

PREMIER Clinical Manual of Procedures

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Summary of Edits

Summary of changes between Version 1.0 and 1.1:

- If pre-exercise heart rate is <40 or >110 beats/minute, do not perform treadmill test. Test may be rescheduled and performed when pre-exercise heart rate is in the correct range.
- If the test is discontinued early, proceed directly to cool down. If the test is discontinued because the participant is experiencing chest pain, cool down rapidly so that participant can dismount safely and staff can attend to his symptoms.

Summary of changes between Version 1.1 and 1.2:

- Added a step to estimate the number of revolutions per minute to treadmill qc procedure

Summary of changes between Version 1.2 and 1.3:

- Corrects calibration step 7 calculation of belt speed to 6 times the belt length as the distance factor
- Corrects numbering of step references in calibration steps 8 and 9.
- Adds instruction to call service contractor where appropriate
- Adds instructions for creating measurement device with tri-square and level, and how to use it.

Summary of changes between Version 1.3 and 1.4:

- Updates staff certification procedure to show that master trainer (or backup master trainer) observes staff performing treadmills quarterly while in use, rather than monthly.

Summary of changes between Version 1.4 and 1.5:

- Confirms that heart rate should be monitored continuously during the procedure, and test should be terminated immediately if heart rate equals or exceeds 85% of age-predicted maximum.

18. Fitness Assessment

Introduction

A submaximal treadmill exercise test will be used to estimate cardiorespiratory fitness from the participants' heart rate response to a set workload. The underlying assumption for using this procedure is that as an individual's fitness level improves, heart rate at a set workload (e.g., HR at 3 mph) will be lower. The advantages of using this method are that no extrapolation is performed to estimate cardiorespiratory fitness, which has error associated with it, and no assumptions are made regarding a participant's maximal heart rate.

Blinding

It is preferred that the treadmill test be conducted by a blinded staff person. When this is not possible, treadmill testing may be conducted by an unblinded staff person who is not doing intervention visits or taking outcome blood pressure measurements.

Treadmill Protocol

Background

The treadmill protocols are devised based on the following assumptions:

1. Protocol to not exceed moderate intensity, since the intervention goals to all individuals are for moderate intensity, with vigorous intensity for those who qualify and are interested.
2. The protocol is based on estimated maximal cardiorespiratory fitness (METs) based on 50th percentile norms for age and sex.
3. The treadmill walk takes 10 full minutes. (Total time for the test including preparation is 20-25 minutes).

There are different protocols for men and women between the age of 20 and 39 years, 40 and 59 years, and 60 years and over. The protocols are listed in Appendix 1 at the end of the chapter.

The treadmill protocols are devised to have one workload in the light intensity category and one in the moderate intensity category. Each stage is for 3 minutes. There is a 2-minute warm-up before Stage 1 and a 2-min cool down after Stage 2. Each participant should be on the treadmill for 10 minutes.

Required equipment and materials

- Any brand of treadmill as long as it can be calibrated for speed and incline
- Polar Vantage XL or other brand heart rate monitor able to keep a continuous digital read out
- Heart monitor extension strap for larger people (need several, elastic is not very resilient and gets stretched out easily)

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- Stethoscope (any brand or style that is capable of a clinically valid measure)
- Standard sphygmomanometer (any brand or style that is capable of a clinically valid measure. If using a mobile mercury, will need a long BP tube)
- Wide tape (paper type like used in lab) to hold BP cuff from sliding down participant's arm.
- Large timer
- Towel and water bottle for participant after test
- Treadmill Protocol table (Appendix 3)
- Fitness Test Form (Form #26)
- Ratings of Perceived Exertion (RPE) Scale (Appendix 4 – make into a poster-sized chart and place in front of treadmill)

Preparing the participant for the test

Participants should be given basic instructions when the visit for the test is scheduled. They need to wear comfortable clothing with loose sleeves and athletic or rubber soled shoes with socks.

Clinics should keep extra clothing (eg. Scrub tops) for participants who are not dressed appropriately.

