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How the Heart Works

Your heart is a strong muscle, a little larger than a fist. It works 24/7 to receive oxygen-rich blood from your lungs and pump it through your body.

The heart has four chambers that hold blood as it moves through the heart. There are two on the right and two on the left. The 2 upper chambers are called atria and the 2 lower chambers are called ventricles.

The right atrium takes in oxygen-poor blood from the rest of the body and pumps it through the right ventricle to the lungs.

Oxygen-rich blood travels from the lungs to the left atrium, and then to the left ventricle, which pumps it to the rest of the body.

Just as the body needs oxygen, so does the heart. The heart has blood vessels that bring blood to your heart muscle called coronary arteries.

www.sentara.com/heart
Coronary Heart Disease (CHD) is a disease in which the arteries supplying oxygen-rich blood to your heart muscle become blocked with a substance called plaque.

The lack of blood to the heart muscle is what causes pain in your chest.

The plaque can build up in any one of the arteries pictured below and your cardiologist or heart surgeon will work on them to help restore the flow of oxygen rich blood to your heart.
Your Heart after a Heart Attack

Once a coronary artery becomes blocked, blood flow to the heart muscle is decreased and the muscle does not receive oxygen and begins to die. This causes pain and permanent damage. The longer the artery is blocked the more damage occurs.

Healing begins soon after the event. The dead cells are removed by the body’s white blood cells. This may cause you to have a slight fever during this time. After the dead cells are gone a scar forms and completes within 4 to 6 weeks.

The 2 most common complications after a heart attack are:

- Arrhythmia (ar-rhyth-mi-a) – occurs when your heart beats abnormally. This may occur due to the damage of the heart muscle. This may be temporary or permanent and can be managed by your healthcare provider.

- Heart Failure – occurs when the heart cannot pump well enough to meet the body’s needs and fluid builds up in the lungs or other parts of the body.
Risk Factors

There are risk factors you can change and those that you cannot change.

The following risk factors increase the chance of a heart attack:

**Risk Factors you can change**
- Overweight (high fat diet), diet habits, sedentary lifestyle, lack of exercise
- Female who smokes and takes birth control pills
- Cocaine use
- Diabetes
- Tobacco use or exposure to smoke

**Risk Factors you cannot change**
- Family history of heart disease, high blood pressure or high cholesterol
- Atherosclerosis (ath-er-o-skler-O-sis) is a collection of fat, cholesterol or other sticky material in the heart and other arteries of the body such as the legs and neck.
- Female who has gone through menopause or over 55 years of age
- Male over 45 years of age
- Over 55 years of age
What is a Heart Attack

A heart attack is usually caused by coronary artery disease. Coronary artery disease is when artery walls become coated with fat, cholesterol or another sticky material called plaque. A heart attack occurs when this plaque in the coronary artery cuts off blood flow to your heart muscle.

<table>
<thead>
<tr>
<th>PICTURE OF ARTERY</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Normal artery wall" /></td>
<td>Normally the walls of the arteries are smooth.</td>
</tr>
<tr>
<td><img src="image" alt="Plaque" /></td>
<td>Over time the artery wall becomes coated with fat, cholesterol, or other sticky material called plaque- then the blood may not flow freely enough through the coronary artery to reach the heart muscle. Over time this plaque will continue to thicken.</td>
</tr>
<tr>
<td><img src="image" alt="Blood Clot" /></td>
<td>As the plaque thickens a blood clot can form and stick to the plaque, causing a blockage that stops blood flow. Then oxygen cannot reach the heart muscle.</td>
</tr>
<tr>
<td><img src="image" alt="Plaque" /></td>
<td>Plaque within the artery wall can break free, preventing blood from reaching the heart muscle.</td>
</tr>
</tbody>
</table>
This table describes the common signs and symptoms of angina and a heart attack for women and men. Women may have different symptoms than men, including:

- Nausea, dizziness or shortness of breath without chest pain
- Unexplained anxiety, tiredness, cold sweats, or paleness.

