CHEDOKE-McMASTER STROKE ASSESSMENT

INCLUDES:

- Administering the Chedoke Assessment
- Scoring and Interpreting the Chedoke Assessment
- Chedoke-McMaster Stroke Assessment Score Forms
  - Impairment Inventory
  - Activity Inventory

Taken from:

CHEDOKE-McMASTER STROKE ASSESSMENT

Development, Validation and Administration Manual

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ADMINISTERING THE CHEDOKE ASSESSMENT Revised

OVERVIEW

Chapter 6 and Chapter 7 address the administration, scoring, and interpretation of test scores. The information in this Chapter provides general guidelines for the administration of the Chedoke-McMaster Stroke Assessment (Chedoke Assessment). This information is divided into four sections: i: Qualifications of Users, ii) Description of the Population, iii) Administration Procedures, and iv) The Chedoke Assessment Score Form.

QUALIFICATIONS OF USERS

The first standard of the *General Standards for Use of Measures quoted in Measurement Standards for Interdisciplinary Medical Rehabilitation*[1] is that "Users of measures should read the technical manual for the measures they use and be familiar with relevant administration, scoring, and interpretation procedures, including reliability and validity for the specific application." It is recommended that therapists using the Chedoke Assessment carefully read this test manual before proceeding to use the measure in either a clinical or research setting.

The Chedoke Assessment was initially developed for use by physical therapists working in stroke rehabilitation. Even though the reproducibility of the Chedoke Assessment has been established, one cannot infer that all testers will be reliable in its administration. It is recommended that each facility or research group test interrater and intrarater reliability, as appropriate. A one-day Training Workshop has been developed to instruct health professionals about the administration and scoring guidelines and the clinical application of the measure. The workshop includes a test for scoring competency. Attendance at the Training Workshop was found to be more effective than self-directed learning in a sample of physiotherapists and occupational therapists (n=95) from 3 Canadian provinces.[3]

DESCRIPTION OF THE POPULATION AND THE MEASURE

This assessment was developed and validated for use with clients from an inpatient and day-hospital population. The initial development and validation studies were carried out on a Stroke Unit of the Chedoke Rehabilitation Centre.[2] At the time of the study, this

regional tertiary care program provided intensive rehabilitation lasting on average 10 weeks. Adults varying in age from 18 to 90 years were admitted to this unit. The time from onset of stroke to the admission to the unit varied from one week to several years, with a mean of 9 weeks.

Although the Chedoke Assessment was developed for the assessment of clients with stroke in a rehabilitation setting, its application has been more widely demonstrated. The Activity Inventory (formerly the Disability Inventory) has been shown to be a valid measure of functional change in clients in an acute neurological setting[4] and for those with acquired brain injury[5]. The Chedoke Assessment has been shown to function as discriminative, predictive, and evaluative measure. The minimal clinically important difference (MCID) of the Activity Inventory for neurological clients, including those with stroke, is 7 points when determined a physiotherapist, [4, 6, 7] and the MCID of the Activity Inventory is 8 points when determined by clients with stroke and their caregivers.[6,7] In addition, predictive equations have been developed for both the Impairment Inventory and the Activity Inventory for use with patients with acute stroke[8] or patients with stroke in the rehabilitation setting.[9] The predictive equations are found Chapter 8 of the manual. The potential for using the Impairment Inventory scores as a predictor of independent ambulation has also been reported.[10]

Limitations to Use

This measure had not been validated for use on clients who are less than one week post stroke.

ADMINISTRATION PROCEDURES

Physical setting, environment and clothing

Every effort should be made to ensure that the client feels comfortable and at ease during the administration of the assessment. The testing room should be comfortable warm, and large enough to accommodate a low plinth, a floor mat and a wheelchair. The plinth should be wide enough for a client to roll from supine to side lying without feeling apprehensive. Distractions should be kept to a minimum. Clients should wear comfortable clothing (e.g. shorts or a jogging suit) which allows the therapist to observe knees and elbows. During the testing of shoulder pain, the shoulder region should be free of clothing. Halter tops are suggested for female clients. Access to a full flight of stairs and the outdoors is required for the Activity Inventory. Shoes and orthoses are not worn during the testing of the Impairment Inventory stages, but should be worn for the administration of the Activity Inventory.

Equipment

All equipment should be assembled ahead of time.

- foot stool
- pillows
- 2 meter line marked on the floor
- chair with armrests
- adjustable table
- plastic measuring cup (250 ml)
- wide, low plinth
- stop watch
- floor mat
- ball, 6.5 cm (2.5 in) in diameter
- 1 liter plastic pitcher with water

Testing Time

Approximately 45 to 60 minutes is required to complete the assessment, depending on the client's level of endurance and concentration. It may not be feasible to complete the entire test in one session. Every effort should be made to complete the assessment within 2 days in order to minimize changes in the client's physical condition.

Client Safety

A therapist should always exercise sound judgement to ensure a client's safety. Prior to testing, check on the client's medical history and identify any conditions which could put the client at risk. The presence of pain should be considered as sufficient reason to not complete a task, which is then scored accordingly. If, during testing, the therapist thinks it is neither safe nor prudent to ask the client to attempt an activity that could worsen the client's condition (e.g., roll onto a very painful shoulder) the activity should be avoided. If a client becomes excessively fatigued or apprehensive it is advisable to end the assessment.

Client Comprehension of Instructions

A therapist's instruction, whether words or gestures, should be clear and concise. Every effort should be made to ensure that a client understands what is being asked of him or her. To ensure that a client understands what is being asked, a movement task may be demonstrated, a client's limb may be moved passively through a task, or the client may be asked to perform a task on the uninvolved side. A treatment session aimed at teaching a client how to perform a task should not precede testing. Once the client understands what is required, the test instructions are given, and the performance observed. Once a client understands what is requested, a task should only be attempted twice in the Impairment Inventory and only once in the Activity Inventory.

The administration and scoring guidelines are available in a Canadian French version as well.

THE CHEDOKE ASSESSMENT SCORE FORM

The Score Form for the Chedoke Assessment is reproduced at the end of this Chapter. Although copyrighted, we invite you to "COPY FREELY – DO NOT CHANGE." Detailed instructions for administration and scoring are provided in Chapter 7.

References:

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10. Stevenson TJ. Using Impairment Inventory Scores to determine ambulation status in individuals with stroke. Physiother Can Summer 1999; 168-174.

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SCORING AND INTERPRETING THE CHEDOKE ASSESSMENT Revised

OVERVIEW

This Chapter continues with the guidelines for administration, scoring and interpretation. Chapter 6 gave general guidelines for *Administration* while this Chapter gives the details for *Scoring* and *Interpreting* the findings. Chapter 8 expands on the clinical use of the Chedoke Assessment by describing the Clinical Data Set, and delineating how the findings can be interpreted in the context of this data set.

This Chapter is divided into two major sections: I. Impairment Inventory, and II. Activity Inventory. In the Impairment Inventory we first describe how to stage shoulder pain. The remainder of this section provides the information needed to score the stage of motor recovery for the five remaining impairment dimensions: postural control, the arm, the hand, the leg and the foot. In the Activity Inventory we describe how to score both the Gross Motor Function Index and the Walking Index.

Headers are provided throughout the Chapter to assist the tester in locating the dimensions and indices in the manual during test administration. Each header notes the Inventory, the Dimension or Index and the corresponding Score Form Page.

I. IMPAIRMENT INVENTORY

IMPAIRMENT INVENTORY: STAGE OF SHOULDER PAIN
Score Form Page I

When assessing the stage of shoulder pain, consider any pain that is present and its relationship to functional activities, even those not involving the shoulder or arm. In the Chedoke Assessment, the term, "interfering with function", is defined as "a limitation in the ability to carry out a functional activity thought to be due to the shoulder pain, not due to the paresis of the arm or hand".

Steps in the Shoulder Assessment: 1. ask questions regarding pain and function, 2. test range of motion, and 3. examine the shoulder and scapula.

PROGNOSTIC INDICATORS

Start the assessment of shoulder pain by noting the state of the prognostic indicators. These indicators were identified from a pool of 13 variables thought to predict shoulder pain. Through multiple regression analyses we found these indicators to be the most significant.

- The arm is in a low stage of recovery, Stage 1 or 2.
- The scapula is misaligned. It can be elevated, depressed, abducted or adducted.
- Loss of range of shoulder movement with flexion or abduction less than 90°, or external rotation less than 60°.

Observe the position of the scapula and the passive range of motion of the shoulder as follows:

Scapular Spine
Position: Sitting on the side of the bed, feet on the floor. The scapula should be visible.
Method: Stand behind the client. Place thumbs along the spine of both scapulae; note if the scapular spine on the involved side is elevated or depressed when compared to the strong side.

Scapular Inferior Angle
Position: Sitting on the side of the bed, feet on the floor. The scapula should be visible.
Method: Stand behind the client. Palpate the inferior angle of the scapula and note if the inferior angle is abducted or adducted in relation to the spinous process. Compare the two sides.

Shoulder Flexion
Position: Supine with the weak arm in a neutral position and the elbow extended.
Method: Flex the shoulder and note whether there is less than 90° of pain free range.

Shoulder Abduction
Position: Supine with the weak arm in a neutral position and the elbow bent to 90°.
Method: Abduct the shoulder and note whether there is less than 90° of pain free range.

