

CANADIAN STROKE BEST PRACTICE RECOMMENDATIONS

Rehabilitation and Recovery following Stroke

Table 1: Suggested Stroke Rehabilitation Screening and Assessment Tools

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Rehabilitation and Recovery following Stroke Writing Group*

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a. Tools to Assess Functional Capacity and Activities of Daily Living

Assessment Tool	Purpose	Items and Administration	Additional Considerations	Availability
Functional Independence Measure (FIM®) Keith et al. 1987	The FIM® is an assessment tool for physical and cognitive disability and is intended to measure burden of care.	18 items evaluating 6 areas of function: self-care, sphincter control, mobility, locomotion, communication and social cognition. Score Interpretation: Maximum score is 126, with higher scores indicating greater levels of functional independence. Scores can also be calculated for motor and cognitive subscales. Administration: Observation; approx. 30 minutes to complete.	The FIM® has been well-studied for its validity and reliability within stroke populations; however, it has been suggested that reliability is dependent on the individual administering the assessment (Salter et al. 2012). Specialized Training: Required.	Available for purchase. www.udsmr.org/WebModules/FIM/Fim_About.aspx
AlphaFIM® Instrument Stillman et al. 2009	The AlphaFIM® Instrument is an assessment tool designed for use during acute care.	6 items assessing of motor (eating, grooming, bowel management and toilet transfers) and cognitive (expression and memory) function, which can be reliably collected in acute care. For patients who are able to walk 150 feet or more, eating and grooming items are replaced by items evaluating walking and bed transfer. Score Interpretation: Alpha-FIM® scores are transformed to a projected FIM® scores and an estimate of patient burden of care hours using an online proprietary algorithm (Lo et al. 2012). Administration: Approx. 5 minutes to complete.	Requires less time to complete than the original FIM®. Specialized Training: Required	Available for purchase. www.udsmr.org/WebModules/Alpha/Alp_About.aspx
Modified Rankin Scale (mRS) Rankin 1957, Bonita et al. 1988, van Swieten et al. 1988	The mRS is an assessment tool for rating global outcome.	Individuals are assigned a subjective grade or rank ranging from 0 (no symptoms) to 5 (severe disability) based on level of independence with reference to pre-stroke activities rather than observation of task-based performance. Administration: Interview; 15 minutes to complete.	The scale's categorical options have been criticized as being broad and poorly defined (Wilson et al. 2002). Specialized Training: Not required.	Free www.rankinscale.org/
Barthel Index of Activities of Daily Living (BI) Mahoney et al. 1965	The BI is an assessment tool for evaluating independence in self-care	The BI consists of 10 common ADLs, 8 related to personal care and 2 related to mobility. Score Interpretation: The index yields a total score out of 100 with higher scores indicating greater functional independence.	Widespread familiarity of the BI contributes to its interpretability. The BI is relatively insensitive and a lack of comprehensiveness may result in problems with ceiling and floor effects (Duncan et al. 1997).	Free http://www.strokecenter.org/wp-content/uploads/2011/08/barthel.pdf

Assessment Tool	Purpose	Items and Administration	Additional Considerations	Availability
	activities.	Administration: Self-Report (less than 5 minutes) or direct observation (up to 20 minutes).	Specialized Training: Not required.	
Modified Barthel Index of Activities of Daily Living (MBI) Collin et al. 1988	The MBI is a modified version of the BI.	The content of the BI and MBI are the same. It is only the scoring values that were changed in the MBI. Scoring: Functional categories may be scored from 0 to 1, 0 to 2 or 0 to 3, depending on the item. Total scores range from 0 to 20	The MBI has been reported to have excellent internal consistency, test-retest reliability and inter-rater reliability. Specialized training: Training required if administered by direct observation	http://www.strokecenter.org/trials/scales/barthel.pdf
Frenchay Activities Index (FAI) Holbrook et al. 1983	The FAI is an assessment tool for instrumental activities of daily living.	15 items representing activities in 3 domains: domestic chores, leisure and work, and outdoor activities. Score Interpretation: Summed scores range from 15-60, with lower scores indicating less frequent activity. Administration: Interview; approx. 5 minutes to complete.	The FAI provides complementary information to that obtained from the Barthel Index, with the FAI representing higher level ADLs (Pederson et al. 1997) Age and Gender may influence scores (Holbrook & Skilbeck 1983; Appelros 2007). Specialized Training: Not required.	Free www.rehabmeasures.org/PDF%20Library/Frenchay%20Activities%20Index.pdf
6 Minute Walk Test (6MWT) Butland et al. 1982	The 6MWT is an assessment tool for walking capacity and endurance.	The total distance in metres walked during the trial period is measured and recorded. The number and duration of rests can also be measured. Administration: Observation; 6 minutes to complete.	Age, height, weight, and sex should each be considered when interpreting results. Encouragement may also impact test results: the published standardized protocol should be used (ATS, 2002; updated protocol Holland et al. 2014). Reference equation developed for Canadians, which was based from the ATS protocol, uses only sex and age to determine the normative value for the 6-minute walk (Hill et al. 2011). As a test of submaximal walking capacity, this test may be best suited to those with moderate-severe impairment (Salter et al. 2012). Variations of this test include the 2 minute and 12-minute walk tests. Specialized Training: Required reading.	Free The iWalk Toolkit has stroke-specific protocols, educational videos, and the iWalkAssess app. To find the toolkit, visit: www.iwalkassess.com

