LABORATORY MANUAL FOR EXERCISE ONCOLOGY CONTINUING EDUCATION COURSE

Cleveland Clinic

Cleveland, OH

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ACADEMY of ONCOLOGIC PHYSICAL THERAPY

Knowledge | Compassion | Practice | Results

FACT-G (Version 4)

Below is a list of statements that other people with your illness have said are important. **Please circle or mark one number per line to indicate your response as it applies to the <u>past 7 days.</u>**

	PHYSICAL WELL-BEING	**Not at all**	**A little bit**	**Some-what**	**Quite a bit**	**Very much**
GP1	I have a lack of energy	0	1	2	3	4
GP2	I have nausea	0	1	2	3	4
GP3	Because of my physical condition, I have trouble meeting the needs of my family	0	1	2	3	4
GP4	I have pain	0	1	2	3	4
GP5	I am bothered by side effects of treatment	0	1	2	3	4
GP6	I feel ill	0	1	2	3	4
GP7	I am forced to spend time in bed	0	1	2	3	4

	SOCIAL/FAMILY WELL-BEING	**Not at all**	**A little bit**	**Some-what**	**Quite a bit**	**Very much**
GS1	I feel close to my friends	0	1	2	3	4
GS2	I get emotional support from my family	0	1	2	3	4
GS3	I get support from my friends	0	1	2	3	4
GS4	My family has accepted my illness	0	1	2	3	4
GS5	I am satisfied with family communication about my illness	0	1	2	3	4
GS6	I feel close to my partner (or the person who is my main support)	0	1	2	3	4
Q1	*Regardless of your current level of sexual activity, please answer the following question. If you prefer not to answer it, please mark this box* ☐ *and go to the next section.*					
GS7	I am satisfied with my sex life	0	1	2	3	4

FACT-G (Version 4)

Please circle or mark one number per line to indicate your response as it applies to the past 7 days.

	EMOTIONAL WELL-BEING	Not at all	A little bit	Some-what	Quite a bit	Very much
GE1	I feel sad	0	1	2	3	4
GE2	I am satisfied with how I am coping with my illness	0	1	2	3	4
GE3	I am losing hope in the fight against my illness	0	1	2	3	4
GE4	I feel nervous	0	1	2	3	4
GE5	I worry about dying	0	1	2	3	4
GE6	I worry that my condition will get worse	0	1	2	3	4

	FUNCTIONAL WELL-BEING	Not at all	A little bit	Some-what	Quite a bit	Very much
GF1	I am able to work (include work at home)	0	1	2	3	4
GF2	My work (include work at home) is fulfilling	0	1	2	3	4
GF3	I am able to enjoy life	0	1	2	3	4
GF4	I have accepted my illness	0	1	2	3	4
GF5	I am sleeping well	0	1	2	3	4
GF6	I am enjoying the things I usually do for fun	0	1	2	3	4
GF7	I am content with the quality of my life right now	0	1	2	3	4

FACT-G Scoring Guidelines (Version 4)

Instructions:* 1. Record answers in "Item response" column. If missing, mark with an X
2. Perform reversals as indicated, and sum individual items to obtain a score.
3. Multiply the sum of the item scores by the number of items in the subscale, then divide by the number of items answered. This produces the subscale score.
4. Add subscale scores to derive total FACT-G score. ***The higher the score; the better the QOL.***

Subscale	Item Code	Reverse item?		Item response	Item Score
PHYSICAL WELL-BEING (PWB)	GP1	4	-	_____	= _____
	GP2	4	-	_____	= _____
	GP3	4	-	_____	= _____
	GP4	4	-	_____	= _____
Score range: 0-28	GP5	4	-	_____	= _____
	GP6	4	-	_____	= _____
	GP7	4	-	_____	= _____

Sum individual item scores: _____
Multiply by 7: _____
Divide by number of items answered: _____ =**PWB subscale score**

SOCIAL/FAMILY WELL-BEING (SWB)	GS1	0	+	_____	= _____
	GS2	0	+	_____	= _____
	GS3	0	+	_____	= _____
	GS4	0	+	_____	= _____
Score range: 0-28	GS5	0	+	_____	= _____
	GS6	0	+	_____	= _____
	GS7	0	+	_____	= _____

Sum individual item scores: _____
Multiply by 7: _____
Divide by number of items answered: _____ =**SWB subscale score**

EMOTIONAL WELL-BEING (EWB)	GE1	4	-	_____	= _____
	GE2	0	+	_____	= _____
	GE3	4	-	_____	= _____
	GE4	4	-	_____	= _____
Score range: 0-24	GE5	4	-	_____	= _____
	GE6	4	-	_____	= _____

Sum individual item scores: _____
Multiply by 6: _____
Divide by number of items answered: _____ =**EWB subscale score**

FUNCTIONAL WELL-BEING (FWB)	GF1	0	+	_____	= _____
	GF2	0	+	_____	= _____
	GF3	0	+	_____	= _____
	GF4	0	+	_____	= _____
Score range: 0-28	GF5	0	+	_____	= _____
	GF6	0	+	_____	= _____
	GF7	0	+	_____	= _____

Sum individual item scores: _____
Multiply by 7: _____
Divide by number of items answered: _____ =**FWB subscale score**

TOTAL SCORE:

Score range: 0-108 _____ (PWB score) + _____ (SWB score) + _____ (EWB score) + _____ (FWB score) = _____ =**FACT-G Total score**

*For additional guidelines please refer to the Administration and Scoring Guidelines in the manual or at www.facit.org.

Brief Fatigue Inventory

Study #: _____ HOSPITAL #: _____

Date: ____/____/____ Time: _____

Name: _____ _____ _____

Last First Middle Initial

Throughout our lives, most of us have times when we feel very tired or fatigued. Have you felt unusually tired or fatigued in the last week? Yes ☐ No ☐

1. Please rate your fatigue (weariness, tiredness) by circling the one number that best describes your fatigue right NOW.

