



Vascular Disease
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Pilot Study Shows Promise for New Exercise Treatment for PAD and Offers Hope for Patients

Walking has been a proven treatment for patients with peripheral arterial disease (PAD), and can make a difference in the lives of many. Recent studies have shown that for some individuals, a structured walking program is excellent for reducing leg pain or cramps, but as the disease worsens, walking can become more and more difficult. In some cases, the leg pain, or claudication, may be so severe that performing everyday tasks such as climbing a flight of stairs or going to the store becomes challenging.

Lois Olson is one of the approximately nine million Americans affected each year in the United States by PAD. One in five people over the age of 70 have the condition. Olson, who is 85, found an ad for a research study funded by the National Institutes of Health (NIH) compar-

Continued on page 2



Dr. Diane Treat-Jacobson (background) monitors Lois Olson as she participates in the NIH pilot study comparing the benefits of arm-cycling compared to walking on a treadmill.



Our Mission

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ing the benefits of aerobic arm cycling exercise to more traditional treadmill exercise at the University of Minnesota. She signed up immediately to participate in the study. For Olson, the study has offered hope. Her doctors had told her that she was just getting old and that she would have to live with her leg pain.

“I couldn’t find any help,” said Olson. “My doctor just kept saying, ‘Well, Lois, you just have to keep doing what you’re doing.’ But I never thought it was enough.”

The current NIH-funded study follows a pilot study that tested the benefits of “arm cycling” (arm-ergometry) compared to walking on a treadmill, and the results have shown signs of hope for patients with PAD. During this study, each member participated in either supervised arm cycling or treadmill walking for an hour three times per week for a total of 12 weeks. Each participant’s walking ability was tested before and after 12 weeks of supervised exercise training and also after 12 weeks of follow-up to see if there was any improvement. After 12 weeks of exercise training, all exercise groups improved their walking ability, with 53 percent improvement in the arm group and 69 percent improvement in the treadmill group. The arm exercisers also showed the most improvement (82 percent) in how far they could walk before their leg pain (claudication) symptoms started. The arm cyclers also showed an 11 percent decrease in resting blood pressure, while the others did not.

“We are not yet sure how or why the arm cycling exercise is working, but participants on the whole are not only showing improvement in their ability to walk, but also showing improvement in overall health measures such as lower blood pressure,” said Diane Treat-Jacobson, PhD, RN, Associate Professor in the School of Nursing at the University of Minnesota, and Principal Investigator for the studies. “We know overall that exercise has many health benefits, and arm-cycling seems to have a systemic effect on the arteries throughout the body, even the legs.”

Continued on page 3

With the first study showing such promising results, a second study, The EXERT Study, “Exercise Training to Reduce Claudication”, funded by the NIH, has been launched with a larger sample size as well as additional measurements to try to understand why the arm exercise helps improve walking. As this study gets underway, Treat-Jacobson is hopeful about the potential results.

“We’re going to be able to partially identify the mechanism of improvement, which will lead us to better understand what intervention might be best for which individuals,” says Treat-Jacobson.

About the Author: Diane J. Treat-Jacobson, PhD

Associate Professor School of Nursing, University of Minnesota. She has been conducting studies on exercise interventions and quality of life in patients with PAD for the past decade and is a strong advocate for increased awareness, early detection and better treatment for patients with PAD.



“The EXERT (Exercise Training to Reduce Claudication) study will continue to enroll new participants over the next three years and is currently seeking volunteers to participate in a study to increase our understanding of the effects of aerobic arm or treadmill exercise on leg pain, walking capability and quality of life in people with claudication. If you would like to participate, please visit www.EXERTstudy.org or call **612.624.7614** or e-mail exert@umn.edu

It should be noted that the EXERT study is experimental and is not the current standard of treatment for PAD.