Assessment Tool	Purpose	Items and Administration	Additional Considerations	Availability
10 Meter Walk Test (10MWT) Sullivan et al. 2013	<p>The 10MWT is an assessment tool for walking speed.</p>	<p>The total time required to walk 10 meters is measured and recorded.</p> <p>Administration: Time is measured while individual walks 10-meters, after given space to accelerate to their preferred walking speed (this distance is not included when determining speed).</p>	<p>Requires a 14-meter path that includes 2 meter for acceleration and deceleration. Meta-analysis of age- and sex-specific normative speed found that the grand mean speed ranged from 94.3 cm/second (women aged 80 to 99 years) to 143.4 cm/second (men aged 40 to 49 years). The grand mean gait speed was relatively consistent for the decades 20 to 29 years to 60 to 69 years for men (133.9 to 143.3 cm/second) and women (124.1 to 139.0 cm/second). By the time subjects were aged 80 years or more, their mean gait speed declined to less than 100 cm/second. (Bohannon et al. 2011).</p> <p>Specialized Training: Required reading.</p>	<p>Free</p> <p>http://www.rehabmeasure.org/PDF%20Library/10%20Meter%20Walk%20Test%20Instructions.pdf</p> <p>The iWalk Toolkit has stroke-specific protocols, educational videos, and the iWalkAssess app. To find the toolkit, visit: www.iwalkassess.com</p>
Life Habits (LIFE-H) Fougeyrollas et al. 1998	<p>The LIFE-H is an assessment tool for quality of social participation based on the ability to accomplish activities of daily living and social roles.</p>	<p>LIFE-H assesses 12 domains of life habits. The first 6 domains are related to activities of daily living including: nutrition, fitness, personal care, communication, housing, mobility. The remaining are domains are related of social roles: responsibilities, interpersonal relationships, community life, education, employment and leisure.</p> <p>Score interpretation: LIFE-H is based on a continuous score ranging from 0 to 9, with 0 implying an optimal level of participation and 9 indicating total handicap. In the shortened version, the scale is reversed with 9 implying optimal level of participation and 0 indicating total handicap. The total LIFE-H score is obtained by summing the score of each item and then dividing by the number of items.</p> <p>Administration: The life-H is a self-administered questionnaire. Proxy respondents may be used for clients with low cognitive levels. (Poulin & Desrosiers 2008).</p>	<p>The LIFE-H includes 240 items. The LIFE-H is also available to three shortened version: 1. LIFE-H 2.1 (58 items); 2. LIFE-H 3.0 (69 items); and 3. LIFE-H 3.1 (77 items). The International Network of Disability Creation Process encourages use of version 3.0. (Fougeyrollas et al. 1997; Fougeyrollas et al. 2001)</p> <p>The LIFE-H 3.0 (short form) may take 20 to 40 minutes to complete. The administration time for the long form can vary from 20 to 120 minutes.</p> <p>The LIFE-H is able to discriminate healthy individuals from clients with stroke.</p> <p>Training: None</p>	<p>A copy of the LIFE-H can be ordered from the International Network on the Disability Creation Process (INDCP) by emailing the coordinator at francis.charrier@idrpg.qc.ca.</p>
Canadian	<p>The COPM is</p>	<p>The measure consists of 25 functional</p>	<p>The measure has been shown to have</p>	<p>Available for purchase.</p>

Assessment Tool	Purpose	Items and Administration	Additional Considerations	Availability
Occupational Performance Measure (COPM) Law et al. 1990	an assessment tool that measures a client's everyday functioning in self-care, productivity and leisure.	items/tasks (i.e. bathing, ability to work at least part-time, activities involved in). Each task is then scored on a single 10-point rating scale primarily measuring proficiency in each of the 3 sub-categories (self-care, productivity and leisure). Administration: The COPM is administered using a semi-structured interview in a five-step process with the client or their caregiver. The five steps are: problem definition, problem weighting, scoring, re-assessment, and follow-up (Law et al. 1990).	good reliability and adequate validity (Yang et al. 2017). Specialized training: Required.	http://www.thecopm.ca/buy/
ABILHAND Penta et al. 1998	The ABILHAND is an assessment tool for performing bimanual activities of daily living.	The measure consists of 23 items assessing common bimanual activities of daily living. Each item is scored from: 0=impossible, 1=difficult, 2=easy. Administration: Typically administered by a clinician in an interview. Estimated to take between 10 to 30 minutes to complete (Ashford et al., 2008).	The measure has been shown to have good psychometric properties (Murphy et al. 2015). Specialized training: None required	The measure and its corresponding analysis can be viewed for free at: http://rssandbox.iescagilly.be/abilhand-rasch-analysis-chronic-stroke.html
Functional autonomy measurement system (SMAF) Hébert 1988	The SMAF is an assessment tool of functional independence.	The measure consists of 29 items relating to: Instrumental activities of daily living (7 items), mobility (6 items), communication (3 items), cognitive function (5 items), and home living activities (8 items). Administration: Observation, approx. 42 minutes to complete.	The measure has been shown to have a strong correlation with the FIM (Desrosiers, 2003). Specialized training: Required.	Available for purchase http://www.demarchesmaf.com/en/