0	1	2	3	4	5	6	7	8	9	10
No Fatigue										As bad as you can imagine

2. Please rate your fatigue (weariness, tiredness) by circling the one number that best describes your USUAL level of fatigue during past 24 hours.

0	1	2	3	4	5	6	7	8	9	10
No Fatigue										As bad as you can imagine

3. Please rate your fatigue (weariness, tiredness) by circling the one number that best describes your WORST level of fatigue during past 24 hours.

0	1	2	3	4	5	6	7	8	9	10
No Fatigue										As bad as you can imagine

4. Circle the one number that describes how, during the past 24 hours, fatigue has interfered with your:

A. General activity

0	1	2	3	4	5	6	7	8	9	10
Does not interfere										Completely interferes

B. Mood

0	1	2	3	4	5	6	7	8	9	10
Does not interfere										Completely interferes

C. Walking ability

0	1	2	3	4	5	6	7	8	9	10
Does not interfere										Completely interferes

D. Normal work (includes both work outside the home and daily chores)

0	1	2	3	4	5	6	7	8	9	10
Does not interfere										Completely interferes

E. Relations with other people

0	1	2	3	4	5	6	7	8	9	10
Does not interfere										Completely interferes

F. Enjoyment of life

0	1	2	3	4	5	6	7	8	9	10
Does not interfere										Completely interferes

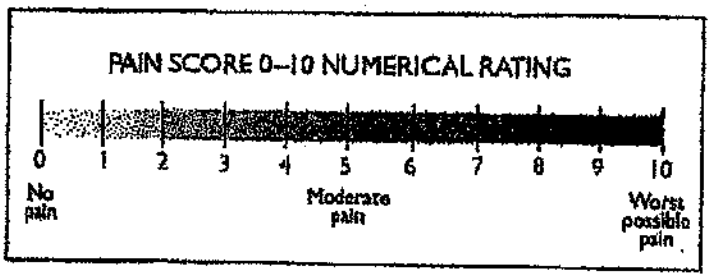
SCORING THE BRIEF FATIGUE INVENTORY

1. There are 9 question to be answered by the patient, each question will generate a score between 0 [no fatigue] and 10 [fatigue as bad as you can imagine].

2. Sum these 9 scores [maximum score = 90]

3. Divide the maximum score by 9 to get an average score.

4. Likert Scale



5. Classification
   - Limited fatigue: < 4
   - Education plus general strategies to manage fatigue
     - Set activity priorities
     - Pace
     - Delegate
     - Labor saving device

     - Does not require specific intervention unless PT thinks it is needed
   - Moderate fatigue: 4-7
     - Physical therapist must document specific interventions to treat fatigue
   - Severe fatigue: > 7
     - Call in the cancer care team and organize consultations
     - Nutrition
     - Psychology/Social worker
     - Referral to Rehabilitation

4. National Comprehensive Cancer Network
   - Cancer Related Fatigue
     - Fatigue should be assessed at every visit exactly like any other vital sign

Physical Activity Readiness Questionnaire (PAR-Q) and You

Regular physical activity is fun and healthy, and increasingly more people are starting to become more active every day. Being more active is very safe for most people. However, some people should check with their doctor before they start becoming much more physically active.

If you are planning to become much more physically active than you are now, start by answering the seven questions in the box below. If you are between the ages of 15 and 69, the PAR-Q will tell you if you should check with your doctor before you start. If you are over 69 years of age, and you are not used to being very active, check with your doctor.

Common sense is your best guide when you answer these questions. Please read the questions carefully and answer each one honestly:

YES	NO		
☐	☐	1.	Has your doctor ever said that you have a heart condition and that you should only do physical activity recommended by a doctor?
☐	☐	2.	Do you feel pain in your chest when you do physical activity?
☐	☐	3.	In the past month, have you had chest pain when you were not doing physical activity?
☐	☐	4.	Do you lose your balance because of dizziness or do you ever lose consciousness?
☐	☐	5.	Do you have a bone or joint problem that could be made worse by a change in your physical activity?
☐	☐	6.	Is your doctor currently prescribing drugs (for example, water pills) for your blood pressure or heart condition?
☐	☐	7.	Do you know of any other reason why you should not do physical activity?

If you answered:

YES to one or more questions

Talk to your doctor by phone or in person BEFORE you start becoming much more physically active or BEFORE you have a fitness appraisal. Tell your doctor about the PAR-Q and which questions you answered YES.

- You may be able to do any activity you want – as long as you start slowly and build up gradually. Or, you may need to restrict your activities to those which are safe for you. Talk with your doctor about the kinds of activities you wish to participate in and follow his/her advice.
- Find out which community programs are safe and helpful for you.

NO to all questions

If you answered NO honestly to all PAR-Q questions, you can be reasonably sure that you can:

- Start becoming much more physically active – begin slowly and build up gradually. This is the safest and easiest way to go.
- Take part in a fitness appraisal – this is an excellent way to determine your basic fitness so that you can plan the best way for you to live actively.

Delay becoming much more active:

- If you are not feeling well because of a temporary illness such as a cold or a fever – wait until you feel better; or
- If you are or may be pregnant – talk to your doctor before you start becoming more active.

Please note: If your health changes so that you then answer YES to any of the above questions, tell your fitness or health professional. Ask whether you should change your physical activity plan.

