90°, elbow at 0°	0-Arm is immediately abducted, or elbow flexes at start of motion 1-Abduction or elbow flexion occurs in later phase of motion 2-Complete pronation and supination with correct positions at elbow and shoulder	
	Pronation/supination of forearm with elbow at 90° & shoulder at 0°	0- Correct position of shoulder and elbow cannot be attained, and/or pronation or supination cannot be performed at all 1-Active pronation or supination can be performed even within a limited range of motion, and at the same time the shoulder and elbow are correctly positioned 2-Complete pronation and supination with correct positions at elbow and shoulder	
V. Movement out of synergy	Shoulder abduction to 90°, elbow at 0°, and forearm pronated	0-Initial elbow flexion occurs, or any deviation from pronated forearm occurs 1-Motion can be performed partly, or, if during motion, elbow is flexed, or forearm cannot be kept in pronation 2-Performed faultlessly	
	Shoulder flexion 90-180°, elbow at 0°, and forearm in mid-position	0-Initial/flexion of elbow or shoulder abduction occurs 1-Elbow flexion or shoulder abduction occurs during shoulder flexion 2-Performed faultlessly	

	Pronation/supination of forearm, elbow at 0° and shoulder between 30-90° of flexion	0-Supination and pronation cannot be performed at all, or elbow and shoulder positions cannot be attained 1-Elbow and shoulder properly positioned and pronation and supination performed in a limited range 2-Performed faultlessly	
VI. Normal reflex activity	Biceps and/or finger flexors and triceps (This item is only included if the patient achieves a maximum score on all previous items, otherwise score 0)	0-At least 2 of the 3 phasic reflexes are markedly hyperactive 1-One reflex is markedly hyperactive, or at least 2 reflexes are lively 2-No more than one reflex is lively and none are hyperactive	
VII. Wrist	Stability, elbow at 90°, shoulder at 0°	0-Patient cannot dorsiflex wrist to required 15° 1-Dorsiflexion is accomplished , but no resistance is taken 2-Position can be maintained with some (slight) resistance	
	Flexion/extension, elbow at 90°, shoulder at 0°	0-Volitional movement does not occur 1-Patient cannot actively move the wrist joint throughout the total ROM 2-Faultless, smooth movement	
	Stability, elbow at 0°, shoulder at 30°	0-Patient cannot dorsiflex wrist to required 15° 1-Dorsiflexion is accomplished , but no resistance is taken 2-Position can be maintained with some (slight) resistance	
	Flexion/extension, elbow at 0°, shoulder at 30°	0-Volitional movement does not occur 1-Patient cannot actively move the wrist joint throughout the total ROM 2-Faultless, smooth movement	
	Circumduction	0-Cannot be performed 1-Jerky motion or incomplete circumduction 2-Complete motion with smoothness	
VIII. Hand	Finger mass flexion	0-No flexion occurs 1-Some flexion, but not full motion 2-Complete active flexion (compared with unaffected hand)	
	Finger mass extension	0-No flexion occurs 1-Patient can release an active mass flexion grasp 2-Full active extension	
	Grasp I - MCP joints extended and proximal & distal IP joints are flexed; grasp is tested against resistance	0-Required position cannot be acquired 1-Grasp is weak 2-Grasp can be maintained against relatively great resistance	

	Grasp II - Patient is instructed to adduct thumb, with a scrap of paper inter-posed	0-Function cannot be performed 1-Scrap of paper interposed between the thumb and index finger can be kept in place, but not against a slight tug 2-Paper is held firmly against a tug	
	Grasp III - Patient opposes thumb pad against the pad of index finger, with a pencil interposed	0-Function cannot be performed 1-Pencil interposed between the thumb and index finger can be kept in place, but not against a slight tug 2-Pencil is held firmly against a tug	
	Grasp IV - The patient should grasp a can by opposing the volar surfaces of the 1st and 2nd digits.	0-Function cannot be performed 1-A can interposed between the thumb and index finger can be kept in place, but not against a slight tug 2-Can is held firmly against a tug	
	Grasp V - The patient grasps a tennis ball with a spherical grip or is instructed to place his/her fingers in a position with abduction position of the thumb and abduction flexion of the 2nd, 3rd, 4th & 5th fingers	0-Function cannot be performed 1-A tennis ball can be kept in place with a spherical grasp but not against a slight tug 2-Tennis ball is held firmly against a tug	
IX. Coordination/Speed-Finger from knee to nose (5 repetitions in rapid succession)	Tremor	0-Marked tremor 1-Slight tremor 2-No tremor	
	Dysmetria	0-Pronounced or unsystematic dysmetria 1-Slight or systematic dysmetria 2-No dysmetria	
	Speed	0-Activity is more than 6 seconds longer than unaffected hand 1-(2-5.9)seconds longer than unaffected hand 2-Less than 2 seconds difference	
Upper Extremity Total		Maximum = 66	
Motor Function - Lower Extremity			
TEST	ITEM	SCORING CRITERIA	SCORE
I. Reflex Activity	Achilles	0-No reflex activity can be elicited	
	Patellar	2-Reflex activity can be elicited	
II. A. Flexor Synergy (in supine)	Hip flexion	0-Cannot be performed at all	
	Knee flexion	1-Partial motion	
	Ankle dorsiflexion	2-Full motion	
II. B. Extensor Synergy (in side lying)	Hip extension	0-Cannot be performed at all	
	Adduction	1-Partial motion	
	Knee flexion	2-Full motion	
	Ankle plantar flexion		

III. Movement combining synergies (sitting: knees free of chair)	A. Knee flexion beyond 90°	0-No active motion 1-From slightly extended position, knee can be flexed, but not beyond 90° 2-Knee flexion beyond 90°	
	B. Ankle dorsiflexion	0-No active flexion 1-Incomplete active flexion 2-Normal dorsiflexion	
IV. Movement out of synergy (standing, hip at 0°)	A. Knee flexion	0-Knee cannot flex without hip flexion 1-Knee begins flexion without hip flexion, but does not reach to 90°, or hip flexes during motion 2-Full motion as described	
	B. Ankle dorsiflexion	0-No active motion 1-Partial motion 2-Full motion	
V. Normal Reflexes (sitting)	Knee flexors Patellar Achilles (This item is only included if the patient achieves a maximum score on all previous items, otherwise score 0)	0-At least 2 of the 3 phasic reflexes are markedly hyperactive 1-One reflex is markedly hyperactive, or at least 2 reflexes are lively 2-No more than one reflex is lively and none are hyperactive	
VI. Coordination/speed - Sitting: Heel to opposite knee (5 repetitions in rapid succession)	A. Tremor	0-Marked tremor 1-Slight tremor 2-No tremor	
	B. Dysmetria	0-Pronounced or unsystematic dysmetria 1-Slight or systematic dysmetria 2-No dysmetria	
	C. Speed	0-Activity is more than 6 seconds longer than unaffected side 1-(2-5.9) seconds longer than unaffected side 2-Less than 2 seconds difference	
Lower Extremity Total		Max = 34	
Total Motor Score (UE+LE)		Max = 100	

*Sullivan KJ, Tilson JK, Cen SY, et al. Fugl-Meyer assessment of sensorimotor function after stroke: standardized training procedure for clinical practice and clinical trials. *Stroke*, 2011. **42**(2): p. 427-32.