<table>
<thead>
<tr>
<th></th>
<th>ANGINA</th>
<th>HEART ATTACK</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cause</strong></td>
<td>Temporary lack of blood flow to the heart muscle.</td>
<td>Prolonged lack of blood supply to heart muscle.</td>
</tr>
<tr>
<td><strong>Location</strong></td>
<td>Pain behind the breastbone and across chest. May go to shoulders, one or both arms, neck, jaw, back or stomach.</td>
<td></td>
</tr>
<tr>
<td><strong>Type of Pain</strong></td>
<td>Pressure, crushing, aching, choking, squeezing, burning or feeling of heartburn.</td>
<td>Same as angina but more intense.</td>
</tr>
<tr>
<td><strong>How long it lasts</strong></td>
<td>Not long, only a few minutes.</td>
<td>Longer than a few minutes and is not relieved by rest or medication.</td>
</tr>
<tr>
<td><strong>Triggers</strong></td>
<td>Related to the demands on the heart...change in temperature, exercise, etc.</td>
<td>Not specific to demand on the heart and can happen at rest.</td>
</tr>
<tr>
<td><strong>Pain relieved by</strong></td>
<td>Rest or medication</td>
<td>Some relief with medication and rest, but does not go away completely.</td>
</tr>
<tr>
<td><strong>Other signs</strong></td>
<td>Sweating, shortness of breath, nausea or lightheadedness, feeling of fullness or indigestion, unusual tiredness</td>
<td>Severe sweating, shortness of breath, weakness, nausea, anxiety, vomiting, dizziness, feeling of fullness or indigestion, unusual tiredness</td>
</tr>
</tbody>
</table>
What to Do

Quick treatment could save your life.

Sometimes heart attacks can happen with mild or few symptoms or without symptoms; this is called a silent heart attack.

Never wait if you experience any of the symptoms of a heart attack or angina.

Even if you are unsure if you are having a heart attack or just angina, call 911 for help right away.

**What to do if you are experiencing chest pain:**

1. Stop and rest. Sit or lie down with your head raised up.
2. If you have it, put one nitroglycerin under your tongue.
3. If the pain is relieved, call your healthcare provider for the next steps.
4. If pain not relieved after one tablet:
   - Call 911 immediately!
   - Take the second nitroglycerin. You can take one nitroglycerin every three to five minutes for a total of three tablets in fifteen minutes.
   - If you are not allergic to aspirin, chew a regular or baby aspirin (to prevent blood clots) even if you have already taken one that day.

**DO NOT drive yourself to the hospital or delay by calling your healthcare provider.**
# Common Cardiac Testing

<table>
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<tr>
<th>DIAGNOSTIC TEST</th>
<th>WHAT IT MEASURES?</th>
</tr>
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<tbody>
<tr>
<td><strong>Electrocardiogram (EKG)</strong></td>
<td>Records the heart’s activity by measuring the electrical current through the heart muscle. Changes can show if there is blockage or damage.</td>
</tr>
<tr>
<td><strong>Echocardiogram (Echo)</strong></td>
<td>Uses high-frequency sound waves, called ultrasound, to examine the size, shape, function and motion of the heart.</td>
</tr>
<tr>
<td><strong>Lab Work</strong></td>
<td>When the heart muscle is injured, it will release enzymes into your blood stream. There are lab tests that detect and measure these enzymes in your blood.</td>
</tr>
<tr>
<td><strong>Stress Test</strong></td>
<td>Records the heart’s electrical activity while exercising. Sometimes medication will be given while performing this test to show areas of the heart muscle where there is less blood flow.</td>
</tr>
<tr>
<td><strong>Coronary Angiography (Cardiac Catheterization)</strong></td>
<td>Dyes are placed into your arteries through a catheter and X-rays are taken at that time to look for narrowing or blockages in the coronary arteries.</td>
</tr>
</tbody>
</table>
Treatment of a Heart Attack

You and your healthcare provider will determine which treatments are best for you.

Your treatment may consist of medicines, angioplasty, stent placement or surgery.

An angiogram is a test that uses dye and x-rays to look for narrowing in the coronary arteries. During an angiogram, balloons or stents may be placed in your coronary arteries to correct blockages.

Bare Metal Stents (BMS) and Drug Eluting Stents (DES) are two types of stents that can be placed during an angiogram procedure.

