



Cleveland Clinic

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Exercise and Cardiovascular Health

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Agenda

- Exercise Safety
- Cardiovascular Risk Factors
 - Modifiable
 - Non-modifiable
- Importance/Benefits of Exercise
- Where do I Start?

Exercise Safety

- Talk to your physician
- PAR-Q and You
- Warm-up and Cool-down
- Start slow and gradually increase your pace
- “Walk and Talk”
- Home monitoring equipment
 - BP cuff, HR monitor, Pulse Ox, Blood glucose (if diabetic) etc.

Cardiovascular Risk Factors

Non-modifiable

- Age (Male >45 y.o., Female >55 y.o.)
- Gender (Male, greater risk until age 70)
- Family History (First degree relative)

Modifiable

- High Blood Pressure
- Abnormal Lipid Profile
- Diabetes
- Being Overweight
- Physical Inactivity
- Tobacco Use
- Poor Management of Stress

What is Blood Pressure?

- Systolic Blood Pressure (SBP)
 - The top number
 - Indicates how much pressure your blood is exerting against your artery walls when the heart beats
- Diastolic Blood Pressure (DBP)
 - The bottom number
 - Indicates how much pressure your blood is exerting against your artery walls when the heart is resting between beats
- Both are important, however more attention is typically given to the systolic blood pressure

Blood Pressure (mm/Hg) (2017)

BP Category	Systolic BP (Top #)	Diastolic BP (Bottom #)
Normal	Less than 120	Less than 80
Elevated	120 to 129	Less than 80
Hypertension Stage 1	130 to 139	80 to 89
Hypertension Stage 2	140 or higher	90 or higher
Hypertensive Crisis	Higher than 180	Higher than 120

“The new definition will result in nearly half of the U.S. adult population (46%) having High BP, with the greatest impact expected among younger people. However, only a small increase is expected in the number of adults requiring anti-hypertensive meds.”

“You’ve already doubled your risk of cardiovascular complications compared to those with a normal level of blood pressure,” said Paul K. Whelton, MB, MD, MSc, FACC, lead author of the guidelines. “We want to be straight with people – if you already have a doubling of risk, you need to know about it. It doesn’t mean you need medication, but it’s a yellow light that you need to be lowering your blood pressure, mainly with non-drug Approaches.”

A Few Words about Hypertension

- “Although the rate of progression from prehypertension to hypertension is positively associated with age, baseline BP and comorbidities, hypertension does not appear to be a fundamental feature of human aging but the outcome of lifestyle factors (*i.e.* high salt diet, excess body weight, and physical inactivity).”
- Although a variety of medication are available in the treatment of hypertension, guidelines for management also emphasize lifestyle modifications to lower blood pressure.

Lifestyle Modifications

Modification	Recommendation	Approx. SBP Reduction, range
Weight Reduction	Normal/Healthy Weight (BMI = 18.5 to 24.9)	5-20 mm/Hg per 4.5 pound weight loss
Dietary Approach To Stop Hypertension	High fruit and vegetable, low-fat dairy products, reduced sat and trans fat	8-14 mm/Hg
Sodium Reduction	Less than 2,000mg/day *unless told otherwise	2-8 mm/Hg
Physical Activity	30 minutes of aerobic exercise most days of the week	4-9 mm/Hg
Moderate Alcohol Consumption	No more than 1 drink/day for women and 2 drinks/day for men	2-4 mm/Hg

Abnormal Lipid Profile

- Total Cholesterol
 - Under 200 mg/dL
- Low Density Lipoprotein (LDL-C)
 - Less than 100 mg/dL
 - Less than 70 mg/dL if prior cardiac event
- High Density Lipoprotein (HDL-C)
 - Greater than 40 mg/dL for men, 50 mg/dL for women
- Triglycerides
 - Less than 150 mg/dL

Benefits of Exercise

- Aerobic Exercise
 - Consistently shown to reduce LDL-C by 3-6 mg/dL
- Resistance Training
 - Consistently shown to reduce LDL-C and TG by 6-9 mg/dL
- Diet Changes
 - For every 1% decrease in calories consumed from saturated fat, LDL-C is decreased by 1.83 mg/dL

Diabetes Mellitus

- A complex metabolic disorder characterized by impaired glucose uptake caused by insufficient pancreatic insulin production (type 1) or loss or peripheral insulin sensitivity (type 2).

