

Exercising Your Way to Lowering Your Blood Pressure



Why is Hypertension Bad?

Hypertension causes the pressure in your arteries to be consistently elevated above what is required to circulate blood. This puts a strain on both the blood vessels and the heart which can cause them both to weaken and work less efficiently over time. This continuous pressure on the vessel walls causes harm to the delicate tissue covering the arteries. In the presence of “bad” or low-density lipoprotein (LDL) cholesterol, plaque forms within these areas of injury and so begins atherosclerosis. Atherosclerosis is the process through which fatty build-up occurs on the inner lining of the arteries. During this process the arteries are weakened and become less flexible and may narrow, allowing less oxygenated blood to the body. This process also increases the risk for ischemic stroke in the brain. Hypertension may also lead to heart failure. This is a condition that may occur over several years and is associated with the inability to supply enough blood to your body. The narrowing of the arteries associated with HBP causes the heart to have to work even harder. The heart muscles adapt by becoming thicker and the heart becomes larger; these two adaptations make the heart less efficient. Hypertension is associated with memory loss and dementia from these narrowed or blocked arteries.

What is Hypertension?

Hypertension or high blood pressure (HBP), as defined by the American Heart Association, is when the force of your blood pushing against the walls of your blood vessels is consistently too high. There are two types of hypertension: primary (essential) and secondary hypertension. Primary hypertension accounts for 90% to 95% of adults with hypertension and is often linked to genetics, physical inactivity, poor diet and obesity. Secondary hypertension is present in 5% to 10% of the adult population and is associated with a known disease. These may include conditions that impact your kidneys, arteries, heart and/or endocrine system. Although the cause of high blood pressure continues to be researched, factors commonly associated with HBP include family history and lifestyle factors such as smoking, poor diet, and physical inactivity. These behaviors increase an individual’s risk for developing high blood pressure. As such, it is important to regularly check your blood pressure as hypertension generally does not show symptoms. This is why blood pressure is commonly called “The silent killer.”

BLOOD PRESSURE CATEGORY	SYSTOLIC MM HG (UPPER NUMBER)	AND/OR	DIASTOLIC MM HG (LOWER NUMBER)
NORMAL	< 120	AND	< 80
ELEVATED	120-129	AND	< 80
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 1	130-139	OR	80-89
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 2	140 OR HIGHER	OR	90 OR HIGHER
HYPERTENSIVE CRISIS (CONTACT DOCTOR IMMEDIATELY)	HIGHER THAN 180	AND/OR	HIGHER THAN 120

DATA COURTESY OF THE AMERICAN HEART ASSOCIATION
HEART.ORG/BPLEVELS

How Exercise Helps with Hypertension

Blood pressure naturally increases while exercising. Generally, this increase is not associated with negative health outcomes. Systolic and diastolic blood pressure can be expected to drop an average of 5 to 7 mmHg among adults with hypertension with regular aerobic exercise. These reductions may be even greater among those with even higher baseline starting blood pressure. These changes occur immediately and can last for up to 22 hours. Over time, these acute changes turn into long-term or chronic changes. Even modest reductions in blood pressure for those with severe hypertension can provide substantial benefits.

Dieting for Hypertension

The Dietary Approaches to Stop Hypertension (DASH) eating plan is designed for individuals with hypertension and can be effective in lowering blood pressure. This eating plan emphasizes the consumption of: fruits and vegetables, whole grains, low-fat dietary products, skinless poultry and fish, nuts and legumes and non-tropical vegetable oils. The DASH plan also recommends limiting the intake of saturated and trans fats, red meat, sugary beverages and sweets, and sodium. Choosing foods that are low in salt is also important for managing hypertension. Most individuals consume more salt than is recommended. And there are some groups that are more sensitive to sodium including the elderly and African Americans. The American Heart Association suggests that adults should ideally limit their daily sodium consumption to less than 1500 mg, especially for those with hypertension. This is equal to a little more than 1/2 teaspoon of table salt.

Tips to staying active and F.I.T.T.

Frequency - How often?