Treadmill Procedures

- 1. Welcome participant and ask if he/she has ever walked on a treadmill before.**
 - a) If not, reassure the participant that it is very easy and all of the walking will be “at an effort level where you can speak and breathe comfortably.”
 - b) If not, give a brief demonstration of how to walk on a treadmill (this should take less than one minute).
- 2. Explain the objective of the test to the participant.** See Appendix 1 for instructions and a sample script. Important points to cover are:
 - a) The test is sub-maximal (“a level where you can speak and breathe comfortably”).
 - b) There is a 2-minute warm-up, 2 stages of progressive workload in which the speed and grade will increase slightly, and a 2-minute cool-down. The participant will be on the treadmill for 10 minutes.
 - c) Heart rate will be monitored continuously; blood pressure will be monitored at the end of each stage. This is not a “score” for the participant, just an assessment of their heart rate.
 - d) If heart rate or blood pressure goes too high (see item #13 p.18-5), the test will be terminated.
 - e) If the participant has any chest pressure, dizziness, or other symptoms, the participant should inform the technician and the test will be terminated.
- 3. Explain the Ratings of Perceived Exertion (RPE) Scale.** The scale should be displayed near the treadmill. Instruct the participant that you will be asking them how hard they feel like they are working during the last minute of each stage. See Appendix 2 for participant instructions.

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4. Prepare participant for test

- a) Place heart rate band on participant using the procedure described by the manufacturer. For example, if using Polar heart rate bands and monitors: Put clean Polar heart rate band around participant's chest (below bra line for women). The "Polar" brand name should be in the center-front. The band may be moistened with water before placing it on the participant to hasten receiving heart rate information. Touch heart rate watch to "Polar" name on chest band to activate the heart rate.
- b) Apply the correct size BP cuff to the participant's arm at heart level. Either arm can be used. Use paper tape to maintain in position throughout the test.

5. Seat participant for 5 minutes. While the participant is seated:

- a) Fill out the participant's ID and the date of the visit on the Fitness Test Form (#26)
- b) Compute predicted maximal heart rate ($= 220 - \text{age}$) and 85% predicted maximal heart rate ($= 220 - \text{age}$) * 0.85. Record this information on the Fitness Test Form (#26).

6. After the 5 minutes is up, measure pre-exercise blood pressure and record on the Fitness Test Form.

7. Measure pre-exercise heart rate and record on the Fitness Test Form. If the pre-exercise heart rate is <40 or >110 beats/minute, do not perform the treadmill test and refer the participant to his physician for follow-up. The test may be rescheduled and performed at a time when the pre-exercise heart rate is in the appropriate range.

8. Guide participant to the treadmill: use appropriate protocol depending on participant's age and sex. Participants should be told they cannot hold on to the handrails (after initial balance is established).

9. Refer to Appendix 3 for the correct age and gender protocol

10. Program treadmill for 2-minute warm-up at appropriate speed.

11. Stage 1: Increase treadmill pace and incline at 1:55. Record heart rate at 2:50 and 3:50. Measure blood pressure and RPE at 4:20. Record heart rate again at 4:50. Record blood pressure and heart rate on Fitness Test Form.

12. Stage 2: Increase treadmill grade at 4:55. Record heart rate at 5:50 and 6:50. Measure blood pressure and RPE at 7:20. Record heart rate again at 7:50. Record blood pressure and heart rate on Fitness Test Form (#26).

13. Cool down: Decrease treadmill speed and grade at 7:55. Record cool down heart rate at 9:50. After a 3 minute seated rest, record blood pressure and post exercise heart rate on Fitness Test Form.

14. Continue the test until completion or if criteria for terminating the protocol are met . Criteria are:

- a) Participant heart rate $\geq 85\%$ of age-predicted maximal heart rate at any time during the fitness test. Record this heart rate in the next available field for heart rate on Form #26.
- b) Blood pressure greater than 240 mmHg systolic or 115 mmHg diastolic.
- c) Participant complains of chest pressure, dizziness, or other symptoms.
- d) Participant RPE > 17

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15. If any criteria for terminating the protocol are met (see 14 a-d), then proceed directly to the cool down stage of the procedure. If the test is discontinued because a participant is experiencing chest pains, accelerate the cool down by slowing the treadmill as rapidly as possible so that participants can dismount safely and staff can attend to their symptoms.

