

FUNCTIONAL STANDARDS FOR OPTIMAL AGING EXPERT: *ADULT FUNCTIONAL INDEPENDENCE TEST (AFIT)* INSTRUCTIONS

Before performing the assessments, ensure that participants sign the consent form and general health history. Participants may be assessed with or without assistive devices. Always monitor patients' response to exercise to ensure their safety.

Equipment Needed

- Blood pressure monitor
- Pulse oximeter
- Straight-back chair 17-18" (set against the wall)
- Masking tape or painter's tape
- Hand Held Dynamometer
- Grip dynamometer
- Long arm Goniometer
- Stopwatch or smart phone with lapping mechanism
- Tape measure (at least 3 meters long) and ruler
- Borg Scale
- One copy of the Adult Functional Independence Test (AFIT) form for each participant
- Exercise handouts
- Pen or pencil
- Metronome or metronome app on a smart phone

Recording Scores and Follow up

The patient will complete the consent form and general health history and the examiner will review it prior to beginning the assessments. Take resting heart rate, blood pressure and oxygen saturation while the patient is filling out this part of the form.

Beginning with the posture assessments. Record the score for each test on the screening form. Check YES if the score is outside the functional standard and NO if the score suggests that the patient is not at risk. At the end of your assessment, based on how many YES checks and the severity of these checks, decide if the person needs

- a) a pat on the back and encouragement to keep up whatever he/she is doing,
- b) one or more suggested exercises to improve in one or more areas of functional fitness, or
- c) further assessment and an exercise prescription by a physical or occupational therapist.

TESTING

Standing Posture

Forward Head: Wall Occiput Distance (WOD). Ask the participant to stand straight against a wall with his/her heels, buttocks, and back touching the wall, and with her/his head position set to maintain horizontal and eyes straight ahead. Measure the horizontal distance between the wall and the back of the head (prominence of the occiput) in millimeters. (1)

Common error:

- The person's head is not horizontal.

Possible Script: *"I am going to look at your neck posture. I want you to stand as straight as possible against the wall w/ your heels, buttock and back touching the wall. I want your eyes to look straight ahead. I am going to measure from the big part of the back of*

your head to the wall. (MEASURE) You are X cm which has been shown to indicate an increased risk of thoracic vertebral fractures (>4cm, >0-4 poor posture). I have an exercise that also has been shown to improve this."

Thoracic Extension: Rib-Pelvis Distance. Stand behind the participant whose arms are raised to 90 degrees in front and measure from the inferior margin of the eleventh rib to the superior surface of the iliac crest, along the midaxillary line. Measure using units of 0.5 fingerbreadths. (2)

Common error:

- Not measuring along the midaxillary line.
- Not measuring the width of your fingers (if yours are too big or too small). If >5cm, you should use a tape measure and the cm conversion.

Possible Script: "I am going to measure your back posture by looking at the distance from your bottom rib and the top of your pelvis. Please face away from me (reminder, I have measured my fingers to be 1.8cm, so I will demonstrate using my fingers). Can you please raise your arms like Frankenstein (measure from behind, be sure to be at the apex of the pelvis and mid axillary line). I can get 3 fingers b/w your rib and your pelvis, and optimally we would like to see a little more space between those. You are not at the point that indicates an increased risk of fractures (≤ 2). What that tells me is you would really benefit from doing this postural exercise to decrease the chance that this doesn't progress."

Flexibility

Shoulder: Back Scratch. Ask the participant to stand and place his or her preferred hand (the one that usually results in the better score) behind his/her same-side shoulder, palm toward back and fingers extended, reaching down the middle of the back as far as possible (elbow pointed up). The other hand should then be placed behind the back, palm out, reaching up as far as possible in an attempt to touch or overlap the extended middle fingers of both hands. Without moving the participant's hands, the test administrator checks to see that the middle fingers of each hand are directed toward the other, then the test administrator measures the shortest distance between a middle finger on the right and left hands. The fingers are not allowed to be pulled/grabbed together by the participant.

The test administrator demonstrates and then the client determines the preferred hand. Although it is important to work on flexibility on both sides of the body, only the "better" side has been used in developing norms. (3)

Common error:

- Measuring from the thumbs or any fingers other than the middle fingers.

Possible script: "I want to assess your shoulder flexibility. I want you to stand and place one hand behind the same shoulder, palm toward your back and fingers straight, reaching down the middle of your back as far as possible. The other hand is placed behind your back palm out, reaching as far up as possible (demonstrate for the patient). I will measure from the middle finger to the other middle finger. Pick which ever arm you prefer (measure) and you are 3 inches."