b. Tools to Assess Stroke Severity

Assessment Tool	Purpose	Items and Administration	Additional Considerations	Availability
Canadian Neurological Scale (CNS) Côté et al. 1986	The CNS is an assessment tool for neurological impairment.	Items include an assessment of mental activity (level of consciousness, orientation and speech) and motor activity (face, arms and legs) for patients with or without comprehension deficits in the acute stage. Score Interpretation: Maximum score is 11.5; lower scores indicate higher severity. Administration: Approximately 5-10 minutes or less to complete by an administrator.	Quick and simple tool completed by a trained health care practitioner. Used in the acute phase of stroke. Specialized Training: Not Required.	Free www.strokecenter.org/wp-content/uploads/2011/08/canadian.pdf
National Institutes of Health Stroke Scale (NIHSS) Brott et al. 1989	The NIHSS is an assessment tool for neurological status following a stroke.	11 items which include an assessment of level of consciousness, facial palsy and the presence of neglect or visual, sensory, motor, language or speech deficits. Items are answered according to a 3 or 4 point ordinal scale. Score Interpretation: Maximum score is 42; higher scores indicate a greater level of severity. (1-4=mild; 5-14=mild to moderate; 15-24=severe; >25=very severe) Administration: Approximately 5-10 minutes to complete by an administrator.	Can be completed by non-neurologists. Shortened versions are available. The suitability of the item assessing limb ataxia has been questioned, and several items cannot be assessed in patients with severe stroke. Specialized Training: Required.	Free www.strokecenter.org/wp-content/uploads/2011/08/NIH_Stroke_Scale.pdf
Orpington Prognostic Scale (OPS) Kalra & Crome 1993	The OPS is an assessment tool for stroke severity and has been found to be beneficial in identifying a patient's suitability for rehabilitation.	4 items which include an assessment of motor functioning in the arm, proprioception, balance and cognition. Score Interpretation: Maximum score is 6.8; higher scores indicate a greater level of severity. (<3.2=mild to moderate; 3.2 - 5.2 = moderate to moderately severe; >5.2 = severe or major). Administration: Approximately 5 minutes or less to complete by an administrator.	Quick and simple tool that does not require additional equipment for administration. Should not be used until the patient's medical condition has stabilized. Specialized Training: Not Required.	Free www.uwhealth.org/files/uwhealth/docs/pdf/spep_orpington_scale.pdf

c. Tools to Assess Motor Function

Assessment Tool	Purpose	Items and Administration	Additional Considerations	Availability
Chedoke-McMaster Stroke Assessment Scale (CMSA) Gowland et al. 1993	The CMSA is a screening and assessment tool for physical impairment and disability.	The CMSA consists of two inventories. The physical impairment inventory assesses 6 domains (should pain, postural control and arm, hand, leg, and foot movement), whereas the disability inventory assesses gross motor and walking function. Score Interpretation: The impairment and disability inventories yield total scores out of 42 and 100, respectively, with lower scores indicating greater impairment. Administration: Observation; up to 60 minutes to complete.	The CMSA is relatively comprehensive and has been well studied for reliability and validity (Poole and Whitney 2001). Taking approximately 1 hour to complete, the length and complexity of the CMSA may decrease the scales utility in clinical practice (Poole and Whitney 2001). Specialized Training: Required reading.	Free http://www.rehabmeasures.org/PDF%20Library/CMSA%20Manual%20and%20Score%20Form.pdf
Fugl-Meyer Assessment of Motor Recovery after Stroke (FMA) Fugl-Meyer et al. 1975	The FMA is an assessment tool for motor functioning following a stroke.	155 items assessing motor function in the upper and lower extremity, balance, sensation, range of motion and pain. Score Interpretation: Maximum score is 226 (66 for upper extremity, 34 for lower extremity, 14 for balance, 24 for sensation, 44 for range of motion and 44 for pain); higher scores indicate greater functional performance. Administration: Approximately 30 minutes or more to complete by direct observation.	Widely used and validated. Shortened versions are available and the motor scale of the tool can be administered on its own. Requires additional equipment (e.g. tennis ball) and should be administered by a trained therapist (Occupational Therapist or Physiotherapist). Specialized Training: Required.	Free http://www.rehabmeasures.org/lists/rehabmeasures/disform.aspx?ID=908
Rivermead Motor Assessment (RMA) Lincoln & Leaditter 1979	The RMA is an assessment tool for motor performance.	38-items of increasing difficulty representing 3 domains: gross function, leg and trunk movement, and arm movement. Score Interpretation: Scores range from 0-38, with higher scores indicating better motor ability. Administration: Observation; up to 45 minutes to complete.	Although the RMA can be time consuming, administration is faster with high functioning individuals because of the progressing difficulty of the measure. Some concern has been reported regarding the validity of the RMA (Adams et al. 1997; Kurtais et al. 2009). The RMA should be administered by a physiotherapist. Specialized Training: Not required.	Free www.strokingengine.ca/assess/rma/
Stroke Rehabilitation Assessment of Movement (STREAM)	The STREAM is an assessment tool for motor	30 items assessing voluntary movement of the upper and lower limbs and basic mobility. Items are answered based on a 3 or 4 point	Quick and simple tool that does not require additional equipment for administration. A shortened version is	Free http://ptjournal.apta.org/content/79/1/8.full.pdf

