

1 **BACKGROUND AND RATIONALE**

Limitation in ability to walk is an important outcome of morbid obesity. Walking ability and endurance can be directly assessed by performance testing. The 400-meter walk test has been shown to be related to VO_2 max (the maximum volume of oxygen consumed by the body each minute during exercise, while breathing air at sea level); thus the walk not only tests ability to walk but also physical fitness.

This test is a modification of a long distance corridor walk administered in the Health ABC study, a study of body changes in the elderly and how these changes affect cognitive and physical function. This modified test, instructs patients to **walk at their usual pace** (as opposed to walking at the fastest pace they can maintain).

2 **MATERIALS NEEDED**

- White cloth tape or marker and colored tape
- Polar heart rate monitor (see §5.1.2, “Physical Measures” for details of use)
- Digital stopwatch (see §2.1 for details of use)

2.1 STOPWATCH

The stopwatch will be used to measure the time it takes to complete the 400 meter corridor walk. Press the middle (mode) button to make sure you are in stopwatch mode. The display should read **0:0000**. To time the walk, press the right-hand button (labeled STA/STP) at the top of the stopwatch at the start and end of the walk. After recording the walk time (time at 400 meters or when the walk was stopped) on the 400 meter data collection form, use the stopwatch to time a two minute recovery phase. The time is digitally displayed on the stopwatch. To get the display to read **0:0000** again, press the left (lap) button. Time is displayed as minutes: seconds, hundredths of a second.



3 **PREPARATION**

3.1 COURSE PREPARATION: 20 METERS

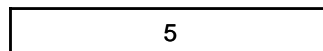
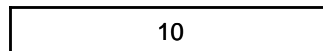
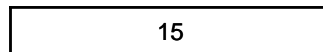
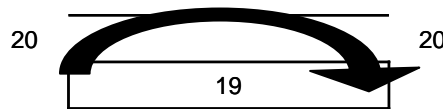
For consistency between centers, the walking course length will be 20 meters and should be laid

out in advance of patient's test in an unobstructed, dedicated corridor. Cloth tape or marker should be used to indicate the beginning and the end of the 20 meter length. Place a 10 cm length of tape marking every 5 meters between the start and stop of the course. In addition place a 10 cm length of colored tape marking 1 and 19 meters on the course. Label each piece of tape (as in course illustration (§3.1.1)). Note, if you are not able to leave tape on the ground or participants seem to have trouble identifying where to turn around, use bright orange cones to clearly mark the turn around points at 1 and 19 meters. Participants are to walk in a clockwise direction going around the 1 and 19 meter marks (which allow for a 1 meter turn at each end).

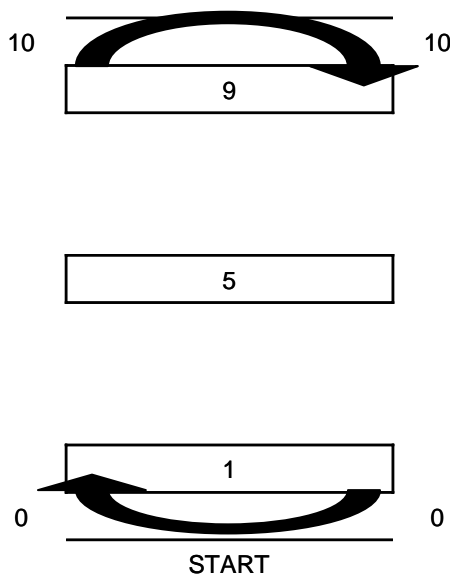
Sites that are unable to dedicate a 20 meter length of corridor for the 400 meter walk are permitted to dedicate 10 meters of a corridor, as in course illustration (§3.1.2); however, it is preferred that sites follow the 20 meter protocol as laid out in this §3.1.

A chair large enough to accommodate all LABS participants must be placed near the start of the course.

3.1.1 Course illustrations



3.1.2



3.3 PARTICIPANT PREPARATION

To eliminate the effect of different footwear on test performance, this test should be performed in tennis shoes or comfortable walking shoes with minimal or no heels. The participant should be instructed prior to the visit that they should wear or bring appropriate shoes to the clinic. Patients wearing footwear that impedes their walking should be excluded from the test.

