

Heart & Health Reports™

Your trusted source for prevention, treatment, fitness and nutrition

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Much more than a health club

Who Needs Cardiac Rehab?

EXERCISE has been valued as a medical treatment for thousands of years. The Ancient Greeks recommended physical activity for maintaining health and well-being. Patients at the hospital of Epidaurus were encouraged to participate in sporting activities. Today, an integral part of recovery from orthopedic injuries is physical therapy, with the goal of improving musculoskeletal strength and function. But what about rehabilitation after injury to the most important muscle of the body — the heart?

The benefits of exercise

The approach to exercise in the cardiac patient has changed dramatically over the years. At one time, exercise was considered too dangerous in the early days following a heart attack. Patients were advised for weeks of bed rest, with a slow, gradual return to limited activity. A problem with this approach was a rapid and persistent loss of fitness. In the early 1950s, evidence accumulated about the benefits of an exercise, both as an aid in recovery after a heart



Exercise-based cardiac rehabilitation can speed your recovery after cardiac illness.

attack and to prevent recurrent complications. Exercise-based cardiac rehabilitation programs were developed in the 1960s and are of proven benefit in patients at risk or

with established cardiovascular disease.

A multifaceted approach

Cardiac rehabilitation is not just a glorified health club. It is a multifaceted intervention designed to optimize a cardiac patient's physical, psychological, and social functioning. Cardiac rehabilitation programs involve a team of dedicated professionals including physicians, exercise physiologists, nutritionists, and specially trained nurses. Programs can be located in freestanding facilities, or connected to hospitals, physical therapy centers or even doctors' offices.

Who is eligible?

Although everyone should follow a healthy lifestyle, certain patients are particularly suited for formal cardiac rehabilitation. These

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Real people

A Sodium Scare

MARION, age 80, had enjoyed particularly good health. She was active and was frequently mistaken for someone 15 years younger. She always looked forward to meeting her daughter every Tuesday for lunch. This became even more important to her after she lost her husband a year ago. Just in the past few months was she diagnosed with high blood pressure. She tried to control it by cutting back on her salt intake, but at her last doctor's visit three weeks ago, he started her on a

diuretic. It wasn't much of an imposition, and she diligently took her hydrochlorothiazide every morning. Today, however, she was glad her daughter was coming for lunch because she didn't feel like her usual spry self.

During their lunch date, Marion's daughter noticed that her mother seemed a bit sluggish. "I'm just a little tired," her mother said. "I didn't sleep too well last night for some reason." They finished their

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Heart & Health Reports™

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“Off-label” drug prescribing

Regulations for direct-to consumer advertisements require information regarding potential risks and side effects. You may also often hear that the product is not indicated for treating a particular disorder, or has not been shown to provide some other benefit. This is to ensure that the advertisement does not mislead the nonmedical public. An example might be a cholesterol-lowering drug that is effective for reducing cholesterol, but has not been shown to lower the risk of heart attack.

How could this be? The answer is that not every manufacturer of these drugs has spent millions of dollars over many years of study to prove that claim.

Physicians are free to use clinical judgment and this form of “off-label” prescribing is legal and common. A study of 160 frequently prescribed medicines published in

2006 in the *Archives of Internal Medicine* found that 21% were off-label.

There are different forms of off-label prescribing, some good, some not. It allows medicines to be adopted based on emerging evidence. For example, aspirin is recommended for patients with diabetes to help prevent cardiovascular complications, even though this use is technically “off-label.” And, when traditional treatments have failed, off-label prescribing allows innovation.

Some limitation in off-label prescribing is prudent. The practice must be based on sound scientific principles. This hasn't always been the case. Every physician must adhere to the principle of “*primum non nocere*” (first, do no harm).