Tune into the “Ask the Doctor” Live Chat with Dr. Treat-Jacobson

Tuesday, June 1 — *Diane Treat-Jacobson, PhD from the University of Minnesota will answer your questions about exercise and PAD.*

Please visit www.vdf.org and click the “**Interactive Resources**” tab for more information. (See article on page 13)

For some tips on how to get started with an arm-cycling exercise program, continue to page 4...

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How to Start an Arm-Cycling Exercise Program



Photo of arm ergometer

Reading the article about the pilot study for new exercise treatment for PAD may inspire you to start an arm-cycling exercise program right away. Exercise has been proven to have overall benefits on vascular health, and we encourage you to begin an exercise program. For your health

and safety, we ask that you follow these guidelines:

1. Consult your health care provider to make sure you are healthy enough to begin regular exercise.
2. A stress test might be necessary to evaluate your heart to determine if it is safe to do aerobic arm exercise.
3. Get your resting blood pressure checked as a “starting point” so you can compare results later.
4. Ask someone at your local gym or recreation center to assist you in getting started and to adjust the settings for your body type on an arm-cycling machine, starting with lighter resistance.
5. Start by cycling for two minutes and then rest for two minutes and repeat for up to 60 minutes.
6. After a few weeks, as your endurance builds, increase to cycles of three minutes of exercise and one minute of rest.
7. After a few more weeks, increase to four minutes of exercise and one minute of rest.
8. As time progresses, work up to five minutes of exercise and one minute of rest for 60 minutes.
9. Continue the exercise for at least 12 weeks or longer if desired.
10. Increase the resistance on the machine a little at a time, but be careful not to make it too hard.
11. At the end of 12 weeks, check your resting blood pressure to see if it has changed.

Tips:

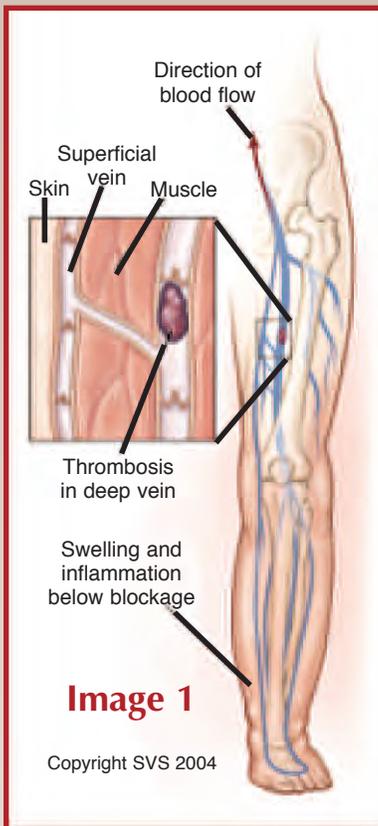
- Get clearance from your health care provider to exercise.
- Start with low resistance and work your way up.
- Watch for pain in your shoulders and/or joints and decrease or stop the exercise if it becomes painful.

Leg Pain: Claudication Versus Other Causes of Leg Pain

Clinical Condition	Location of Pain	Association with Exercise	Relieved by
Intermittent claudication	Calf, hip, buttock or thigh	Always	Stopping
Lumbar spinal stenosis	Calf, hip, buttock or thigh	Yes and also when standing	Flexing or moving the spine
Herniated disc	Radiates down leg	Varies	Varies. Aspirin or inflammation drugs
Osteoarthritis	Hips, knees, ankles	Varies. Not always reproducible	Varies. Aspirin or inflammation drugs

Adapted from LePerna, Lucy, “Management of Intermittent Claudication” JAOA, Volume 100, No. 10 Supplement October 2001.

What Is Chronic Venous Insufficiency?



Chronic venous insufficiency (CVI or Venous Reflux Disease) is very common, affecting about 20 percent of the population — nearly 24 million Americans. When the leg veins cannot pump enough blood back to the heart, that condition is called chronic venous insufficiency, which is sometimes called chronic venous disease. There are three kinds of veins: superficial veins, deep veins and perforating veins, which connect

the superficial to the deep veins (image 1). Deep veins lead to the vena cava (a large deep vein in the abdomen and chest), which runs directly to the heart.