Assessment Tool	Purpose	Items and Administration	Additional Considerations	Availability
Daley et al. 1999	functioning following a stroke.	ordinal scale. Score Interpretation: Maximum score is 70 (20 each for upper and lower limb and 30 for basic mobility); higher scores indicate greater mobility. Administration: Approximately 15 minutes to complete by an administrator.	available. Floor and ceiling effects have been noted for the STREAM raising concerns about the ability to capture change in patients who are functioning at the higher or lower end of the scale. Specialized Training: Not required.	f+html

d. Tools to Assess Mobility

Assessment Tool	Purpose	Items and Administration	Additional Considerations	Availability
Berg Balance Scale (BBS) Berg et al. 1989	The BBS is an assessment tool for balance in older adults.	14-items in which patients are asked to maintain positions or complete movement tasks of varying levels of difficulty. All items are common to everyday life. Score Interpretation: Total scores range from 0-56, with scores of less than 45 generally accepted as being indicative of balance impairment. Administration: Observation; approx. 10 -15 minutes to complete.	The BBS requires little equipment or space to complete and has demonstrated high levels of reliability even when administered by an untrained assessor (Berg et al. 1995). Sensitivity may be reduced among severely affected patients as the BBS includes only one item relating to balance in a seated position (Mao et al. 2002). <u>Specialized Training:</u> Not required.	Free http://www.strokengine.ca/assess/bbs/
Clinical Outcome Variables (COVS) Seaby & Torrance 1989	The COVS is an assessment tool for functional mobility.	13 items assessing mobility with respect to transfers, rolling, lying to sitting, sitting balance, ambulation, wheelchair mobility and arm function. Score Interpretation: Total scores range from 13 - 91, with lower scores indicating less functional mobility. Administration: Observation; 15 - 45 minutes to complete.	Provides detail in areas of mobility not assessed by global functional assessments such as the FIM® (Barclay-Goddard 2000). Although reliability of the COVS has been demonstrated, further evaluation of validity is required (Salter et al. 2012). Administration of the COVS requires a fairly lengthy list of equipment. <u>Specialized Training:</u> Required reading.	Available for purchase http://www.irrd.ca/covs/

Assessment Tool	Purpose	Items and Administration	Additional Considerations	Availability
Functional Ambulation Categories (FAC) Holden et al. 1984	The FAC is an assessment tool for rating ambulation status.	<p>Individuals are assigned a subjective grade based on 5 broad categories of walking ability, with scores ranging from 0 (cannot walk or needs help from more than 1 person) to 5 (can walk independently anywhere).</p> <p>Administration: Observation; approx. 5 minutes to complete.</p>	<p>The FAC may be subject to ceiling effects. Further research is needed to evaluate responsiveness in higher functioning populations (Salter et al. 2012).</p> <p>Specialized Training: Not required.</p>	<p>Free</p> <p>http://www.strokengine.ca/?s=functional+ambulation+categories</p>
Mini BESTest Franchignoni et al. 2010.	The MiniBEST is an assessment tool for balance control	<p>The MiniBEST assesses balance control and dynamic balance through 14 items through the following domains: anticipatory postural adjustment, reactive postural control, sensory orientation, dynamic gait.</p> <p>Scoring: Each item is scored on a 3 level ordinal scale (0-2) for a total of 28 points. Two items have right and left assessment, where the lower score is used within the total score.</p> <p>Administration: 10 to 15 minutes to administer</p>	<p>Requires the following equipment:</p> <ul style="list-style-type: none"> • 60 cm x 60 cm block of 4" medium density Tempur foam (T41) • Incline ramp of 10-degree slope (2 x 2 foot recommended) • Standard chair without arm rests or wheels • Firm chair with arms • Box that is 9 inches (23 cm) in height (~2 stacked shoeboxes) • Stopwatch • Masking tape marked on floor at 3 meters from front of chair <p>Training: Specialized training is required: reading article/manual; training course/training DVD.</p>	<p>For free:</p> <p>http://www.bestest.us/</p>
Rivermead Mobility Index (RMI) Collen et al. 1991	The RMI is an assessment tool for functional mobility.	<p>15 items, 14 of which involve yes/no questions regarding performance of functional activities and 1 that involves unassisted standing for 10 seconds.</p> <p>Score Interpretation: Scores range from 0 - 15, with higher scores indicating better functional mobility.</p> <p>Administration: Self-report and observation; less than 5 minutes to complete.</p>	<p>Caution in the interpretation of the tests' hierarchical scaling has been advised as modifications (e.g., use of assistive devices) are not considered (Collen et al. 1991).</p> <p>Specialized Training: Not required.</p>	<p>Free</p> <p>http://www.strokengine.ca/?s=rivermead</p>
Timed "Up and Go" Test (TUG)	The TUG is a screening tool	Individuals are asked to stand from a seated position, walk 3 metres (using an aid if	The TUG addresses relatively few aspects of balance and yields a narrower	<p>Free</p> <p>http://www.strokengine.ca/</p>

Assessment Tool	Purpose	Items and Administration	Additional Considerations	Availability
Podsiadol & Richardson 1991	for basic mobility and balance.	required), turn, walk back to the chair, and reseat themselves. Score Interpretation: The total time to complete the test is recoded with shorter intervals indicating better mobility and balance. Administration: Observation; approx. 3 minutes to complete.	assessment than more comprehensive balance measures, such as the Berg Balance Scale (Whitney et al. 1998). Specialized Training: Not required.	ca/?s=timed+up+and+go
Functional Reach Test (FRT) Duncan et al. 1990	The FRT is an assessment tool for static balance assessing the maximum distance a participant can reach forward while standing in a fixed position.	The participant stands along a wall, position the arm at 90 degrees of shoulder flexion with a closed fist. Measurements are taken at the 3 rd metacarpal head in the starting position, and then again at the 3 rd metacarpal head after reaching as far as they can. Reach distance is measured in inches. This is done three times, with the final score being the average of the last two trials. The modified version of the FRT is assessed similarly, except it is used for participant who are unable to stand. Trials are done either: sitting with the unaffected side near the wall and leaning forward; sitting with the back to wall and leaning right; and sitting with back to the wall leaning left.	Requires a yardstick and duct tape. Specialized Training: Not required.	Free https://www.sralab.org/sites/default/files/2017-06/5Hgjkv-Functional%20Reach%20Test.pdf

e. Tools to Assess the Upper Extremity

Assessment Tool	Purpose	Items and Administration	Additional Considerations	Availability
Action Research Arm Test (ARAT) Lyle 1981	The ARAT is an assessment tool for upper extremity function and dexterity.	19 items assessing four areas of function: grasp, rip, pinch, and gross movement. Score Interpretation: Scores range from 0 - 57, with lower scores indicating greater impairment. Administration: Observation; approx. 10 minutes to complete.	Significant floor and ceiling effects have been identified (Van der Lee et al.2002). Specialized Training: Not required.	Free http://www.strokeengine.ca/?s=action+research+arm+test
Box & Block Test (BBT)	The BBT is an	Individuals are asked to move small blocks,	Established norms increase the	Standardized

