

Novel Exercises and Stretches for Managing High Blood Pressure

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According to the World Health Organization, hypertension is a leading cause of stroke and cardiovascular disease, which cause more than 15 million deaths annually (1). Affecting more than 1.3 billion people worldwide, arterial hypertension is diagnosed when systolic pressure exceeds 130 mmHg and/or diastolic pressure exceeds 80 mmHg (2). The risk of a cardiovascular event increases in a linear manner with systolic pressure: every 20 mm increase in systolic pressure over 115 doubles the risk of an event (3). In other words, someone with a systolic blood pressure of 135 mmHg is twice as likely to have a stroke as an individual with a systolic pressure of 115. Alarmingly, hypertension is present in more than 65% of the American population over the age of 60 and its prevalence is increasing (4).

Standard medical treatment for hypertension is pharmacological intervention (for people with systolic pressure greater than 140 mmHg) and/or lifestyle modification. Unfortunately, despite having spent more than 70 years perfecting medications to lower blood pressure, nearly 50% of individuals receiving pharmacological treatment are unable to meet their guideline driven goals (5). Even worse, 50% of hypertensives receive no treatment at all.

Although recommendations for lifestyle changes, such as reducing salt intake, smoking cessation, and weight loss are effective, patient compliance is low. Also, while light regular exercise is routinely recommended in the management of hypertension, it is not that effective. Previous meta-analyses show that commonly prescribed exercises such as walking, swimming, and light resistance training reduce systolic and diastolic pressure by only 3 mmHg (6). This insignificant drop hardly alters the cardiovascular risk profile associated with hypertension.

Fortunately, recent research has shown that there are specific exercises and stretches that can appreciably reduce blood pressure. One of the more interesting new strategies to lower blood pressure is to strengthen your diaphragm. In 2019, researchers from Colorado (7) had 13 middle-aged hypertensive men and women perform high-intensity diaphragm training by repeating 30 inhales at 75% maximum inspiratory pressure, six days per week for six weeks. A control group repeated the same exercises only at 15% maximum inspiratory pressure. At the end of the study, the average systolic blood pressure in the high-intensity group dropped from 137 to 127 mmHg, while there was no change in blood pressure in the control group.

In 2021, da Silva et al. (8) published a meta-analysis evaluating the efficacy of diaphragm strengthening for lowering blood pressure and noted that when resistance is applied during inspiratory muscle training, systolic pressures drop by almost 16 mmHg and diastolic pressures drop by 7 mmHg. When diaphragm exercises are performed without resistance, systolic pressures drop 5 mmHg while diastolic pressures remain unchanged. The authors attribute the reductions in blood pressure to the increased parasympathetic tone associated with respiratory muscle training. The easiest way to perform inspiratory muscle training is with a *BreatheEasy Lung Exerciser*, which has a dial that allows the user to adjust resistance. This device can be purchased online for about \$30.

In addition to diaphragm exercises, multiple studies have shown that performing just a few minutes of isometric muscle contractions a few times per week can effectively lower blood pressure (9, 10, 11). In a particularly interesting paper, Wiley et al. (9) had subjects perform isometric handgrip exercises in which they were told to squeeze their hands at about 30% full effort and hold the contraction for two minutes. This was followed by a brief rest and repeated four times (Fig. 1). This routine was repeated three times per week for eight weeks. At the end of the study, systolic and diastolic resting blood pressures were reduced 12.5 and 14.9 mmHg, respectively.

One of the things that makes this paper so interesting is that the people spent less than 24 minutes exercising each week. In a review of the literature regarding the effects of isometric exercise on resting blood pressure, Owen et al. (11) determined that on average, isometric exercises performed just a few times per week lower systolic pressure by 10.4 mmHg, and diastolic pressure by 6.7 mmHg. The authors state “these changes are similar to those achieved with a single pharmacological agent.” The fact that isometric contractions reduce blood pressure was proven by Buck et al. (12), who measured blood pressure in 4,273 men and noted that blood pressure was significantly lower in men with jobs requiring moderate to heavy isometric activity. This difference persisted after adjusting for age, affluence, obesity, and/or the use of alcohol.

Besides exercise interventions, the simple act of stretching has recently shown to lower blood pressure. Bisconti et al. (13) measured vascular function, arterial stiffness, and vascular remodeling before and after 12 weeks of a stretching routine consisting of various calf, quadriceps, and hamstring stretches designed to specifically stretch the femoral and popliteal arteries. Each stretch was held for 45 seconds and repeated five times. At the end of the study, blood pressure and arterial stiffness decreased in both the upper and lower extremities, confirming that the stretching routine induced both local and systemic cardiovascular improvements. There was an increase in femoral artery blood flow, decrease in peripheral artery stiffness, and a significant decrease in both systolic and diastolic pressures. The authors of the study suggest that stretching large arteries creates a tensile strain in the arteries endothelium that incites the production of nitric oxide, which has been proven to reduce vascular stiffness. My favorite stretch for targeting all of the large blood vessels is the reverse warrior pose in yoga (Fig. 2).