When you are in an upright position, the blood in the leg veins must go against gravity to pump and return the blood to the heart. To accomplish this when you walk or are active, the leg muscles squeeze the deep veins of the legs to help move blood back to the heart. One-way flaps, called valves, in the veins open and close to keep blood flowing in the right direction — from the legs to the heart and prevent blood from flowing in reverse, back down the legs. The entire process of sending blood back to the heart is called the venous pump.

While walking, the leg muscles squeeze and the venous pump works well but when sitting or standing, especially for a long time, the blood in the leg veins can pool and increase the venous blood pressure. Deep veins and perforating veins are usually able to withstand short periods of increased pressures.

However, sitting or standing for a long time can stretch vein walls from this increased pressure. Over

time, in susceptible individuals, this can weaken the walls of the veins and damage the venous valves, causing CVI.

Duplex ultrasound uses painless sound waves higher than human hearing can detect, and allows a health care provider to measure the speed of blood flow and to see the structure of the leg veins.

CVI is due to reflux (backflow) of blood in the veins of the legs (image 2). This is because the valves in the veins, which prevent backflow, do not work properly. Risk factors include obesity, prolonged standing, pregnancy, trauma, weak muscles in the leg and heredity. Dilated veins and improper valve function result in an increase in venous blood pressure. This, in turn can result in swelling, skin color changes (hyperpigmentation), hardening of the skin and even ulcers. Varicosities (abnormal swelling of the vein) are common and the



Your health care provider will take a medical history and examine the legs. It is important to mention any trauma or history of blood clots or deep vein thrombosis (DVT). You should note whether the swelling in the legs disappears over-night. Any other risk factors should also be mentioned. The health care provider will rule out any other cause of swelling, such as heart or thyroid disease. After the medical history and physical exam, a duplex ultrasound will be performed. This non-invasive (no needles) test determines if the valves are working and whether reflux is present. It will

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Chronic Venous Insufficiency continued from page 5

also check to make sure there are no blood clots. If ulcers are present on the ankles, your arterial circulation may also be checked with an ankle/brachial index (ABI). Your health care provider will conduct an ABI by measuring the blood pressure in your ankles and arms to make sure the ulcers are not caused by decreased arterial circulation and that you can use compression devices without a problem.

Venous ulcers are irregular in shape, usually occur on the ankles and are often beefy red at the base. If they are infected, the infection must be cleared first in order for them to heal.



Image 3

Example of elevating the legs above the heart.

The daily use of compression hose is the most common treatment for venous ulcers. They come in a variety of types and usually are needed only up to the knee. They are used if arterial disease has been ruled out. Elevation of the leg (legs) above the heart during the day and at night (image 3) may help with swelling and with healing. Walking is encouraged but standing is discouraged. Good nutrition and weight loss (if needed) are equally important. Other methods of compression include multilayer elastic dressings and dressings such as Unna's boot. This is a firm, inelastic dressing, which

must be changed by the health care provider regularly. Another method of compression is sequential pump therapy. This is a sleeve for the leg which inflates and deflates to push the blood up the leg and return it to the heart.

Sometimes, surgery is needed to clear up venous ulcers. Excision (cutting out) of the ulcers, possibly with a skin graft, may be necessary, but the underlying venous disease must be addressed. Compression may prove to be adequate, but other procedures may also be required.