Assessment Tool	Purpose	Items and Administration	Additional Considerations	Availability
Mathiowetz et al. 1985	assessment tool for unilateral gross manual dexterity.	one at time, from one compartment to another within 60 seconds. Score Interpretation: Scores are calculated by summing the number of blocks transported within the trial period. Administration: Observation; approx. 5 minutes to complete.	interpretability of BBT results. Seated administration may increase the accessibility of the test. Because the BBS requires adequate strength and grip to transport blocks, it may be best suited for those with mild-moderate hemiparesis/weakness (Chanubol et al. 2012). Specialized Training: Not required.	equipment available for purchase http://www.pattersonmedical.com/app.aspx?cmd=getProductDetail&key=070_921018701
Chedoke Arm and Hand Activity Inventory (CAHAI) Barreca et al. 2004	The CAHAI is an assessment tool for arm and hand function.	13 bilateral functional tasks (e.g. do up five buttons, carry a bag up stairs, pour a glass of water). Score Interpretation: Total scores range from 13 to 91, with lower scores indicating greater impairment. Administration: Observation; approx. 25 minutes to complete.	The CAHAI has demonstrated good validity and reliability in stroke populations and evaluates a wide range of functions that are not considered in other measures of arm and hand function (Barreca et al. 2005). Specialized Training: Required.	Free http://www.cahai.ca/
Nine Hole Peg Test (NHPT) Mathiowetz et al. 1985	The NHPT is an assessment tool for fine manual dexterity.	Individuals are asked to, one at a time, insert 9 pegs from a container into a board with 9 empty holes and then to move the pegs back into the container while being timed. Score Interpretation: Two-trials are performed with each hand, with the final time being an average of the two trials. Lower scores indicate better dexterity. Administration: Observation; approx. 5 minutes to complete	The NHPT has demonstrated good reliability and validity (Salter et al. 2012). Norms for age, gender, and hand dominance have been established; however, norms produced from the original study may not transfer well commercial versions of the test (Davis et al. 1999). The NHPT is susceptible to practice effects. Specialized Training: Not required.	Standardized equipment available for purchase http://www.pattersonmedical.com/app.aspx?cmd=getProduct&key=IF_921029571
Wolf Motor Function Test (WMFT) Wolf et al. 2001	The WMFT is an assessment tool for upper extremity motor ability.	17 items of increasing complexity and progressing from proximal to distal joint involvement. Tasks are performed as quickly as possible and are assessed in terms of time, strength, and movement quality. Score Interpretation: Scores range from 0 - 75 with higher scores indicating greater motor	Provides assessment of both performance time and quality of movement. Floor effects have been reported for individuals with severe impairment (Salter et al. 2012).	Free http://www.strokenine.ca/?s=wolf+motor+function+test

Assessment Tool	Purpose	Items and Administration	Additional Considerations	Availability
		ability. Administration: Observation; approx. 30 - 45 minutes to complete.	Further evidence regarding reliability and validity when used in clinical practice (i.e., real-time observation) is required. Specialized Training: Required.	

f. Tools to Assess Mood and Cognition

Assessment Tool	Purpose	Items and Administration	Additional Considerations	Availability
Beck Depression Inventory (BDI) Beck et al. 1961	The BDI is a screening tool for depression and, if present, provides cut points for severity.	21 items relating to symptoms that have been found to be associated with the presence of depression. Items are presented in a multiple choice format ranging from 0 (no symptoms) to 3 (severe symptoms). Score Interpretation: Maximum score is 63; higher scores indicate greater severity. Graded levels of severity; a score of 10 is considered the cut point for depression. Administration: 5 - 10 minutes for self- report; 15 minutes with support.	Quick screening tool that does not require extra tools for completion. Level of depression may be overestimated in women and when completed by a proxy. Rate of misdiagnosis was up to 34% in patients with stroke (Aben et al. 2002). Specialized Training: Not required.	Free http://www.strokengine.ca/?s=beck+depression+inventory
Patient Health Questionnaire-9 (PHQ-9) Kroenke et al. 2001	The PHQ-9 is the 9-item depression module from the full PHQ. It is a screening tool for depression and provides an assessment of symptom severity as well.	9 items relating to the 9 criteria used by the DSM-V for the diagnosis of depressive disorders. Items ask about behaviour in the past two weeks, and each item is scored from: 0 ("Not at all"), 1 ("Several days"), 2 ("More than half the days"), 3 ("Nearly everyday"). Consists of a total score from 0 to 27. Item 9 measures suicidal ideation. Major depression is diagnosed if a score greater than 10 is attained. Other depression is diagnosed if a score between 4 to 8 is attained. Administration: Is a 3-page questionnaire that can be self-administered by the patient.	Quick screening tool. Clinicians before making a final diagnosis should rule out physical causes of depression, normal bereavement, and history of a manic episode. Specialized Training: Not required.	Free https://www.phqscreeners.com/
Geriatric Depression Scale (GDS)	The GDS is a screening tool for depression	30 items relating to symptoms that have been found to be associated with the presence of depression. Items are presented in a yes/no	Developed for use in the geriatric population. Short forms of the GDS are available.	Free http://www.strokengine.ca/?s=geriatric+depre