While there are many alternative approaches for reducing blood pressure, such as taking magnesium taurate supplements (14), performing high intensity interval training (15), and eating foods rich in nitric oxide (such as beets) (16), a proven and effective way to reduce blood pressure is to strengthen your diaphragm, perform a few isometric contractions a couple of times per week, and regularly stretch your large blood vessels. Because these stretches and exercises are so good for maintaining cardiovascular health, they should be a part of everyone’s workout, whether or not they have hypertension.

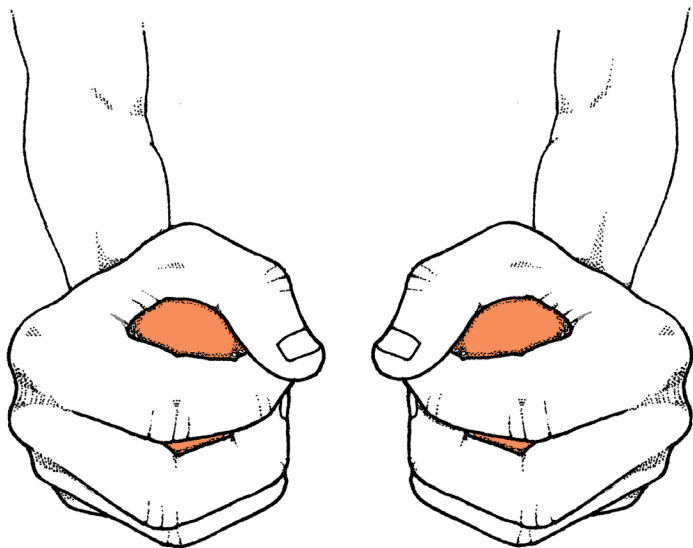


Fig. 1. Isometric handgrip exercise. Squeeze a soft foam ball with moderate force for 2 minutes. Rest 1 minute and repeat 4 times. Do this 3 times a week for 8 weeks.

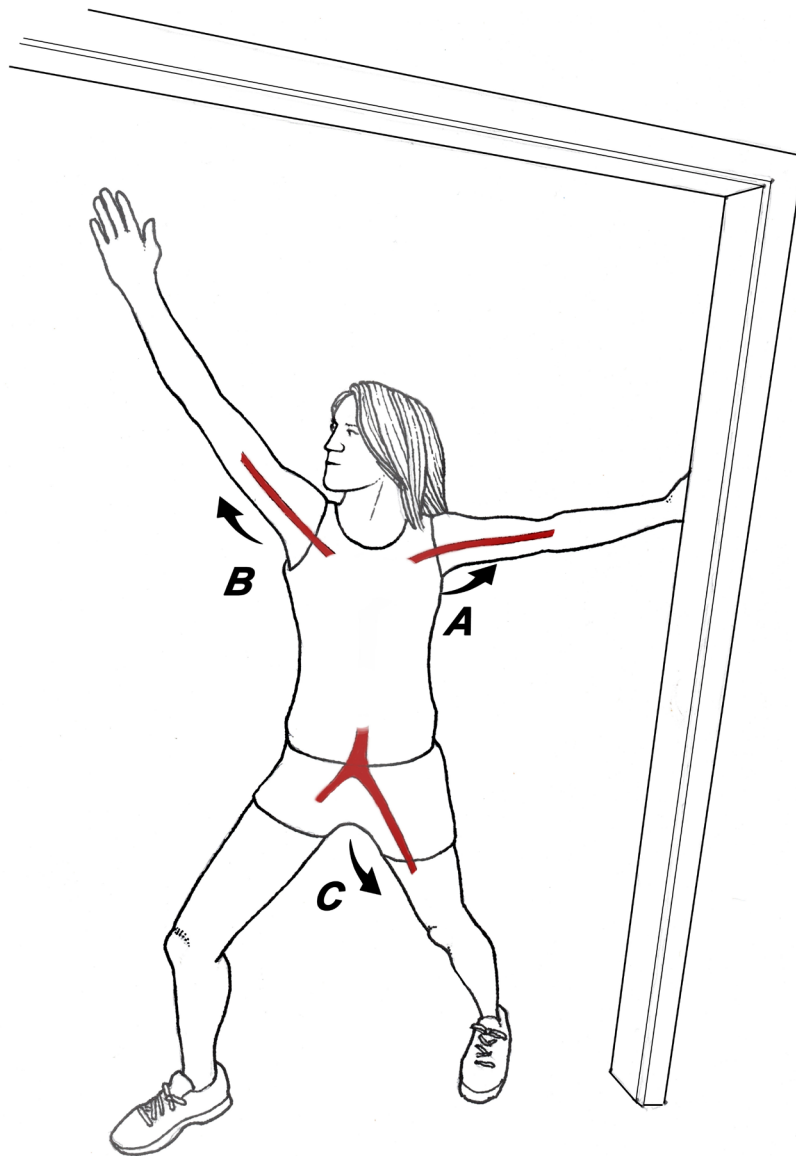


Fig. 2. Reverse warrior pose. Hold on to a door jamb to more effectively stretch your upper arm and hold the illustrated stretch for a full 45 seconds. Repeat five times while alternating sides. Vigorously stretching the femoral (**C**) and brachial arteries (**A and B**) results in a decrease in peripheral artery stiffness, which has been proven to reduce both systolic and diastolic pressures.

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