Franklin H. Zimmerman, MD

Editor

WEB WATCH

CardioSmart

www.cardiosmart.org



RATING

Outstanding



Excellent



Good




Fair



Poor



In This Section:	How the Heart Works
CardioSmart Challenge	Text Size: A A A Printer Friendly
How the Heart Works	
Am I at Risk?	
Slay the Giant	
About CardioSmart and the ACC	
What is a Cardiologist?	
<p>The heart is responsible for circulating blood throughout the body. It is about the size of your clenched fist and sits in the chest cavity between your two lungs. Its walls are made up of muscle that can squeeze or pump blood out every time the heart “beats” or contracts. Fresh, oxygen-rich air is brought into the lungs every time you take a breath. The lungs are responsible for delivering oxygen to the blood, and the heart circulates the blood through the lungs and out to the different parts of the body.</p>	

Cardiosmart is a newly-launched patient educational web site sponsored by the American College of Cardiology. Its goal is to provide a credible, unbiased source of information about cardiovascular disease, without interference from advertisements. The content and format is excellent. The site is easy to navigate with areas devoted to both prevention and treatment. There are short videos on a few common topics including understanding lipids, hypertension, and smoking cessation. The video section on explaining cardiac testing needs to be expanded, something likely to come as the site matures. Visitors to the site can use the individualized heart disease risk and body mass index calculators. The news section is particularly worthy for reviewing recent topics covered in the media. Overall, an outstanding site.

Coronary stents and surgery a challenge

Coronary stents are a major advance in cardiac treatment. They are used, together with angioplasty, to prop open clogged coronary arteries and improve blood flow to the heart. The first generation devices, known as “bare-metal” stents, improved on plain balloon angioplasty in keeping arteries open. Their main drawback, however, is a nagging rate of re-narrowing (restenosis) requiring patients to undergo repeat procedures. The newer drug-eluting stents have the advantage of a lower rate of restenosis compared with bare-metal devices. Drug-eluting stents release biologically active agents at their surfaces. The eluting agents, (i.e., sirolimus and paclitaxel) are anti-proliferative drugs that prevent cells from multiplying in response to the metallic foreign body. This process, unchecked, leads to stent narrowing. These drugs are also used in cancer chemotherapy and as immunosuppressive agents.

Like many breakthrough therapies in medicine, drug-eluting stents have their downside. All types of stents are foreign bodies within the coronary vessel and are subject to a dangerous complication: stent thrombosis. This problem differs from restenosis, which is a gradual process, allowing time for treatment and remediation. Stent thrombosis, by contrast, occurs suddenly, often leading to heart attack or death. The drug-eluting stents, while effective in preventing restenosis, appear to be particularly susceptible to stent thrombosis. By inhibiting cellular proliferation, drug-eluting stents also hinder the body’s ability to form a protective layer of endothelial cells to cover the stent. This protective barrier is essential in preventing sudden thrombosis.

In order to protect the patient

from this problem, two anti-platelet agents, aspirin and clopidogrel (*Plavix*), are prescribed following placement of stents. While aspirin is prescribed indefinitely, the duration of Plavix therapy has been less certain. Most cardiologists prescribe Plavix for at least six weeks after placing a bare metal stent and for at least one year following a drug-eluting stent.

A problem arises when due to unforeseen circumstances, a patient must be taken off the anti-platelet protocol. Uncontrolled bleeding would be one such condition. During the time off aspirin and Plavix, there is an increased risk of stent thrombosis.

What to do if a patient requires surgery? The first alarms about this problem were sounded in 2000, with a report of the deaths of 8 of 12 patients who underwent non-cardiac surgery within two weeks of insertion of a bare-metal stent died. Six of the deaths were due to myocardial infarctions, two were due to bleeding. Another larger study revealed increased risk of surgery for at least six weeks after bare metal stent placement.

This has caused us to rethink the concept of inserting stents to “protect” the heart for non-cardiac surgery. This practice has been largely abandoned.

Two recent studies published in the journal *Anesthesiology* addressed the issue of elective surgery for patients with recently implanted coronary stents. One examined patients with bare metal stent patients, the other those with drug-eluting stents. The study of bare metal stents revealed an increased risk of non-coronary surgery when performed within 90 days of stent placement. The second study suggested an increased risk of cardiac events associated with surgery up to one year after placement of a drug-eluting stent.