4 ELIGIBILITY ASSESSMENT FORM

Use the Corridor Walk Eligibility Assessment Form to determine whether a patient should be excluded from the 400 Meter Walk. The exclusion criteria are explained below. If it is unclear to the examiner whether or not the patient's safety would be compromised to complete the walk, the patient should be excluded and the reason for exclusion appropriately noted on the Corridor Walk Eligibility Assessment Form.

Note, it is important to complete questions 1-5 on the Corridor Walk Eligibility Assessment Form even if a patient is found to be ineligible before you complete question 5 so that we know all of the reasons a patient is ineligible.

4.1 USE OF WALKING AID

If participant uses a walker or quad cane they are excluded from the 400 m walk. If the participant uses a straight cane for joint relief but is otherwise stable, or if the participant is blind but is not walking disabled they may attempt the corridor walk. For walking aid use *see question 4.1 on the medical form*. Examiners should pay close attention to the participant's stability throughout the walk to ensure that the patient is kept safe.

4.2 BLOOD PRESSURE

Refer to the blood pressure data collected as part of patient's clinical visit (*question 1.3 on the coordinator form*). The exclusion criteria are:

- SBP >180 mmHg
- DBP > 100 mmHg

4.3 HEART RATE

Refer to the heart rate data collected as part of patient's clinical visit (*question 1.4 on the coordinator form*). The exclusion criteria are:

- <40 bpm
- >110 bpm,

4.4 ECG

Prior to the completion of the 400-meter eligibility form and the patient's clinical visit, check the patient's chart to see if there were any abnormal ECG hard copy references in the last 12 months. The exclusion criteria are:

- Atrial fibrillation or atrial flutter (new onset)
- Wolff-Parkinson-White (WPW) or ventricular pre-excitation
- Idioventricular rhythm
- Ventricular tachycardia
- Third degree or complete A-V block
- Any statement including reference to acute injury or acute ischemia, or marked T wave abnormality
- **Abnormal cardiogram indicative of ischemia without medical/cardiac clearance for surgery**

Note: This exclusion criterion only applies to patients who have had an ECG. If the patient has not had an ECG, please refer to other exclusion criteria in this §4.

4.5 ADDITIONAL EXCLUSION CRITERIA -PAST 3 MONTHS

The Corridor Walk Eligibility Assessment Form lists several additional exclusion criteria related to events that may have occurred in the past 3 months:

The next test assesses your walking ability by having you walk about 1/4 mile. To determine if you should try the test, I need to ask you a few questions.

- *In the past 3 months, were you hospitalized for myocardial infarction or heart attack?*
- *In the past 3 months, have you had angioplasty or heart surgery?*
- *In the past 3 months, have you seen a health professional or thought about seeing a health professional for new or worsening symptoms of chest pain?*
- *In the past 3 months, have you had angina?*

- *In the past 3 months, did you have major thoracic (chest), abdominal or joint surgery?*
- *In the past 3 months, were you hospitalized for 3 or more days?*

*If the answer is “Yes” to **any** of the above questions you **do not** need to ask questions 6 and 7 on the eligibility form. Do not administer the 400-meter walking test or complete the 400-meter walk data collection form.*

4.6 ADDITIONAL EXCLUSION CRITERIA

If the answer is “No” to all of the above questions, continue to question 6 on the eligibility form:

Do you feel it would be unsafe for you to try to walk up and down this hallway?

If the patient answers “Yes” you **do not** need to ask question 7 on the eligibility form. Do not administer the 400-meter walking test or complete the 400-meter walk data collection form. If the answer is “No” ask the last question:

Are you wearing shoes that make it difficult for you to walk?

If the answer is “Yes” do not administer the 400-meter walking test or complete the 400-meter walk data collection form. However, if patient has comfortable shoes to change into ask participant to change shoes and mark no.

5 ADMINISTERING THE TEST

5.1 EXPLAIN THE TEST

*We would like you to attempt to walk 400 meters (about ¼ mile) at your **usual walking pace**, as a measure of physical function. So that I can record your heart rate before, during and after the walk I'd like you to wear a Polar heart rate monitor. The monitor has two pieces. The first piece is placed under your shirt against your chest with a band. The second piece, which displays your heart rate, is worn like a wrist watch. Immediately before and after the walk I will measure your heart rate. I will also measure your resting heart rate 2 minutes after you have completed the walk. Therefore, after the walk I will ask you to please sit and rest for 2 minutes. May I put the heart rate monitor on you now?*

Polar Heart Rate Monitor Tips:

- 1) To get the Heart Rate Monitor to read more efficiently put the watch on the participant so that the watch is read when the palm is up (under the wrist)
- 2) If the HRM is not reading properly try to adjust the chest strap by raising it higher around the participant's sternum.
- 3) If the HRM is still not reading properly re-apply moisture to the back of the unit that comes in contact with the participant's skin.

After putting the Polar Heart Rate Monitor on the participant, accompany the participant to

the starting line and ask him or her to sit in the chair at the start while you explain the next section. Note, if the participant refuses or can not wear the Polar Heart Rate Monitor he/she is not excluded from the 400 meter walk.

During this walk, I will ask you to rate how hard you feel you are working while you continue walking. When I ask you to rate how hard you are working during the walk, I want you to think about the total feeling of exertion in your overall body, including your breathing and muscles.

Please note, as a safety precaution if your heart rate goes above 135 beats per minute at any time during the walk the heart rate monitor will beep and I will ask you to slow down. Please do not be alarmed, simply slow down. If your heart rate remains above 135 beats per minute for more than 5 minutes I will end the walk and ask that you sit and rest.

If, at any time during the test, you feel any chest pain, tightness or pressure in your chest, you become short of breath or if you feel faint, lightheaded or dizzy, or you feel knee, hip, calf, or back pain please tell me. If you feel any of these symptoms, you may slow down or rest. You may also choose to stop the walk.

Do you have any questions?

5.2 TEST

Right before you start the test measure the participant's heart rate (while they are still sitting), and record this value. If you can not use the Polar Heart Rate Monitor because the participant is too large for the strap or refuses to wear the strap, take heart rate manually.

After you've recorded the starting heart rate prepare the stop watch by resetting it. As you say "go" start the stop watch and the heart rate monitor simultaneously. This way the 400m walk will be recorded on the stopwatch (time) and Polar Heart Rate Monitor (time and heart beats per minute).

When I say 'GO,' start walking at your usual pace. "Ready, GO."

For every lap, offer standard encouragement, and call out the number of laps completed and the number remaining. Record each lap on the form.

Encourage participant each lap (or every other lap if the 20 meter course is used): *Keep up the good work. You are doing well. Good job. Etc.* Also tell the participant, *You have completed ___ laps and have ___ to go.*

When the participant completes **4 laps**, their effort should be recorded.

Please tell me how hard you feel you are working right now. Is it "light", "somewhat hard", "hard", or "very hard"?

If the participant reports “hard” or “very hard”, remind the participant to walk their “usual pace without overexerting yourself” and ask the question again after 8 laps if answer is hard or very hard.

I would like to remind you to walk at your usual pace. If you develop chest pain or significant shortness of breath, or are too uncomfortable to continue, please stop walking and tell me. If you need to, you may stand in place and rest.

If the participant feels they need to stop and rest, they may stand in one place and rest. Also, if the participant appears to be in obvious distress (excessive sweating, unusually pale, labored breathing, unsteady/wavering gait, appears confused, or unresponsive to questions) or pain, you may recommend that he/she stand in place and rest for a moment. After **30 seconds**, ask them if they can continue walking. If they can, continue the walk and record the rest on the form. If they need to rest longer, have them continue to stand. After **another 30 seconds**, ask them if they can continue walking. If they can, continue the walk and record the rest stop on the form.

If they cannot continue after a 60-second rest or if they need to sit down, stop the test. There is no limit to the number of rest stops as long as they can complete the walk **without sitting and within 15 minutes.**

Recording heart rate and time at end of walk:

- 1) When the participant completes 400-meters (10 laps, first footfall on or over the finish line) or the walk is stopped, stop the stop watch and the heart rate monitor immediately (at the same time) **paying attention to the heart rate as the participant finishes.**
- 2) Record the walk time and restart the stopwatch to time the 2-minute recovery period.
- 3) Ask the participant to sit for a 2 minute recovery period.*
- 4) During the 2 minute recovery period record the participants' ending heart rate **which must be viewed on the watch as the participant finishes the walk**, as well as their average heart rate for the walk by going into 'file.' Note, the average heart rate will almost always be higher than the starting heart rate and lower than the ending heart rate. However, if a participant slows down at the end of the walk the average heart rate may be higher than the ending heart rate.
- 4) Restart the HRM
- 5) When the two-minute period is up read the HRM and record the heart rate that is **on the watch at that time.**

Complete the remainder of the 400-meter walk form with the patient present.

***Ideally all participants will sit down for the recovery period. However, if a participant asks to remain standing at the end of the walk, allow him to do so but after 30 seconds ask him if he is now willing to sit. Do so every 30 seconds until the participant sits or 2 minutes has passed. If the participant remains standing for the entire recovery phase,**

still measure the 2 minute heart rate as described above.

6 STOPPING

If possible, the test should **not** be stopped cold. The participant should be told to slow down, and the examiner should quickly approach and meet the participant to check their heart rate, and record the heart rate, time, and distance. If necessary, bring a chair to the participant. Always indicate on the 400 M Corridor Walk Data Collection forms why the participant did not complete the walk.

6.1 EXAMINER INITIATED STOP

The examiner may initiate a stop if the patient's heart rate exceeds 135 and remains above 135 for more than 5 minutes. The patient's heart rate monitor will emit a short beep to alert you and the patient that the heart rate is out of range. If a participant does not wear the Polar Heart Rate Monitor you will not know if his/her heart rate exceeds 135. Therefore, error on the conservative side and ask the participant to take a break and stand still so you can manually measure his/her heart rate if you suspect it may be too high. As long as the participant does not rest for more than 60 seconds during this break and you feel it is safe, he/she may continue the walk.

If a participant appears short of breath (has difficulty talking while walking) or complains of dizziness, he/she should be asked if he/she feels able to continue to walk. If so, a staff member should walk by the participant at a close distance to prevent falling for the rest of the walk and the patient should be asked about his/her symptoms **every two minutes** for the rest of the walk. Participants may stop the walk at any time, but should not be allowed to lean against any wall or other surface (desk, counter etc.). Staff may stop the walk for evidence of inability to talk while walking, unstable gait, or any other staff concern about the immediate safety of the participant. All participants who exhibit the above symptoms should be escorted to a chair upon stopping the walk and should be guarded when first getting up again.

6.2 PARTICIPANT INITIATED STOP

Participant reports a significant degree of any of the following symptoms:

- chest pain, tightness, or pressure
- trouble breathing or shortness of breath
- feeling faint, lightheaded or dizzy
- leg pain
- need to sit down
- OR participant requests or needs their cane or assistive device to complete the test

As noted above, if the test is stopped, record heart rate, distance covered, and time. Also, complete the 2 minute recovery heart rate. Record the reason on the 400-meter Walk data collection form. At any point of concern, contact the clinic supervisor to come and assess the participant. This may include measuring the participant's blood pressure or other assessments to be determined by the clinic supervisor.

6.3 TIME LIMITS

The protocol allows for rest stops, but the total test time should not exceed 15 minutes. If the total elapsed time reaches 15 minutes, stop the test and record the distance covered.

7 **CHEST PAIN/OTHER SYMPTOMS FROM TEST**

If the participant develops chest pain or other symptoms listed below, the clinic supervisor should be notified immediately.

If a participant requires medical attention as a result of the below symptoms during or upon completion of the 400 M walk, an Adverse Event report is to be completed.

1. Chest pain, pressure and/or other "anginal symptoms".
2. Severe shortness of breath defined as greater than anticipated for the level of physical exertion during the 400-meter walk.
3. Loss of consciousness or an acute or new-onset bout of "dizziness" and/or "lightheadedness" that does not resolve with termination of the test and/or quiet sitting.
4. Persistent severe lower extremity pain that does not resolve with termination of the test.
5. Wheezing/dyspnea