Safety Precautions

Safety precautions for the exercise testing will include training clinic staff to handle any emergencies that may arise. All clinical center staff should be aware of the procedures to follow should a participant experience a coronary event during the administration of the test. All technicians responsible for administering the treadmill test will receive formal training in CPR and will hold a valid certificate from the American Heart Association or another organization that provides training. Emergency telephone numbers should be prominently posted near the telephone.

Training, Certification, and Quality Assurance

Certification of a master trainer for each clinical site is done annually at a central location. At that time the study wide trainer reviews the appropriate techniques for measuring and recording the treadmill results.

All technicians take duplicate measurements on two individuals. Technicians are certified to

- Explain the test objective and safety procedures
- Explain the RPE chart to the participant
- Perform pre-test calculations (age predicted MHR, 85% MHR)
- Perform test preparation procedures (heart rate monitor, BP cuff placement, resting BP and pulse)
- Select pace and incline appropriate for participant's age and gender
- Measure exercise blood pressure
- Measure exercise pulse
- Measure exercise intensity by recording the participant reported RPE at the correct time
- Perform appropriate and timely adjustment of treadmill pace and incline
- Accurately complete the Fitness Test Form (#26)

The master trainer will then go back to the clinical site and train other staff as needed to do the treadmill protocol. For each person trained, the following form is completed by the master trainer and copies are sent to the Coordinating Center:

- Form #326, Fitness Test Certification Form

The master trainer (or backup master trainer) will also observe at least one treadmill testing session per technician each quarter (Form #326) while fitness tests are being conducted.

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Treadmill Calibration

The equipment selected for exercise testing must be reliable, and allow for calibration every 3 months or 50 hours of use, whichever comes first. The resulting quality control allows one to evaluate the effectiveness of an exercise program, or simply to establish the fitness levels of those beginning an exercise program. This section is meant to be instructive and not a replacement for the specific procedures recommended by the manufacturer.

Treadmill

The treadmill is one of the most common pieces of equipment used to study exercise responses. The intensity of the exercise can be altered by changing the speed and/or grade. Reasonable results depend on accurate grade and speed settings.

Speed Calibration

Method 1. In some older treadmills, a mechanical counter is attached to the rear of the treadmill with a micro switch suspended over the treadmill belt. As the belt moves around the drums, an elevated surface on the outside edge of the belt triggers the switch. If the belt length (in meters) and the number of times the belt moves past the switch per minute are known, belt speed can be calculated in meters per minute ($\text{m}\cdot\text{min}^{-1}$). It is possible to use the same procedure on any treadmill by doing the following:

1. Using a meter stick, measure exact length of the belt, and record the value.
2. Place a small piece of tape on the belt surface near the edge, or mark the surface with a pen.
3. Turn on the treadmill to a given speed, using the speed control.
4. **Estimate the amount of revolutions per minute.** Count the number of belt revolutions in one minute by counting the number of times the piece of tape on the belt passed a fixed point, i.e., the back roller of the treadmill. Use a digital timer with an audio alarm to time 60 seconds, while the observer watches the belt and counts rotations. Alternatively, use two staff, one to count belt revolutions and the other to observe time on a stopwatch: start counting with “zero” and start your watch as the tape first moves past the fixed point.
5. Convert the number of revolutions to revolutions per minute as follows:
 - use a stopwatch to measure the exact time, in seconds, required for the belt to complete the number of revolutions observed in step 4.
 - convert this time in seconds and revolutions per minute into revolutions per minute.

