FALLS PREVENTION & RISK ASSESSMENTS

Created With Support From:
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Continuing Care Division of Catholic Health System's Senior Services
D'Youville College, Occupational Therapy Department
Geriatric Center of WNY
Learning Partners
UB Department of Rehabilitation Science

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THE ACTIVITIES-SPECIFIC BALANCE CONFIDENCE (ABC) SCALE*

Administration:
The ABC can be self-administered or administered via personal or telephone interview. Larger typeset should be used for self-administration, while an enlarged version of the rating scale on an index card will facilitate in-person interviews. Regardless of method of administration, each respondent should be queried concerning their understanding of instructions, and probed regarding difficulty answering specific items.

Instructions to Participants:
For each of the following, please indicate your level of confidence in doing the activity without losing your balance or becoming unsteady by choosing one of the percentage points on the scale from 0% to 100%. If you do not currently do the activity in question, try and imagine how confident you would be if you had to do the activity. If you normally use a walking aid to do the activity or hold onto someone, rate your confidence as if you were using these supports. If you have any questions about answering any of these items, please ask the administrator.

Instructions for Scoring:
The ABC is an 11-point scale and ratings should consist of whole numbers (0-100) for each item. **Total the ratings (possible range = 0 – 1600) and divide by 16 to get each subject's ABC score.** If a subject qualifies his/her response to items #2, #9, #11, #14 or #15 (different ratings for "up" vs. "down" or "onto" vs. "off"), solicit separate ratings and use the lowest confidence of the two (as this will limit the entire activity, for instance the likelihood of using the stairs.)

- 80% = high level of physical functioning
- 50-80% = moderate level of physical functioning
- < 50% = low level of physical functioning

Myers AM (1998)

- < 67% = older adults at risk for falling; predictive of future fall

LaJoie Y (2004)

References

1. Powell, LE & Myers AM. The Activities-specific Balance Confidence (ABC) Scale. *J Gerontol Med Sci* 1995; 50(1): M28-34
2. Myers AM, Fletcher PC, Myers AN, Sherk W. Discriminative and evaluative properties of the ABC Scale. J Gerontol A Biol Sci Med Sci. 1998;53:M287-M294.
3. Lajoie Y, Gallagher SP. Predicting falls within the elderly community: comparison of postural sway, reaction time, the Berg balance scale and ABC scale for comparing fallers and non-fallers. Arch Gerontol Geriatr. 2004;38:11-26.

NAME _____DATE_____

ACTIVITIES-SPECIFIC BALANCE CONFIDENCE (ABC) SCALE

For each of the following, please indicate your level of confidence in doing the activity without losing your balance or becoming unsteady by choosing one of the percentage points on the scale from 0% to 100%. If you do not currently do the activity in question, try and imagine how confident you would be if you had to do the activity. If you normally use a walking aid to do the activity or you hold on to someone, rate your confidence as if you were using these supports. If you have any questions about answering any of these items, please ask the therapist.

For each of the following activities, please indicate your level of self-confidence by choosing a corresponding number from the following scale:

0%	10	20	30	40	50	60	70	80	90	100%
No confidence										completely confident

How confident are you that you will not lose your balance or become unsteady when you . . .

1. .... walk around the house? _____ %
2. .... walk up or down stairs? _____ %
3. .... bend over and pick up a slipper from the front of a closet? _____ %
4. .... reach for a small can off a shelf at eye level? _____ %
5. .... stand on tip toes and reach for something above your head? _____ %
6. .... stand on a chair and reach for something? _____ %
7. .... sweep the floor? _____ %
8. .... walk outside the house to a car parked in the driveway? _____ %
9. .... get into or out of a car? _____ %
10. .... walk across a parking lot to a mall? _____ %
11. .... walk up or down a ramp? _____ %
12. .... walk in a crowded mall where people rapidly walk past you? _____ %
13. .... are bumped into by people as you walk through the mall? _____ %
14. .... step onto or off of an escalator while you are holding onto a railing? _____ %
15. .... step onto or off of an escalator while holding onto parcels such that you cannot hold onto the railing? _____ %
16. .... walk outside on icy sidewalks? _____ %

