

Incremental Step Test - Instructions

Incremental Step Test

The incremental step test is an externally paced exercise test where the step cadence increases with each level, controlled by a series of pre-recorded signals. The test continues until the participant can no longer continue or cannot keep up with the required step cadence. The maximum duration of the test is 15 minutes.

Preparing to conduct the incremental step test

Equipment

The equipment required is: 1) a 20 cm tall platform or stair to perform the test; 2) a pre-recorded audio; 2) one chair, next to the platform/stair; 3) modified Borg scale to measure dyspnea and subjective fatigue; 4) sphygmomanometer for blood pressure measurement; 5) pulse oximeter (%SpO₂); 6) stopwatch; 7) access to telephone in case of an emergency; 8) an emergency plan; 9) portable supplemental oxygen if required to perform exercise test by participant; 10) a reporting sheet and pen.

Location

The test can be conducted in any setting (e.g., home environment), if the space and the ambient temperature is comfortable for the participant to exercise. However, testing should be performed in a location where a fast response to an emergency is possible, and the assessor should be certified in cardiopulmonary resuscitation with a minimum of basic life support certification.

Patient Preparation and Assessment

Participants should wear comfortable clothing and appropriate shoes and should then rest in a chair for at least 15 minutes before commencing the test. The following measurements should be obtained at rest: 1) SpO₂ and heart rate from pulse oximetry; 2) baseline dyspnea and fatigue; and 3) blood pressure.

Prior to the test

At the beginning of the test, the instructions, presented below, are read to the patient.

Instructions

“The objective of the incremental step test is to step up and down on this 20 cm high platform/stair as long as possible, keeping to the step cadence indicated by the bleeps on the audio recording. You will hear these bleeps at regular intervals.

You should step up one foot when you hear the first beep, step up the second foot when you hear the second beep, step down one foot when you hear the third beep, and step down the other foot when you hear the fourth beep, and so on. At first, your step cadence will be very slow, but you will need to speed up at the end of each minute. Your aim should be to follow the set rhythm for as long as you can. You should stop stepping up and down only when you become too breathless to maintain the required step cadence or can no longer keep up with the set pace.

The test is progressive. In other words, it is easier at the start and harder at the end. The step cadence for the first minute is very slow, only 10 steps/minute. The test will start so get ready.”

Once the instructions have been read, and the assessor has confirmed that the patient has understood, the patient is positioned in front of the platform/stair.

During the Test

The assessor should watch the patient and keep count of the number of steps as the participant completes them, throughout the duration of the test. One step is counted when both feet step up and step down the platform.

In case of imbalance, the use of a handrail is allowed if the participant so prefers. As the step cadence increases every minute, indicated by a different beep, it is important to advise the participant “you now need to increase your rhythm of stepping”.

Termination of the test

The test is ended when: 1) not able to maintain the required step cadence for 10 seconds; 2) requested by the participant; 3) SpO₂ falls to ≤85%, or 4) reported symptoms (chest pain, intolerable dyspnea, leg cramps, diaphoresis and a pale or ashen appearance).

Recording performance of the test

The main outcome measure of the incremental step test is the total number of steps performed. Maximal step cadence reached and duration of the test should also be

recorded. The maximal step cadence must be recorded according to the last completed level during the test.

These instructions have been adapted from the recommendations for conducting field walking tests in people with chronic respiratory disease, from the new European Respiratory Society/American Thoracic Society Technical Standard [1, 2].

An example of a reporting form for the incremental step test is presented below.

Incremental Step Test - Reporting Form

Date: ___ / ___ / _____

Name: _____

Date of birth (dd/mm/yyyy): ___ / ___ / _____

Diagnosis: _____

Supplemental oxygen (flow rate, device, method carried): _____

Medication taken today (dose and how many hours prior to testing?):

Observations: _____

Incremental Step Test - First Attempt

	Rest	1 min	2 min	3 min	4 min	5 min	6 min	7 min	8 min	9 min	10 min	11 min	12 min	13 min	14 min	15 min
HR																
BP																
SpO ₂																
Dyspnea																
Fatigue																

HR: Heart rate; BP: blood pressure; SpO₂: peripheral oxygen saturation. Note: the blood pressure should not be assessed due to the difficulty of measuring during the stepping.

Reason for termination: _____

Recovery

HR: _____ SpO₂(%): _____ Dyspnea: _____ Fatigue: _____

Performance

Total number of steps: _____ Maximal step cadence: _____ Duration: _____

Incremental Step Test - Second Attempt

	Rest	1 min	2 min	3 min	4 min	5 min	6 min	7 min	8 min	9 min	10 min	11 min	12 min	13 min	14 min	15 min
HR																
BP																
SpO ₂																
Dyspnea																
Fatigue																

HR: Heart rate; BP: blood pressure; SpO₂: peripheral oxygen saturation. Note: the blood pressure should not be assessed due to the difficulty of measuring during the stepping.

Reason for termination: _____

Recovery

HR: _____ SpO₂(%): _____ Dyspnea: _____ Fatigue: _____

Performance

Total number of steps: _____ Maximal step cadence: _____ Duration: _____

Comments: _____

Best test - Performance

Total number of steps: _____ Maximal step cadence: _____ Duration: _____

Comments: _____

References

1. Holland AE, Spruit MA, Troosters T, et al. An official European Respiratory Society/American Thoracic Society technical standard: field walking tests in chronic respiratory disease. *Eur Respir J* 2014;44(6):1428-46.
2. Holland AE, Spruit MA, Singh SJ. How to carry out a field walking test in chronic respiratory disease. *Breathe* 2015;11(2):128-39.