6. For example, if the belt made 33 complete revolutions in 58 seconds:

$$58 \text{ sec} \div 60 \text{ sec}\cdot\text{min}^{-1} = .967 \text{ min.}$$

$$\text{So, } 33 \text{ rev} \div .967 \text{ min} = 34.14 \text{ rev}\cdot\text{min}^{-1}$$

7. Multiply the calculated $\text{rev}\cdot\text{min}^{-1}$ (step 6) times the belt length (step 1). The product is the belt speed in $\text{m}\cdot\text{min}^{-1}$. For example, if the belt length were 2.532 m:

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$$34.14 \text{ rev}\cdot\text{min}^{-1} \times 2.532 \text{ m}\cdot\text{rev}^{-1} = 86.4 \text{ m}\cdot\text{min}^{-1}$$

8. To convert $\text{m}\cdot\text{min}^{-1}$ to miles per hour ($\text{mi}\cdot\text{hr}^{-1}$), divide the answer in step 7 by 26.8 $\text{m}\cdot\text{min}^{-1}$ per $\text{mi}\cdot\text{hr}^{-1}$:

$$86.4 \text{ m}\cdot\text{min}^{-1} \div 26.8 \text{ m}\cdot\text{min}^{-1} \text{ per } \text{mi}\cdot\text{hr}^{-1} = 3.22 \text{ mi}\cdot\text{hr}^{-1}$$

9. The value obtained in step 8 is the actual treadmill speed in $\text{mi}\cdot\text{hr}^{-1}$. If the speed indicator does not agree with this value, adjust the dial or display to the proper reading using directions in the manual that accompanied the treadmill, or call the service contractor.
10. Repeat for a number of different speeds to ensure accuracy across the speeds used in test protocols.

Method 2. If your treadmill is equipped with a device to count the revolutions of one of the drums, the counter may be used to check the accuracy of the speedometer. Simply set the counter to zero, set the treadmill to the desired speed, and operate the counter for exactly 1 minute. Check the instruction manual for your treadmill to make sure of the relationship between the $\text{rev}\cdot\text{min}^{-1}$ and speed in $\text{mi}\cdot\text{hr}^{-1}$. Adjust the speedometer to the correct setting, or call the service contractor. This method is accurate only if the treadmill belt is properly adjusted and does not slip.

Elevation Calibration

The manual that comes with the treadmill describes how to calibrate the grade with a simple “carpenter’s level” and a “square.” This calibration procedure is shown below.

1. Use a carpenter’s level to make sure that the treadmill is level and check the “O” on the grade dial under these conditions (with the treadmill electronics “on”). If the dial does not read “O,” follow instructions to make the adjustment.
2. Elevate the treadmill so that the grade dial reads approximately 20%. Measure the exact incline of the treadmill as shown in Figure 1. When the level’s bubble is exactly in the center of the tube, the “rise” measurement is obtained. Calculate the grade as the “rise” over the “run” (tangent θ), and adjust the treadmill meter to read that exact grade, or call the service contractor. For example, if the “rise” were 4.5 inches to the “run’s” 22.5 inches, the fractional grade would be:

$$\text{Grade} = \text{tangent } \theta = \text{rise} \div \text{run} = 4.5 \text{ in} \div 22.5 \text{ in} = 0.20 \times 100\% = 20\%$$

3. Repeat this process at grades between 0 and 20° (0-34%) to make sure the meter is correct. An alternative measurement device can be created with a 48-inch level, an adjustable tri-square and a 1-½ inch C clamp. Attach the tri-square to one end of the level so that the flat surface of the 90-degree tri-square angle rests on the long surface of the level and the 12-inch ruler part of the tri-square is flush with the level’s end. The C clamp is used to hold the tri-square in this position.

1. With the measurement device assembled the 48-inch level is placed on the surface of the treadmill so that the tri-square end is at the rear of the treadmill. At low ranges of incline the

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device will need to be placed on the treadmill so that the tri-square is on the upper surface of the level. At high ranges of incline the device will need to be reversed.

2. Verify that the treadmill is flat. With the treadmill reading 0 grade, place the device on the surface of the treadmill. The horizontal bubble in the center of the level should be in the mid-point of the glass, between the lines.