Perforating veins which connect the superficial and deep venous systems may need to be closed off through procedures called subfascial endoscopic perforating vein surgery (SEPS), radiofrequency ablation (RFA) and ligation (tie off) or ultrasound guided sclerotherapy. If the superficial system is affected, sometimes surgical ligation and stripping of the greater or lesser saphenous veins may be necessary. However, there are newer procedures now available. Endovenous laser treatment (EVLT) and RFA are two of them (image 4). EVLT uses laser-generated heat to injure the vein wall and cause it to close off. EVLT is not generally used below the knee, but is often used on the greater saphenous vein above the knee. RFA heats the vein with alternating current, causing scarring and congealing of the blood leading to closing of the veins. Both procedures have excellent results. Contraindications to the two procedures include: isolated reflux, blood clots, arterial disease, intention to become pregnant and obesity, which hinders needed visualization of the landmarks.

Treatment of Venous Insufficiency

Endovenous ablation, either with laser energy or radiofrequency, has become the standard of care.

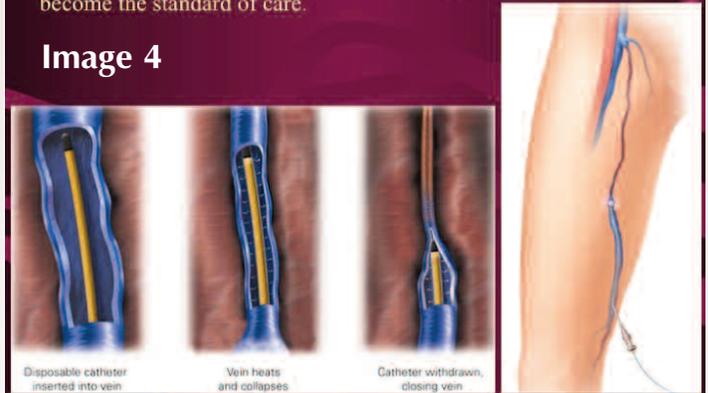
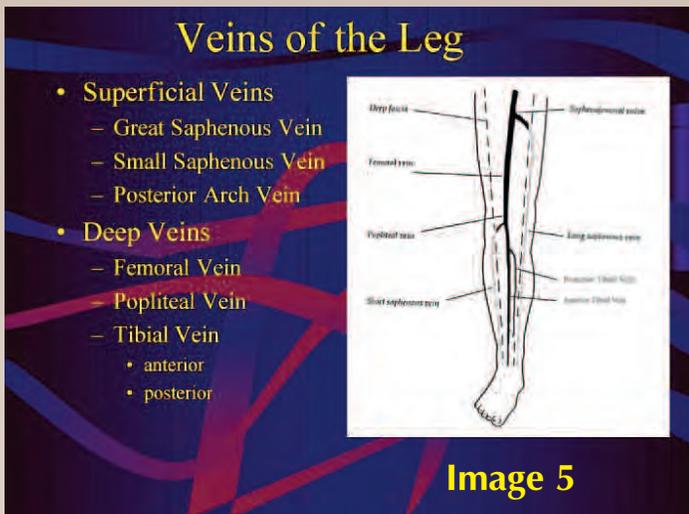


Image 4

Disposable catheter inserted into vein Vein heats and collapses Catheter withdrawn, closing vein

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Chronic Venous Insufficiency



Treatment is aimed at improving the symptoms and, whenever possible, correcting the underlying problem. Superficial veins can safely be removed or ablated without any major consequences because the incompetent vein has already proved itself unnecessary.

Both EVLT and RFA are performed on an outpatient basis under adequate sedation and local anesthesia. Complications include blood clots, phlebitis (inflammation of the vein), hyperpigmentation (change in color of the skin), redness, bruising, infection and pain. These occur infrequently, however. Duplex ultrasound is performed pre- and postoperatively to make sure there are

no blood clots. The patient's progress is then followed on a regular basis.

Compression therapy of some kind is generally recommended following all treatment modalities, and sometimes other veins become problematic, requiring further treatment. However, careful following of instructions can prevent most recurrences of problems. The ulcers should heal and swelling should decrease.

Consultation with a venous disease specialist often yields new options for patients with chronic venous disease.

Note: All pictures and illustrations in this article are provided with permission from Glenn Buczkowski, RPA-C.