Because stents are not a normal part of your artery walls, your body may develop a blood clot or grow more tissue than normal over the stent inside your artery.

Your cardiologist (heart doctor) may prescribe anti-clotting medicines to stop your body from developing this condition.

If you have been told to take anti-clotting medicines, you should not stop them, even for a few days, until you talk to your cardiologist.
Treatment of a Heart Attack

Heart surgery may be necessary depending on your test results.

Coronary artery bypass grafting is a surgery that will improve the blood flow to the heart muscle by taking a healthy vein from another part of the body and connecting it to the blocked coronary artery.

This new artery or vein will bypass or go around the part of your coronary artery that is blocked by the plaque.

This creates a new path for the oxygen rich blood to go to the heart muscle.
If you smoke – it is never too late to QUIT!

Reduce stress. Make a list of the things you are grateful for.

Enjoy a heart healthy diet: low saturated fat, low sodium and low cholesterol. Eat 3-4 small meals a day.

Lose weight and/or maintain a healthy weight by exercising regularly and allowing time for rest. Walking is a great way to start!

Limit how much alcohol you drink. It is important that you ask your healthcare provider for their specific recommendations for you.
Living Well After a Heart Attack

Avoid very hot and very cold temperatures.

Ask your healthcare provider about attending an outpatient cardiac rehabilitation program.

Brush your teeth twice a day, floss regularly and use mouth wash.

Remember it may take up to 2 or 3 months before you feel like yourself again.

You can do it! Take small steps every day.
Follow up with your healthcare provider and cardiologist as instructed. Do not drive until your healthcare provider says you are safe.

Monitor your blood pressure, pulse and cholesterol level.

If you have diabetes – control your blood sugars.

Take all of your medicines as given by your healthcare provider.
# Common Medicines after a Heart Attack

<table>
<thead>
<tr>
<th>TYPES OF MEDICINES</th>
<th>WHAT THEY DO FOR YOU.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ACE (angiotensin converting enzyme) inhibitors</strong></td>
<td>Opens up your arteries and lowers blood pressure which decreases the amount of work the heart has to do.</td>
</tr>
<tr>
<td><strong>-OR-</strong></td>
<td></td>
</tr>
<tr>
<td><strong>ARB (angiotensin II receptor blockers)</strong></td>
<td></td>
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<tr>
<td><strong>Anti-platelet/Blood Thinner</strong></td>
<td>Prevent platelets (tiny blood cells) from sticking together to form blood clots in your arteries.</td>
</tr>
<tr>
<td><strong>Beta Blockers</strong></td>
<td>Blocks the effects of chemicals that increase how hard your heart has to work. Over time beta blockers can improve your heart’s ability to pump blood.</td>
</tr>
<tr>
<td><strong>Calcium Channel Blocker</strong></td>
<td>Relaxes blood vessels and makes it easier for the heart to pump blood.</td>
</tr>
<tr>
<td><strong>Cholesterol Lowering</strong></td>
<td>Helps to lessen the amount of cholesterol the liver makes or increase the amount of cholesterol that is removed from the body.</td>
</tr>
<tr>
<td><strong>Nitrates</strong></td>
<td>Nitrates open the arteries to the heart. This increases blood flow to the heart, relieving chest pain or discomfort (angina).</td>
</tr>
<tr>
<td><strong>Statins</strong></td>
<td>Block the action of the liver enzyme that is responsible for producing cholesterol.</td>
</tr>
<tr>
<td><strong>Stool Softeners</strong></td>
<td>Helps to avoid straining to have a bowel movement. This is important so you do not put additional strain on your heart.</td>
</tr>
</tbody>
</table>
How to Take Your Medicines

Coronary heart disease can be controlled with medicine, in addition to diet and exercise. Taking your medicine will help your heart work better and can make you feel better and live longer.

✓ Whenever possible, have all of your medicines filled from the same pharmacy. It is helpful to have one pharmacist review all of your medicines to avoid drug interactions that could be harmful to you.

✓ Take each of your medicines, everyday, at the right times.

✓ Do not skip doses of your medicines, even when you feel good.

✓ Do not stop taking your anti-platelet therapy and blood thinner without talking with your healthcare provider.