Analysis: Patients anticipating

elective non-cardiac surgery should forego the operation unless absolutely necessary. Necessary surgery should be delayed for at least one year after placement of a drug-eluting stent and three months after bare metal stent placement. This recommendation must be modified, of course, according to clinical circumstances. For many patients, a delay of a year is not possible. Patients with newly diagnosed cancer, for example, will not have the option of waiting a year. Cases at high risk of operative bleeding, such as neurosurgical patients, will require discontinuation of aspirin for one week and Plavix for five days before surgery. The drugs should be resumed as soon as bleeding risk has receded postoperatively. For some procedures like cataract operations, surgeons may be willing to proceed with the patient on one or both anti-platelet agents.

How should emergency surgery be handled in the stent patient? Here, the patient may have to go to the OR without time for the platelet inhibitors to wear off. The period of time off anti-platelet medications should again be kept to a minimum; aspirin and Plavix should be resumed as soon as possible after operation. After surgery, all stent patients must be monitored especially closely for evidence of myocardial ischemia and bleeding post-operatively.♥

— Arthur E. Fass, MD

Nuttall GA, et al: Time and Risk of Surgery after Bare-metal Stent Percutaneous Coronary Intervention. Anesthesiology 2008;109:588-95.

Rabbitts JA, et al. Cardiac Risk of Noncardiac Surgery after Percutaneous Coronary Intervention with Drug-eluting Stents. Anesthesiology 2008;109:596-604.

Cardiac rehabilitation . . . continued from page 1

include patients with stable angina or after a recent heart attack. Other appropriate patients are those who have undergone cardiac surgery (coronary bypass, valve or transplant) or percutaneous interventions (angioplasty or stent). Most third party insurances and Medicare cover reimbursement for cardiac rehabilitation.

What to expect

A typical cardiac rehabilitation program consists of four phases (I-IV). The first phase is started within the first 24-48 hours after a patient is admitted to the hospital following a heart attack or cardiac surgery. The goal of this stage is to assist with early ambulation and begin risk factor modification.

The second phase of cardiac rehabilitation continues after discharge from the hospital and usually lasts for 6-12 weeks. A graded exercise (stress) test is routinely performed prior to beginning the program to ensure that it is safe to exercise and gauge the baseline level of fitness. A team of specialists works with the

patient that can accommodate just about every fitness level, helping both athletes and “couch potatoes” to improve their cardiac status. Even those with severe limitations, physical disabilities and special needs can participate in cardiac rehabilitation. Program goals are to improve a patient’s ability to perform both general aerobic activities (e.g., for walking, stair climbing, running) and muscle strength (e.g., for lifting packages or physical work). Patients rotate through a series of “stations” that may include treadmills, exercise bicycles, elliptical or step machines, designed to improve endurance and exercise capacity. Resistance training with free weights, pulley devices or variable weight machines (e.g., *Nautilus*) is used to improve muscle strength and flexibility. Each session lasts about an hour, three times a week. In this phase, patients wear cardiac monitors to watch for abnormal heart rhythms.

After completing the monitored portion of cardiac rehabilitation, patients advance to phase III, where they are supervised, but no longer

wear a cardiac monitor. Phase IV is the final goal, where individuals exercise on their own, unmonitored and with limited supervision.

Specific goals to achieve

Modern cardiac rehabilitation programs have evolved far beyond just exercise instruction and are now involved in the education and support of all aspects of secondary cardiovascular prevention. A series of components now make up the core of every program.

- **General assessment.** The staff interviews every patient, reviewing current and past medical and surgical history. A physical examination is performed to assess the cardiopulmonary system. Medications are reviewed to evaluate dose, frequency and compliance. The staff assists the patient’s primary physician in meeting goals for prescribing aspirin, clopidogrel, beta-blockers, lipid-lowering agents, and ACE inhibitors or angiotensin receptor blockers.