How much exercise is needed to see improvements in blood pressure? Truth is, benefits can be achieved after a single bout! Exercise provides a positive stress in the arteries which stimulates the cells to release nitric oxide. This molecule helps dilation (widening of the arteries) which can remain in effect for up to 24 hours after the bout is completed. Regular exercise causes a reduction in resting blood pressure, along with other whole-body benefits such as a reduction in cardiometabolic risk factors (cholesterol, triglycerides, plasma glucose) and improvements in bone mineral density with weight bearing exercise. The new ACSM guidelines recommend moderate-intensity aerobic training 5 to 7 days per week and resistance training with a frequency of 2 to 3 sessions per week to achieve maximal benefits in individuals with hypertension. Preferably, ACSM recommends exercising on most if not every day of the week due to the favorable blood pressure lowering effect of regular exercise.

Intensity - How hard should we push ourselves?

Even light to moderate regular exercise can improve blood pressure. Moderate-intensity exercise is defined by exercising at 40% to 59% heart rate reserve. If available, a heart rate monitor can assist an individual in assessing their exercise intensity. There are a handful of specialized formulas to estimate your maximum heart rate if you do not know your own. These formulas are more effective when applied to the population from which they were tested and validated. Heart rate reserve (HRR) is another important measure as exercise intensity may be overestimated or underestimated if you predicted your maximum heart rate from an equation. Once you have calculated your predicted maximum heart rate you can determine the desired exercise intensity. One valid equation used to predict HRmax and was tested on a wide range of ages and health conditions is Gellish et al: $207 - (0.7 \text{ and age})$. For example, for a 55-year-old with a resting heart rate of 70 bpm wanting to exercise at 55% HRR the equation is calculated as follows:

- HR max: $(207 - (0.7 \times 55)) = 169 \text{ bpm}$
- 55% HRR: $(169 \text{ bpm} - 70 \text{ bpm}) = (99 \text{ bpm} \times .55) + 70 \text{ bpm} = 120 \text{ bpm}$

Therefore, an individual will have to exercise at a heart rate of 120 bpm in order to reach a moderate intensity of 55% HRR. An example of this could be going out for a light jog or hiking on an inclined trail. Calculated intensities may be valuable, but they are still estimated values and don't fully consider an individual's perception of the relative intensity of the exercise. One significant example of this is when an individual is taking one of the aforementioned blood pressure medications such as a beta-blocker. These medications help keep blood pressure and heart rate lower; however, elevation of these two things is a necessary physiological response that the body needs to sustain exercise. As a result, the previous example of exercise (55% HRR) could make you feel like you are pushing yourself to your absolute maximum. In the absence of a heart rate monitor, or if the individual is taking a beta-blocker, another valid and commonly-used tool to assess intensity is the Rating of Perceived Exertion (RPE). An RPE between 12-13 is the desired range to maintain moderate-intensity exercise and should feel somewhat hard; vigorous activity on the scale is between 14-16 and should feel hard. Therefore, if medications are making a 55% HRR activity feel like a 17 on this scale, then make sure to listen to your body and base your exercises on the RPE scale as it will be a more accurate representation of your intensity and exertion.

Type - What kinds of exercise?

Exercise, regardless of the type, is beneficial for health when it is centered around reductions in blood pressure. However, the greatest reductions in blood pressure have been associated with aerobic exercise (jogging, walking, cycling, swimming). ACSM recommends resistance training at moderate intensity (60% to 70% of 1 repetition maximum (1 RM)) and as strength increases, progression to 80% of 1 RM. For resistance training for older individuals or for novices, try to perform exercises with lighter weights (40% to 50% 1 RM) with more repetitions of dynamic (moving) exercise such as walking lunges, barbell squats, pushups, cable flies, and shoulder presses. And just as important is making sure you breathe regularly throughout all of your activities. Holding your breath during activity can increase your blood pressure. And remember too that deep breathing can also help you to relax!

Time - How long?

The latest ACSM FITT recommendations for individuals with

hypertension encourage individuals to exercise on most and preferably every day of the week with an accumulation of 90 minutes to 150 minutes per week. This may be accomplished through a combination of aerobic and resistance exercise. For maximum health benefits, ACSM recommends continuous or accumulated activity of 30 minutes per day of moderate-intensity (RPE of 12-13) or 20 minutes a day of vigorous-intensity (RPE 14-16). These exercise bouts do not have to be performed in a single session. You can complete 10 minutes in the morning, 10 minutes in the afternoon, and 10 minutes in the evening and still reap the benefits of exercise for lowering blood pressure. This is an excellent strategy of fitting exercise into our constantly busy everyday lives.

