

Exercise Challenge to Test for Exercise-induced Bronchoconstriction

An exercise challenge to test for exercise-induced bronchoconstriction (EIB) is a specialized exercise stress test that can detect changes in lung function with vigorous exercise. Your lung function is measured (with a test called spirometry) before and after exercise to look for changes that are seen with EIB. It can also be used for people who have known asthma to look for exercise-induced asthma problems (EIA). This fact sheet describes the EIB exercise challenge. For more information about spirometry and other lung function tests see the ATS Patient Information Series at www.thoracic.org.



Why am I being asked to perform this test?

This test is usually done to help with the diagnosis of EIA or EIB. Your healthcare provider might order it if you have symptoms that are suggestive of asthma with exercise, such as cough and shortness of breath during or after exercise. If you have EIA or EIB, you could have a drop in lung function with exercise.

The test can also be done to assess how well medical treatment for EIA, such as inhalers or pills is working for you.

For some elite athletes, there may be a current or future need to formally document the presence or absence of EIA or EIB in order to justify the use of certain medications.

Are there any reasons I should not, or might not be able to perform an exercise challenge?

If you have any of the following, you may not be allowed to do this test:

- Severely limited lung function.
- Recent heart attack or stroke.
- Poorly controlled high blood pressure.
- A dilated aorta.
- A physical limitation that prevents you from using a treadmill or exercise bicycle

You should let the lab know if you are pregnant, nursing, or on medications for myasthenia gravis.

If you are unsure if you can do the test, talk to your healthcare provider.

How should I prepare for the test?

Each lab may have slightly different instructions. You will receive specific instructions for the lab. Commonly, people are advised to:

- Wear comfortable clothing and footwear that are appropriate for exercise such as running shoes.
- Avoid exercise or warming up prior to the test (for at least 4 hours before the test).
- Avoid smoking or vaping the day of the test.
- Eat a light meal in the morning and then avoid eating for at least 4 hours prior to the test.
- Avoid caffeinated substances (coffee, tea, chocolate, cola, and energy drinks) for 24 hours prior to the test.
- Avoid antihistamines (allergy medications) for at least 48 hours prior to the test.
- Ask about your other medications and if any should be held. The lab will typically tell you if you need to stop any medicines, including inhalers, prior to testing, and for how long you need to not take the medicines prior to testing.

What happens during the exercise challenge test?

The test begins with spirometry or complete pulmonary function prior to exercise.

The staff then prepares you for the exercise challenge

test by attaching several monitoring devices. The devices that will vary slightly from lab to lab. It is common to use EKG leads (to monitor your heart rate), a pulse oximeter (to test your oxygen saturation), and a blood pressure cuff. You will be asked to wear a nose clip. You may also use a mouthpiece that measures airflow and oxygen consumption (how much your body is using oxygen). These are used to measure how deep you are breathing and the intensity of exercise. Depending on the protocol in your specific lab, you might be breathing room air or a specialized blend of low humidity air using a mouthpiece.

The exercise is done using a treadmill or a stationary bicycle. The staff will aim to have you exercise for about 6-8 minutes, with 4-6 of those being near your maximum exercise ability. In the initial 2 minutes the speed or grade of the treadmill, or the resistance on the bike, are increased until the targeted level of exertion is achieved. The staff person will use your heart rate reading or the amount of air you are breathing each minute to judge if the intensity of exercise is enough. Factors such as your age, sex, weight, and general fitness will affect the intensity of the workout.

During the test, the staff may talk to you to encourage you to keep exercising or to decrease the intensity so you can sustain it for 4-6 minutes.

After you are done with the exercise portion, several repeat spirometry measurements are done over the 15-30 minutes that follow the exercise to assess if there is a drop in your lung function tests. You might be given an inhaler or a nebulizer if the test shows a decrease in airflow.

When will I get the results of the test?

A physician will review the results of your lung function before and after exercise. Results are typically available within two days. You can ask the lab staff how long it may take for the results to be available.

Are there alternatives to the test (and when are these appropriate)?

There are other tests for EIA and EIB that can be used in specific situations. For example, people who have medical conditions that severely limit exercise on a treadmill or stationary bicycle will need to work with their healthcare provider to consider alternatives. Elite athletes who are required to document EIA or EIB may consider alternative testing. Options include:

- Methacholine challenge. Spirometry is done before and after increasing doses of a chemical called

methacholine. (See ATS Patient Information series fact sheet at www.thoracic.org)

- Eucapnic voluntary hyperventilation: Spirometry is done before and after a period of deep, rapid breathing such as occurs during exercise.
- Mannitol challenge: Spirometry done before and after inhaling a medication called mannitol.
- Hypertonic saline challenge: Spirometry done before and after inhaling a concentrated salt water solution.
- Histamine challenge: Spirometry done before and after a chemical called histamine.
- An exercise challenge test can also be performed outside a hospital if spirometry equipment is available. Sometimes, testing needs to occur in relation to specific sport challenges or environmental conditions.

Authors: Mohammed Dalabih, MD, J. Tod Olin, MD, MSCS

Reviewer: Marianna Sockrider, MD, DrPH, David Kaminsky, MD

Rx Action Steps

- ✓ Ask your healthcare provider if you should have an exercise challenge if you have airway symptoms with exercise such as cough, wheezing, or shortness of breath.
- ✓ Check with the lab to find out how to prepare for the test and any changes you may need to make with your medicines.
- ✓ Be sure to wear the right shoes and clothes to do the test.

Healthcare Provider's Contact Number:

Resources

American Thoracic Society

- www.thoracic.org/patients/
 - Cardiopulmonary exercise testing
 - Methacholine challenge
 - Pulmonary function tests

World Anti-Doping Agency

- TUE Physician Guidelines: Asthma. https://www.wada-ama.org/sites/default/files/resources/files/tuec_asthma_version6.1.pdf

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