BERG BALANCE SCALE (BBS)*

Name _____ **Date** _____

Location _____ **Rater** _____

ITEM	DESCRIPTION	SCORE (0-4)
1.	Sitting to standing	_____
2.	Standing unsupported	_____
3.	Sitting unsupported	_____
4.	Standing to sitting	_____
5.	Transfers	_____
6.	Standing with eyes closed	_____
7.	Standing with feet together	_____
8.	Reaching forward with outstretched arm	_____
9.	Retrieving object from floor	_____
10.	Turning to look behind	_____
11.	Turning 360 degrees	_____
12.	Placing alternate foot on stool	_____
13.	Standing with one foot in front	_____
14.	Standing on one foot	_____
	TOTAL	_____

GENERAL INSTRUCTIONS

Please demonstrate each task and/or give instructions as written. When scoring, please record the lowest response category that applies for each item.

In most items, the subject is asked to maintain a given position for specific time. Progressively more points are deducted if the time or distance requirements are not met, if the subject's performance warrants supervision, or if the subject touches an external support or receives assistance from the examiner. Subjects should understand that they must maintain their balance while attempting the tasks. The choices of which leg to stand on or how far to reach are left to the subject. Poor judgment will adversely influence the performance and the scoring.

Equipment required for testing are a stopwatch or watch with a second hand, and a ruler or other indicator of 2, 5 and 10 inches (5, 12.5 and 25 cm). Chairs used during testing should be of reasonable height. Either a step or a stool (of average step height) may be used for item #12.

*references at end

1. **SITTING TO STANDING**
INSTRUCTIONS: Please stand up. Try not to use your hands for support.

( ) 4 able to stand without using hands and stabilize independently
( ) 3 able to stand independently using hands
( ) 2 able to stand using hands after several tries
( ) 1 needs minimal aid to stand or to stabilize
( ) 0 needs moderate or maximal assist to stand

2. **STANDING UNSUPPORTED**
INSTRUCTIONS: Please stand for two minutes without holding onto any support.

( ) 4 able to stand safely 2 minutes
( ) 3 able to stand 2 minutes with supervision
( ) 2 able to stand 30 seconds unsupported
( ) 1 needs several tries to stand 30 seconds unsupported
( ) 0 unable to stand 30 seconds unassisted

If a subject is able to stand 2 minutes unsupported, score full points for sitting unsupported. Proceed to item #4.

3. **SITTING WITH BACK UNSUPPORTED BUT FEET SUPPORTED ON FLOOR OR ON A STOOL**
INSTRUCTIONS: Please sit with arms folded for 2 minutes.

( ) 4 able to sit safely and securely 2 minutes
( ) 3 able to sit 2 minutes under supervision
( ) 2 able to sit 30 seconds
( ) 1 able to sit 10 seconds
( ) 0 unable to sit without support 10 seconds

4. **STANDING TO SITTING**
INSTRUCTIONS: Please sit down.

( ) 4 sits safely with minimal use of hands
( ) 3 controls descent by using hands
( ) 2 uses back of legs against chair to control descent
( ) 1 sits independently but has uncontrolled descent
( ) 0 needs assistance to sit

5. **TRANSFERS**
INSTRUCTIONS: Arrange chairs(s) for a pivot transfer. Ask subject to transfer one way toward a seat with armrests and one way toward a seat without armrests. You may use two chairs (one with and one without armrests) or a bed and a chair.

( ) 4 able to transfer safely with minor use of hands
( ) 3 able to transfer safely definite need of hands
( ) 2 able to transfer with verbal cueing and/or supervision
( ) 1 needs one person to assist
( ) 0 needs two people to assist or supervise to be safe

6. **STANDING UNSUPPORTED WITH EYES CLOSED**
INSTRUCTIONS: Please close your eyes and stand still for 10 seconds.

( ) 4 able to stand 10 seconds safely
( ) 3 able to stand 10 seconds with supervision
( ) 2 able to stand 3 seconds
( ) 1 unable to keep eyes closed 3 seconds but stays steady
( ) 0 needs help to keep from falling

7. **STANDING UNSUPPORTED WITH FEET TOGETHER**
INSTRUCTIONS: Place your feet together and stand without holding.