Assessment Tool	Purpose	Items and Administration	Additional Considerations	Availability
Yesavage et al. 1982	and, if present, provides cut points for severity.	<p>response format.</p> <p>Score Interpretation: Maximum score is 30 and indicates the highest level of depression. Graded levels of severity; a score of 10 is considered the cut point for depression.</p> <p>Administration: 5 - 10 minutes for self- report.</p>	<p>The tool has been cited as being more accurate for diagnosing women compared to men, and there are concerns with its use for cognitively impaired individuals.</p> <p>Specialized Training: Not required.</p>	ssion+scale
Hospital Anxiety and Depression Scale (HADS) Zigmond & Snaith, 1983	The HADS is a screening tool for anxiety and depression and, if present, provides cut points for severity.	<p>14 items (7 anxiety items and 7 depression items). Items are presented in a multiple choice format ranging from 0 to 3.</p> <p>Score Interpretation: Maximum score is 21 for both anxiety and depression; higher scores indicate greater severity. (0-7=normal; 8-10=borderline abnormal; 11-21=abnormal)</p> <p>Administration: 2-6 minutes for self- report.</p>	<p>Simple screening tool that does not require extra tools for completion.</p> <p>Does not contain questions related to the presence of somatic symptoms.</p> <p>Specialized Training: Not required.</p>	<p>Available for purchase.</p> <p>http://www.gi-assessment.co.uk/products/hospital-anxiety-and-depression-scale-0</p>
General Health Questionnaire (GHQ) Goldberg & Hillier, 1979	The GHQ is a screening tool for psychiatric disorders.	<p>28 items each addressing a particular symptom related to 4 domains of distress (depression, anxiety, worrying, and social distress). Items are in the form questions with yes/no responses.</p> <p>Score Interpretation: Multiple scoring methods exist. Conventional method is to score based on presence or absence of a symptom.</p> <p>Administration: Approximately 5 minutes to complete by self-report.</p>	<p>Quick and simple tool that does not require additional materials for completion.</p> <p>Cut-off scores have not been properly validated for diagnosis of psychiatric disorders.</p> <p>Specialized Training: Required reading.</p>	<p>Available for purchase.</p> <p>https://shop.psych.acer.edu.au/acer-shop/group/SD</p>
Mini-Mental State Examination (MMSE) Folstein et al. 1975	The MMSE is a screening tool for cognitive impairment.	<p>11 items relating to 6 cognitive domains (orientation – in time and space, registration, attention and calculation, recall, language and read and obey). Items are in the form of questions or tasks.</p> <p>Score Interpretation: Maximum score is 30; higher scores indicate greater cognitive functioning.</p> <p>Administration: Approximately 10 minutes to</p>	<p>Relatively quick and simple tool that requires no additional equipment.</p> <p>Has been reported to have a low sensitivity, noted especially for those individuals with mild cognitive impairment as well and patients with stroke.</p> <p>Specialized Training: Not required.</p>	<p>Available for purchase.</p> <p>http://www4.parinc.com/Products/Product.aspx?ProductID=MMSE</p>

Assessment Tool	Purpose	Items and Administration	Additional Considerations	Availability
Montreal Cognitive Assessment (MoCA) Nasreddine et al. 2005	The MoCA is a screening tool for cognitive impairment.	administer. 11 items relating to 8 cognitive domains (visuospatial, executive, naming, memory, language, abstraction, delayed recall and orientation). Items are in the form of questions or tasks. Score Interpretation: Maximum score is 30; higher scores indicate greater cognitive functioning. Total score ≥ 26 is considered normal. Administration: Approximately 10 minutes to administer.	Relatively quick tool and is suitable for patients with mild cognitive impairment. Requires extra equipment (stopwatch and score sheet) and some training. Specialized Training: Required reading.	Free http://www.mocatest.org/
Clock Drawing Test (CDT) Sunderland et al. 1989	The CDT is a screening tool for cognitive impairment.	Involves a command to draw a clock or to copy a clock. Score Interpretation: No universal system for scoring exists. Individual scoring systems are based on the number of deviations from what is expected from the drawing. Administration: Approximately 1-2 minutes to complete by the patient.	Quick and simple tool that does not require additional equipment for administration. Often used as a supplement to other cognitive assessment tools. The CDT is one component of the MoCA. Specialized Training: Not required.	Free http://www.strokengine.ca/?s=clock+drawing

g. Tools to Assess Visual Perception and Neglect

Assessment Tool	Purpose	Items and Administration	Additional Considerations	Availability
Behavioral Inattention Test (BIT) Wilson et al. 1987	The BIT is a screening and assessment tool for visual neglect.	Comprised of two sections: the BIT Conventional subtest (BITC) (6 tests) and the BIT Behavioral subtest (BITB) (9 tests). The BITC consists of tests such as Line Crossing, Letter Cancellation etc. and the BITB consists of tests such as Picture Scanning and Telephone Dialing. Score Interpretation: Maximum score and cut point for diagnosis of visual neglect are: (cut point/maximum score)	A shortened version of the BIT is available consisting of 3 tests from the BITC and 5 tests from the BITB. Lengthy test that requires additional equipment (e.g. photographs, clock, coins, cards etc.). Specialized Training: Not required.	Available for purchase. http://www.pearsonassess.ca/en/programs/00/51/95/p005195.html?CS_Category=%26CS_Catalog=TPC-CACatalog%26CS_ProductID=749129972