- **Influenza vaccination.** All patients with cardiovascular disease

Sodium . . . continued from page 1

lunch and Marion’s daughter made a mental note to call her mother early the next morning to check in.

When Marion’s daughter called, she was shocked to hear her mother’s garbled speech. Thinking her mother had suffered a stroke, Marion’s daughter called an ambulance.

The emergency department physician soon determined the reason for Marion’s sudden change. “Your mother’s sodium is 117, instead of the normal 140,” the doctor explained. “We’ll make sure there wasn’t a stroke, but I think the problem is her diuretic.”

After further testing, the diagnosis was confirmed and Marion was treated with intravenous fluids that slowly raised her sodium level. As

her sodium improved her mental status returned to normal. Her doctor explained that some patients have an abnormal response to some diuretics and that he would change her blood pressure medication to something she would tolerate.

Cardiologist’s comment:

Thiazide diuretics have been a mainstay of hypertension treatment for decades. They can, however, cause electrolyte depletion including abnormalities of sodium, potassium, and magnesium. A low sodium level (hyponatremia) is an uncommon, but important complication. Elderly females are more prone to this problem, which can manifest with symptoms of weakness and lethargy. Severe hypona-

tremia can cause seizures. Treatment is directed to stopping the offending agent and slowly restoring sodium levels with intravenous electrolyte solutions.

Diuretics remain an important tool for controlling blood pressure. After beginning treatment, patients should always follow-up with their doctor for clinical evaluation and blood chemistries to evaluate electrolyte levels. If thiazide diuretics cause problems, another class of diuretic may be better tolerated or other antihypertensive agents can be used instead.♥

— Franklin H. Zimmerman, MD

The stories reviewed in this section represent actual patients. Details have been modified to preserve anonymity.

should be vaccinated against influenza. These may be offered at the program or the patient will be advised to do so.

- **Nutritional counseling.** Patients are evaluated regarding their consumption of total calories, dietary fat and cholesterol, sodium and nutrients. Recommendations are made about following a healthy diet with emphasis on consuming fruits, vegetables, whole grains, and fish. Interventions are suggested as needed to avoid excessive alcohol, snacks, and unhealthy foods.

- **Weight management.** Patients are evaluated for weight, height and waist circumference to calculate their body mass index (BMI). This is a useful indicator of whether an individual is overweight, obese, or has components of the metabolic syndrome, which is an independent cardiac risk factor. As necessary, the staff will establish reasonable short and long-term goals for weight loss. For appropriate patients, a typical goal may be to reduce body weight by at least 5%, and preferably more than 10%, at a rate of 1-2 lbs/wk, over a period of up to 6 months. A formal nutritional consultation can be arranged to design a diet that achieves an energy deficit of 500-1000 kcal/day.

- **Physical activity counseling and exercise training.** The exercise physiologist will assess baseline exercise capacity and strength, using information obtained from the pre-enrollment exercise test and physical examination. The staff will design an individualized exercise program, usually involving a motorized treadmill and other aerobic equipment. At first the speed will often be quite slow, with minimal if any elevation. Over time, both the speed and elevation of the treadmill will be increased so that gradual, but steady progress is made. A traditional recommendation is for patients to perform aerobic exercise for 3-5 days a week, at 50-80% of exercise capacity, for 20-60 minutes. Resistance training with free weights or other equipment is used

to improve muscular strength. A standard recommendation is to perform this type of exercise 2-3 days a week with 10-15 repetitions of each exercise. One to three sets of 8-10 different upper and lower body exercises are performed. Patients are instructed how best to warm up, cool down, and stretch as part of their exercise routine.

- **Hypertension management.** Blood pressure is measured before and after each exercise session. The goal is to assist each patient to achieve a blood pressure at least below 140/90 mm Hg, or below 130/80 mm Hg for those with diabetes. Medications are reviewed and the staff will assess every patient's current treatment and compliance with drug therapy. The staff also reviews nonprescription drugs that may adversely affect blood pressure and will advise dietary changes that can help with blood pressure control.