( ) 4 able to place feet together independently and stand 1 minute safely
( ) 3 able to place feet together independently and stand for 1 minute with supervision
( ) 2 able to place feet together independently and to hold for 30 seconds
( ) 1 needs help to attain position but able to stand 15 seconds feet together
( ) 0 needs help to attain position and unable to hold for 15 seconds

8. **REACHING FORWARD WITH OUTSTRETCHED ARM WHILE STANDING**
INSTRUCTIONS: Lift arm to 90 degrees. Stretch out your fingers and reach forward as far as you can. (Examiner places a ruler at end of fingertips when arm is at 90 degrees. Fingers should not touch the ruler while reaching forward. The recorded measure is the distance forward that the fingers reach while the subject is in the most forward lean position. When possible, ask subject to use both arms when reaching to avoid rotation of the trunk.)

( ) 4 can reach forward confidently >25 cm (10 inches)
( ) 3 can reach forward >12.5 cm safely (5 inches)
( ) 2 can reach forward >5 cm safely (2 inches)
( ) 1 reaches forward but needs supervision
( ) 0 loses balance while trying/ requires external support

9. **PICK UP OBJECT FROM THE FLOOR FROM A STANDING POSITION**
INSTRUCTIONS: Pick up the shoe/slipper which is placed in front of your feet.

( ) 4 able to pick up slipper safely and easily
( ) 3 able to pick up slipper but needs supervision
( ) 2 unable to pick up but reaches 2-5cm (1-2 inches) from slipper and keeps balance independently
( ) 1 unable to pick up and needs supervision while trying
( ) 0 unable to try/needs assist to keep from losing balance or falling

10. **TURNING TO LOOK BEHIND OVER LEFT AND RIGHT SHOULDERS WHILE STANDING**
INSTRUCTIONS: Turn to look **directly** behind you over toward left shoulder. Repeat to the right. Examiner may pick an object to look at directly behind the subject to encourage a better twist turn.

( ) 4 looks behind from both sides and weight shifts well
( ) 3 looks behind one side only other side shows less weight shift
( ) 2 turns sideways only but maintains balance
( ) 1 needs supervision when turning
( ) 0 needs assist to keep from losing balance or falling

11. **TURN 360 DEGREES**

INSTRUCTIONS: Turn completely around in a full circle. Pause. Then turn a full circle in the other direction.

( ) 4 able to turn 360 degrees safely in 4 seconds or less
( ) 3 able to turn 360 degrees safely one side only in 4 seconds or less
( ) 2 able to turn 360 degrees safely but slowly
( ) 1 needs close supervision or verbal cueing
( ) 0 needs assistance while turning

12. **PLACING ALTERNATE FOOT ON STEP OR STOOL WHILE STANDING UNSUPPORTED**

INSTRUCTIONS: Place each foot alternately on the step/stool. Continue until each foot has touched the step/stool four times.

( ) 4 able to stand independently and safely and complete 8 steps in 20 seconds
( ) 3 able to stand independently and complete 8 steps >20 seconds
( ) 2 able to complete 4 steps without aid with supervision
( ) 1 able to complete >2 steps needs minimal assist
( ) 0 needs assistance to keep from falling/unable to try

13. **STANDING UNSUPPORTED ONE FOOT IN FRONT**

INSTRUCTIONS: (DEMONSTRATE TO SUBJECT)
Place one foot directly in front of the other. If you feel that you cannot place your foot directly in front, try to step far enough ahead that the heel of your forward foot is ahead of the toes of the other foot. (To score 3 points, the length of the step should exceed the length of the other foot and the width of the stance should approximate the subject's normal stride width)

( ) 4 able to place foot tandem independently and hold 30 seconds
( ) 3 able to place foot ahead of other independently and hold 30 seconds
( ) 2 able to take small step independently and hold 30 seconds
( ) 1 needs help to step but can hold 15 seconds
( ) 0 loses balance while stepping or standing

14. **STANDING ON ONE LEG**

INSTRUCTIONS: Stand on one leg as long as you can without holding onto any support.