Informed use of the PAR-Q: Reprinted from ACSM's Health/Fitness Facility Standards and Guidelines, 1997 by American College of Sports Medicine

MONITORING DYSPNEA
(important measure of intensity)

Table 3. 5-Grade Dyspnea Scale

0	no dyspnea
1	mild, noticeable
2	mild, some difficulty
3	moderate difficulty, but can continue
4	severe difficulty, cannot continue

Reprinted, with permission from American Association of Cardiovascular and Pulmonary Rehabilitation. *Guidelines for Cardiac Rehabilitation and Secondary Prevention Programs.* 4th ed. Champaign, IL: Human Kinetics; 2004:81.

MODIFIED BRUCE PROTOCOL

1. This is a submaximal, multistage, graded, exercise test to determine or estimate an individual's maximal aerobic capacity (VO_{2max}).

2. The test is continuous, with the treadmill speed and/or inclined every 3 minutes (called stages) with heart rate, blood pressure and rating of perceived exertion determined at the end of each stage.

3. This test has a predetermined endpoint:
   % of HRmax- generally 85%
   HRmax = 207- (0.7 X age)

4. Outcome measures:
   Total time on treadmill
   Stage completed
   Estimated VO2max
   VO2max =(S x 0.1)+(S x G x 1.8)
   S: speed in meters/minute
   G: gradient in decimal form

5. ramp protocol

STAGE	ELAPSTED TIME (MIN)	% GRADE	MPH
1	3:00	0	1.7
2	6:00	5	1.7
3	9:00	10	1.7
4	12:00	12	2.5
5	15:00	14	3.4
6	18:00	16	4.2
7	21	18	5.0

6. Other outcome measures:
   Elapsed time
   Stages completed
   HR at the end of each stage
   RPE at the end of each stage

7. Data Collection Form

STAGE	ELAPSTED TIME (MIN)	Heart Rate (BPM)	Blood Pressure	RPE
1	3:00			
2	6:00			
3	9:00			
4	12:00			
5	15:00			
6	18:00			
7	21			
RECOVERY				
	2			
	4			

8. CALCULATIONS

HRmax: 207- (0.7 X age)

Patient age: _____

HRmax: 207- (0.7 X _____) = 207 - _____ = _____

9. Estimated VO2 max

VO2max =(S x 0.1)+(S x G x 1.8)

S = speed in m/min; G= grade in decimal

VO2max= (_____x 0.1) + (_____x_____x 1.8)

VO2max= _____+_____

VO2max=_____ ml/kgmin

Convert this measures into METs! _____ ml/kg min/ 3.5 ml/kg min

_____ METS

Rating of Perceived Exertion (RPE)	
6	No exertion at all
7	
	Extremely light
8	
9	Very light
10	
11	Light
12	
13	Somewhat hard
14	
15	Hard (heavy)
16	
17	Vey hard
18	
19	Extremely hard
20	Maximal exertion

rating	description
0	NOTHING AT ALL
0.5	VERY, VERY LIGHT
1	VERY LIGHT
2	FAIRLY LIGHT
3	MODERATE
4	SOMEWHAT HARD
5	HARD
6	
7	VERY HARD
8	
9	
10	VERY VERY HARD (MAXIMAL)

Estimated VO2 max of females (values in ml/kg/min) and resulting fitness category

Female (ml/kg/min)

Age	Very Poor	Poor	Fair	Good	Excellent	Superior
13-19	<25.0	25.0 - 30.9	31.0 - 34.9	35.0 - 38.9	39.0 - 41.9	>41.9
20-29	<23.6	23.6 - 28.9	29.0 - 32.9	33.0 - 36.9	37.0 - 41.0	>41.0
30-39	<22.8	22.8 - 26.9	27.0 - 31.4	31.5 - 35.6	35.7 - 40.0	>40.0
40-49	<21.0	21.0 - 24.4	24.5 - 28.9	29.0 - 32.8	32.9 - 36.9	>36.9
50-59	<20.2	20.2 - 22.7	22.8 - 26.9	27.0 - 31.4	31.5 - 35.7	>35.7
60+	<17.5	17.5 - 20.1	20.2 - 24.4	24.5 - 30.2	30.3 - 31.4	>31.4

Male (ml/kg/min)

Age	Very Poor	Poor	Fair	Good	Excellent	Superior
13-19	<35.0	35.0 - 38.3	38.4 - 45.1	45.2 - 50.9	51.0 - 55.9	>55.9
20-29	<33.0	33.0 - 36.4	36.5 - 42.4	42.5 - 46.4	46.5 - 52.4	>52.4
30-39	<31.5	31.5 - 35.4	35.5 - 40.9	41.0 - 44.9	45.0 - 49.4	>49.4
40-49	<30.2	30.2 - 33.5	33.6 - 38.9	39.0 - 43.7	43.8 - 48.0	>48.0
50-59	<26.1	26.1 - 30.9	31.0 - 35.7	35.8 - 40.9	41.0 - 45.3	>45.3
60+	<20.5	20.5 - 26.0	26.1 - 32.2	32.3 - 36.4	36.5 - 44.2	>44.2

Fitness category for subject:_____

6 MIN WALK TEST:

RESTING HEART RATE (bpm):_____ RESTING O2 SATURATION (%): _____

NO. OF LAPS:_____ ADDITIONAL DISTANCE:_____

6-MIN WALK DISTANCE (ft):_____6-MIN WORK (lb-ft): _____

POST EXERCISE HEART RATE (bpm):_____

POST EXERCISE O2 SATURATION (%): _____

POST EXERCISE RPE:_____ POST EXERCISE DYSPNEA:_____

POST EXERCISE HR: 2 MIN: _____ 4 MIN: _____

AVERAGE GAIT VELOCITY (meters/min): _____

COMMENTS:

STOPPED/PAUSED DURING 6 MINUTE WALK TEST: Yes/No

IF SO, WHEN IN TEST AND WHY::_____

_____

SYMPTOMS AT END OF TEST: NONE _____CHEST PAIN/ANGINA:_____

DIZZINESS:_____HIP/LEG OR CALF PAIN: _____

Age Predicted 6 min walk distance:

Enright et al. Am J Respir Crit Care Med 1998;158:1384–1387.

FEMALE:

6MWD = (2.11 x ht (cm)) – (2.29 x wt (kg)) – (5.78 x age) + 667

= (2.11 X _____) – (2.29 X_____) – (5.78 x___) + 667

= _____

(ACTUAL/CALCULATED) x 100 =

MALE:

6MWD = (7.57 x height (cm)) - (5.02 X age) - (1.76 x weight (kg)) –

309 m

= (7.57 X _____) – (5.02 X_____) – (1.76 x___) – 309M

=

(ACTUAL/CALCULATED) x 100 =

1 meter = 3.281 ft. or 39.27 in.

1 in = 2.54 cm.

Bohannon RW. Six-Minute Walk Test A Meta-Analysis of Data From Apparently Healthy Elders. Topics in Geriatric Rehabilitation. 2007;23;155-160.

Table 2. Summary of descriptive meta-analysis of 6-minute walk distances

Category, y	Studies/groups (n)*	Total sample (N)	Meters walked†	Homogeneity Q (P)
All ≥60	13/63	4809	499 (480–519)	76.8 (.097)
Men ≥60	10/31	1534	524 (496–553)	33.5 (.299)
Women ≥60	10/30	3212	475 (448–503)	37.3 (.138)
Men 60–69	8/10	582	560 (511–609)	8.0 (.533)
Women 60–69	8/10	1176	505 (460–549)	6.9 (.648)
Men 70–79	9/10	661	530 (482–578)	7.5 (.584)
Women 70–79	8/9	1426	490 (442–538)	7.2 (.516)
Men 80–89	7/8	228	446 (385–507)	4.8 (.689)
Women 80–89	6/7	499	382 (316–449)	4.1 (.662)

*Most studies (see Table 1) contributed to multiple gender/age categories. The data in some studies could not be categorized into groups by gender or age.
†Mean (95% CI).

Short Physical Performance Battery

1. Repeated Chair Stands

Instructions: Do you think it is safe for you to try and stand up from a chair five times without using your arms? Please stand up straight as quickly as you can five times, without stopping in between. After standing up each time, sit down and then stand up again. Keep your arms folded across your chest. Please watch while I demonstrate. I'll be timing you with a stopwatch. Are you ready? Begin

Grading: Begin stop watch when subject begins to stand up. Count aloud each time subject arises. Stop the stopwatch when subject has straightened up completely for the fifth time. Also stop if the subject uses arms, or after 1 minute, if subject has not completed rises, and if concerned about the subject's safety.. Record the number of seconds and the presence of imbalance.. Then complete ordinal scoring.

Time: _____sec (if five stands are completed)
Number of Stands Completed: 1 2 3 4 5

Chair Stand Ordinal Score: _____

0 = unable
1 = > 16.7 sec
2 = 16.6-13.7 sec
3 = 13.6-11.2 sec
4 = < 11.1 sec

2. Balance Testing

Begin with a semitandem stand (heel of one foot placed by the big toe of the other foot). Individuals unable to hold this position should try the side-by-side position. Those able to stand in the semitandem position should be tested in the full tandem position. Once you have completed time measures, complete ordinal scoring.

a. Semitandem Stand

Instructions: Now I want you to try to stand with the side of the heel of one foot touching the big toe of the other foot for about 10 seconds. You may put either foot in front, whichever is more comfortable for you. Please watch while I demonstrate.

Grading: Stand next to the participant to help him or her into semitandem position. Allow participant to hold onto your arms to get balance. Begin timing when participant has the feet in

position and lets go.

Circle one number

2. Held for 10 sec
1. Held for less than 10 sec; number of seconds held _____
0. Not attempted

b. Side-by-Side stand

Instructions: I want you to try to stand with your feet together, side by side, for about 10 sec. Please watch while I demonstrate. You may use your arms, bend your knees, or move your body to maintain your balance, but try not to move your feet. Try to hold this position until I tell you to stop.

Grading: Stand next to the participant to help him or her into the side-by-side position. Allow participant to hold onto your arms to get balance. Begin timing when participant has feet together and lets go.

Grading

2. Held of 10 sec
1. Held for less than 10 sec; number of seconds held_____
0. Not attempted

c. Tandem Stand

Instructions: Now I want you to try to stand with the heel of one foot in front of and touching the toes of the other foot for 10 sec. You may put either foot in front, whichever is more comfortable for you. Please watch while I demonstrate.

Grading: Stand next to the participant to help him or her into the side-by-side position. Allow participant to hold onto your arms to get balance. Begin timing when participant has feet together and lets go.

Grading

2. Held of 10 sec
1. Held for less than 10 sec; number of seconds held_____
0. Not attempted

Balance Ordinal Score: _____

0 = side by side 0-9 sec or unable
1 = side by side 10, <10 sec semitandem

2 = semitandem 10 sec, tandem 0-2 sec

3 = semitandem 10 sec, tandem 3-9 sec

4 = tandem 10 sec

3. 8' Walk (2.44 meters)

Instructions: This is our walking course. If you use a cane or other walking aid when walking outside your home, please use it for this test. I want you to walk at your usual pace to the other end of this course (a distance of 8'). Walk all the way past the other end of the tape before you stop. I will walk with you. Are you ready?

Grading: Press the start button to start the stopwatch as the participant begins walking. Measure the time take to walk 8'. Then complete ordinal scoring.

Time: _____ **sec**

Gait Ordinal Score: _____

0 = could not do

1 = >5.7 sec (<0.43 m/sec)

2 = 4.1-6.5 sec (0.44-0.60 m/sec)

3 = 3.2-4.0 (0.61-0.77 m/sec)

4 = <3.1 sec (>0.78 m/sec)

Summary Ordinal Score: _____

Range: 0 (worst performance) to 12 (best performance). Shown to have predictive validity showing a gradient of risk for mortality, nursing home admission, and disability.

Reprinted from Guralnik JM, Simonsick EM, Ferrucci L, Glynn RJ, Berkman LF, Blazer DG, Scherr PA, Wallace RB. A short physical performance battery assessing lower extremity function: association with self-reported disability and prediction of mortality and nursing home admission. J Gerontol Med Sci 1994; 49(2):M85-M94

Appendix 1. Score Sheet for the Short Physical Performance Battery

Patient Name: _____

Date : _____

Balance Score

Unable to hold side by side stance for > 9 seconds	0 points
Side by side stance for 10 sec, but unable to hold semitandem for 10 sec	1 point
Semitandem for 10 sec, unable to hold full tandem for > 2 sec	2 points
Full tandem for 3-9 sec	3 points
Full tandem for 10 sec	4 points

Walk Score (4 Meter or 13.12 feet)

Unable to walk		0 points
If time is more than 8.70 seconds		1 point
If time is 6.21 to 8.70 seconds	Time 1: _____	2 points
If time is 4.82 to 6.20 seconds		3 points
If time is less than 4.82 seconds	Time 2: _____	4 points

Chair Stand Score

If the participant was unable to complete the 5 chair stands		0 points
If chair stand time is 16.7 seconds or more		1 point
If chair stand time is 13.7 to 16.6 seconds		2 points
If chair stand time is 11.2 to 13.6 seconds		3 points
If chair stand time is 11.1 seconds or less	Time: _____	4 points

Total Score _____

Converted Gait Velocity (13.12/time in seconds)*0.68 = mph) _____

Date : _____

Balance Score

Unable to hold side by side stance for > 9 seconds	0 points
Side by side stance for 10 sec, but unable to hold semitandem for 10 sec	1 point
Semitandem for 10 sec, unable to hold full tandem for > 2 sec	2 points
Full tandem for 3-9 sec	3 points
Full tandem for 10 sec	4 points

Walk Score (4 Meter or 13.12 Feet)

Unable to walk		0 points
If time is more than 8.70 seconds		1 point
If time is 6.21 to 8.70 seconds	Time 1: _____	2 points
If time is 4.82 to 6.20 seconds		3 points
If time is less than 4.82 seconds	Time 2: _____	4 points

Chair Stand Score

If the participant was unable to complete the 5 chair stands		0 points
If chair stand time is 16.7 seconds or more		1 point
If chair stand time is 13.7 to 16.6 seconds		2 points
If chair stand time is 11.2 to 13.6 seconds		3 points
If chair stand time is 11.1 seconds or less	Time: _____	4 points

Total Score _____

Converted Gait Velocity (13.12/time in seconds)*0.68 = mph) _____

Table 1. Classification of Limitations Based on Short Physical Performance Score

Score	Classification
0-3	Severe limitations
4-6	Moderate limitations
7-9	Mild limitations
10-12	Minimal limitations

Classification from Guralnik JM, Ferrucci L, Simonsick EM, Salive ME, Wallace RB. Lower-extremity function in persons over the age of 70 years as a predictor of subsequent disability. *N Engl J Med*. 1995;332:556-561.

Table 3.

BESTest, Mini-BESTest, and Brief-BESTest Scores for Canadians 50 to 89 Years of Age[a]

Test	Age Cohort (y)												Kruskal-Wallis Analysis		
	50–59			60–69			70–79			80–89					
	n	$\bar{X}$ (SD)	95% CI	n	$\bar{X}$ (SD)	95% CI	n	$\bar{X}$ (SD)	95% CI	n	$\bar{X}$ (SD)	95% CI	χ^2	df	P
BESTest															
Total score (%)	20	95.7 (2.9)	94.4–97.1	20	91.4 (3.4)	89.8–93.0	20	85.4 (6.0)	82.5–88.2	19	79.4 (10.6)	74.3–84.5	47.990	3	<.001
Section score (%)															
Biomechanical constraints	20	96.3 (9.0)	92.1–100.6	20	89.0 (9.5)	84.6–93.4	20	83.7 (10.5)	78.8–88.6	19	78.6 (13.4)	72.1–85.1	28.843	3	<.001
Stability limits/verticality	20	94.8 (4.3)	92.7–96.8	20	92.1 (6.6)	89.1–95.2	20	87.1 (8.0)	83.4–90.9	19	85.2 (9.1)	80.8–89.6	17.463	3	.001
Anticipatory postural adjustments	20	97.8 (5.2)	95.3–100.2	20	94.4 (6.7)	91.3–97.6	20	85.6 (12.3)	79.8–91.3	19	75.1 (18.2)	66.4–83.9	28.401	3	<.001
Postural responses	20	96.9 (4.6)	94.8–99.1	20	88.3 (9.9)	83.7–92.9	20	85.5 (7.9)	81.8–89.3	19	76.9 (17.3)	68.5–85.2	29.460	3	<.001
Sensory orientation	20	98.3 (3.0)	96.9–99.7	20	96.7 (5.1)	94.3–99.0	20	94.7 (10.1)	90.0–99.4	19	88.8 (14.1)	82.0–95.5	11.782	3	.008
Stability in gait	20	92.6 (5.0)	90.3–94.9	20	90.0 (6.5)	86.9–93.1	20	77.8 (12.3)	72.1–83.6	19	73.1 (13.2)	66.8–79.5	36.571	3	<.001
Mini-BESTest (maximum score=28)	19	26.3 (1.1)	25.7–26.8	18	24.7 (2.2)	23.6–25.8	20	21.0 (3.1)	19.5–22.4	19	19.6 (4.2)	17.6–21.6	41.662	3	<.001
Brief-BESTest (maximum score)															
Total score (24)	20	22.7 (1.7)	21.9–23.5	20	20.5 (2.2)	19.5–21.6	20	18.8 (3.3)	17.3–20.4	19	15.0 (4.7)	12.8–17.3	37.608	3	<.001
Section score															
Biomechanical constraints (3)	20	2.9 (0.5)	2.6–3.1	20	2.1 (1.2)	1.5–2.6	20	2.2 (1.0)	1.8–2.7	19	1.8 (1.0)	1.4–2.3	14.392	3	.002
Stability limits/verticality (3)	20	2.7 (0.5)	2.5–2.9	20	2.5 (0.5)	2.3–2.7	20	2.4 (0.5)	2.1–2.6	19	2.0 (0.5)	1.8–2.2	16.710	3	.001
Anticipatory postural adjustments (6)	20	5.7 (0.9)	5.3–6.1	20	5.6 (0.8)	5.2–5.9	20	4.0 (2.0)	3.0–4.9	19	2.6 (2.1)	1.6–3.7	29.417	3	<.001
Postural responses (6)	20	5.7 (0.7)	5.3–6.0	20	4.9 (1.2)	4.3–5.4	20	4.8 (0.7)	4.4–5.1	19	3.8 (2.0)	2.8–4.8	17.413	3	.001
Sensory orientation (3)	20	2.8 (0.4)	2.6–3.0	20	2.6 (0.6)	2.3–2.9	20	2.7 (0.6)	2.4–2.9	19	2.1 (0.8)	1.7–2.5	10.566	3	.014
Stability in gait (3)	20	3.0 (0.0)	3.0–3.0	20	3.0 (0.0)	3.0–3.0	20	2.9 (0.3)	2.8–3.0	19	2.6 (0.5)	2.4–2.9	17.152	3	.001

[a] CI=confidence interval.

STAIR CLIMBING POWER TEST

PURPOSE:

This is a simple and safe measure associated with measures of lower-limb muscle strength, power, and functional performance in older adults

EQUIPMENT REQUIRED:

1. Staircase of 10 steps
2. Tape measure
3. Stop watch

METHODOLOGY

The subject is told to ascend 10 steps as quickly and as safely as possible. The subject may use the handrail if he/she thinks it is necessary for safety purposes.

The instructor says "Ready, set, go." At "go", the patient starts ascending the stairs and timing begins.

Timing ends when both feet of a subject reached the top step.

DATA FORM

PATIENT NAME: _____ AGE: _____

PATIENT HEIGHT: _____ WEIGHT: (KG) _____

STAIR HEIGHT (m): _____

TIME:

TRIAL #1: _____ TRIAL #2: _____ AVG: _____

POWER: power = vertical height (m)/time (sec) X body weight X 9.81 N

= (____ / ____) X (____) X (____) = _____ W

Bean JF, Kiely DK, LaRose S, et al. Is stair climb power a clinically relevant measure of leg power impairments in at-risk older adults? Arch Phys Med Rehabil. 2007;88: 604–609.

FRAIL QUESTIONAIRE ITEMS

1. **F** (Fatigue): Is the patient easily fatigued?	Y/N
2. **R** (Resistance): Is the patient unable to walk up one flight of stairs?	Y/N
3. **A** (Ambulation): Is the patient unable to walk one block?	Y/N
4. **I** (Illnesses): Does the patient have more than five illnesses?	Y/N
5. **L** (Loss of weight): Has the patient lost more than 5% of weight in the past 6 months?	Y/N

SCORING

ROBUST: 0
1-2 PREFRAIL
3-5 FRAIL

Fatigued: Are you fatigued?	Y/N
Resistance: Cannot walk up 1 flight of stairs.	Y/N
Aerobic: Cannot walk 1 block	Y/N
Illness: Do you have more than 5 illnesses?	Y/N
Loss of weight: Have you lost more than 5% of your weight in the past 6 months?	Y/N

Linking Exercise Outcomes to Function

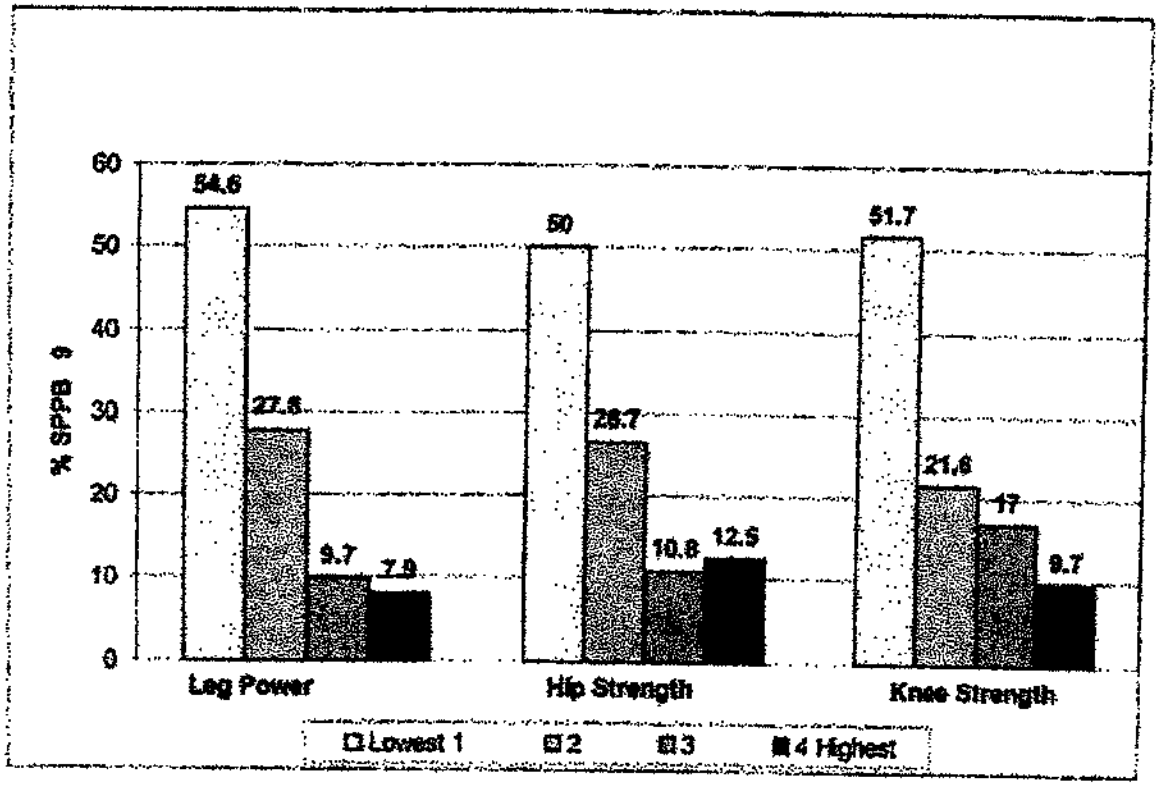


Figure 1. Quartiles of impairment. Percentages of individuals with poor physical performance (SPPB ≤9) according to quartiles of lower extremity muscle power and strength. SPPB ≤9 is consistent with moderate–severe mobility limitations. SPPB = Short Physical Performance Battery.

Bean JF, et al. J Gerontol: Medical Sciences 2003;58A:728

Linking Exercise Capacity to Function

Table 3. Pearson and Spearman correlation coefficients between isometric quadriceps strength explosive force, and power measures, and functional capacity.

		SPPB total score	Balance score	Gait speed (m/s)	5STS time (s)
MVIC (Nm)	r-value	.243	.278*	.227	−.159
	p-value	.051	.025	.069	.205
RTD	r-value	.150	.231	.193	−.129
	p-value	.237	.067	.126	.308
Average power (watts)	r-value	.457**	.403**	.321**	−.322**
	p-value	.000	.001	.009	.009
Peak Power (watts)	r-value	.370**	.349**	.321**	−.237
	p-value	.003	.005	.010	.060
Peak velocity (deg/s)	r-value	.308*	.262*	.293*	−.334**
	p-value	.013	.035	.018	.007

In gray: Spearman correlation coefficients

**Correlation is significant at the 0.01 level (2-tailed); *Correlation is significant at the 0.05 level (2-tailed). Abbreviations: 5STS: Five-repetition sit-to-stand; s:second; SPPB: Short Physical Performance Battery; m/s: meter/second; Nm: Newton-meter; deg/s: degree/second; MVIC: isometric maximal voluntary contraction; RTD: rate of torque development between 40 and 80% of peak MVIC in isometric assessment

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It's Not Always All About the Nuts and Bolts of Exercise Testing and Prescription!

G. Stephen Morris, PT, PhD, FACSM

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Recently, I was flying home after having taught a continuing education course for the Academy, titled "Exercise Training Guidelines for Individuals With Cancer." As I raced along at 35 000 feet, I asked myself, "What key points, outside of the basics of exercise testing and prescription, would I like my audience to take home with them"? Following is a partial answer to that question.

A. Consider providing each patient who comes to you for care with a heart rate monitor with a chest strap at the time of initial evaluation. I make this recommendation for several reasons. First, consider it a safety issue. Increasing heart rate normally accompanies an increase in exertional demand (exercise) and does so in a manner that is directly proportional to a progressive increase in exertional demand.[1] A failure of heart rate to do so appropriately suggests that the mechanisms controlling heart rate are dysfunctional and your patient is at risk for an adverse event. Placing heart rate monitors on patients allows the clinician [and the wearer] to easily and quickly access real-time heart rate information, information that might suggest cardiac dysfunction, a signal for discontinuing an exercise session, and possibly a referral back to the patient's oncologist for further evaluation.

Cancer survivors are at increased risk for autonomic dysfunction, a comorbidity that can compromise their ability to appropriately respond to increasing exertional demand.[2] Knowledge of an apparent mismatch between exercise intensity and heart rate can be a safety issue and an exercise prescription issue. Combining real-time monitoring of heart rate during exercise with visual inspection for the presence of signs and symptoms of cardiovascular distress and patient-reported rating of perceived exertion provides a robust perspective of patient response to exercise intensity and provides assurances that a heart rate–based exercise prescription is both safe, efficacious, and physiologically sound.[3]

Most aerobic exercise intensities are predicated on an estimated maximum heart rate and are prescribed within defined target heart rate ranges that, if achieved for sufficient duration, will improve conditioning status.[1] A patient wearing a heart rate monitor while aerobically exercising allows a clinician and the patient to quickly and easily determine whether the target heart rate contained in the exercise prescription is being achieved or whether the exercise prescription is inappropriate either in general or for that particular session. Knowing that the patient is exercising within his or her target heart rate range helps ensure that reconditioning goals will be met and treatment plans are being followed.

Finally, clinicians often rely on the heart rate numbers provided by a pulse oximeter. While providing 2 pieces of physiologic information, these devices have, in my experience, proven to be generally unreliable from an operational perspective, that is, they often work only intermittently during exercise. It is discouraging for a clinician to be in the midst of an exercise test only to have the pulse oximeter fail, limiting the collection of important functional and physiological data.

Rehabilitation Oncology

The author declares no conflicts of interest.

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B. Deconditioning is not limited in the cancer survivor to aerobic deconditioning and will, quite likely, include strength deficits, a problem that can adversely affect a survivor's physical functional capacity.[4] As such, an exercise prescription must include goals and interventions to improve both aerobic conditioning and strength. We all learned how to perform manual muscle testing (MMT) in school, focusing on proper hand placement and joint stabilization. Despite the quality of our techniques, results from MMT remain qualitative at best and provide challenges in translating the results into quantifiable exercise prescriptions and strengthening goals. New devices such as hand-held myometers that quantify the force produced during a manual muscle test have been shown to be reliable, valid, and increasingly available.[5] Results from these devices are sensitive to testing techniques, particularly to instrument placement, so testing protocols must be standardized within a clinic and across institutions. The 1-repetition maximum test is also safe and reliable for use in the oncology population, but its use may be limited by the availability of appropriate testing equipment.[6] Other strength testing tools are available, such as an isokinetic machine, but these devices have signtficant practical limitations in a clinical setting. Knowing or accurately estimating a patient's strength allows for documenting quantifiable assessments of strength and generating personalized exercise prescriptions.

C. The average age of a patient in this country at the time of a cancer diagnosis is 56 years, and 75% of survivors are older than 65 years. These facts graphically point out that treating survivors often requires treating comorbidities associated with the disease and its treatment as well as those associated with older age. Oncologic physical therapists are often geriatric physical therapists by default, and they must recognize this reality. Because of their age, many cancer survivors experience sarcopenia, a progressive, age-associated loss of muscle strength, which, in turn, diminishes their physical functional capacity. Sarcopenia contributes to frailty, a physical phenotype characterized by the presence of 3 or more phenotypes (unintentional weight loss, weakness, poor endurance, slowness, and inactivity).[7] The presence of frailty has been associated with an earlier occurrence of disability, premature aging, compromised surgical outcomes, and reduced responsiveness to chemotherapy.[8] The deficits that characterize frailty are clearly identifiable and treatable by physical therapists. While these losses are not completely reversible, participation in an exercise training program can ameliorate this progressive decline in strength and aerobic capacity, further supporting my argument that the evaluation and treatment of most cancer survivors should include aerobic and resistance exercise testing and the development of a multimodal exercise prescription. Diagnosing frailty, even if it is not contained in a medical prescription for physical therapy, can identify deficits that should be treated, thus allowing for expanding the services offered to these patients. Gait speed is considered to be the best, single-item screening tool for assessing for frailty.

D. Available guidelines to assist clinicians in the development of exercise programs for cancer survivors generally fail to incorporate exercise guidelines specific for the older individuals. Because of this oversight, clinicians must know and understand these guidelines so that they can safely and effectively provide exercise-based services to the older cancer survivor. For example, the American College of Sports Medicine (ACSM) and the American Heart Association have provided recommendations for physical activity in older adults.[9] Some of the recommendations for this group are interesting. For example, the authors strongly recommend the use of the 0- to 10-point rating of perceived exertion scale rather than heart rate to describe exercise intensity, with a 5- to 6-point rating equaling moderate exertion. When there is concern that an individual might not understand exercise intensity, a period of supervised exercise is recommended so as to help the individual learn the desired level of exertional effort. Sets of resistance exercises should include 10 to 15 repetitions rather the 8 to 12 repetitions recommended for adults. Specific recommendations call for the engagement in at least 10 minutes of flexibility activities per exercise session and these activities be performed on all days that aerobic and muscle-strengthening activities are performed, which suggests that flexibility activities should be performed as many as 5 times per week. Perhaps, most significantly, these authors remind us that older individuals commonly have comorbid conditions requiring specific exercise interventions that may be superimposed on general reconditioning needs. As such, an optimal exercise prescription may need to reflect a blending of general public health recommendations, that is, ACSM guidelines[1] for reconditioning with an impairment and disease-specific prescription.

E. Every physical therapist knows that changing the fitness status of a patient requires that individual to be sufficiently challenged physiologically to bring about adaptations to reduce the relative demand of physical and functional activity. Defining that challenge is the underlying premise of the FITT model, that is, exercise Frequency, Intensity, Time (duration), and Type.[1] Exercise prescriptions or exercise-based treatment plans must clearly

quantify these components of an exercise prescription and describe how the exercise program will be progressed over the duration of the treatment plan. These characteristics of an exercise session must be documented in daily notes, if for no other reason than to inform the next therapist or assistant who treats the patient what had been done previously and what steps need to be taken to ensure progression of the treatment plan. In 2012, Campbell et al[10] reviewed randomized controlled trials of exercise interventions used to study women with a diagnosis of breast cancer for the completeness of their reporting on the FITT specifics of tested exercise protocols. None of the 29 articles reviewed reported all FITT components of their exercise prescription or adherence to the prescribed exercise program. If researchers do not fully document exercise specifics and adherence, I wonder what is occurring in the clinics regarding completeness and accuracy of documentation. Incomplete documentation can easily compromise the effectiveness of an exercise prescription and possibly demonstrate that a treatment plan is not being implemented. After all, if a treatment plan calls for a patient walking on a treadmill at a target heart rate range of 45% to 55% of heart rate reserve for 25 minutes, shouldn't the note demonstrate that this intervention did indeed occur. The Template for Intervention Description and Replication (TIDieR) checklist prompts authors to describe interventions in adequate detail to allow their replication. This checklist includes the minimum recommended items for describing an intervention in a publication. This journal requires the checklist be included in the submission of intervention manuscripts as do most biomedical journals.[11]

Enough of my ramblings!!!!
Cheers.

G. Stephen Morris, PT, PhD, FACSM

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