Shoulder External Rotation
Position: Supine with the weak arm in a neutral position and the elbow bent to 90°.
Method: Externally rotate the shoulder and note whether there is less than 60° of pain free range.

Proceed with the shoulder pain assessment using the following descriptions. Match the descriptions with your impression of the client's pain. Record the stage of shoulder pain in the appropriate box on the Score Form.

STAGE 1: Constant, severe arm and shoulder pain in more than just the shoulder

Constant severe pain interferes with the client's ability to participate in the regular rehabilitation program or to carry out regular functional activities. The pain is not relieved by movement, positioning or rest. The client cannot tolerate having the arm moved, and complains of pain while dressing and undressing the limb.

Pathology causing the pain is in more than just the shoulder (e.g., thalamic pain or shoulder hand syndrome). Pain may involve just the shoulder and hand, or the whole side of the body.

STAGE 2: Intermittent, severe arm and shoulder pain in more than just the shoulder

Intermittent severe pain refers to pain that interferes with function, but not constantly. Intermittently, the pain is worsened by activity or relieved by rest or positioning. There are times when the client cannot tolerate having the arm moved or cannot participate in the regular rehabilitation program or daily activities because of the pain.

Pathology causing the pain is in more than just the shoulder (e.g., thalamic pain or shoulder hand syndrome). Pain may involve just the shoulder and hand, or the whole side of the body.

STAGE 3: Constant shoulder pain in just the shoulder

Constant pain interferes with a client's ability to participate in the regular rehabilitation program or to carry out regular functional activities. Pain is not relieved by movement, positioning or rest. The client complains of pain while dressing and undressing the limb.

Pathology in just the shoulder is responsible for the pain (e.g., acute bursitis). The pain is present over the shoulder region or is referred from the shoulder.

STAGE 4: Intermittent shoulder pain in just the shoulder

Intermittent pain refers to pain that interferes with function, but not constantly. Intermittently, the pain is worsened by activity or relieved by rest or positioning. Some movement is pain free; the pain is aggravated from time to time. Occasionally the client cannot participate in the regular rehabilitation program or daily activities because of the pain.

Pathology causing the pain is only in the shoulder (e.g., acute bursitis). The pain is present over the shoulder region or pain is referred from the shoulder.

STAGE 5: Shoulder pain is noted during testing, but the functional activities that the client normally performs are not affected by the pain

Shoulder pain is elicited only during active or passive movement of the shoulder. Pain does not limit the client's regular activities of daily living or other functions.

STAGE 6: No shoulder pain, but at least one prognostic indicator is present

No shoulder pain is noted during passive range of motion or with functional activities. One or more of the following adverse prognostic indicators are present:

- The arm is in a low stage of recovery, Stage 1 or 2.
- The scapula is malaligned. It can be elevated, depressed, abducted or adducted.
- Loss of range of shoulder movement with flexion or abduction less than 90°, or external rotation less than 60°.

STAGE 7: Shoulder pain and prognostic indicators are absent

The client does not complain of shoulder pain. No adverse prognostic indicators are noted.

MOTOR RECOVERY

Motor recovery following stroke was first described by Twitchell in a cardinal paper on "The restoration of motor function following hemiplegia in man", written in 1951.[1] In this paper, he introduced the notion of recovery occurring in a predictable manner with movement occurring first in stereotyped patterns of movement called limb synergies. Brunnstrom expanded on Twitchell's concepts, defined six discrete stages of motor recovery and described these limb synergies. The therapists on the stroke team at the Chedoke Rehabilitation Centre further expanded on this knowledge during the many years spent on the development of the Chedoke Assessment (see Chapter 2).

Knowledge of motor recovery should assist the individual therapist in precise staging and in linking the meaning of the assessment items and findings to both an understanding of the current state of the client's nervous system and the recovery taking place. As well, this knowledge should assist in the correct interpretation of the significance of the impairment and potential for change. Although some of this information was given in Chapter 2, it is repeated here to reinforce its importance when administering, scoring and interpreting the assessment results and planning treatment. This knowledge is summarized here under the headings: (i) definitions of the Stages of Motor Recovery, (ii) sequence of motor recovery, (iii) description of the limb synergies, and (iv) principles of motor recovery.

Definitions of the Stages of Motor Recovery

The definitions of the Stages of Motor Recovery are given in Table 7.1, on the following page. It is these definitions that form the conceptual context for the selection of items throughout the Impairment Inventory (with the exception of Shoulder Pain).

Sequence of Motor Recovery

In *Stage 1* the part (limb or trunk) is *flaccid* and the nervous system is in a state of inhibition. The muscle stretch reflexes (i.e., biceps, pronator, pectoralis major, triceps, quadriceps and tendo-achilles) are absent or hypoactive, the limb feels heavy and does not respond to facilitation. During the transition from Stage 1 to 2, tone increases. This increase in tone with the onset of hyperactive muscle stretch reflexes is obvious before active movement can be facilitated.

In *Stage 2* active movement can be facilitated or occurs spontaneously as an *associated reaction.* Arm movement may result from facilitation of the tonic neck reflexes. Resistance given to the contra lateral limb may also produce movement through facilitation of an associated reaction. Movement can be in any range. For scoring purposes, do *not* consider an increase in tone alone to qualify as movement. Movement results from the facilitation of spinal reflexes (e.g., input via cutaneous or proprioceptive receptors), brainstem (or tonic neck) reflexes (input via proprioceptive vestibular receptors or receptors in the neck), or associated reactions (irradiation from antagonists, synergists or muscles from the opposite side of the body).

Table 7.1 Definitions of the Stages of Motor Recovery

Stage	Description
1	Flaccid paralysis is present. Phasic stretch reflexes are absent or hypoactive. Active movement cannot be elicited reflexly with a facititory stimulus, or volitionally.
2	Spasticity is present and is felt as a resistance to passive movement. No voluntary movement is present but a faciftory stimulus will elicit the limb synergies reflexly. These limb synergies consist of stereotypical flexor and extensor movements.
3	Spasticity is marked. The synergistic movements can be elicited voluntarily, but are obligatory. In most cases, the flexion synergy dominates the arm, the extension synergy the leg. There are strong and weak components within each synergy.
4	Spasticity decreases. Synergy patterns can be reversed if movement takes place in the weaker synergy first. Movements combining antagonistic synergies can be performed when the prime movers are the strong components of the synergy.
5	Spasticity wanes, but is evident with rapid movement and at the extremes of range. Synergy patterns can be reversed even if the movement takes place in the strongest synergy fast. Movements utilizing the weak components of both synergies acting as prime movers can be performed. Most movements become environmentally specific.
6	Coordination and patterns of movement are near normal. Spasticity as demonstrated by resistance to passive movement is no longer present. A large variety of environmentally specific patterns of movement are now possible. Abnormal patterns of movement with faulty timing emerge when rapid or complex actions are requested.
7	Normal. A "normal" variety of rapid, age appropriate complex movement patterns are possible with normal timing, co-ordination, strength and endurance. There is no evidence of functional impairment compared to the normal side. There is a "normal" sensory-perceptual-motor system.

In Stage 3 active voluntary movement occurs without facilitation, but is only in the stereotyped synergistic patterns. We observed that complete range of all synergy components returns at a later stage, and therefore revised the Brunnstrom staging so that full synergy range is not required until Stage 4 or in some cases Stage 5.

Synergy patterns and simple movements out of synergy are possible at *Stage 4*.

By *Stage 5*, full range synergy movements and complex combinations of synergies are possible. Ankle eversion, hip abduction with internal rotation, and finger and thumb extension are movements that are not part of either the flexion or extension synergies. Thus, they are slower to recover than other movements, and are not present through full range at this stage.

Stage 6 differs from normal only when the nervous system is stressed. This is tested by requesting more complex or faster movement than would normally be needed in daily activities.

By *Stage 7* there is no evidence of functional impairment. Activities and skill are at a pre-stroke level. There is a "normal" sensory-perceptual-motor system. Arms and legs do not feel heavier than the contralateral side nor do they fatigue more rapidly.

Description of the Limb Synergies

Brunnstrom[2] described four limb synergies:

- the flexion synergy of the arm and hand
- the extension synergy of the arm and hand
- the flexion synergy of the leg and foot
- the extension synergy of the leg and foot

She noted that the flexion synergy often dominates in the arm, while the extension synergy usually dominates in the leg. Any deviation from these usual states should be noted during assessment. She also identified what are usually the strongest and weakest components of each synergy. The components of the flexion and extension `of` the limb synergies `of` the arm, hand, leg and foot are identified in Table 7.2 on the following page.

Table 7.2 Flexion and Extension Limb Synergies of the Arm, Hand, Leg and Foot

ARM & HAND		LEG & FOOT	
Flexion	**Synergy**	**Flexion**	**Synergy**
Shoulder girdle	- elevation	Hip	- <u>flexion</u>
	- retraction		- abduction
Shoulder joint	- hyperextension		- external rotation
	- *abduction***	Knee	*-flexion*
	- *external rotation*	Ankle	- dorsi flexion
Elbow	- <u>flexion</u>*		- inversion
Forearm	- supination	Great Toe	- extension
Wrist	- flexion	Toes	- flexion
Finger	- flexion		
	- adduction		
Thumb	- flexion		
	- adduction		
Extension	**Synergy**	**Extension**	**Synergy**
Shoulder	- <u>adduction</u>	Hip	- *extension*
	- <u>internal rotation</u>		- adduction
Elbow	- *extension*		- internal rotation
Forearm	- pronation	Knee	- <u>extension</u>
Wrist	- flexion or extension	Ankle	- plantar flexion
Finger	- flexion		- inversion
	- adduction	Toes	- flexion or extension
Thumb	- flexion		
	- adduction		

* strong components underlined
** weak components italicized

Principles of Motor Recovery

- Motor recovery from hemiplegia follows a stereotyped sequence of events.