✓ If you think you are having side effects from your medicines, call and talk with your healthcare provider or pharmacist immediately.

✓ If you are having trouble paying for your medicine, talk with your healthcare provider.

✓ Make sure you always have enough medicine left in your pill bottles. Don’t let your medicine run out.
Think of a way to take your medicines that will help you remember how and when to take them.

 ✓ Keep a list of your medicines with instructions for what medicines you take and when to take them.

 ✓ Some people like to use a pill box to put their medicines in for each day of the week. Fill the box on Sunday, and then you will know each day if you have taken all of your medicine.

 ✓ If you are going to be away from home when your medicine is due, take the medicine with you.

 ✓ Plan ahead for trips and vacations. Make sure you have the medicine you will need when you are away from home. Take your medicine bottles with you to identify what medicines you are carrying. Do not pack all of your medicines in your checked bags.
Medicine List

Bring your current medicine list with you each time you go to your healthcare provider.

Be sure you have included any over-the-counter medicines, herbal medicines, or dietary supplements you are taking.

When your healthcare provider changes your medicines, ask for an updated medicine list and what the side effects of the new medicines may be, before you leave the office.
Choose a Heart Healthy Diet

Eating a variety of foods from all the food groups is a great way to keep you healthy. Planning healthy meals is good for the whole family.

**CHOOSE MORE:**

- Fresh or frozen fruit
- Fresh or frozen vegetables
- Low fat or fat free milk
- Lean cuts of meat and fish
- Whole grains
- Healthy fats: olive and canola oil, nuts

Ask your healthcare provider about sugar substitutes in place of sugar.
Reading a Food Label

The label information is for the serving size listed, not always for the whole container.

**Step 1:**
Look at the total saturated fat, cholesterol and sodium per serving.

**Step 2:**
Look at the total saturated fat, cholesterol and sodium per serving.

**Step 3:**
Choose foods with less than:
- 140 mg sodium per serving,
- 5 g of total fat per serving.
- 3 g of saturated and trans fat per serving. Read the ingredients: if a food contains partially hydrogenated oils, then it has trans-fat.

Limit the amount of cholesterol you eat to less than 200 mg per day.
How to Eat Less Salt

Salt is also called “sodium” and is found in many foods.

Most foods you eat have salt even if you can’t see or taste it.

Salt acts like a sponge and makes the body hold water.

Eating too much salt can cause your weight to go up and cause swelling in your feet, ankles, legs or belly and make it hard to breathe.

It is recommended that you limit your salt intake to less than 1500 mg/day. Ask your healthcare provider what amount is right for you.

You can do it! One day at a time.
More Tips: How to Eat Less Salt

When you eat at home:

✔ Don’t add salt to food when you cook or eat. Take the salt shaker off the table.

✔ Season foods with herbs and seasonings that do not have salt.

✔ Make your own or choose low sodium soups, sauces, salad dressings, breads, and desserts.

✔ Stay away from “instant foods” that come in a bag or a box.

✔ Rinse canned foods before cooking.

✔ Read food labels and choose foods that have less than 140mg of sodium per serving.
More Tips: How to Eat Less Salt

- Ask for food cooked with no salt.
- Stay away from butter, cheese, or sauces.
- Stay away from fried foods.
- Choose grilled, baked, broiled or steamed foods.
- Choose oil and vinegar salad dressing.
- Limit fast food items or choose items with less sodium.
- Stay away from bacon, sausage, or ham.
Cardiac Rehabilitation is often prescribed after a heart attack. Please discuss with your healthcare provider when you should start a cardiac rehabilitation program, any home exercise or exercise program even if you were exercising before your heart attack.

**Cardiac Rehabilitation:**
The purpose of Cardiac Rehabilitation is to help improve your heart muscle safely and improve your general fitness ability. The program is usually three times a week including:

- **Exercise** – Using a treadmill, or stationary bicycle, weights, or rowing machines while specially trained cardiac staff monitor your heart rhythm and blood pressure

- **Education** – Lifestyle changes including: diet, weight loss, stress management, and how to stop using tobacco products

- **Monitoring** – Blood pressure and weight

- **Counseling** – with dietitians, diabetic educators, psychologists and social workers in individual and group settings
Activity after a Heart Attack

Immediately following your heart attack it is important that you do not lift objects that weigh more than 5-10 pounds until your healthcare provider has given you permission to do so.