Normal	Pre-Diabetes	Diabetes Mellitus
HbA1C <5.7%	HbA1C = 5.7%-6.4%	HbA1C ≥6.5%
Fasting Plasma Glucose <100 mg/dL	Fasting Plasma Glucose = 100-125 mg/dL	Fasting Plasma Glucose ≥126 mg/dL

Benefits of Exercise

- Prevention of diabetes-related health complications
- Increased insulin sensitivity
- Increased cellular uptake of glucose
- Decreased HbA1C
- Can yield a reduction in requirements for exogenous insulin
- May delay the transition from pre-diabetes to Type 2 Diabetes

Being Overweight

- Defined as a body mass index (BMI) > 25
 - 68% of U.S. adults are overweight or obese
 - 32% of U.S. youth are overweight or obese
- High prevalence and strong link to other risk factors...
 - High blood pressure
 - High cholesterol
 - Diabetes

Benefits of Exercise

- Improvement in abdominal obesity
- Increased insulin sensitivity
- Decreased HbA1C
- Improvements in lipid profile
- Improvements in blood pressure
- Improvements in self-reported quality of life

Benefits of Exercise

- Need to create a caloric deficit of 3,500 calories to lose 1 pound of fat
 - Aim to burn 500 calories/day
- Sustained weight loss of 3-5% is likely to result in clinically meaningful reductions in the previous listed CVD risk factors
- Evidence that even as little as a 2-3% weight loss can result in similar CVD risk factor reduction

Benefits of Exercise

- CVD benefits are more likely to be sustained through the maintenance of weight loss, but maintenance is challenging.
- Lifestyle interventions for weight loss that combine reductions in *EI* with increase in *EE* through exercise and other forms of PA often result in an initial 5-10% reduction in body weight
- Have a greater impact when combining increases in exercise with diet modifications
- Dose-response relationship
 - The more exercise, the greater weight loss

Weight Loss Example

- Example with adding exercise alone
- 200 pound person burns 3.97 calories per minute walking on the treadmill at 2 MPH
 - 596.5 calories burned w/ 150 minutes of ex
 - .17 pound lost/week
 - 795.5 calories burned w/ 200 minutes of ex
 - .23 pound lost/week
 - 1,193.2 calories burned w/ 300 minutes of ex
 - .34 pounds lost/week

Physical Inactivity

- Less than 50% of adults meet the minimal exercise recommendations
 - PA vs. Exercise
- Low cardiorespiratory function and increased sitting time have been associated with the increased risk for CVD
- Inactive if, you do not exercise at least 3 days per week or at least 150 minutes/week for the past 3 months

Benefits of Exercise

- Decreased heart rate and blood pressure
- Reduced total body fat
- Reduced Insulin needs
- Decreased anxiety and depression
- Reduced risk of falls and injuries
- Increased ability to perform activities of daily living
- Primary prevention
 - Higher activity/fitness levels are associated with lower death rates from CAD

Tobacco Use

- Damages your arteries throughout the body, making it easier for plaque to stick to the damaged artery walls
- Nicotine increases your heart rate and blood pressure
- Nicotine acts as a vasoconstrictor
- Nicotine increases platelet activation
 - Thickens the blood
- Carbon monoxide, a by-product of smoking, injures vascular endothelium and interferes with the amount of oxygen delivered to the heart

Poor Management of Stress

- Too much stress for a long period of time can raise blood pressure and increase your risk of developing cardiovascular disease
- Many ways to manage stress
 - Exercise
 - Meditate
 - Relaxation exercise
 - Stress management class

Where do I get Started?

- Exercise Guidelines
 - Aerobic – 4-7 days/week
 - Strength – 2-3 non-consecutive days/week
- Walking is free
- Doesn't have to be hours on end or miles of exercise
 - Even in very deconditioned participants, short bouts of 10 minutes, multiple times a day can be beneficial

“F.I.T.T.” Principles

- Frequency
 - Aerobic – 4-7 days/week
 - Strength – 2-3 non-consecutive days/week
- Intensity
 - Rating 3-5 out of 10 on Perceived Exertion Scale
 - Weight you can lift 10-15 repetitions without excessive fatigue
- Time
 - **A:** 20-60 minutes per session, or multiple bouts accumulated throughout the day
 - **S:** Start with one set, increase to 2-3 sets once accustomed to regimen
- Type
 - **A:** – walk, bike, jog, run, swim, elliptical, NuStep
 - **S:** – free weights, machines, resistance bands

References

- **ACC/AHA – 2017 Guidelines**
- **ACSM – 10th Edition**
- **AACVPR – 5th Edition**



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