- The performance of selected motor tasks, requiring increasingly more complex motor control, indicates recovery of the central nervous system.

- Movement first occurs in patterns (limb synergies), and, in the early stages, it is these patterns of movement that are assessed. As the stages progress, movement patterns become more complex and dependence on the stereotypical synergies decreases.

- Postural control, the arm, hand, leg and foot may recover at different rates (e.g., commonly the leg is in Stage 3 while the arm is in Stage 2). The stage of recovery of the proximal part of the limbs is often in a higher stage than the distal part (i.e., the arm is frequently in a higher stage than the hand). Also, movements involving flexion are often at a different stage of recovery than movements involving extension.

- Elements of pathology consistent with a lower stage of recovery may persist even when the client performs at a more advanced stage. For example, a single task within Stage 3 may not be possible when the client can perform two tasks at Stage 4.

- The Stages of Motor Recovery measure the amount of neurological impairment

ADMINISTRATION GUIDELINES

Refer to Chapter 6 (Administering the Chedoke Assessment) for administration procedures and score forms.

Starting position

Testing begins at Stage 4 for postural control and the leg, and at Stage 3 for the arm, hand and foot. Standard starting positions are indicated at the top of each page of the Score Form. When the standard starting position is changed, the change is indicated on the Score Form at the side of the task or is underlined and followed by a colon. You may assist a client into the starting position. When indicated in the following guidelines, you may stabilize the part being tested (e. g., Stage 3 of the Leg, Task I - The foot may be stabilized while the client attempts to adduct the leg). When indicated, you may provide assistive support to a client who is standing so that he or she will not lose balance. In this instance only light support may be offered. A client is not permitted to weightbear through the therapist.

Testing Procedures

When instructing the client, use simple commands. Examples of specific instructions are included for your use. You may modify the instructions, if necessary, to be sure that your client understands the required movements.

When Stage 2 tasks involve facilitated active movement, the movement may be in any range. Visible muscle contraction qualifies as movement, but an increase in muscle tone alone does not. When applying a facilitory stimulus only manual stimuli are permitted. Neither ice nor mechanical devices are allowed during testing. A facilitory stimulus cannot be applied more than twice. When testing Stage 2 tasks involving a change in tone, the part is passively put through the available range of movement briskly with two repetitions.

In Stages 3 to 7, voluntary movement is tested. Facilitation techniques are not permitted. Stage 6 tasks require full range of motion with near normal timing and coordination. Stage 7 tasks require fill range of motion and rapid complex movements with normal timing. For any task requiring either greater than half or full range of motion, compare with the range on the uninvolved side. At Stage 7, timing and coordination of the task must be comparable to the uninvolved side.

Once familiar with the assessment, you can increase your efficiency in test administration by minimizing the amount of repositioning that the client is asked to do. For example, test all postural control, arm, hand, leg and foot tasks that use the same starting position. In Stages 2 and 3 of the arm, hand, leg and foot, however, tasks within each stage must be done in the order presented. The weaker synergy should always be tested first.

Scoring

The client may attempt each task twice. Additional attempts which serve to train the client to achieve a task are not permitted. To receive credit for completing a task, the client must be able to perform it correctly at least once. Place an "X" in the appropriate box for tasks that are accomplished. If the client fails to complete two of the three tasks in the stage where testing began, move to a lower stage until two tasks are accomplished in a single stage. If two tasks are accomplished at the stage where testing began, assess the third task, but regardless of the result, move up to the next stage. In order to achieve a Stage 7, all, three tasks in Stage 6 as well as two in Stage 7 must be accomplished. The client's stage of recovery is the highest stage where at least two of the three tasks are accomplished. *Put this score in the box provided.* Note any limitations in range of movement that will impact on function.

A Stage 2 involuntary movement task which occurs spontaneously within the time frame of the assessment (but not on command) is scored as present if it fulfils all of the requirements of the task. Clients should be given credit for movement tasks that can be completed during functional activity.

IMPAIRMENT INVENTORY – STAGE OF POSTURAL CONTROL
Score Form Page 1

Standard Starting Position: No shoes and socks. No standard position**.** Encourage good sitting posture (ie. with hips and knees at 90°) during testing when indicated. Start the assessment at Stage 4.

STAGE 1

Unable to demonstrate at least two of the Stage 2 tasks

STAGE 2

Task 1: **Facilitated log roll to side lying**
Position: Supine.
Instruction: "Roll onto your strong side."
Method: Facilitate rolling at head, shoulders or pelvis.
Required: Some active movement (either log or segmental rolling is acceptable).

Task 2: **Resistance to trunk rotation**
Position: Side lying on the strong side.
Instruction: "Let me move your trunk."
Method: Place one hand on the shoulder girdle and the other over the hip. Passively move shoulder girdle and hip in opposite directions with sufficient speed of passive movement to elicit a stretch reflex. Feel for resistance to trunk rotation.

Task 3: **Static righting with facilitation**
Position: Sitting unsupported on the side of the bed, hands on lap, feet on floor
Instruction: "Sit without holding on."
Method: Facilitate static righting in sitting.
Required: Some active response, without falling.
Don't accept: Holding on for support.

STAGE 3

Task 1: **Log roll to side lying**
Position: Supine.
Instruction: "Roll onto your strong side without pulling on the bed."
Required: Unassisted rolling onto side. Segmental rolling is acceptable.
Don't accept: Using hands to pull self over.

Task 2: **Move forward and backward**
Position: Sitting unsupported on the side of the bed, hands on lap, feet on floor
Instruction: "Lean forwards and backwards, and return to the centre."
Required: Independent righting forward and backward within base of support. Head and shoulders should be aligned over the pelvis to complete the task.
Don't accept: Holding on for support, eg. knees.

Task 3: **Remain upright for 5 seconds**
Position: Standing unsupported.
Instruction: "Stand for 5 seconds."
Method: Time standing position for 5 seconds. You can help the person into standing. Uneven weight bearing is allowed.
Don't accept: Leaning against plinth or chair.

STAGE 4

Task 1: **Segmental rolling to side lying**
Position: Supine
Instruction: "Roll onto your strong side without pulling on the bed."
Required: Independent rolling onto strong side. Either the pelvis and legs or the head and shoulders can lead.
Don't accept: Using hands to pull over.

Task 2: **Righting within the base of support**
Position: Sitting unsupported on the side of the bed, hands on lap, feet on floor
Instruction: "Move your weight from one hip to the other while keeping your bottom on the bed and return to the center."
Required: Independent weight shift from side to side with return to midline, within the base of support. Head and shoulders should be aligned to complete the task.
Don't accept: Holding on for support.
Allowed: Unequal weightbearing through the hips.

Task 3: **Standing Up**

Position: Sitting unsupported on the side of the bed, hands on lap, feet on floor
Instruction: "Stand up."
Required: Safe independent rising from sitting to standing, can push off with hands. Some weight bearing through affected limb.
Allowed: Uneven weight bearing.
Don't accept: Pushing legs against the bed or chair to stand, or standing by bracing against the bed or chair.

STAGE 5

Task 1: **Dynamic righting side to side, feet on floor**
Position: Sitting unsupported on the side of the bed, hands on lap, feet on floor
Instruction: "Shift your weight from one hip to the other, lifting your buttocks off the mat as you move and return to the centre."
Method: Weight shifting from one hip to the other. The client must maintain balance when centre of gravity falls outside base of support. Head, trunk and pelvis must be aligned on completion of task.
Required: Some shortening and elongation of trunk while weight shifting. Buttocks need to come off the mat.
Don't accept: To use hands for support.

Task 2: **Standup with equal weight bearing**

Position: Sitting unsupported on the side of the bed, hands on lap, feet on floor
Instruction: "Stand up, making sure to take the same amount of weight through both legs."
Required: Independent standing with equal weight bearing during transition from sit to stand.
Don't accept: Use of hands.

Task 3: **Step forward onto weak leg, transfer weight**
Position: Standing unsupported taking equal weight through both legs.
Instruction: "Take a step forward with your weak leg, and then with your stronger one."
Required: Smooth weight shifting forward onto the weak leg while maintaining control of hip and knee extension of the weak leg during the stance phase.

STAGE 6

Task 1: **Dynamic righting backward or sideways with displacement, feet off floor**
Position: Sitting unsupported on the side of the bed, hands on lap, feet off floor
Instruction: Choose a) or b)
a) "Shift your weight from one hip onto the other without stopping."
b) "Shift your weight forwards and backwards without stopping."
Method: Place your hand lightly on client's shoulders and attempt to push client off balance when client is beyond base of support.
Required: Balance and equilibrium reactions adequate to maintain balance even when displaced beyond base of support.
Don't accept: Holding on for support or the loss of one's balance.

Task 2:	**On weak leg 5 seconds**
Position:	Standing unsupported, arms at side.
Instruction:	"Stand only on your weak leg as long as you can."
Method:	Time unipedal stance and record results in box provided.
Required:	Independent unipedal stance for at least 5 seconds.
Allowed:	Arm, leg, and trunk movements that permit the person to accomplish the task.