3. Measure various grades of incline. Increase the incline. Hold the level so the bubble shows it is horizontal. Adjust the ruler on the tri-square with the thumbscrew so the lower end touches the surface next to the treadmill. The rise is measured on the tri-square ruler where the bottom edge of the level intersects the ruler. The run is the length of the level. The measurement limit of this device with a 48 inch ruler is a 25% incline. If the tri-square ruler measured the rise at 7 inches the fractional grade would be:

$$\text{Grade} = \text{tangent } \theta = \frac{\text{rise}}{\text{run}} = \frac{7 \text{ in}}{48 \text{ in}} = 0.145 \times 100\% = 14.5\%$$

This “Rise” over the “Run” method is a typical engineering method for calculating grade – the vertical rise divided by the horizontal run. This method gives the tangent of the angle (the opposite side divided by the horizontal distance, as shown in Fig. 1). Although this tangent method is not exactly correct, it is a good approximation for grades less than 20% or 12° (see Table 18-1).

Fig. 1. Calibration of grade by tangent method (rise run) with carpenter’s square and level

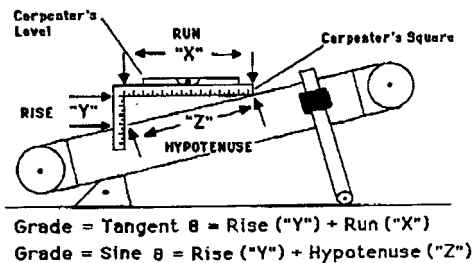
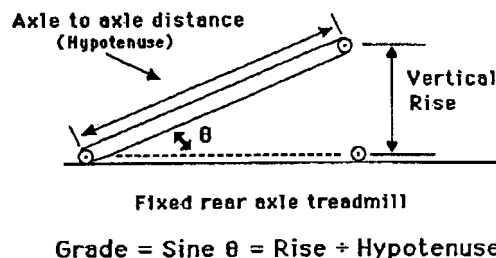


Fig. 2. Calibration of grade for fixed rear axle treadmill by sine method (rise hypotenuse)



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Table 18-1. Table of Natural Sines and Tangents

| Degrees | Sine | % Grade | Tangent | % Grade |
|---------|--------|---------|---------|---------|
| 0 | 0.000 | 0.0 | 0.0000 | 0.0 |
| 1 | 0.0175 | 1.7 | 0.0175 | 1.7 |
| 2 | 0.0349 | 3.5 | 0.0349 | 3.5 |
| 3 | 0.0523 | 5.2 | 0.0524 | 5.2 |
| 4 | 0.0698 | 7.0 | 0.0699 | 7.0 |
| 5 | 0.0872 | 8.7 | 0.0875 | 8.7 |
| 6 | 0.1045 | 10.4 | 0.1051 | 10.5 |
| 7 | 0.1219 | 12.2 | 0.1228 | 12.3 |
| 8 | 0.1392 | 13.9 | 0.1405 | 14.0 |
| 9 | 0.1564 | 15.6 | 0.1584 | 15.8 |
| 10 | 0.1736 | 17.4 | 0.1763 | 17.6 |
| 11 | 0.1908 | 19.1 | 0.1944 | 19.4 |
| 12 | 0.2079 | 20.8 | 0.2126 | 21.3 |
| 13 | 0.2250 | 22.5 | 0.2309 | 23.1 |
| 14 | 0.2419 | 24.2 | 0.2493 | 24.9 |
| 15 | 0.2588 | 25.9 | 0.2679 | 26.8 |
| 20 | 0.3420 | 34.2 | 0.3640 | 36.4 |
| 25 | 0.4067 | 40.7 | 0.4452 | 44.5 |

The “correct” method expresses grade as the sine of the angle ($\sin \theta$), where $\sin \theta$ equals the vertical rise (opposite side) over the hypotenuse [$\sin \theta = \text{rise} \div \text{hypotenuse}$ (see Fig. 1)]. This method should be used to calculate steep grades (above 20%). The vertical rise can be calculated simply for a treadmill with a fixed rear axle. Simply measure the change in the height of the front axle above the horizontal (rise). When you divide this by the axle length (hypotenuse), you have the grade, expressed as a fraction (Fig. 2).

For a treadmill with movable rear and front axles, the vertical rise is equal to the sum of the rise of the front axle and the drop of the rear axle (Fig. 3). When this total is divided by the axle-to-axle length, the quotient is the grade, expressed as a fraction. For example, if the front axle height, is 0.327 m on the level (0% grade) and 0.612 m at the unknown grade, the front axle rise is $0.612 - 0.327 = 0.285$ m. Similarly, if the rear axle height is 0.324 m at 0% grade and 0.299 m at the unknown grade, the drop is 0.025 m. The total vertical rise is then equal to the “rise” plus “drop” or $0.285 + 0.025 = 0.31$ m. If the axle-to-axle length (hypotenuse) is 2.095 m, the grade can be calculated as:

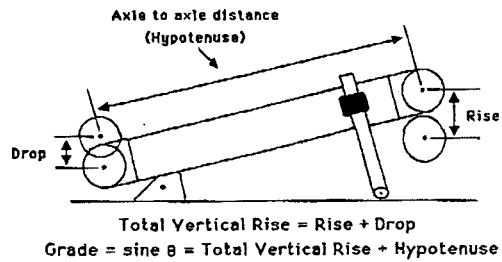
$$\text{Grade} = \text{total rise} \div \text{hypotenuse} = 0.31 \text{ m} \div 2.095 \text{ m} = 0.148 \times 100\% = 14.8\%$$

Note: For low grades (below 20%), the sine method gives a value that is nearly equal to the tangent method, so that method does not matter (see Table 18-1). For steep grades, one can also use the “rise” over the “run” method (using the carpenter’s square) to obtain the tangent value

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and then look across the table to obtain the correct sine value to set on the treadmill dial. For example, if the “rise” over the “run” method yielded 0.268 or 26.8% (tangent), the “correct” setting would be 25.9% (sine). The latter value is set on the grade dial of the treadmill.

Fig. 3. Calibration of grade for movable rear axle treadmill by sine method (rise hypotenuse)



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Appendix 1: Participant Instructions Script

Following is the information that should be explained to participants. These instructions can be read verbatim to the participant, or explained in a conversational manner. However, the points that must be covered are:

1. The test is submaximal.
2. There is a 2-minute warm-up, 2 stages of progressive workload for 3 minutes each stage, in which the speed and grade will increase slightly, and a 2-minute cool-down. The participant will be on the treadmill for 10 minutes.
3. Heart rate will be monitored continuously; blood pressure will be monitored at the end of each stage.
4. If the participant has any chest pressure, dizziness, or other symptoms, the participant should inform the technician and the test will be terminated.

PREMIER Exercise Test Script

Introduction and Overview

Today we're going to ask you to complete a fitness test on a treadmill that will evaluate your body's response to exercise. We will need you to walk on a treadmill for 10 minutes at an intensity level where you can speak and breathe comfortably. Have you ever walked on a treadmill? (If not, demonstrate.) There are a few guidelines I need you to remember throughout the test:

- 1) Straddle the belt when you step on the treadmill, making sure both feet are not touching the belt. After the belt starts you can slowly step on and begin walking
- 2) You can hold the rail to gain initial balance but when I tell you the test is beginning I will need you to release the railing
- 3) Never turn your head or body to the side or the back when you are walking on the treadmill
- 4) Let me know if anytime during the test you experience feelings of illness, nausea, shortness or breath, dizziness, or pain in your chest, jaw, and arms. If any of these symptoms occur, we'll stop the test immediately
- 5) Unless you need to report any unusual symptoms, I ask that you remain quiet during the test (especially when we are measuring your BP)

Preparation and Warm-up

What I first need you to do is rest quietly for 5 minutes. Then I'll measure your resting heart rate and blood pressure. After that, you can step on the treadmill and we'll let you warm up with a 2-minute walk at 2 mph.

Performance and Monitoring

The test will consist of 2 stages that will last 6 minutes. During those 6 minutes, I will gradually increase the speed and incline of the treadmill every 3 minutes. I'll be sure to let you know

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during the test when these changes will occur. As a safety precaution, I will also be periodically measuring your heart rate and blood pressure. To do this, I will need you to hold out your arm when I indicate that I need a BP measurement.