Assessment Tool	Purpose	Items and Administration	Additional Considerations	Availability
		<ol style="list-style-type: none"> 1. BITC: 129/146 2. BITB: 67/81 3. BIT: 196/227 <p>Administration: Approximately 40 minutes to administer.</p>		
Line Bisection Test (LBT) Schenkenberg et al. 1980	<p>The LBT is a screening tool for unilateral spatial neglect.</p>	<p>Consists of a series of 18 lines for which patients are asked to mark the midpoint on each line. It is part of the BIT but can also be used as a stand-alone tool.</p> <p>Score Interpretation: Scoring is completed by measuring the distance between the true midpoint of the line and the mark made by the patient. No cut point for the diagnosis of unilateral spatial neglect has been established for this test.</p> <p>Administration: Approximately 5 minutes to complete by the patient.</p>	<p>Does not require extra tools for completion.</p> <p>The test is unable to differentiate between visual neglect and visual field deficits.</p> <p>Specialized Training: Not required.</p>	<p>Available for purchase.</p> <p>http://www.pearsonassess.ca/en/programs/00/51/95/p005195.html?CS_Category=%26CS_Catalog=TPC-CACatalog%26CS_ProductID=749129972</p>
Motor-free Visual Perception Test (MVPT) Colarusso & Hammill 1972	<p>The MVPT is an assessment tool for visual perception.</p>	<p>36 items assessing 5 domains of visual perception (spatial relations, discrimination – visual and figure-ground, visual closure and visual memory). Items are in the form of multiple choice questions with 4 possible answers.</p> <p>Score Interpretation: Maximum score is 36; higher scores indicate greater visual perception.</p>	<p>Quick and simple tool and widely used.</p> <p>Administration requires extra equipment (test plates).</p> <p>Specialized Training: Required.</p>	<p>Available for purchase.</p> <p>http://www.academichtherapy.com/detailATP.tpl?action=search&cart=14301685755462655&eqskudatarq=8962-9&eqTitledatarq=Motor-Free%20Visual%20Perception%20Test-4%20%28MVPT-4%29&eqvendordatarq=ATP&bobby=%5Bboby%5D&bob=%5Bbob%5D&TBL=[tbl]</p>

h. Tools to Assess Spasticity

Assessment Tool	Purpose	Items and Administration	Additional Considerations	Availability
<p>Modified Ashworth Scale (MAS)</p> <p>Bohannon & Smith 1987</p>	<p>The MAS is an assessment tool for spasticity.</p>	<p>Number of items is dependent on the number of joints that are being assessed. Joint assessment involves the movement of a joint from either maximal extension or flexion to the opposite position over a one second count.</p> <p>Score Interpretation: A score is reported for each joint assessed. Scores can range from 0-4 (0, 1, 1+, 2, 3, and 4); higher scores indicate greater rigidity or tone.</p> <p>Administration: Variable depending on the number of joints being assessed; a single joint is assessed over a one second count.</p>	<p>Quick assessment with no extra equipment required.</p> <p>The joint movement may cause some patient discomfort.</p> <p>Specialized Training: Required.</p>	<p>Free</p> <p>http://www.strokengine.ca/?s=modified+ashworth</p>
<p>Disability Assessment Scale (DAS)</p> <p>Brashear et al. 2002</p>	<p>The DAS is an assessment tool for upper limb spasticity.</p>	<p>The items of the DAS assess spasticity in four functional domains: hand hygiene, dressing, limb position and pain.</p> <p>Items are scored from: 0 (no disability), 1 (mild disability), 2 (moderate disability), and 3 (severe disability).</p> <p>Administration: A face to face interview with the client.</p>	<p>Measure is specific to clients with spasticity. DAS has been shown to have comparable intra- and interrater reliability to the MAS (Brashear et al., 2002).</p> <p>Specialized Training: Not required.</p>	<p>Information about the scale can be seen in the following publication by Brashear et al. 2002.</p> <p>https://www.ncbi.nlm.nih.gov/pubmed/12370866</p>
<p>Modified Tardieu Scale (MTS)</p> <p>Tardieu et al. 1957</p>	<p>The MTS is an assessment scale for spasticity in various neurological conditions.</p>	<p>The MTS assesses spasticity by quantifying a spastic muscle's response to stretch applied at given velocities.</p> <p>The velocities of joint movement are as slow as possible (V1), speed of the limb falling from gravity (V2), and when the joint is moved as fast as possible (V3). The quality and angle of muscle reactions are recorded during these velocities.</p> <p>The quality of muscle reactions are scored as: 0 (no resistance throughout the duration of the stretch), 1 (slight resistance), 2 (clear catch occurring at a precise angle, followed by a release), 3 (fatigable clonus), 4 (infatigable clonus), 5 (joint is immovable).</p>	<p>The MTS has been believed to be an appropriate alternative to the MAS, as it compares the muscle reaction to passive stretch at both slow and fast velocities (Li et al., 2014). But the MAS is more commonly used.</p> <p>Specialized Training: An experienced therapist with repositioning spastic muscles.</p>	<p>Information about the scale can be seen in the following publication by Ansari et al., 2008.</p> <p>https://www.ncbi.nlm.nih.gov/pubmed/19117179</p>

Assessment Tool	Purpose	Items and Administration	Additional Considerations	Availability
		Administration: Performed and assessed by a trained therapist.		

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