Task 3:	**Sideways braiding for 2 meters**
Position:	Standing unsupported.
Instruction:	"Walk sideways to the left, keep crossing your right foot in front of the left foot for a distance of 2 meters, then reverse for 2 meters with your left foot crossing in front of your right foot. Keep your hips and feet facing forward and keep your feet on the line."
Method:	Use a 2 meter (2 yard) line on the floor. The client may stop to change directions.
Required:	The trunk, pelvis, and feet must remain facing forward, and the feet must stay on the line.

STAGE 7

Task 1:	**Abduction of strong leg**
Position:	Standing unsupported.
Instruction:	"Lift your strong leg out to the side while keeping your weak leg straight.
Required:	Abduction of strong leg beyond neutral, maintaining pelvic alignment.
Don't accept:	Trendelenburg.

Task 2:	**Tandem walking 2 meters in 5 seconds**
Position:	Standing unsupported.
Instruction:	"Touching heel to toe, walk along this straight line as quickly as possible."
Method:	Time 2 meters (2 yards) tandem walking. Record the number of seconds in the box provided. Use tape to make a 2 meter (2 yard) line on the floor.
Don't Accept:	Any loss of balance. (ie: falling off the line) or not touching heels to toes.

Task 3:	**Walk on toes 2 meters**
Position:	Standing unsupported.
Instructions:	"Walk on your tip toes without stopping."
Method:	Use tape to make a 2 meter (2 yard) line on the floor.
Required:	Bilateral equal plantar flexion and weight bearing.

Standard Starting Position: Sitting with the forearm in the lap or supported on a pillow in the lap in a neutral position, wrist at 0° and fingers slightly flexed. Sitting either unsupported over the side of the bed or plinth, or supported in a chair or wheelchair. Feet should be supported. Encourage good sitting posture during testing (ie. with hips and knees at 90°). Start the assessment at Stage 3.

STAGE 1
Unable to demonstrate at least two of the Stage 2 tasks.

STAGE 2 *Support the limb as necessary while facilitating the movements.*

Task 1: **Resistance to passive shoulder abduction or elbow extension**
Position: Standard starting position.
Instruction: "Let me move your arm."
Method: Choose either a) or b):
a) Abduct and adduct shoulder 5 times with sufficient speed of passive movement to elicit a stretch reflex. Do not exceed 70° of abduction. Feel for resistance to passive movement and watch for active contraction of pectoral muscles. Do with care, respecting pain.
b) Flex and extend elbow 5 times with sufficient speed of passive movement to elicit a stretch reflex.
Required: Feel for resistance to passive movement and watch for active contraction of the stretched muscle.

Task 2: **Facilitated elbow extension**
Position: Standard starting position.
Instruction: "Straighten your elbow and try to touch your opposite knee."
Method: Facilitate a contraction of the elbow extensors.
Required: Some observed active elbow extension.

Task 3: **Facilitated elbow flexion**
Position: Standard starting position.
Instruction: "Bend your elbow."
Method: Facilitate a contraction of the elbow flexors.

STAGE 3

Task 1: **Touch opposite knee**
Position: Standard starting position.
Instruction: "Straighten your elbow and try to touch your opposite knee."
Required: Active shoulder adduction and full elbow extension with palm facing down.
Permitted: The wrist may be supported in a neutral position so that it does not interfere with arm extension.

Task 2: **Touch chin**

Position: Standard starting position.
Instruction: "Touch your chin with your hand."
Required: Sufficient elbow flexion for any part of the hand to touch the chin. Movement in synergy is permissible.
Not permitted: Flexion of head

Task 3: Shoulder shrugging greater than half range
Position: Standard starting position.
Instruction: "Shrug both shoulders up towards your ears."
Required: Active scapular elevation greater than half range. Movement in synergy is permissible.

STAGE 4

Task 1: Extension synergy, then flexion synergy
Position: Standard starting position.
Instruction: "Reach across and touch your opposite knee with your elbow straight, then without stopping, touch the ear on your weak side, keeping your elbow up."
Required: Shoulder adduction and full elbow extension to touch or pass the top of the opposite knee with full internal rotation of the shoulder and pronation of the forearm. Then without stopping the shoulder should attain at least 90° of abduction with 0° horizontal flexion and some external rotation when the hand touches the ear. The forearm may be either pronated or supinated.
Don't accept: Prolonged pause between synergies.

Task 2: Shoulder flexion to 90°
Position: Standard starting position
Instruction: "Keep your elbow straight throughout movement, and lift your arm up to shoulder height."
Required: Shoulder flexion to 90˚ with full elbow extension. Forearm may be pronated.
Don't accept: Shoulder abduction, scapular elevation or elbow flexion.

Task 3: Supination then pronation
Position: Elbow at side with 90˚ elbow flexion.
Instruction: "Keep your elbow at your side, and turn your palm up and then down."
Required: Full supination and full pronation. Elbow remains at side of trunk.
Don't accept: Compensatory movement of trunk.

STAGE 5

Task 1: **Flexion synergy, then extension synergy**
Position: Standard starting position.
Instruction: "Touch the ear on your weak side, keeping your elbow up, and then without stopping reach towards your opposite knee, finishing with your elbow straight."
Method: Watch for 90˚ of shoulder abduction with 0˚ horizontal flexion and external rotation to touch the ear with any part of the hand. The elbow may be flexed with either pronation or supination. Touch the opposite knee while fully extending the elbow and adducting and internally rotating the shoulder with pronation of the forearm so that the palm faces down.
Required: Smooth controlled reversal between synergies, and full elbow extension

Task 2: **Shoulder abduction to 90◦ with pronation**
Position: Standard starting position.
Instruction: "Lift your arm out to the side, keeping your elbow straight and your palm down."
Required: Shoulder abduction 90˚ with full elbow extension. Forearm must be pronated. Wrist control is not necessary.
Don't accept: Compensatory movements: trunk side flexion, scapular elevation, shoulder flexion, or elbow flexion.

Task 3: **Pronation then supination**
Position: Shoulder flexion to 90˚, arm in midposition.
Instruction: "Keep your elbow straight, and turn your palm down and then up."
Required: Full pronation, full supination (with or without internal and external rotation of shoulder) and full elbow extension with 90° of shoulder flexion.
Don't accept: Compensatory trunk movements or elbow flexion. Loss of shoulder flexion. .

STAGE 6:

Task 1: **Hand from knee to forehead 5 times in 5 seconds**
Position: Standard starting position.
Instruction: "Touch your forehead and your weak knee as quickly as possible."
Method: Count the knee to forehead repetitions in 5 seconds. Note that some part of the hand or wrist touches the knee and the forehead on each repetition.
Required: Smoothness of movement.
Don't accept: To lower head or raise knee.

Task 2: **Trace a vertical figure 8**
Position: Shoulder flexion to 90°.
Instruction: "Draw a large "figure 8" keeping your elbow straight."
Required: The figure 8 is drawn smoothly, both above and below 90° of shoulder flexion. The elbow must be straight throughout the movement. Finish with the arm at shoulder level. The circles should be 20-30 centimeters (8-12 inches) in diameter.
Don't accept: A small pattern, or compensatory trunk movements to achieve the pattern, elbow flexion through any part of the pattern, or a jerky pattern.

Task 3: **Raise arm overhead with full supination**
Position: Arm resting at side of body.
Instruction: "Raise your arm over your head keeping your elbow straight and finish with your palm facing backwards."
Required: Full shoulder flexion, elbow extension and supination. Elbow extended through the movement.
Don't accept: Shoulder abduction, elbow flexion, less than full supination or any compensatory trunk movements.

STAGE 7
Task l: **Clap hands overhead, then clap hands behind back 3 times in 5 seconds**
Position: Arms at side of body while standing (or sitting on stool).
Instruction: "Clap your hands above your head, then behind your back as quickly as possible."
Method: One movement consists of clapping hand overhead and behind back. Time the number of movements performed in 5 seconds. Listen for clap overhead while watching for the coordinated movement.
Required: Smooth coordinated movement with shoulder flexion range of 160-180° .
Don't accept: Clapping hands in front of face, not overhead.

Task 2: **Scissor in front 3 times in 5 seconds**
Position: Shoulder flexion to 90˚, elbows extended and forearms pronated.
Instruction: "Keep your elbows straight and your palms down. Cross your arms in front of you, alternating the arm that crosses on top. Repeat the over/under movement 3 times."
Required: Shoulders remain held in 90˚ flexion throughout the movement with elbows extended and forearms pronated. Equal range (shoulder width) and speed of crossovers. Smooth coordinated movement.
Don't accept: Stopping between repetitions.

Task 3: **Resisted shoulder external rotation**
Position: Both elbows at side with 90° elbow flexion.
Instruction: "Keep your elbows at your side. Tighten your muscles and don't let me push your arms in"
Method: Place hands on client's forearms. Instruct client as above and apply resistance to external rotation. Maintain resistance for 3 seconds.
Required: Equal strength bilaterally.

Standard sitting position: Sitting with the forearm in the lap, or supported on a pillow, in a neutral position, wrist at 0° and fingers slightly flexed. The client can sit either unsupported on the side of the bed or plinth, or supported in a chair or wheelchair. Feet should be supported. Encourage good sitting posture for testing (ie. with hips and knees at 90°). Start the assessment at Stage 3.

STAGE 1

Unable to demonstrate at least two of the Stage 2 tasks.

STAGE 2 Support the limb as necessary while facilitating the movements.

Task 1: **Positive Hoffman**
Position: Standard starting position.
Instruction: "Let me move your fingers."
Method: With one hand support the client's middle phalanx of the middle finger. With the other hand quickly snap the distal phalanx of the middle finger into flexion. A positive response is flexion of the fingers or thumb (or both).

Task 2: **Resistance to passive wrist or finger extension**
Position: Standard starting position.
Instruction: "Let me move your hand."
Method: Choose either (a) or (b):

a) Extend and flex wrist 5 times with sufficient speed of passive movement to elicit a stretch reflex. Feel for resistance to passive movement and watch for contraction of wrist flexors.
b) Extend and flex fingers 5 times with sufficient speed of passive movement to elicit a stretch reflex. Feel for resistance to passive movement and watch for contraction of finger flexors.

Task 3: **Facilitated finger flexion**
Position: Standard starting position.
Instruction: "Bend your fingers."
Method: Facilitate a contraction of the finger flexors.
Required: Some active finger flexion.

STAGE 3

Task 1:	**Wrist extension greater than 1/2 of the remaining range**
Position:	Standard starting position.
Instruction:	"Bend your wrist back."
Method:	Forearm may be supported.
Required:	Active wrist extension greater than half range. Movement in synergy is permissible.

Task 2:	**Finger or wrist flexion greater than 1/2 of the remaining range**
Position:	Standard starting position.
Instruction:	"Make a fist." If the client cannot complete this task, ask him or her to "Bend your wrist forward as far as you can."
Required:	Finger flexion greater than half range or wrist flexion greater than half range.
Permissible:	To flex wrist, fingers or both.

Task 3:	**Thumb to index finger**
Position:	Supination, thumb in extension.
Instruction:	"Touch your index finger with your thumb."
Method:	Place thumb in extension if client is unable to assume the position. Watch or feel for active thumb adduction sufficient to touch the index finger.
Permissible:	Some thumb opposition is permissible. Movement in synergy is permissible.
Don't accept:	Gravity assisting with the performance of the movement.
Acceptable:	To support the hand in supination if necessary.

STAGE 4

Task 1:	**Finger extension then flexion**
Position:	Standard starting position.
Instruction:	"Stretch your fingers out straight, then make a tight fist."
Required:	Greater than half range of extension followed by full flexion at PIP and DIP joints of all fingers.

Task 2:	**Thumb extension greater than 1/2 range, then lateral prehension**
Position:	Standard starting position.
Instruction:	"Straighten your thumb, then bring it down to hold onto the paper."
Method:	Place a piece of paper between the thumb and index finger. With the client holding on to the paper, try to pull it out. The thumb may touch any part of the lateral border of index finger.
Required:	Thumb extension greater than half range. Exertion of some pressure to hold the paper.

Task 3: **Finger flexion with lateral prehension**
Position: Standard starting position.
Instruction: "Make a tight fist and bring your thumb down to your index finger. Don't let me move your thumb."
Method: Test for active lateral prehension (key grip) by trying to move the thumb away from the index finger.
Required: Sufficient finger flexion to bring tips of all fingers to the palm of the hand. Active thumb flexion, and ability to maintain the prehension position.

STAGE 5

Task 1: **Finger flexion then extension**
Position: Standard starting position.
Instruction: "Make a tight fist and then straighten your fingers out."
Required: Smooth reversal from flexion to extension. Full flexion and full extension of fingers.
Don't accept: To bend or straighten fingers unevenly.

Task 2: **Finger abduction**
Position: Forearm pronated with fingers extended.
Instruction: "Spread your fingers apart as far as you can."
Required: Full range finger abduction
Don't accept: Wrist and finger flexion during movement.

Task 3: **Opposition of thumb to little finger**
Position: Hand unsupported (forearm may be supported).
Instruction: "Touch the tip of your little finger with the tip of your thumb."
Required: Some flexion of MCP, PIP, and DIP joints of the thumb and 5th finger.
Don't accept: Wrist flexion.

STAGE 6
Task 1: **Tap index finger 10 times in 5 seconds**
Position: Standard starting position with forearm pronated.
Instruction: "Keeping your finger straight, tap your index finger as quickly as you can."
Required: Active flexion and extension at MCP joint with IP joints in extension, with smooth movements of equal amplitude.
Don't accept: Movement taking place at wrist, or flexion of the IP joints.

Task 2: **Pull trigger, then return**
Position: Pistol grip, wrist in neutral position, thumb and index finger extended, 3 other fingers flexed.
Instruction: "Bend and straighten your index finger without moving anything else."
Required: Full range flexion and extension of PIP and DIP joints with no movement at the MCP joint of the index finger. No movement of thumb and other fingers.
Don't accept: Any change from the starting position.

Task 3: **Wrist and finger extension with finger abduction**
Position: Hand resting on lap or support, forearm pronated.
Instruction: "Lift your wrist as far as you can and then stretch your fingers apart."
Required: Full range wrist and finger extension with full range of abduction.

STAGE 7

Task 1: **Thumb to finger tips, then reverse 3 times in 12 seconds**
Position: Standard starting position with thumb touching the little finger.
Instruction: "Starting with the little finger, touch the tip of each finger with your thumb and then go back to the little finger. Make sure the index and little fingers are touched twice. Do this 3 times."
Required: Smooth, coordinated movement repeated 3 times in 12 seconds.

Task 2: **Bounce a ball 4 times in succession, then catch it**
Position: Sitting, holding onto a ball 6.5 centimeters (2.5 inches) in diameter (e.g. a tennis ball).
Instruction: "Bounce the ball 4 times and then catch it."
Required: The activity is controlled and the height of the ball (around knee height) is consistent. It is permissible to bounce ball between the knees or to the outside of weak side.
Don't accept: Catch and release of the ball.

Task 3: **Pour 250 ml. from 1 liter pitcher, then reverse**
Position: Sitting at a table with 250 ml. (1 cup) plastic measuring cup with handle and a 1 liter (1 quart) plastic pitcher on the table. The 1 liter pitcher is three-quarters full. The measuring cup is medial to the pitcher.
Instruction: "With your weak hand, pour the water from the pitcher to the cup. Pick up the cup and pour the water back into the pitcher by turning the palm of your hand up."
Required: The client must pour the water to fill the measuring cup. Task is accomplished without spilling the liquid.
Don't accept: Pitcher and cup touching, compensatory movements of the trunk or upper limbs or jerky movements.

Standard starting position: Lying on back with knees bent and feet flat, with hands resting on stomach, shoes and socks off, and pants rolled up. Start assessment at Stage 4.

STAGE 1

Unable to demonstrate at least two of the Stage 2 tasks.

STAGE 2

Task 1: **Resistance to passive hip or knee flexion**
Position: Standard starting position, with limb supported as necessary.
Instruction: "Let me move your leg."
Method: Choose either a) or b):

a) flex and extend hip 5 times with sufficient speed of passive movement to elicit stretch reflex. Feel for resistance to passive movement and watch for an active contraction of hip flexors.
b) flex and extend knee 5 times with sufficient speed of passive movement to elicit stretch reflex. Feel for resistance to passive movement and watch for an active contraction of the quadriceps.

Task 2: **Facilitated hip flexion**
Position: Standard starting position.
Instruction: "Bend your leg towards your chest."
Method: Facilitate a contraction of the hip flexors.
Required: Some active hip flexion.

Task 3: **Facilitated extension**
Position: Standard starting position.
Instruction: "Straighten your leg out."
Method: Facilitate a contraction of hip and knee extensors.
Required: Some active contraction of hip or knee extensors.

STAGE 3

Task 1: **Adduction to neutral**
Position: Standard starting position with weak leg abducted (30-45°).
Instruction: "Bring your weak knee into the middle."
Method: Adduction of weak leg to neutral. Foot may be stabilized.

Task 2: **Hip flexion to 90°**
Position: Standard starting position.
Instruction: "Bend your leg up towards your chest."
Required: Hip flexion to 90° (hip abduction and/or pelvic tilt are permitted).

Task 3: **Full extension**
Position: Standard starting position. Leg may be stabilized.
Instruction: "Straighten your leg out."
Method: Full active hip and knee extension. Gravity may assist with the movement. Adduction and internal rotation are not required, but are permitted.

STAGE 4

Task 1: **Hip flexion to 90° then extension synergy**
Position: Standard starting position. The unaffected leg remains in flexion during this task.
Instruction: "Bend your leg up towards your chest, and out to the side. Then without stopping, straighten your leg out, crossing your weak leg over the mid-line."
Required: Hip and knee flexion to 90°, hip abduction to 45°, and external rotation at least to neutral during the flexion component. Full extension of hip and knee with sufficient hip internal rotation and adduction to cross the weak foot over the midline. No stopping between synergies.
Don't accept: Prolonged pause between synergies.

Task 2: **Bridging hips with equal weight bearing**
Position: Standard starting position.
Instruction: "Lift your hips off the bed pushing equally with both feet."
Method: Test for equal weight bearing by trying to displace the weak foot.
Required: Hip extension and weight bearing equal bilaterally. Pelvis aligned.
Don't accept: The use of a non-slip material under the weak foot.

Task 3: **Knee flexion beyond 100°**
Position: Sitting, hips and knees flexed to 90° and feet supported.
Instruction: "Bend your knee back as far as you can."
Required: Knee flexion greater than $100^{o.}$
Acceptable: Part of the foot can remain in contact with the floor.
Don't accept: Excessive trunk movement.

STAGE 5

Task 1: **Extension synergy, then flexion synergy**
Position: Standard starting position. The unaffected leg remains in flexion during this task.
Instruction: "Straighten your leg out crossing your weak leg over the mid-line, then without stopping, bring your weak leg up towards your chest and out to the side."
Required: Full extension of hip and knee with sufficient hip internal rotation and adduction to cross weak foot over the mid-line. Hip and knee flexion to 90˚, hip abduction to 45˚ with external rotation at least to neutral. Smooth transition between synergies.

Task 2: **Raise thigh off bed**
Position: Sitting, hips and knees flexed to 90˚. Feet on floor.
Instruction: "Lift your thigh off the bed."
Required: Active hip flexion through inner range so that the thigh clears the bed.
Don't accept: External rotation of hip, compensating trunk movements, or use of hands.

Task 3: **Hip extension with knee flexion**
Position: Standing on strong leg with light support.
Instruction: "Take your leg back, keep it there, then lift your heel towards your bottom."
Method: Therapist may provide light support for balance.
Required: Hip extension to 0˚ with enough knee flexion to raise the foot off the floor.
Don't accept: Compensatory trunk movements or weight bearing through the support offered by the therapist. Less than neutral hip extension while flexing knee.

STAGE 6

Task 1: **Lift foot off floor 5 times in 5 seconds**
Position: Sitting with hips and knees at 90°, feet supported.
Instruction**:** “Lift your thigh off the bed and stamp the floor with your whole foot 5 times.”
Method: Count the number of times the foot taps the floor in 5 seconds.
Required: 90˚knee flexion. Each repetition should be of equal amplitude.
Don't accept: Compensatory trunk or hip movements, less than 90˚knee flexion.

Task 2: **Full range internal rotation**
Position: Sitting with hip and knees at 90^{o}, feet supported.
Instruction: "Keep your knees together and spread your ankles apart.”
Method: It is permissible to hold on to the bed.
Required: Full range of internal rotation (compare to other side), no compensatory trunk movements. Feet should come off the support.
Don’t accept: Hip flexion or movement in synergy

Task 3:	**Trace a pattern: forward, side, back, return**
Position:	Standing on strong leg with light support.
Instruction:	"Trace the shape of a triangle on the floor: forward, side, back, return. Keep your forefoot on the floor and keep your knee straight."
Method:	Therapist may provide light support for balance.
Required:	Smooth, coordinated hip flexion, abduction and extension while keeping the knee extended.
Don't accept:	Weight bearing through support, jerky movements or knee flexion when the leg is abducting or extending.
Acceptable:	Knee flexion is permitted when the limb is returning to the neutral position from hip extension.

STAGE 7

Task 1:	**Rapid high stepping 10 times in 5 seconds**
Position:	Standing unsupported.
Instruction:	"Quickly march on the spot lifting your legs up high."
Method:	Count 10 high steps, 5 with each leg, in 5 seconds.
Required:	Consistent step height with at least 45º of hip flexion.

Task 2:	**Trace a pattern quickly; forward, side, back, return. Reverse pattern**
Position:	Standing with light support**.**
Instruction:	"Quickly trace a shape of a triangle on the floor and without stopping, reverse the pattern. Keep your forefoot on the floor and keep your knee straight**.**"
Method:	Movement consists of hip flexion, abduction and extension while keeping knee extended.
Required:	Smooth, coordinated, movement with a rapid reversal.
Acceptable:	Knee flexion is permitted when the limb is returning to the neutral position from hip extension.

Task 3:	**Hop on weak leg**
Position:	Standing on weak leg with light support.
Instruction:	"Hop on your weak foot."
Method:	Therapist may provide light support for balance.
Required:	Sufficient clearance so that the whole foot is off the floor. Ankle stability.
Don't accept:	Weight bearing through support. Excessive trunk movements.

Standard Starting Position: No standard position. Test all tasks in one position before the client moves to another position, i.e., in lying before sitting. Encourage good sitting posture (ie. with hips and knees at 90°) during testing when indicated. Remove socks and shoes. Start at Stage 3 with the client supine.

STAGE 1

Unable to demonstrate at least two of the Stage 2 tasks.

STAGE 2

Task 1: **Resistance to passive dorsiflexion**
Position: Supine with knees flexed and feet on the mat.
Instruction: "Let me move your foot."
Method: Dorsiflex and plantarflex ankle 5 times with sufficient speed of passive movement to elicit stretch reflex. Support the limb as necessary while facilitating the movement.
Required: Feel for resistance to passive movement and watch for active contraction in plantarflexors.

Task 2: **Facilitated dorsiflexion or toe extension**
Position: Supine with knees flexed and feet on the mat.
Instruction: "Pull your foot and toes up."
Method: Facilitate dorsiflexion or toe extension. Support the limb as necessary while facilitating the movement.
Required: Some active ankle dorsiflexion or toe extension.
Permissible: Use of the Babinski Reflex to elicit movement.

Task 3: **Facilitated plantarflexion**
Position: Supine with knees flexed and heels on the mat.
Instruction: "Point your foot and toes down."
Method: Facilitate plantar flexion of the ankle. Support the limb as necessary while facilitating the movement.
Required: Some active ankle plantar flexion.
Permissible: The leg can move into extension.

STAGE 3

Task 1: **Plantarflexion greater than 1/2 range**
Position: Supine, legs extended, ankles in a neutral position.
Instruction: "Push your foot down."
Method: It is permissible to position the foot in the neutral (near 90^{o} at ankle).
Required: Plantar flexion greater than half the remaining range.

Task 2: **Some dorsiflexion**
Position: Sitting, feet supported.
Instruction: "Lift your foot off the floor while keeping your heel down."
Method: May stabilize the heel and support the leg. Movement in synergy is permissible.
Required: Some active dorsiflexion.
Permissible: Movement in synergy.

Task 3: **Extension of toes**
Position: Sitting.
Instruction: "Lift your toes up."
Method: Leg may be stabilized.
Required: Some active toe extension.
Permissible: Movement in synergy

STAGE 4

Task 1: **Some eversion**
Position: Sitting with the ankle inverted, foot on the floor.
Instruction: "Turn foot out and lift up the outside edge of your foot."
Method: Start in inversion. Ankle may be stabilized. Client may lift the foot off the floor.
Required: Some active eversion.

Task 2: **Full inversion**
Position: Sitting with the ankle everted.
Instruction: "Turn your foot in."
Method: Start in eversion. Ankle may be stabilized. Client may lift the foot off the floor.
Required: Full available range of inversion.

Task 3: **Dorsiflexion, then plantarflexion**
Position: Sitting with the weak leg crossed over the strong leg at the knee.
Instruction: "Pull your foot up, then push it down."
Method: Leg may be stabilized (eg the thigh may be supported)
Required: Full dorsiflexion and then full plantarflexion.

STAGE 5

Task 1: **Toe extension with ankle plantarflexion**
Position: Sitting with the weak leg crossed over the strong leg at the knee.
Instruction: "Push your foot down. Keep it there and then lift your toes up."
Method: Leg may be stabilized.
Required: Maintained ankle plantar flexion with full toe extension for all toes.

Task 2: **Ankle plantarflexion, then dorsiflexion**
Position: Sitting with the weak knee extended.
Instruction: "Push your foot down, then pull it up."
Method: Leg is fully extended. Support can be provided above the knee.
Required: Full plantarflexion and full dorsiflexion with knee extension.
Don't accept: Any knee flexion.

Task 3: **Eversion**
Position: Standing with involved foot slightly forward and light hand support.
Instruction: "Keeping your heel on the ground, lift your foot up and out."
Method: Do not stabilize the leg.
Required: Full eversion with heel on floor, with no internal or external rotation of hip.

STAGE 6

Task 1: **Tap the foot 5 times in 5 seconds**
Position: Standing with involved foot slightly forward and light hand support.
Instruction: "Heel on the floor, tap your foot as quickly as possible."
Required: At least 5 taps of the foot in 5 seconds. Smooth movements with consistent dorsiflexion range with each repetition while maintaining the heel on the floor.
Don't accept: Compensation with flexion synergy or trunk movement.

Task 2: **Foot circumduction**
Position: Standing with knee extended, weak foot off floor, and light hand support.
Instruction: "Make 4 large circles with your foot only."
Required: Smooth coordinated circular movement using full available range.
Don't accept: Movement at hip or knee.

Task 3: **Eversion**
Position: Standing with knee extended, weak foot off floor, and light hand support.
Instruction: "Keep your knee straight and then turn only your foot out."
Required: Full range eversion while maintaining full knee extension.
Don't accept: External rotation of hip.

STAGE 7

Task 1:	**Heel touching forward, then toe touching behind, 5 times in 10 seconds**
Position:	Standing with light hand support.
Instruction:	"Touch the floor in front of you with your heel and then behind you with your toes. Do this as quickly as you can."
Method:	The task consists of full dorsiflexion in front and full plantarflexion behind. Count the number of movements performed in 10 seconds.
Required:	Smooth, coordinated, full range dorsiflexion and full plantarflexion with hip extension.
Don't accept:	Weight bearing through support.

Task 2:	**Circumduction quickly, reverse**
Position:	Standing with weak foot off the floor and light hand support.
Instruction:	"Make 4 large circles with your foot in one direction and then reverse."
Required:	Smooth, coordinated, circular movement quickly in the full available range and at a constant speed.
Don't accept:	Weight bearing through support.

Task 3:	**Up on toes then back on heels 5 times**
Position:	Standing with light hand support.
Instruction:	"Stand on your toes, then back on your heels raising your toes up. Repeat as quickly as possible 5 times.”
Method:	Knees remain extended.
Required:	Weight bearing and range equal bilaterally for all 5 repetitions.
Don't accept:	Weight bearing through support
Permissible:	Slight hip flexion for balance

ACTIVITY INVENTORY

The purpose of the Activity Inventory is to assess the client's functional level, not the precise way in which the task is achieved. Therefore, while testing, focus on task accomplishment not quality of movement.

A score of **ONE** is given for any task in which the client requires total assistance, requires the assistance of 2 people, or if it is felt to be unsafe to attempt that task (except for Item 15).

Because this assessment is designed to be used in conjunction with the Uniform Data System for Medical Rehabilitation (UDSMR^{TM}) and the Functional Independence Measure (Adult FIM ^{TM}), a scoring key similar to the Adult FIM^{TM} is used. Observe each task and score in the boxes provided. Sum the scores to determine the Gross Motor Function Index, the Walking Index, and the total score of the Activity Inventory.

DESCRIPTION OF THE LEVELS OF FUNCTION AND THEIR SCORES

INDEPENDENT - Another person is not required for the activity (NO HELPER).

7 **COMPLETE INDEPENDENCE -** All of the tasks which make up the activity are typically performed safely, without modification, assistive devices, or aids, and within reasonable time.

6 **MODIFIED INDEPENDENCE -** Activity requires any one or both of the following to complete the task: an assistive device (eg. foot orthoses, cane), or more than reasonable time (at least 3 times longer than normal).

DEPENDENT Another person is required for either supervision or physical assistance in order for the activity to be performed, or it is not performed (REQUIRES HELPER).

MODIFIED DEPENDENCE- The subject expends half (50%) or more of the effort. The levels of assistance required are:

5 **Supervision -** The client requires no more help than standby supervision, cueing or coaxing, without physical contact.

4 **Minimal contact assistance -** With physical contact the subject requires no more help than touching, and client expends 75% or more of the effort.

3 **Moderate assistance -** The client requires more help than touching, or expends half (50%) or more (up to 75%) of the effort.

COMPLETE DEPENDENCE - The client expends less than half (less than 50%) of the effort. Maximal or total assistance is required, or the activity is not performed. The levels of assistance required are:

2 **Maximal assistance -** The client expends less that 50% of the effort, but at least 25%.

1 **Total assistance -** The client expends less than 25% of the effort, 2 persons are required for assistance, or the task is not tested for safety reasons.

Note: Even though the overall scoring of the Activity Inventory is based on the FIM scoring principles, we have developed specific scoring criteria for the individual tasks of the Activity Inventory. For example, arms on the wheelchair or armchair, are not considered assistive devices.

You are expected to score each task, do not leave any item blank. If you decide not to test a task because of your concerns for the client's safety, assign a score of 1.

Task 1:	**Supine to side lying on strong side**
Position:	Supine lying, head on pillow, legs extended, arms by each side.
Instruction:	"Roll over towards your strong side."
Method:	Assist if necessary and judge the amount of assistance given. For use of the bedrail, score 6.
Permissible:	To use the bed or mattress to push on or pull up

Task 2:	**Supine to side lying on weak side**
Position:	Supine lying, head on pillow, legs extended, arms by each side.
Instruction:	"Roll over towards your weak side."
Method:	Assist if necessary and judge the amount of assistance given. For use of the bedrail, score 6.
Permissible:	To use the bed or mattress to push on or pull up

Task 3:	**Side lying to long sitting through strong side**
Position:	Side lying on the strong side, head on pillow, arms forward, legs slightly flexed.
Instruction:	"Come up into sitting with your legs out in front of you."
Method:	May flex, abduct and externally rotate hips, and flex knees. Assist if necessary and judge the amount of assistance given.
Permissible:	To use the bed or mattress to push on or pull up

Task 4:	**Side lying to sitting on side of the bed through strong side**
Position:	Side lying on the strong side, head on pillow, arms forward, legs slightly flexed.
Instruction:	"Come up into sitting with your legs over the side of the bed."
Method:	Assist if necessary and judge amount of assistance given and aids used. For use of the bedrail, score 6.
Permissible:	To use the bed or mattress to push up or pull up

Task 5:	**Side lying to sitting on side of the bed through weak side**
Position:	Side lying on the weak side, head on pillow, arms forward, legs slightly flexed.
Instruction:	"Come up into sitting with your legs over the side of the bed."
Method:	Assist if necessary and judge amount of assistance given and aids used. For use of bedrail, score 6.
Permissible:	To use the bed or mattress to push up or pull up

Task 6:	**Remain standing**
Position:	Standing.
Instruction:	"Stay standing for 30 seconds."
Method:	Time for 30 seconds. Assist if necessary and judge assistance given. If they use an aid to remain standing, score 6. Score a 1 if the client cannot stand for 30 seconds with assistance.
Permissible:	To assist the client to rise

Task 7:	**Transfer to and from bed towards strong side.**
Position:	a) Sitting in bed. b) Sitting in wheelchair or chair with arms.
Instruction:	Bed to chair: "Come and sit in this chair." Chair to bed: "Come and sit on the side of the bed." Client is permitted to use the arm of a chair to turn.
Method:	Assist if necessary and judge assistance given.
Required:	Safe performance of all aspects of task (including putting on brake, removal of foot pedal if necessary). Score 4 or lower if the client requires help with the brakes/pedals.

Task 8:	**Transfer to and from bed towards weak side**
Position:	a) Sitting in bed. b) Sitting in wheelchair or chair with arms.
Instruction:	Bed to chair: "Come and sit in this chair." Chair to bed: "Come and sit on the side of the bed."
Method:	Client is permitted to use the arm of a chair to turn. Assist if necessary and judge assistance given.
Required:	Safe performance of all aspects of task (including putting on brake, removal of foot pedal if necessary). Score 4 or lower if the client requires help with the brakes/pedals.

Task 9:	**Transfer up and down from floor and chair**
Position:	a) Sitting in the wheelchair or a regular chair with arms. b) Long sitting in the middle of the mat, facing the wheelchair or a regular chair.
Instruction:	a) "Go down onto the mat." b) "Come up and sit in the chair."
Method:	The client attempts both a) and b). The client is permitted to use arms of chair. Assist if necessary, judge amount of assistance given.
Required:	Safe performance of all aspects of task (including putting on brakes, removal of foot pedal if necessary).

Task 10:	**Transfer up and down from floor and standing**
Position:	a) Standing facing the floor mat. b) Long sitting in the middle of the mat.
Instruction:	a) "Get down onto the floor mat." b) "Stand up."
Method:	The clients attempts both a) and b). Assist if necessary, judge amount of assistance given. Furniture, such as chairs, is not allowed.
Required:	Safe performance of task.

WALKING INDEX

A device is any type of walking aid. The highest score that a client can reach with a walking aid or orthoses is 6. To receive 7, the client must walk independently without aids.

Task 11: **Walking indoors 25 meters**
Position: Standing**.**
Instruction: "Walk up and down the hall."
Method: Measure distance walked. Assist if necessary and judge amount of assistance given. (25 meters equals 27 yards.)
Modified scoring: Assign a score of 5 if client walks 15 meters (16 yards) (but not 25) indoors independently with or without an aid.

Task 12: **Walking outdoors, over rough ground, ramps, and curbs (150 meters)**
Position: Standing.
Instruction: "Walk outside on a lawn, a side walk, across a street, and up and down a hill."
Method: Walk a minimum of 150 meters outdoors. Assist if necessary, judge amount of assistance given. If the client cannot walk 150 meters with assistance, score a 1. (150 meters equals 164 yards.)
Required: Safe performance of the task.
Note: If necessary, you can simulate outdoor walking indoors using ramps, varied surfaces, curbs, etc.

Task 13: **Walking outdoors 6 blocks (900 meters**)
Position: Standing.
Instruction: "Walk 6 city blocks." (a distance of 900 meters, with one block approximately equal to 150 meters)
Method: Assist if necessary, judge amount of assistance given. (900 meters equals 984 yards)
Required: Safe performance of the task.
Modified scoring: Assign a score of 5 if client walks 300 meters (324 yards) independently with or without an aid.
Note: If necessary, you can simulate outdoor walking indoors using ramps, varied surfaces, curbs, etc.

Task 14: **Walk up and down stairs**
Position: Standing.
Instruction: "Go up and down 10 to 14 steps (one flight)."
Method: Assist if necessary, judge amount of assistance given. The railing is considered a device.
Required: Safe performance of the task.
Modified scoring: Assign a score of 5 if the client goes up and down 4 to 6 steps independently, with or without an assistive device, and/or takes more than reasonable time or there are safety considerations.

Task 15: Age appropriate walking distance for 2 minutes (2 points)

Position: Standing.
Instruction: "When I say go, walk as fast as you can, but walk safely, and I will measure how far you walk in 2 minutes." Provide encouragement every 30 seconds "Keep it up, you have 1 minute and a half OR a minute OR 30 seconds to go"
Method: Use the standardized protocol for "The Two-Minute Walk Test for Patients with Neurological Dysfunction"*

Scoring: For 2 points:
For clients 70 years of age or less, the distance walked should be a minimum of 96 meters (105 yards). Over 70 years of age the distance walked should be a minimum of 84 meters (92 yards).

Walking Aids: Record any walking aids, orthoses, and assistance and rests required.

*Reference: Miller PA, Moreland J, Stevenson TJ. 2002. Measurement properties of a standardized version of the two-minute walk test for individuals with neurological dysfunction. *Physiotherapy Canada*, Fall 2002: 241-248, 257.

Revised May 2007

Chedoke-McMaster Stroke Assessment
SCORE FORM Page 1 of 4
IMPAIRMENT INVENTORY: SHOULDER PAIN AND POSTURAL CONTROL

POSTURAL CONTROL: Start at Stage 4. Starting position is indicated beside the item or underlined. No support is permitted. Place an X in the box of each task that is accomplished. Score the highest Stage in which the client achieves at least two Xs.

SHOULDER PAIN

1 ☐	constant, severe arm and shoulder pain with pain pathology in more than just the shoulder
2 ☐	intermittent, severe arm and shoulder pain with pain pathology in more than just the shoulder
3 ☐	constant shoulder pain with pain pathology in just the shoulder
4 ☐	intermittent shoulder pain with pain pathology in just the shoulder
5 ☐	shoulder pain is noted during testing, but the functional activities that the client normally performs are not affected by the pain
6 ☐	no shoulder pain, but at least one prognostic indicator is present • Arm Stage 1 or 2 • Scapula malaligned • Loss of range of shoulder movt - flexion/abduction < 90° or external rotation < 60°
7 ☐	shoulder pain and prognostic indicators are absent

☐ **STAGE OF SHOULDER PAIN**

POSTURAL CONTROL

1		☐	not yet Stage 2
2	Supine	☐	facilitated log roll to side lying
	Side lying	☐	resistance to trunk rotation
	Sit	☐	static righting with facilitation
3	Supine	☐	log roll to side lying
	Sit	☐	move forward and backward
	Stand	☐	remain upright for 5 sec
4	Supine	☐	segmental rolling to side lying
	Sit	☐	righting within the base of support
	Sit	☐	standing up
5	Sit	☐	dynamic righting side to side, feet on floor
	Sit	☐	standup with equal weight bearing
	Stand	☐	step forward onto weak leg, transfer weight
6	Sit	☐	dynamic righting backward or sideways with displacement, feet off floor
	Stand	☐	on weak leg, 5 seconds ☐ sec
	Stand	☐	sideways braiding for 2 m
7	Stand	☐	on weak leg: abduction of strong leg
	Stand	☐	tandem walking 2 m in 5 sec
	Stand	☐	walk on toes 2 m

☐ **STAGE OF POSTURAL CONTROL**

Chedoke-McMaster Stroke Assessment
SCORE FORM Page 2 of 4
IMPAIRMENT INVENTORY: STAGE OF RECOVERY OF ARM AND HAND

ARM and HAND: Start at Stage 3. Starting position: sitting with forearms in lap or supported on a pillow in a neutral position, wrist at 0° and fingers slightly flexed. Changes from this position are indicated by underlining. Place an X in the box of each task accomplished. Score the highest Stage in which the client achieves at least two Xs.

ARM

1 ☐ not yet Stage 2

2 ☐ resistance to passive shoulder abduction or elbow extension
☐ facilitated elbow extension
☐ facilitated elbow flexion

3 ☐ touch opposite knee
☐ touch chin
☐ shoulder shrugging > ½ range

4 ☐ extension synergy, then flexion synergy
☐ shoulder flexion to 90°
☐ elbow at side, 90° flexion: supination, then pronation

5 ☐ flexion synergy, then extension synergy
☐ shoulder abduction to 90° with pronation
☐ shoulder flexion to 90°: pronation then supination

6 ☐ hand from knee to forehead 5X in 5 sec
☐ shoulder flexion to 90°: trace a vertical figure 8
☐ arm resting at side of body: raise arm overhead with full supination

7 ☐ clap hands overhead, then behind back 3X in 5 sec
☐ shoulder flexion to 90°: scissor in front 3X in 5 sec
☐ elbow at side, 90° flexion: resisted shoulder external rotation

☐ **STAGE OF ARM**

HAND

1 ☐ not yet Stage 2

2 ☐ positive Hoffman
☐ resistance to passive wrist or finger extension
☐ facilitated finger flexion

3 ☐ wrist extension > ½ range
☐ finger or wrist flexion > ½ range
☐ supination, thumb in extension: thumb to index finger

4 ☐ finger extension then flexion
☐ thumb extension > ½ range, then lateral prehension
☐ finger flexion with lateral prehension

5 ☐ finger flexion, then extension
☐ pronation: finger abduction
☐ hand unsupported: opposition of thumb to little finger

6 ☐ pronation: tap index finger 10X in 5 sec
☐ pistol grip: pull trigger, then return
☐ pronation: wrist and finger extension with finger abduction

7 ☐ thumb to finger tips, then reverse 3X in 12 sec
☐ bounce a ball 4 times in succession, then catch
☐ pour 250 ml. from 1 litre pitcher, then reverse

☐ **STAGE OF HAND**

Chedoke-McMaster Stroke Assessment
SCORE FORM Page 3 of 4
IMPAIRMENT INVENTORY: STAGE OF RECOVERY OF LEG AND FOOT

LEG: Start at Stage 4 with the client in lying on back with knees bent and feet flat. FOOT: Start at Stage 3 with the client in supine. Test position is beside the item or underlined. If not indicated, the position has not changed. Place an X in the box of each task accomplished. Score the highest stage in which the client achieves at least two Xs. For "standing" test items, light support may be provided but weight bearing through the hand is not allowed. Shoes and socks off.

	LEG		FOOT	
1	☐	not yet Stage 2	☐	not yet Stage 2
2 Crook lying	☐	resistance to passive hip or knee flexion	2 Crook lying ☐	resistance to passive dorsiflexion
	☐	facilitated hip flexion	☐	facilitated dorsiflexion or toe extension
	☐	facilitated extension	☐	facilitated plantarflexion
3	☐	<u>abduction</u>: adduction to neutral	3 Supine ☐	plantarflexion > ½ range
	☐	hip flexion to 90°	Sit ☐	some dorsiflexion
	☐	full extension	☐	extension of toes
4	☐	hip flexion to 90° then extension synergy	4 ☐	some eversion
	☐	bridging hips with equal weightbearing	☐	full inversion
Sit	☐	knee flexion beyond 100°	☐	<u>legs crossed</u>: dorsiflexion, then plantarflexion
5 Crook lying Sit Stand	☐	extension synergy, then flexion synergy	5 ☐	<u>legs crossed</u>: toe extension with ankle plantarflexion
	☐	raise thigh off bed	☐	<u>sitting with knee extended</u>: ankle plantarflexion, then dorsiflexion
	☐	hip extension with knee flexion	Stand ☐	<u>heel on floor</u>: eversion
6 Sit	☐	lift foot off floor 5X in 5 sec	6 ☐	<u>heel on floor</u>: tap foot 5X in 5 sec
	☐	full range internal rotation	☐	<u>foot off floor</u>: foot circumduction
	☐	trace a pattern: forward, side, back, return	☐	<u>knee straight, heel off floor</u>: eversion
7 Stand	☐	<u>unsupported</u>: rapid high stepping 10X in 5 sec	7 ☐	heel touching forward, then toe touching behind, repeat 5X in 10 sec
	☐	<u>unsupported</u>: trace a pattern quickly: forward, side, back; reverse pattern	☐	<u>foot off floor</u>: circumduction quickly, reverse
	☐	<u>on weak keg with support:</u> hop on weak leg	☐	up on toes then back on heels 5X
	☐	**STAGE OF LEG**	☐	**STAGE OF FOOT**

Chedoke-McMaster Stroke Assessment
SCORE FORM Page 4 of 4
ACTIVITY INVENTORY

SCORING LEVELS			
NO HELPER	Independence		
	7	Complete Independence	(Timely, Safely)
	6	Modified Independence	(Device)
	Modified Dependence		
	5	Supervision	
	4	Minimal Assist	(Client = 75%)
HELPER	3	Moderate Assist	(Client = 50%)
	Complete Dependence		
	2	Maximal Assist	(Client = 25%)
	1	Total Assist	(Client = 0%)

		SCORE
1.	Supine to side lying on strong side	☐
2.	Supine to side lying on weak side	☐
3.	Side lying to long sitting through strong side	☐
4.	Side lying to sitting on side of the bed through strong side	☐
5.	Side lying to sitting on side of bed through the weak side	☐
6.	Remain standing	☐
7.	Transfer to and from bed towards strong side	☐
8.	Transfer to and from bed towards weak side	☐
9.	Transfer up and down from floor and chair	☐
10.	Transfer up and down from floor and standing	☐
11.	Walk indoors – 25 meters	☐
12.	Walk outdoors, over rough ground, ramps, and curbs – 150 meters	☐
13.	Walk outdoors 6 blocks – 900 meters	☐
14.	Walk up and down stairs	☐
15.	Age appropriate walking distance for 2 minutes (2 Point Bonus)	☐
	Distance ☐ meters **Total Score**	☐

Walking aids:
- walker ☐
- 4 point cane ☐
- 1 point cane ☐
- brace ☐

To score Bonus:
for age less than 70 years distance must be > 96 meters or greater
for age 70 years or greater distance must be > 84 meters or greater

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