Pharmacologic Treatment Options for Hypertension

A healthy eating plan and regular exercise may impart positive outcomes on blood pressure control. However, some individuals may require additional antihypertensive therapy

treatment options to achieve and/or maintain optimal blood pressure control. Sometimes these may be insufficient. Subsequently, there are a number of medications available for controlling blood pressure; these include: angiotensin converting enzyme inhibitors (ACEi), angiotensin receptor blockers (ARBs), calcium channel blockers (CCBs), and thiazide/thiazide-like diuretics. Each of these medications has a different mechanism of action and the associated side effects will need to be considered with your health care provider. For instance, angiotensin receptor blockers lower blood pressure by inhibiting angiotensin, a hormone that can induce constricting of the blood vessels. Alternatively, beta blockers lower the heart rate by blocking the binding receptors that interact with hormones such as adrenaline. Diuretics cause the body to retain less fluid, therefore lowering overall volume of blood and consequently reducing blood pressure. If medications are required, they should not replace a healthy diet and regular exercise, but instead should be included in the plan of action.

Staying Active Pays Off!

Those who are physically active tend to live longer, healthier lives. Research shows that moderate physical activity—such as 30 minutes a day of brisk walking—significantly contributes to a longer life. Even a person with health risk factors like high blood pressure, depression, diabetes or a smoking habit can gain real benefits from incorporating regular physical activity into their daily life.

As many dieters have found, exercise can also help you achieve weight loss goals. What's more, regular exercise can help lower blood pressure, control blood sugar, improve cholesterol levels and build stronger, denser bones. Exercise helps improve your mental well-being too.

A Complete Physical Activity Program

Regular physical activity provides many health benefits. While it's not required, working with an exercise professional can help you reach your fitness goals, tailor exercises to your abilities and most importantly, minimize your risk of injury. You should expect the exercise professional to ask you to fill out an exercise pre-participation health screening. This form will ask if you exercise regularly and if you have any health concerns that should prompt you to see your healthcare provider before getting started. The following precautions will help you safely participate in exercise programs:

If you DO NOT exercise regularly:

[If you have not been diagnosed by a doctor with, AND do not have signs or symptoms of cardiovascular, metabolic or kidney disease](#), THEN you can start right away with light to moderate intensity exercise. You can gradually build up to vigorous exercise if you stay free of any symptoms of health problems.

If you have ever been diagnosed by a doctor, with OR have signs/symptoms of cardiovascular, metabolic or kidney disease, THEN it is recommended to seek medical clearance before beginning an exercise program. Once you get medical clearance, you should start with light to moderate intensity. You can gradually build up to vigorous exercise if you stay free of any symptoms of health problems.

If you DO exercise regularly:

If you have not been diagnosed with, AND do not have signs or symptoms of cardiovascular, metabolic, or kidney disease, you can continue with moderate exercise or gradually build to vigorous exercise intensity.

If you have been diagnosed with cardiovascular, metabolic, or kidney disease AND do not have any sign/symptoms of health problems, then you can continue exercising at a moderate intensity. If you received medical clearance within the last 12 months AND your symptoms have not changed, then you can continue with moderate exercise or gradually build to vigorous exercise intensity.

If at any time you develop a sign or symptom of cardiovascular, metabolic or kidney disease, discontinue exercise and seek a doctor's clearance right away. Then, after getting medical clearance, you may continue your moderate intensity exercise program and gradually progress your effort.

Getting Started with an Exercise Program

A well-rounded exercise program includes aerobic, strength training exercises, but not necessarily in the same session. This blend helps maintain or improve overall health and function. So, it is important to choose exercises you enjoy and can fit into your schedule.

Not all exercise programs are suitable for everyone. Activities should be carried out at an effort level that is comfortable for you. You should stop participation in any exercise activity that causes pain. In such event, you should consult with your health care professional immediately.

ACSM recommends you accumulate at least 30 minutes of moderate-intensity physical activity (working hard enough to break a sweat, but still able to carry on a conversation) most days per week, or 20 minutes of more vigorous activity three days per week. Combinations of moderate- and vigorous-intensity activity can be performed to meet this recommendation.

Examples of typical aerobic exercises are: walking, running, stair climbing, cycling, rowing, cross country skiing and swimming. Examples of common strength training exercises are: weight machines, free weights and resistance bands. Flexibility exercises can include: stretches of muscles around different joints and yoga.

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