Ratings of Perceived Exertion Scale

One last thing I will ask you to report during the test is your perceived exercise intensity. To make this easier, I have a chart with a number scale from 6-20. Along side the numbers are words that describe different levels of physical exertion. Two times during the study I will ask you, “how hard to you feel you are working?” I will need you to look at this chart, find the words that best describe how the work feels at that point in time, and tell me the number that corresponds with your feelings. For example, if I’m walking on the treadmill at a certain pace and I felt as though I was working very light, I would estimate that my exercise intensity is at number 9. Keep in mind that as you look at the chart, there are no right or wrong numbers, only a number that represents how hard you feel you are working at a particular point in time.

Ending the test

After you’ve completed both stages of the test I will decrease your speed and incline and let you walk slowly for a 2 minute cool down period. Then you can sit down to rest for about 3 minutes and after that I’ll measure your blood pressure and heart rate one last time. Do you understand everything that I’ve explained? Do you have any questions before we get started?

Appendix 2: Ratings of Perceived Exertion Summary of Participant Instructions

1. Try to estimate the degree of exertion as accurately as possible.
2. Do not underestimate or overestimate the exertion. Simply rate your feelings caused by the work at the moment.
3. The ratings should be based on your own evaluation of your total body feelings, and not on leg cramps, leg fatigue, or other localized sensations.
4. Use the attached expressions to help you rate your feelings.
5. Start at any point shown on the scale — there are no right or wrong numbers.

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Appendix 3: Treadmill Protocols by Age and Gender

| | | | |
|-------------------|------------|----------|---------------------|
| Men ages 20-39: | Warm-up: | 2 MPH, | 0% |
| | Stage 1: | 3.3 MPH, | 2% grade (4.4 METs) |
| | Stage 2: | 3.3 MPH, | 7% grade (6.7 METs) |
| | Cool-down: | 2 MPH, | 0% |
| Men ages 40-59: | Warm-up: | 2 MPH, | 0% |
| | Stage 1: | 3 MPH, | 2% grade (4.1 METs) |
| | Stage 2: | 3 MPH, | 7% grade (6.2 METs) |
| | Cool-down: | 2 MPH, | 0% |
| Men ages 60+: | Warm-up: | 2 MPH, | 0% |
| | Stage 1: | 2.5 MPH, | 2% grade (3.6 METs) |
| | Stage 2: | 2.5 MPH, | 7% grade (5.3 METs) |
| | Cool-down: | 2 MPH, | 0% |
| Women ages 20-39: | Warm-up: | 2 MPH, | 0% |
| | Stage 1: | 3 MPH, | 2% grade (4.1 METs) |
| | Stage 2: | 3 MPH, | 7% grade (6.2 METs) |
| | Cool-down: | 2 MPH, | 0% |
| Women ages 40-59: | Warm-up: | 2 MPH, | 0% |
| | Stage 1: | 2.5 MPH, | 2% grade (3.6 METs) |
| | Stage 2: | 2.5 MPH, | 7% grade (5.3 METs) |
| | Cool-down: | 2 MPH, | 0% |
| Women ages 60+: | Warm-up: | 2 MPH, | 0% |
| | Stage 1: | 2 MPH, | 2% grade (3.1 METs) |
| | Stage 2: | 2 MPH, | 7% grade (4.5 METs) |
| | Cool-down: | 2 MPH, | 0% |

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Appendix 4: Ratings of Perceived Exertion Scale

| | |
|----|------------------|
| 6 | |
| 7 | Very, very light |
| 8 | |
| 9 | Very light |
| 10 | |
| 11 | Fairly light |
| 12 | |
| 13 | Somewhat hard |
| 14 | |
| 15 | Hard |
| 16 | |
| 17 | Very Hard |
| 18 | |
| 19 | Very, Very Hard |
| 20 | |

Your goal is to rate your feelings that are caused by the work and not the work itself. These feelings should be general, that is, about the body as a whole. We will not ask you to specify the feeling but to select a number that most accurately corresponds to your perception of your total body feeling. Keep in mind that there are no right or wrong numbers. Use any number you think is appropriate.