The cutoff for women is >4 inches which indicates tight shoulders that would put you at increased risk of rotator cuff issues. You look good at 3 inches, but that is kind of close, you may want to consider this flexibility exercises for your shoulders, which has been shown to really improve shoulder flexibility. Remember, having >4 inches put you at increased risk for shoulder disability in the future.”

Ankle Dorsiflexion (measure using a goniometer). Ask the participant to sit with one leg out straight and the other bent with the foot flat on the floor. Then ask him or her to pull the toes of the extended leg toward his/her body. If the patient removes his/her shoes, it will be easier to line up the goniometer correctly.

Goniometer axis: The axis of the goniometer is placed approximately 1.5cm inferior to the lateral malleolus.

Stationary arm: Parallel to the longitudinal axis of the fibula, lining up with the fibula head.

Moveable arm: Parallel to the longitudinal axis of the 5th metatarsal

Note the range of motion measures on the score sheet. Measure both legs. (4)

Common error:

- Not elevating the heel to allow the goniometer enough space to measure easily and accurately.
- Measuring with the knee bent and using the knee straight value.

Possible Script: “Ankle stiffness has been correlated to falls, so let’s see if there is a lack of flexibility in your ankles puts YOU at increased risk of falling. We want to see 8 deg of ankle bend with the knee straight, or 10 deg if the knee is bent. You have X deg. Good news; simple stretching exercises have been shown to really improve ankle flexibility.”

Static Balance:

Vestibular Hypofunction. Ask the participant to stand with feet next to each other and then rotate his/her head side-to-side one complete turn per second. Use a metronome app to ensure timely movements. Count how long the person can stand without losing balance. Repeat with the person looking up and down as far as possible. Note the number of times that the patient is able to turn the head without symptoms of dizziness. (5) If the participant does not pass the first test and is dizzy, wait until the dizziness subsides and do not perform the second vestibular hypofunction test.

Common error:

- Counting head turns at a slower than 1 full turn per second

Possible script: “I want to see if head turns cause any dizziness. First, can you show me how far you can look to the right and now to the left, and up/down. Good, I want you to go that far every time you turn your head. To do the test, I need you to put your feet together and you will look left and right 1 full rotation per second for 10 turns (10 sec). I will use a metronome to help keep you on pace. I want you to tell me as soon as you feel dizzy, ok? Hear this beat, see what 1 turn per second looks like (demo to the beat). Are you ready, do you understand what

we are doing? Ok, ready, go. Great you made it for 4 sec, which means you are at increased risk of falls. There are exercises that can be done to improve this.”

One Leg Stand. Ask the patient to stand on one leg with eyes open and arms crossed over the chest or at his/her sides. The test is stopped if the person touches the lifted foot to the floor or other leg, if the arms touch anything, or if the stationary leg moves. Note the number of seconds up to 20 that the person can stand as described.

Possible Script: “I want to see how long you can stand on one foot. Let’s shoot for 20 seconds. When you do this, keep your foot up that is off the ground, you can’t touch anything with your hands. Do you understand what things make me stop the test? Ok go ahead (start timer), you got X seconds. Now let’s try the other leg. Hey, you got X seconds. Being unable to stand for at least 5 sec puts you at increased risk for a fall that would cause injury. And being able to stand on one foot for less than 20 sec indicates lower body weakness. Luckily, we can work on both!”

Dynamic Balance:

Timed Up and Go (TUG). Start with the participant sitting with his/her back against the chair (17-18” from the seat to floor) and arms resting on the arms of the chair (any walking aid in his/her hand). Give the command, “On the word Go, you will get up and walk as quickly and safely as possible to a line on the floor 3 meters away, turn, return to the chair and sit down again with your back against the back of the chair.” Start timing as you say the word “Go” and stop timing when the subject is seated again correctly in the chair with his or her back resting against the chair back. Note the time on the form. (7, 8)

Common errors:

- Using a cone instead of a line.
- Not asking the subject to sit with his/her back against the chair at the beginning and end of the test.

Possible script: “I want to see how you move around. I am going to ask you to start here sitting with your back against the chair, and when I say GO I will time how long it takes for you to stand up, walk as quickly and safely to that line, turn around, come back, and sit back down with your back against the chair. Let me show you what that looks like, see...does that make sense? Ready, go. Ok that took X sec, and we know more than 13 sec indicates increased risk of falls. Now let’s see how long it takes if you walk at a normal pace. That took X sec and >9 sec puts you at increased risk of disability in the future.”

Tandem Walk. Instruct the patient to walk a 2-meter distance with one foot in front of the other, heel to toe without spaces. The test administrator demonstrates and gives the participant a practice round. Then the test administrator counts and records the number of errors as the patient performs the activity.

Possible script: “I want to look at your balance when you are moving. I want you to walk from here to that line, one foot directly in front of the other, no space between. I want to see if you can walk all the way there without making a mistake, a mistake is space b/w your feet, not directly in line, stepping outside the line, or

LOB. Take your time, this is not a speed test. Ok, you made more than 2 errors and that shows you are at increased risk of falls.”

Tandem Walk Eyes Closed. If the patient can perform the previous test with 2 mistakes or less, ask him/her to walk with eyes closed for 10 steps, heel-to-toe without spaces between steps. Count the number of steps taken and record. (10)

Possible script: I want you to walk heel to toe for 10 steps, and I want you to do it with your eyes closed, I know that sounds challenging, but I think you can do it. Go slow, take your time, and try NOT to make any mistakes. Ready, go. Ok, that was 4 steps without a mistake, and we know anything less than 5 consecutive steps puts you at risk for falls.”

Endurance

2 Minute Step. Ask the participant to stand next to a wall. Measure the height of the iliac crest and the midpoint of the patella and mark each on the wall. Then place a piece of tape on the wall half the distance between those two marks and remove the previous marks. Tell the patient, “You’re going to be working somewhat hard. Don’t work to the point of exhaustion. Be safe. But take as many steps as you can in 2 minutes.” On the signal “Go,” the patient begins stepping in place, raising each knee to the mark on the wall, for as many times as possible in the 2-minute period. Only count the number of times the right knee reaches the required height. That is the score. If the proper knee height cannot be maintained with both knees, ask the person to slow down, or to stop until he/she can regain the proper form, but keep the stopwatch running. The timer stops if the participant has to sit down. He/she may use the back of a chair, wall or walker for stability. Assess vitals pre/post. (11)

Common errors:

- Not assessing vitals
- Counting steps when the knee is below the mark
- Not telling participants to lift knees to the mark

Possible script: “This test measures stamina with stepping. First, I need to see how high you need to step. Ok you will be stepping for 2 min, you are going to be working somewhat hard, I don’t want you to work to exhaustion, but I do want to see how many steps you can take in 2 min, so push yourself safely. You can slow down or stop if you need to, then resume as soon as you are able, but if you HAVE to sit, the test is over. Got it? Reminder, your leg must go all the way to this line to count. Your job is to get as many steps as possible in two min but keeping your effort at that ‘somewhat hard’ level. Does that make sense? You can hold on lightly if you need to for balance. I took your vitals at the beginning of this assessment and will use those as baseline, then when you finish your test, I will recheck BP/HR/RPE/SaO2 to see how your heart does with this activity. (reminder to take 2min post vitals to assess recovery).”

Strength

Grip. Set the dynamometer in the second position and ask the participant to be seated. Instruct the patient to bend his/her elbow to 90 degrees and squeeze as hard as possible with right and then left hands. Note score in kilograms. (12) Dynamometer tests must all be gravity eliminated.

Common errors:

- Not gravity eliminated

- Elbow not at 90 degrees
- Dynamometer in 3rd position

Shoulder Rotators. Use a dynamometer and apply a make test to the shoulder rotators. While sitting, the patient tucks his/her elbow into his/her side on the tested side and rotates the forearm outward. The therapist places the dynamometer proximal to the wrist and instructs the person to push against the dynamometer while rotating the forearm outward with as much force as possible. The therapist applies a make test and records the score. (13)

Common errors:

- Person pushes in shoulder abduction versus rotation

We strongly recommend against using manual muscle testing because it is not as accurate as dynamometry and there are no norms for manual muscle testing. However, for those who choose to use manual muscle testing, a person would be considered at risk if he/she scored <5 (normal) using manual muscle testing.



Possible script: “I want to see how strong your shoulder muscles are, their strength has been correlated to rotator cuff injuries. So, let’s see how you are doing. Can you sit here, keep your elbow at your side, and I want you push your wrist out as hard as you can until I say stop. This test uses a device that measures how much pressure you put on it, I will put it right above your wrist, and during the test no one will move, and I will encourage you to push hard. Let’s do one trial to make sure you understand this test. Yup, that’s it. This time I want full effort, ready, go. Ok, you got X#, and compared to age/gender norms ER weakness is a precursor to RC problems, and you are X”

Hip Abduction (Optional test). With the patient in a supine position, place the dynamometer just proximal to the knee joint. The therapist can slip one arm under the calf of the tested side and on top of the calf on the non-tested side so the leg will not drag or rotate as the person pushes out into hip abduction. Tell the participant to press the leg out to the side with as much force as possible. The therapist applies a make test (not a break test) and records the scores on both sides. (12)

Common errors:

- Tester lets the participant go into hip flexion

Plantar flexors. Instruct the participant to stand and face you and go up on the toes of one leg 25 times without bending the knee. He or she may touch your hands or shoulders for balance, but if the person is pressing on your hands or if the arc of motion or height of toe rise decreases to 50%, stop the test. Record the scores on both sides. (14)

Common errors:

- Tester lets the participant to bend the knee without stopping the test

Possible script: *“I want to see how strong your calf mm is, they are related to balance and getting around well. You will stand on one leg and go up on your toes. Face me, you can put your hands on my hands for balance only, if you push into me we will stop. Show me how high you can go , ok good if you cannot go at least 50% of that, we will stop also. And lastly, you need to keep your knee straight, as you get tired you knee is going to want to bend, but you need to keep it straight the whole time. Got it? I want you to shoot for 25 times. Less than 25 is indicative of increased risk of falls.”*

Sit to Stand. Instruct the patient to sit in a strong, armless chair (17-18 inches seat to floor). Ask the person to place his/her arms across the chest and count how many times he/she can stand and sit back down in 30 seconds. Stop the clock. (15) Check YES on the form if the participant scores below the norms for age. You can also get a Five Times Sit to Stand with a stopwatch or smart phone that has lapping capabilities. While the patient is performing the 30 second Sit to Stand test, hit lap at 5 times. When the person completes the 30 seconds, record the number of times he/she completed the sit to stand movements and also record the number of seconds it took for him/her to completed 5 sit to stand movements. (7)

Common errors:

- Participant does not come to a full standing position

Possible script: *“I want to see how many times you can stand in 30 sec (I will also record the amt time it takes her to do 5 and capture that on my phone w/ a lap). For this, arms are crossed, you need to come to a full stand. Let see how you do, ready go. You did X which is X compared to the norms for your age and gender. LE weakness can affect walking, daily activities, and falls. >10 sec for 5STS has been shown to predict disability w/in the next 2 yrs.”*

Abdominals

Plank: Instruct the participant to get on his/her tummy on the floor or table. Then ask him/her to prop on his/her elbows and lift the body up in a straight line from the toes to the head. Time how long the person can hold this position. Stop if the participant bends at the hips or starts shaking or cannot hold the body up. Note time in seconds. (16)

Or

Curl Up: Ask the participant to lie on a table or the floor with knees flexed to 90 degrees and feet flat on the floor or table. Instruct him/her to fold his/her arms across the chest. Ask the person to lift his/her upper body until the shoulder blades do not touch the ground. The test is ended when the shoulder blades touch. Record the amount of time the patient can hold this position. (17)

Common errors:

- Tester allows participant to let shoulder blades touch before stopping the test

Possible script: *“For this one both knees are bent, arms are crossed on your chest and lift your shoulder, so the shoulder blade is off the table. If the shoulder blade touches, we will stop the test. Your job it to hold the position*

w/o letting the shoulder blade touch, do you understand? This is a long test, and it will take a lot of effort to hold as long as you can. Got it? Great, increased risk for back pain is <183 sec men and <85 sec for women.”

Back Extension: Instruct the participant to lie prone with a small pillow under his/her lower abdomen, just above the ASISs. Ask him/her to lift the sternum off the floor while maintaining flexion of the cervical spine and pelvic stabilization through gluteal muscle contraction. Time from the lift until the participant can no longer hold the position. Record time in seconds. (17-18)

Common error:

- Placing the pillow too far forward.
Possible script: “Let’s see how strong your back muscles are.. For this one, please lie on your stomach, prop up onto your elbows, lift your body, and maintain a straight line with your body as long as you can. I will stop the test if you cannot keep your body straight (buttock up/down). This test the strength of you abdominals and if those are weak it can lead to back problems. This is a long hold, it will take a lot of effort, ready? Great, <73 sec is increased risk for back pain.”