- **Lipid management.** The staff works with the patient's physicians, analyzing fasting levels of total cholesterol, HDL, LDL and triglycerides to achieve recommended goals. Current treatment and compliance with medications is reviewed as well as whether appropriate follow-up of liver function and muscle enzyme tests is being performed. Nutritional counseling is provided to help achieve lipid goals.

- **Diabetes control.** The presence or absence of diabetes is reviewed in every patient. If a patient is diabetic, special attention is paid to identifying and preventing complications of this disease, including problems with vision, peripheral circulation, kidney function and neuropathy. Fasting blood glucose levels are monitored and education provided to recognize signs and symptoms of either high or low blood glucose levels, before and after exercise. Medications are reviewed including insulin and oral agents. Meeting blood pressure goals is particularly important for patients with diabetes and will be reviewed with every patient. Nutritional assistance is

performed to achieve glucose control.

- **Tobacco cessation.** Patients are asked about tobacco use in all forms. Efforts are made to assist all patients who use tobacco to quit. Either individual or group counseling is encouraged, working with the patient's primary physician. Recommendations are made to avoid second-hand smoke at work and home.

- **Psychosocial management.** Psychological distress is common in cardiac patients. This may take the form of depression, anxiety, anger, hostility and marital/family distress. Sexual dysfunction is also common, which may be caused by a combination of emotional factors, circulatory disorders and medications. The program will assess and identify psychosocial impairment and assist the patient's primary physician to intervene as required. The program will develop a supportive environment and assist in counseling and management.

Cardiologist's comment:

Cardiac rehabilitation is highly underutilized. Despite its proven benefit, estimates are that only 10-20% of eligible patients are referred to cardiac rehabilitation programs. If you have angina, have recently suffered a heart attack, or have undergone bypass or angioplasty/stent procedures, ask your doctor about enrolling you in cardiac rehabilitation.

And if you think these programs don't work, consider one patient I examined in the office this week. He suffered a heart attack at the age of 58. His angiogram showed blockages in all three major arteries. But instead of having bypass surgery, he began a diligent program of exercise, diet and medications. Now twenty-five years later, he remains a fixture at our cardiac rehabilitation center, a self-proclaimed "poster child" for the benefit of a healthy lifestyle.♥

— Franklin H. Zimmerman, MD

Catapres and Catapres-TTS

(Clonidine hydrochloride)

What kind of medicine is Catapres?

Catapres belongs to a class of medication called centrally acting alpha-2 receptor agonists. This medication is used primarily to treat high blood pressure.

Other, generally accepted uses include as an adjunct for narcotic and alcohol dependence, smoking cessation, pain control and attention deficit hyperactivity disorder.

How does it work?

Catapres lowers blood pressure by a unique mechanism that affects the sympathetic nervous system. This system involves the body's response to catecholamines, chemicals that control pulse and blood pressure. Catapres stimulates special receptors in the brain that ultimately reduce sympathetic outflow, thereby lowering the blood pressure and pulse.

How will this medicine help me?

Hypertension is an important risk factor for coronary artery disease, stroke, and kidney disease. Lowering high blood pressure helps prevent these complications.

How are Catapres and Catares-TTS prescribed?

The recommended starting dose for Catapres tablets is 0.1 mg, twice daily. Geriatric patients may benefit from a lower starting dose of 0.05 mg, twice daily. The daily dose may be increased by 0.1 mg at weekly intervals to a maximum of 0.6 mg.

Catapres-TTS is a transdermal system that is applied weekly to the skin. It should be applied to a hairless area on the arms or chest. The usual dose range is 0.1-0.3 mg daily. The dose may be increased every 1-2 weeks.

What prescription doses are available?

Catapres is available in 0.1 mg, 0.2 mg and 0.3 mg tablets. The tablet is not scored, but may be split or crushed.

Catapres-TTS patches are available in 0.1 mg, 0.2 mg, or 0.3 mg dose strengths.

How long will it take to work?

The blood pressure lowering effect of Catapres tablets begins within 30-60 minutes. The maximum effect is reached in 2-4 hours.

The onset of action of the transdermal patch is 2-3 days.

What if I miss a dose?

Never try to "catch up" by taking an extra pill. If you miss a dose, take the missed tablet as soon as possible and resume the usual schedule the following day.

The effect of the patch stays in your body for 2-3 days. If you miss a day, reapply as soon as possible. Call your doctor if the delay is longer than 2 days.

Do food or other drugs affect this medicine?

- Food does not affect this medication.
- Catapres may enhance the depressive effects of alcohol, barbiturates or other sedatives.
- Tricyclic antidepressants (e.g., *Norpramin*, *Tofranil*, *Pamelor*) may decrease the blood pressure lowering effect of Catapres.
- Catapres can slow the heart rate and should be used with caution with other drugs with this effect.
- Beta blockers can exacerbate the rebound hypertension that can occur if Catapres is withdrawn abruptly.

Who should use caution or not take this medicine?

- Pregnant women: There are no adequate studies that determine the safety of this drug during pregnancy.
- Nursing mothers. This drug appears in breast milk.
- Patients with severe kidney disease may need a lower dose.

How will I feel while taking this medicine?

More common, less serious side effects can include:

- Drowsiness or dizziness
- Dry mouth
- Skin rash or irritation (particularly with transdermal)
- Erectile dysfunction and loss of libido

Are there serious side effects to watch for?

The following potentially serious side effects should be reported promptly to your doctor:

- Severe lightheadedness or fainting, which may indicate an excessively low blood pressure.

How does the doctor monitor my progress?

Your doctor will periodically check your blood pressure, EKG and order simple blood tests.

Do you have any special tips for me?

- Catapres lowers blood pressure more effectively when combined with a diuretic and may allow using a lower dose.
- Mild side effects are common, but often diminish over time, particularly when using the patch.
- Do not abruptly stop this medicine without your doctor's advice because severe, "rebound" hypertension may occur. Beta blockers (e.g., atenolol, metoprolol) may exacerbate this effect. The beta blocker may need to be stopped first and other blood pressure medications substituted.
- For more information on the Internet: Visit: www.Catapres.com.

Catapres and Catapres-TTS® are trademarks of Boehringer Ingelheim pharmaceuticals.

— Franklin H. Zimmerman, MD

Halloween Horrors

WITH autumn’s arrival, the days become shorter and the air becomes crisp. The neighborhood is scattered with pumpkins propped on doorsteps awaiting the excitement of Halloween night. But lurking behind the decorated doors is something more terrifying to a nutritionist than ghosts and goblins – massive bags of Halloween treats. The goodies we promise to save until their intended distribution on October 31st taunt us as the countdown to Halloween night begins. These pre-holiday temptations, not to mention the aftermath of trick-or-treating, can quickly turn into a horror show for those of us trying to maintain a healthy diet.

Halloween candy sales average about two billion dollars annually in the U.S., with chocolate candy being the most popular and widely distributed. Most chocolate candy is filled with artery-clogging saturated fat. The unhealthiest chocolate bars are the ones with peanut butter or nuts, while the lowest-fat chocolates are mint or marshmallow filled. For example, a *Reece’s Peanut Butter Cup* has three times the amount of fat as a *Three Musketeers Bar* and about four times the amount of fat as *Junior Mints*. The lowest fat candies are fruit flavored hard candies or chews such as *Skittles* or *Blow Pops*. Unfortunately low fat does not mean low calorie,

as these little treats tend to be loaded with sugar.

Most of the Halloween “fun size” candies are between 80 and 100 calories, so having just one will not tip the scales. The problem is that these little bite-sized treats are often too tempting to eat just one. This can turn an innocent 80 calories into a staggering 240-320 calories after downing three or four snack-sized bars. And it won’t be easy to walk off those extra calories. You will need to walk 2.5 miles to burn off those three “innocent” little bars.

Indulging in Halloween candy is an American tradition. But here are some tricks you can use to reduce the dreaded treat binge. Try buying candy you don’t care for, but might please the kids. Keep the candy out of sight until the trick-or-treaters arrive to avoid temptation. Donate the leftover candy instead of snacking on them after the holiday. Use our chart below to “compare your poisons.” Remember, it’s better to be frightened by a skeleton at the door on Halloween night, than by a monster number on your bathroom scale the next morning.♥

— Emily Kratz, MS, RD

Ms. Kratz is an outpatient nutrition coordinator at Phelps Memorial Hospital in Sleepy Hollow, NY.

Supermarket Savvy

Halloween Treats Buying Guide

Variety (serving size)	Calories	Fat (g)	Sat. Fat (g)	Sugar (g)
<i>Almond Joy (snack size)</i>	80	4.5	3	8
<i>Blow Pop (1 pop)</i>	50	0	0	11
<i>Butterfinger (snack size)</i>	85	4	1.75	8.5
<i>Hershey’s bar (fun size)</i>	67	4	2.7	8
<i>Junior Mints (snack size)</i>	75	1	0.75	16
<i>M&M’s (fun size)</i>	100	4.5	2.5	13
<i>Nutrageous (snack size)</i>	190	11	3.5	15
<i>Reece’s Peanut Butter Cup (1)</i>	80	4.5	1.5	7
<i>Skittles (fun size)</i>	80	0.75	0.75	30
<i>Smarties (1 roll)</i>	25	0	0	7
<i>Snickers (fun size)</i>	80	4	1.5	8.5
<i>Starburst (4 chews)</i>	80	1.75	1.5	11.5
<i>Three Musketeers (fun size)</i>	63	2	0	15

Q: "What are the causes of an enlarged heart?"
 — New York, NY

A: Enlargement of the heart is usually the result of heart disease. The diagnosis of an enlarged heart and the delineation of its cause are therefore extremely important in providing the patient with the best treatment.

The diagnosis is not always obvious. Patients are frequently referred to a cardiologist because of a chest X-ray finding of an enlarged cardiac silhouette. The chest X-ray, however, is notoriously inaccurate for this diagnosis and additional evaluation is needed for confirmation. A careful physical examination is still important in assessing heart size. However, the echocardiogram has become the most precise tool for evaluating heart size. The echo yields accurate measurements of all cardiac chamber dimensions, wall thicknesses, and can uncover clues as to the nature of the underlying disease process.

The heart can enlarge in two

basic ways: increased wall thickness (hypertrophy), or increased chamber cavity dimensions (dilatation). There is often some combination of these processes.

Left ventricular thickening is often the result of a chronic pressure overload. The most common cause of left ventricular hypertrophy is hypertension. The heart will thicken in a uniform fashion in response to the high pumping pressures. This type of wall thickening is known as concentric left ventricular hypertrophy. Another frequent cause of this type of hypertrophy is aortic stenosis, where the left ventricle must pump against a narrowed aortic valve.

A less common cause of heart thickening is known as hypertrophic cardiomyopathy. In this condition, the heart thickens, often in an asymmetric fashion without an obvious cause. This disease has a genetic basis.

Cardiac dilatation is the result of a number of conditions. The most frequent cause is coronary artery disease. Damage from a heart attack

can culminate in progressive enlargement, sometimes leading to congestive heart failure. Valvular heart disease, especially aortic or mitral regurgitation, can lead to heart enlargement due to volume overload. In these conditions, the heart must pump more blood with each stroke.

Another common cause of cardiac dilatation, often involving all four heart chambers, is dilated cardiomyopathy. Sometimes this is the result of a viral infection, but is usually of unknown cause. This condition is characterized by a weakened heart muscle that is prone to failure.

Cardiac enlargement is not always due to heart disease. The athlete's heart may be somewhat thickened and dilated in response to the stimulus of regular exercise training. Differentiating this finding from early heart disease is sometimes difficult.♥

— Arthur E. Fass, MD

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- Heart disease and the American Presidency: Lessons learned that benefit us all.
- Holiday heart attacks: Myth or reality?