( ) 4 able to lift leg independently and hold >10 seconds
( ) 3 able to lift leg independently and hold 5-10 seconds
( ) 2 able to lift leg independently and hold = or >3 seconds
( ) 1 tries to lift leg unable to hold 3 seconds but remains standing independently
( ) 0 unable to try or needs assist to prevent fall

( ) TOTAL SCORE (Maximum = 56)

***References**

1. Wood-Dauphinee S, Berg K, Bravo G, Williams JI: The Balance Scale: Responding to clinically meaningful changes. Canadian Journal of Rehabilitation 10: 35-50,1997
2. Berg K, Wood-Dauphinee S, Williams JI: The Balance Scale: Reliability assessment for elderly residents and patients with an acute stroke. Scand J Rehab Med 27:27-36, 1995
3. Berg K, Maki B, Williams JI, Holliday P, Wood-Dauphinee S: A comparison of clinical and laboratory measures of postural balance in an elderly population. Arch Phys Med Rehabil 73: 1073-1083, 1992
4. Berg K, Wood-Dauphinee S, Williams JI, Maki, B: Measuring balance in the elderly: validation of an instrument. Can. J. Pub. Health July/August supplement 2:S7-11, 1992
5. Berg K, Wood-Dauphinee S, Williams JI, Gayton D: Measuring balance in the elderly: preliminary development of an instrument. Physiotherapy Canada 41:304-311, 1989

FIVE TIME SIT TO STAND (FTSTS)

Have your patient sit in a standard height chair (43-47cm) with back against chair, arms crossed on chest for entire test, feet comfortable per patient.

Instructions

- "Stand up and sit down 5 times as quickly and safely as you can, when I say 'GO'".
- Inform your patient to stand up completely between repetitions.
- Timing begins at 'GO' and ends when the patient completes the 5th trial in standing.

Equipment

- Standard height chair
- Stop watch or watch with a second hand

Norms

- 60-69 year olds 11.4 seconds
- 70-79 year olds 12.6 seconds
- 80-89 year olds 14.8 seconds

Reference

1. Whitney, S. L., Wrisley, D. M., Marchetti, G. F., Gee, M. A., Redfern, M. S. Furman, J. M., Clinical measurement of sit-to-stand performance in people with balance disorders: Validity of data for the five-time –sit-to-stand test. Physical Therapy 85(10), 1034 – 1045, 2005

MODIFIED MULTI-DIRECTIONAL UPPER EXTREMITY REACH TEST BRG-SG#

Physical and Occupational therapists are often looking for quick, reliable, portable, inexpensive, and clinically relevant ways to evaluate and document the quality characteristics and magnitude of functional movement. It has been argued that measuring limits of stability during a dynamic balance task (such as reaching from a standing position) may assist a therapist in assessing balance skill and falls risk[1,2]. Additional research has conveyed the added value of assessing multi-directional upper extremity reach ability[3,4,5]. Others have cautioned against the use of reach measurements in independently determining risk of falling and frailty in older persons [6,7,8,9].

Perhaps the best use of this type of assessment tool is to employ it as part of a multi-faceted examination process, correlating its results to skilled observation of the movement, knowledge of pathomechanics, and knowledge of function in other body systems. Then, clinical judgments may be made to prioritize what tissue-level or functional component-level insufficiencies may exist that consequently limit an individual's balance control while reaching. Knowing what may be causing abnormal or inefficient motion may directly lead to formulation of intervention plans and/or referral for services that would be most efficacious in modifying such deficits.

In our modified test procedures:

- a standard reach target was measured at 40-inches from floor. It was felt that this height lessens the potential impact of impaired UE motion, and encourages multiple joints and motion segments to become involved in task completion.
- excursion distances were measured to outstretched fingertips, estimated to within ½ inch.
- safety was considered with standard clinical guarding techniques utilized at all times.
- learning and fear-avoidance effects were minimized by offering participants a practice trial followed by recording the average of two test trials. Demonstration was also offered for learning as needed.
- results of Right vs. Left direction of movement were recorded in each test condition to lend insight into mechanical deficits that could elude detection by qualitative observation alone.
- Four testing positions were utilized to encourage movement and drive of the center of mass through the three cardinal planes (as well as backward weight shifting).
    - Bilateral Stance with 2-handed Anterior Reach
    - Bilateral Stance with 1-handed Lateral Reach
    - Bilateral Stance with 2-handed Crossbody Rotational Reach
    - Bilateral Stance with 1-handed Posterior Rotational Reach

References for Reach Testing: **(1)** Duncan PW ; Weiner DK ; Chandler J ; Studenski S Functional reach: a new clinical measure of balance. *J Gerontol* 1990 Nov; 45(6): M192-7 ; **(2)** Duncan PW ; Studenski S ; Chandler J ; Prescott B. Functional reach: predictive validity in a sample of elderly male veterans. *J Gerontol.* 1992 May;47(3):M93-8. ; **(3)** Brauer S ; Burns Y ; Galley P Lateral reach: a clinical measure of medio-lateral postural stability. *Physiotherapy Res Int* 1999; 4(2): 81-8 ; **(4)** DeWaard BP ; Bentrup BR ; Hollman JH ; Brasseur JE Relationship of the functional reach and lateral reach tests in elderly females. *J Geriatr Phys Ther* 2002; 25(3): 4-9 ; **(5)** Newton RA Validity of the multi-directional reach test: a practical measure for limits of stability in older adults. *J Gerontol A Biol Sci Med Sci* 2001 Apr; 56(4): 248-52 ; **(6)** Behrman AL ; Light KE ; Flynn SM ; Thigpen MT Is the functional reach test useful for identifying falls risk among individuals with Parkinson's disease? *Arch Phys Med Rehabil* 2002 Apr; 83(4): 538-42 ; **(7)** Rockwood K ; Awalt E ; Carver D ; MacKnight C Feasibility and measurement properties of the functional reach and the timed up and go tests in the Canadian study of health and aging. *J Gerontol A Biol Sci Med Sci* 2000 Feb; 55(2): M70-3 ; **(8)** Jonsson E ; Henriksson M ; Hirschfeld H , Stockholm, Sweden. Does the functional reach test reflect stability limits in elderly people? *J Rehabil Med* 2003 Jan; 35(1): 26-30 ; **(9)** Wernick-Robinson M ; Krebs DE ; Giorgetti MM Functional reach: does it really measure dynamic balance? *Arch Phys Med Rehabil* 1999 Mar; 80(3): 262-269

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SINGLE LEG STANCE (EYES OPEN)

Equipment

- Stop watch

Start position

- Subject stands erect on firm surface with arms folded across chest and the head facing straight ahead; ideally shoe is off

Test

- Once standing in the start position, keeping eyes open, the subject is asked to raise one leg based on preference of subject and keep the leg raised as long as possible without touching the other leg, without uncrossing arms, or using any support for balance.

Time

- Timer starts once foot is lifted off floor; Timer is stopped when the subject's raised foot either touches the floor, makes contact with other leg or moves his/her stance foot to create a new base of support, or if the arms move out of the test position.

Age appropriate norms for SLS are as follows:

60-69 y/o (mean= 27.0 sec; limits of 95%)
70-79 y/o (mean= 17.2 sec; limits of 95%)
80-99 y/o (mean= 8.5 sec; limits of 95%)

Reference

1. Bohannon RW *Top Geriatric Rehabilitation*, 2006 Jan-Mar; 22(1): 70-7 (31 ref)

TIMED UP AND GO (TUG)

Tips

- The patient starts in a standard chair with arms, wearing his/her customary walking shoes, and using his/her usual walking aid.
- No physical assistance is given.
- The patient starts with his/her back against the chair, his/her arms resting on the arm rests, and his/her walking aid at hand.

Instructions

- Patient is instructed that, on the word "GO" he/she is to get up walk at a comfortable and safe pace to a line on the floor 3 meters away, turn, return to the chair, and sit down again.
- Timing starts with the word "GO" and ends when the subject sits down.

Equipment:

- Standard chair with arms
- Stop watch or watch with second hand
- 3 meters walking space
- Tape mark at the 3 meter mark

Age Adjusted Norms

Mean (95% confidence intervals) for 3 age groups are:

- 60-69 y/o (mean= 8.1 (7.1-9.0) seconds)
- 70-79 y/o (mean= 9.2 (8.2-10.2) seconds)
- 80-99 y/o (mean= 11.3 (10.0-12.7 seconds)

"Patients whose performance exceeds the upper limit of reported confidence intervals can be considered to have worse than average performance."

This is what would determine relative risk level:

"Yes" if outside of high end of 95% CI

"No" if within or under 95% CI

Reference

1. *Bohannon, Richard W, Journal of Geriatric Physical Therapy, 2006*

VESTIBULAR SCREENING/SUPPLEMENTAL NEUROLOGICAL BRG-SG#

In a comprehensive multi-system screening process for falls risk, several markers of possible cardiovascular, neurological, sensory, and/or vestibular involvement may be encountered. These indicators may be in either the participant self-assessment or in clinician-directed physical performance screening procedures. The examining clinician may be given the option to utilize some or all of these supplemental screens at their discretion following completion of the basic home safety, medical review, and gross motor examinations.

Examples of yellow flags in a falls risk assessment that would lead to 'additional screening' being recommended include:

- lightheadedness/ dizziness/ nausea reported
- intolerance to changes in body and/or head position
- disequilibrium in gait/ ataxic gait/ shuffling gait
- recent visual changes/ visual changes with head movement
- recent hearing changes
- history of loss of consciousness
- migraine-type headache linked to dizziness or visual change

Additional screens to choose from may include:

- "finger to nose" test for Dysmetria (=cerebellar dysfunction)
- oculomotor test for cranial nerve function (observing for smoothness of pursuit of tracking through visual field)
- peripheral field of vision testing
- mechanical screening of cervical spine and temporomandibular joint (TMJ)
- seated vestibulo-ocular reflex (VOR) screen *(horizontal and vertical head drive)*
- post-stimulus observation of nystagmus (i.e. : head shake/ spinning in chair)
- positional testing for benign paroxysmal positional vertigo (BPPV)

NOTE: *Screening procedures described are meant solely to indicate possible involvement and dysfunction of a particular body system, but are not designed or intended to adequately formulate a diagnosis or intervention strategy. Such clinical decision-making should be undertaken by the clinical specialist best suited to diagnose and treat the given set of symptoms or conditions.*

NOTE: *See schematic on next page for a recommended triage strategy based on falls prevention 'additional screen' findings*

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VESTIBULAR SCREENING/SUPPLEMENTAL NEUROLOGICAL BRG-SG#

(+) dizziness/ lightheadedness with headache

(+) loss of consciousness or frequent dizziness/ lightheadedness

PCP/ Cardiology

Red Flags:

PCP/ Neurology

1. constitutional symptoms
2. abnormal vital signs (orthostatic hypotension/ dysrhythmia)
3. (+) CNS signs (dysmetria/ undiagnosed CVA/ tremor/ cranial n. or spinal cord lesion)
4. (+) vertebral-basilar artery screening
5. (+) cardiopulmonary distress

(+) dizziness/ lightheadedness with anxiety, exertion, or change in body position

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- OK to proceed if absence of red flags -

↓

If… (+) C-spine or TMJ Examination? *…then→* **PCP/ Physiatry/ Physical Therapy/ Chiropractic**

↓

If… (+) visual field loss or visual acuity change *…then→* **Opthamology**

(+) visual-perceptual (ie: low light/ bifocals/ prisms)

↓

If… (+) recent or undiagnosed hearing loss/ *…then→* **Audiology PCP/ ENT**

Suspicion of infectious disease

↓

If… (+) Positional Vertigo Screen/ *…then→* **Vestibular Rehabilitation**

(+) Vestibulo-Ocular Reflex (VOR) abnormality/

(+) post-stimulus nystagmus or symptom/ (+) gait and balance dysfunction

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