If you are not exercising, start with 10 minutes every day. It can be as simple as walking 5 minutes from your door, turning around and walking back. Moving more can help you have more energy and feel better.

Start slowly. Only do what is comfortable for you. Stop if you feel chest pain, dizziness or have severe shortness of breath.

Following a heart attack discuss with your healthcare provider when it is safe to resume sexual activity.

Typically, your healthcare provider will want to know if you can climb two flights of stairs comfortably or walk three blocks at a brisk pace before you can have sex safely.

Being active is one of the best things you can do.
Exercising Will Get Easier

Your body needs time to get used to being more active. You will notice that it will get easier and you will be able to do more.

Steps for doing more:

Begin slowly. Do some warm up exercises to get your body ready to exercise.

Do some activity that makes your heart beat a little faster for 10 minutes. Try to do this at least three times a week.

After a couple of weeks, add 5 minutes to your exercising time. Continue to add 5 minutes until you can exercise for 30 minutes at a time, most days of the week.

Don’t forget to do cool down exercises at the end of your exercising.
Exercise After a Heart Attack

Walking is easy, fun and free. Many people say that walking is the easiest exercise for them. You can walk with a friend or a pet.

You can also exercise by:

- Using a stationary bicycle or treadmill.
- Walking in your neighborhood or at the mall.
- Going to an exercise class.
- Sweeping, vacuuming, or dusting.
- Riding your bicycle.
- Mowing the lawn or working in your garden.
- Dancing.
Think Positive Thoughts

It is normal to feel sad, overwhelmed, down in the dumps or nervous at times. Some medicines can affect your mood. If you feel this way, talk with your healthcare provider.

Take one day at a time.

Be grateful.

Be kind.

Focus on the things you can do. These may include a hobby, take time to meditate, pray or spending time with the people you care about.

Get enough rest and try to lessen the stress in your life.

Enjoy your family and your pets.

Stay active and have fun with your friends.

Consider joining a support group such as Mended Hearts.
When to Ask for Help

Call your healthcare provider if you:

- are more tired than usual.
- are short of breath at rest or more short of breath than usual.
- have any new cough that does not go away.
- are unable to take your medicines because of nausea, vomiting or diarrhea.
- have a fever over 100.4.
- are asked to stop your anti-platelet therapy or blood thinner, please call your cardiologist before you stop taking the medicine.
- have gone to the Emergency Room or have been hospitalized.

Call 911 if you have:

- chest pain that is not relieved by 1 nitroglycerin placed under the tongue. Take another nitroglycerin every 5 minutes until pain is relieved or 15 minutes has passed. Do not take more than 3 pills.
- tightness, fullness or squeezing pressure in the middle of chest.
- sudden pain in one or both arms, back, neck, jaw or stomach.
- feeling lightheaded or faint, sweating, nausea and/or shortness of breath.

Healthcare Provider Name: ______________________ Phone: ______________
Patient Check List

☐ I have a clear understanding of my diagnosis of a heart attack.

☐ I know the warning signs of a heart attack vs. angina and when to call 911.

☐ I understand when it is necessary to call my healthcare provider.

☐ I know when my follow up appointment is with my healthcare provider.

☐ I have reviewed my medicines and know when and how to take them.

☐ I understand my instructions on a heart healthy diet and any restrictions.

☐ I know what exercises I can do and when I can begin them.

☐ I know what to do to stay healthy.
Important questions to ask your healthcare provider:

1. What is my target blood pressure?

2. What is my target heart rate?

3. What is my target cholesterol level?
More Information

If you would like more information about staying healthy with heart disease, use these sites for reliable information:

- Sentara Healthcare
  http://www.sentara.com/
  Call 1-800-736-8272 for your complimentary copy of the Healthy Heart Express Kit.

- National Institutes of Health
  http://www.nhlbi.nih.gov

- American Heart Association
  http://www.heart.org/HEARTORG

- Mended Hearts Program
  1-888-HEART99 (1-888-432-7899) • e-mail: info@mendedhearts.org

References:


