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Laughter is the best medicine.

~Author unknown

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LAUGHTER AND HEART HEALTH



A patient went to the doctor with a sore throat.

The doctor: “Your tonsils have to come out.”

The patient: “I want a second opinion.”

The doctor: “Okay, you’re ugly, too.”

If you think that was a funny joke, laugh out loud. Laughter, along with an active sense of humor, may help protect you against having a heart attack. But the benefits of laughing don’t stop with your heart. Laughing has previously been found to help fight infections, relieve hay fever, ease pain and help control diabetes.⁵

Laughter is the best medicine.

~Author unknown

“The old saying that ‘laughter is the best medicine’ appears to be true when it comes to protecting your heart,” said Dr. Michael Miller, associate professor of medicine at the University of Maryland School of Medicine and director of the Center for Preventive

A clown is like aspirin, only he works twice as fast.

~Groucho Marx

Cardiology at the University of Maryland Medical Center in Baltimore, Maryland.¹

“We don’t know yet why laughter protects the heart, but we know that mental stress is associated with impairment of the endothelium, the protective barrier lining our blood vessels. Stress can cause a series of inflammatory reactions that lead to fat and cholesterol build-up in the coronary arteries and ultimately to a heart attack.”²

Dr. Miller led research that compared humor responses of 300 people. They found that the patients they interviewed who had heart disease were 40 percent less likely to laugh in situations such as wearing the same outfit to a party, compared to people of the same age without heart disease.

But was the lack of humor cause and effect of having heart disease or something else?

Laughter is an instant vacation.

~Milton Berle

In another study, Dr. Miller and his team decided to investigate the possible healthy effects of laughter. Using movies to gauge the effect of laughter on heart health, they tested blood flow in 20 healthy men and women. Each watched a clip from *Kingpin* (a Woody Harrelson comedy). At least two days later they watched the opening sequence of *Saving Private Ryan* (Steven Spielberg’s graphic war movie).

- During the war movie blood flow decreased by an average of 35%.
- During the comedy it increased by an average of 22%, and the effect lasted 30-45 minutes.

The conclusion? Laughter may be as healthy as exercise!³

Laughter is the sensation of feeling good all over and showing it principally in one place.

~Josh Billings

The benefits of laughing lie in its effect on the inner lining (endothelium) of the walls of your arteries. The endothelium plays a vital role in maintaining blood flow by regulating the diameter of the blood vessels.² Damage to the endothelium is one of the factors involved in cardiovascular disease.

Laughing seems to make the endothelium expand; stress seems to narrow it. So laughing helps keep your artery walls fit and well, helping to maintain good blood flow.²

Laughter gives us distance. It allows us to step back from an event, deal with it and then move on.

~Bob Newhart

Studying therapeutic benefits of laughter began 20 years ago when Norman Cousins, in *Anatomy of an Illness*, told his story of overcoming a fatal disease by watching old movies and Candid Camera shows. "Laughter is a great antidote to illness," he concluded.⁴ Since then, Drs. Lee Berk and Stanley Tan, of Loma Linda University Medical Center in California, have continued research on laughter. Their studies show laughter lowers blood pressure, reduces stress, increases muscle relaxation and boosts the immune system.⁵

Even if there is nothing to laugh about, laugh on credit.

~Author Unknown

The researchers suggest that we should try to laugh more. The best prescription for a long, happy healthy life is to eat a good nutritious diet, exercise on a regular basis and add in a few good laughs every day.³

Think about it. Maybe healthy people don't laugh because they are healthy. Maybe they are healthy because they laugh!

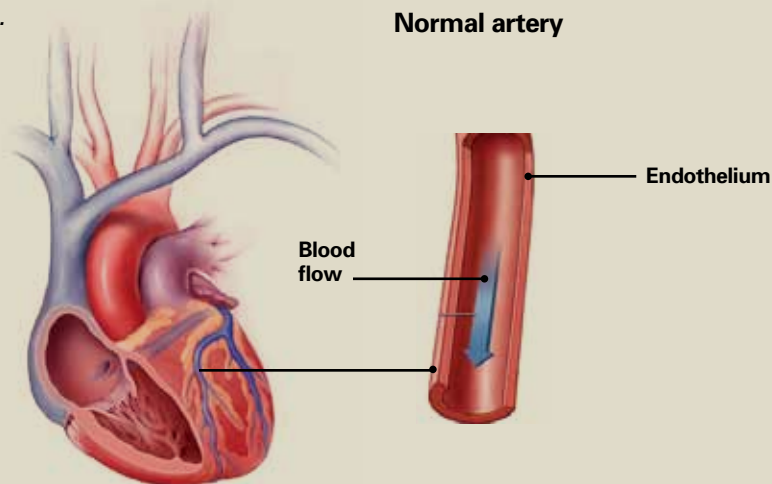
RX for laughter

Here are some things you can do that might cause that all important response... a good belly laugh!

- Watch comedy movies or TV shows or the comedy channel.
- Watch cartoons.
- Read a humorous book.
- Read or tell jokes.
- Listen to humorous radio shows or CDs.
- Play with children - they'll make you chuckle!
- Watch funny videos on You Tube, such as funny animal videos.
- Go to a live comedy review or play.
- Get together for some lighthearted conversation with good friends.
- Re-live humorous experiences.
- Get someone to tickle you! Literally or figuratively.
- Look for opportunities to be just plain silly! It's fun! And it makes you and others laugh!
- Look at your self in a mirror and see how funny you can make your face.

Source:
www.smart-heart-living.com

Figure 1.



¹Laughter is good for your heart, according to a new University of Maryland Medical Center Study." University of Maryland, Baltimore, Maryland. Press release, November 15, 2000.

²Clark A, Seidler A, Miller M. Inverse association between sense of humor and coronary heart disease. *Int J Cardiol* 2001;80(1):87-88.

³Miller M, Mangano C, Park Y, et al. Impact of cinematic viewing on endothelial function. *Heart* 2006;92:261-262.

⁴Cousins, Norman. *Anatomy of an Illness as Perceived by the Patient: Reflections on Healing and Regeneration*. New York, NY: WW Norton & Co Inc., 2001.

⁵Berk L, Tan S, et al. Eustress of mirthful laughter modifies natural killer cell activity. *Clin Res* 1989;37:115A.



Pacemaker patient “tunes up” his activity level

As owner of Dave’s Service Center, an automotive and truck repair center in Star Prairie, Wisconsin for the last 49 years, Dave Peterson has a strong appreciation for how technology has changed the auto industry.

Last year, he also gained appreciation for advances that have happened in medical technology. Dave and his wife Carrie had the opportunity to tour Boston Scientific’s Cardiac Rhythm Management manufacturing plant in Arden Hills, Minn., and see how implantable heart devices such as his pacemaker are made.

“It was really something,” said Dave of the plant. “The people are all really nice that work there. I had no idea how they (devices) were made, so everything surprised me. It was

amazing to see how they put them together.”

Dave was especially impressed with all the careful steps he saw employees take to ensure that the devices remain impeccably sanitary during manufacturing in the clean room environment. He marveled at seeing how the devices work ... “how just that little battery can keep them going.”

Second pacemaker “even better”

Dave, 65, received his first Guidant (now Boston Scientific) pacemaker after suffering a heart attack just a few days after Christmas in 2000. Doctors discovered that he had experienced a previous heart attack that he wasn’t aware of. They recommended a pacemaker to help regulate his heart rhythm.

“Thank God they invented it or I wouldn’t be here.”

In December of 2007, he received a replacement Boston Scientific pacemaker and experienced its technological advances firsthand. Boston Scientific was the first company to introduce the long-lasting battery technology that is the industry standard today.



A passion for hunting and fishing

While Dave has had to make a few adjustments, thankfully, two of his other favorite activities — hunting and fishing — are ones he can still regularly enjoy. He hunts geese, duck, pheasant and deer on 120 acres of land in Northern Wisconsin that a son owns, and hopes

to make return hunting trips to Iowa and North Dakota someday as well.

Dave began deer hunting again about a year after getting his first pacemaker. He now uses a cross-bow, after receiving his doctor’s approval and a special permit for using that type of bow from the Wisconsin Department of Natural Resources. He successfully bagged a deer this past year and is grateful his pacemaker allows him to continue enjoying the sport. “It’s a great thing,” he said.

Device “tune ups” to fit his activity level

Along with the way pacemakers are made, Dave is also impressed that just like a car, his pacemaker’s technology gives his doctor the precise ability to “tune up” or adjust it as needed. His doctor’s goal is to ensure Dave’s pacemaker works the best it can for his lifestyle and level of activity.

His new pacemaker has what’s called a “blended-sensor” feature. The pacemaker’s sensor automatically detects

an increase in his motion and an increase in his breathing rate when he is more active. When the sensor detects this increase, it adapts its pacing rate for life-adaptive pacing. The increase in his heart rate changes with his needs during everyday activities or exercise.

Dave explained, "My doctor and his team know everything I do; they know everything about me. So they just automatically do it (adjust his pacemaker sensor's pacing limits). Doesn't take long at all. They don't even mention it much, but just tell me I'm ready to go and drag out another deer." (Although Dave said he's happy to leave

those deer dragging responsibilities up to his two grown sons!) Along with his sons, wife Carrie and their two grown daughters are thrilled to see Dave doing so well. Dave and Carrie are looking forward to celebrating their 45th wedding anniversary in March 2009.

Thanks to his pacemaker, Dave said he has "lots of energy. I can walk without getting tired; I can even run a little bit without getting tired or out of wind. I'm just more alert ... more awake. It (the pacemaker) just keeps you going. It's an amazing little thing. Thank God they invented it or I wouldn't be here."



What is a blended sensor?

In the normal heart, when you get up and perform an activity, like gardening, your heart automatically senses that more oxygen is needed to fuel the extra effort. It begins beating faster to accommodate the walking, bending, lifting, and other physical tasks you may be doing. You may not even be aware of this natural increase and decrease in your heart rate.

If you are under age 65, you may get your heart rate above 90 beats per minute about 175 times per day. If you are over age 65, you still may get your heart rate above 90 beats per minute over 150 times per day.¹

This normal function is lost when the heart's electrical activity doesn't work properly and the heart is not able to automatically respond to changes in activity. This is called chronotropic incompetence.

The sensors in your pacemaker help restore the responsiveness of your heart rate so that you can resume most everyday activities. This is called rate-responsive or adaptive-rate pacing. Types of sensors used in Boston Scientific pacemakers today include the following:

- An accelerometer is a "motion sensor" that responds when your body is moving through space, such as standing up and walking.
- The minute ventilation sensor is a "physiologic sensor" that responds to increases in breathing rate and depth while you are active, such as carrying a load of groceries or walking up stairs.
- A blended sensor uses both types of sensors, an accelerometer and a minute ventilation sensor, and blends the information received from both sensors to provide an appropriate paced heart rate.

Your healthcare provider can explain the type of sensor in your pacemaker.

¹ Mianulli M, Birchfield D, Yakimow K, et al. Do elderly pacemaker patients need rate adaptation – implications of daily heart rate behavior in normal adults. *PACE*. 1996;19 (pt11):681(abstract).

WHAT'S INSIDE OF ME?

Pacemakers. Leads. ICDs. CRTs. It can be hard to understand the difference. Here are some simple explanations for devices and procedures.



ICD



CRT-D



Leads



Pacemaker

What is the difference between a pacemaker and an ICD?

Both a pacemaker and an ICD (implantable cardioverter defibrillator) are devices implanted in the chest to deliver electrical impulses to the heart. A pacemaker is used when the heart beats too slowly. An ICD is used when the heart beats too quickly in an abnormal, potentially life-threatening rhythm.

Impulses in a pacemaker increase the heart rate to a more normal rate. These impulses are tiny and patients generally cannot feel them. Pacemakers send out these impulses often to help even out the rhythm. They are about the size of a matchbook.

Electrical impulses from an ICD slow down the heart rate by converting the abnormally fast rhythm to a more normal rhythm. The impulses from an ICD to convert the abnormal rhythm can be intense and may

feel like being hit in the chest. But it is good to know that the ICD is treating the problem. ICDs activate as needed and most are about the size of a jelly jar lid.

ICDs are a combination of an ICD and a pacemaker.

What device is used for heart failure?

In a healthy heart, both ventricles (lower part of the heart) pump or beat at exactly the same time in a coordinated way. It's like making a fist—all of the fingers squeeze in unison. But for many people with heart failure, the ventricles do not pump at the same time. For these people, the pumping is uncoordinated. It's like making a fist just one finger at a time.

Cardiac Resynchronization Therapy (CRT) helps restore proper coordination so that your heart pumps more efficiently.

A CRT system consists of two components—the pulse generator and three thin, insulated wires called leads. A CRT device delivers electrical impulses to the heart through these leads. This helps restore the normal timing of the heartbeats, causing both ventricles to pump together again. It's like a fist closing normally again.

There are two types of CRT devices. One is a special kind of pacemaker. It's called a cardiac resynchronization therapy pacemaker (CRT-P) or "biventricular pacemaker." The other is the same device, but it also includes a built-in implantable cardioverter defibrillator (ICD). This type is called a cardiac resynchronization therapy defibrillator (CRT-D).

What is a pulse generator?

A pulse generator is part of a pacemaker or defibrillator system. The pulse generator is the power source for the system. It is also the "brain" of the device. The doctor programs the

pulse generator to monitor a specific heart problem.

The pulse generator monitors the heart. It determines if the heart is beating too fast or too slow, depending on how the doctor has programmed it. Then, when needed, it sends an electrical impulse to the heart through the leads to speed up or slow down the heart.

What is a lead? (pronounced "leed")

A lead is an insulated thin wire that connects a pulse generator to either the surface or the inside of the heart. Leads carry electrical signals between the heart and the pulse generator.

We hope that these explanations have been helpful. If you want to know more about any of the topics we've covered, go online to www.lifebeatonline.com. And don't be afraid to ask your healthcare provider to help you understand.

WHAT IS EJECTION FRACTION – EF?

An ejection fraction (EF) is one of the measurements used by your doctor to tell how well your heart pumps with each beat.

- “Ejection” refers to the amount of blood that is pumped out of the left ventricle – the main pumping chamber – during each heart beat.
- “Fraction” refers to how that amount compares to the total amount of blood in the left ventricle.

Therefore, an ejection fraction is the percentage of blood pumped out of the left ventricle with every heartbeat.

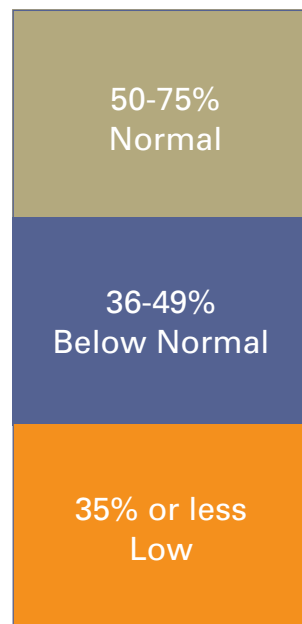
What does the number mean?

A normal heart pumps a little more than half of the left ventricle’s blood volume with each beat. A normal EF is 50% or higher. For example, an LVEF of 55% means that 55% of the total amount of blood in the left ventricle is pumped out with each heart beat. The heart would not ever achieve an EF of 100% since it does not pump out all of the blood it holds at one time.¹

A lower than normal EF, less than 40%, indicates that the left ventricle is weakened.¹

Importantly, if your EF is 35% or less, you are at a higher risk of experiencing life-threatening irregular heartbeats that can cause sudden cardiac arrest and sudden cardiac death.¹ Ask your healthcare provider if an implantable cardioverter defibrillator (ICD) is appropriate for you.

Heart Pumping Ability



How is EF measured?

Your ejection fraction can be measured in many ways, but one of the most common is with an echocardiogram or “echo” test.

An echocardiogram is a simple and painless test that uses sound waves to take moving

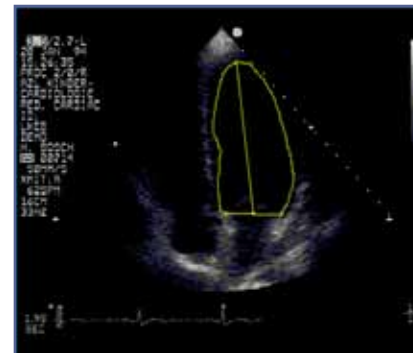


Figure 1

Echocardiogram imaging. This is an example of a normal echocardiogram. The yellow line is an outline of the left ventricle; the straight line highlights the middle of the left ventricle.

pictures of your heart. The technology is the same used to perform a sonogram on a pregnant woman.

This procedure is sometimes done right in the clinic, depending on your doctor’s speciality or the availability of the equipment.

Other tests can also be used to measure EF.

- MUGA (multiple-gated acquisition) scan is a type of radionuclide imaging test that provides clear pictures of blood flow through the heart’s chambers and blood vessels. Also called a nuclear medicine scan.
- Cardiac catheterization threads a catheter through a blood vessel into the heart to gather information about the coronary arteries and the heart’s other structures.

Why should I know my EF number?

If you have a heart condition, it is important for you and your doctor to know your EF. Your EF can help your doctor determine the best course of treatment for you and the effectiveness of the therapies that have been prescribed.

EF is measured initially when you are first diagnosed with a heart condition, and again as needed, based on changes in your condition. If you have an EF of less than 35%, you are a higher risk of experiencing life-threatening irregular heartbeats that can cause sudden cardiac arrest and sudden cardiac death.¹

Ask your healthcare provider how often you should have your EF checked.

¹Bruce Wilkoff, et al. Understanding Your Ejection Fraction. Cleveland Clinic, 2008. <http://my.clevelandclinic.org/heart/disorders/heartfailure/ejectionfraction.aspx>. Accessed 2.12.09.



WomenHeart is the only national patient-centered organization that provides support, education and advocacy for women living with heart disease. Through their coalition of national volunteers and community-based support networks, online support services and educational programs. They offer comprehensive services to women with heart disease and those at-risk and empower all women to take charge of their heart health.

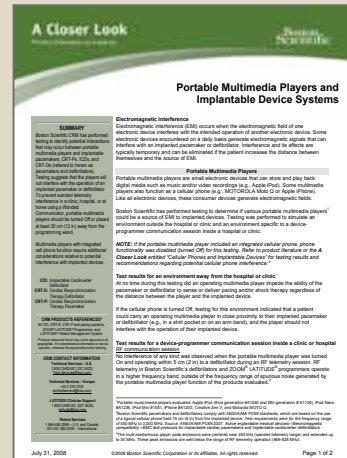
In nine years, WomenHeart has done these and more:

- Grown its membership to thousands of women living with and at-risk for heart disease, friends and family members, and health care professionals nationwide
- Launched a dynamic online support community to connect women across the country and provide them with peer-to-peer support
- Trained more than 400 heart disease survivors as community educators via the WomenHeart Science & Leadership Symposium in collaboration with Mayo Clinic
- Advocated for the HEART for Women Act resulting in it passing the House of Representatives in September 2008
- Sponsored the national Leadership Program to train volunteers from across the country to conduct women's heart disease education and outreach in the communities where they live

For more information go to www.womenheart.org
 808 18th Street, NW | Washington, DC 20006 | 202-728-7199

GO ONLINE FOR A CLOSER LOOK

The topics listed below have been of interest to patients. They can be found at www.lifebeatonline.com in Resources for Patients.



1. Information for the Traveling Pacemaker or Defibrillator Patient
2. Electromagnetic Interference EMI and Implantable Device Systems
3. Portable Multimedia Players and Implantable Device Systems
4. Cellular Phones and Implantable Devices
5. Automobile "Smart Key" systems and Implantable Pacemakers and Defibrillators
6. Polar Heart Rate Monitors and Implantable Devices
7. Electrical Arc Welding and Implantable Device Systems
8. Latex, Polyvinyl Chloride (PVC) and Implantable Device Systems

Patient Directed Versions with Reliability Statement Important Safety Information

Cardiac Resynchronization Therapy Devices

Cardiac resynchronization therapy pacemakers (CRT-P) and defibrillators (CRT-D) are designed to treat heart failure patients who have symptoms despite the best available drug therapy. They are also designed to help your heart pump more effectively and meet your body's need for blood flow. CRT-P and CRT-D systems are not for everyone, including people with separate implantable cardioverter-defibrillators (CRT-P only) or certain steroid allergies. Procedure risks include infection, tissue damage, and kidney failure. Patients who should not receive this device include: patients who have additional medical conditions that may not allow the pacemaker to function appropriately (CRT-P only) and patients whose ventricular rhythm disturbances or heart failure have a reversible or temporary cause. In some cases, the device may be unable to detect or appropriately respond to your heart rhythm (CRT-P and CRT-D) or may deliver inappropriate shocks (CRT-D only). In rare cases severe complications or device failures can occur. Electrical or magnetic fields can affect the device. Only your doctor knows what is right for you. These devices are available by prescription only. Individual results may vary. For further safety information see the Physicians Instructions for Use page on www.bostonscientific.com/ifu or call 1.866.484.3268.

Implantable Cardioverter Defibrillators

An implantable cardioverter defibrillator is designed to monitor and treat heart rhythm problems, greatly reducing the risks associated with them. But it is not for everyone, including people with certain steroid allergies. Procedure risks include infection, tissue damage, and kidney failure. Patients who should not receive this device include: patients whose ventricular rhythm disturbances have a reversible or temporary cause and patients with certain types of atrial rhythm disturbances. Procedure risks include infection and tissue damage. In some cases, the device may not respond to irregular heartbeats or may deliver inappropriate shocks. In rare cases severe complications or device failures can occur. Electrical or magnetic fields can affect the device. Only your doctor knows what is right for you. This device is available by prescription only. Individual results may vary. For further safety information see the Physicians Instructions for Use page on www.bostonscientific.com/ifu or call 1.866.484.3268.

Pacemakers

A pacemaker system is designed to monitor and treat your heart rhythm problems, greatly reducing the risks associated with them. But it is not for everyone, including patients with certain steroid allergies. Procedure risks include infection, tissue damage, and kidney failure. Patients who have additional medical conditions that may not allow the pacemaker to function appropriately should not receive a device. In rare cases severe complications or device failures can occur. Electrical or magnetic fields can affect the device. Only your doctor knows what is right for you. This device is available by prescription only. Individual results may vary. For further safety information see the Physicians Instructions for Use page on www.bostonscientific.com/ifu or call 1.866.484.3268.

Device Quality and Reliability

It is Boston Scientific's intent to provide implantable devices of high quality and reliability. However, these devices may exhibit malfunctions that may result in lost or compromised ability to deliver therapy. Refer to Boston Scientific's CRM product performance report on www.guidant.com for more information about device performance, including the types and rates of malfunctions that these devices have experienced historically. While historical data may not be predictive of future device performance, such data can provide important context for understanding the overall reliability of these types of products. Also, it is important that you talk with your doctor about the risks and benefits associated with the implantation of a device. (Rev. C)