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Compression: When and V



Photo courtesy of JUZO

Compression garments are used to prevent or control edema (leg swelling). They may be stockings, sleeves, panty hose or leotards, depending on the problem. The compression helps circulation by preventing pooling of fluid in the arms or legs. To get good results from compression garments, they need to fit well and must be used as prescribed every day. They may be removed at bedtime.

At certain times in life, for one reason or another, the body may retain fluid in a specific area such as the legs, arms, or abdomen. This swelling is referred to as edema. When one experiences a sudden onset of edema, pain or redness in a particular area, any of these may signal an acute situation requiring immediate medical attention. Most edema, however, occurs over a prolonged period, gradually getting worse. This is when compression therapy may be recommended by a health care provider as part of a treatment plan.

By definition, compression means to condense, squeeze or press together. In general, there are four situations when compression may be indicated.

1. "Tired Legs" — This occurs when the legs feel "achy," especially at the end of the day, from prolonged standing or sitting.
2. Varicose Veins — These are dilated, "ropey" veins in the legs, which may cause symptoms of tenderness, pain, burning and swelling.
3. Chronic Venous Insufficiency (CVI) — This is a disorder in which there is a reduced ability of the veins to move the blood back to the heart.
4. Lymphedema — This occurs when the body's lymphatic system, which carries the lymph fluid from the limb back into the body's circulation, is impaired, causing persistent swelling in the arm or leg.

The specific cause of your medical condition will dictate the type and amount of compression necessary.

Make sure your health care provider tells you exactly what compression intensity is required for your specific condition before you purchase your compression garments. He or she will give you a prescription, which you can then take to a medical supply store.

For "tired legs" and varicose veins, mild to moderate compression below the knee stockings may be very helpful. These stockings are widely available at local drug stores, pharmacies and medical supply stores, most often staffed with trained personnel to assist in obtaining the proper size and fit. They may also be purchased on the Internet. Stockings should be worn during the day and removed at bedtime.

For chronic venous insufficiency, compression treatment may range from the use of multi-layered leg wraps to low and high stretch bandages and higher compression below-knee stockings. These remedies all require a doctor's order. The higher compression (30-40 mmHg) below-knee stockings are also available or may be ordered from a local drug or medical supply store.

When someone is diagnosed with lymphedema, compression pumping may also be used to decrease the edema before a stocking is fit for the limb. A sleeve connected to a pump is placed on the swollen leg or legs. The fluid is then rhythmically massaged up the leg and eventually excreted by the body. The lymphedema pump is used on a daily basis and must be prescribed by a doctor. After pumping, compression stockings (in some cases, 40-50 mmHg pressure) are applied to maintain these results. Insurance companies may frequently assist with the cost of the lymphedema pump. A technique called Manual Lymph Drainage (MLD) may be used in conjunction with the pump or special stretch bandages. MLD is a light type of massage that stimulates rhythmic movement of the lymph vessels and their valves, which are located superficially in the skin. Trained and licensed personnel may perform this movement of "massaging" the lymph fluid out of a particular area to help decongest the edema. Patients or a family member can also be taught to perform this treatment at home in order to maintain the limb size.

Getting the Right Fit Is Important to Get the Best Results

Before getting measured for a compression garment, the patient should understand that it is important to make sure all the excess fluid is out of the limb. This

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Why It May Be Necessary

may be done by using a compression pump and wearing wraps between pumping sessions until much of the edema is reduced. Sometimes, if the edema is mild, simply wearing a wrap and elevating the limb over-night can reduce the edema so that measurement is possible.

When getting measured, the patient should go early in the morning so that the limb doesn't accumulate fluid. If the edema is severe, it may be necessary to wear a wrap on the limb to make sure that the edema stays down before the limb is measured.



Photo courtesy of JUZO

Correct Use of Your Compression Garment

Follow the instructions from your health care provider when using compression garments. Whenever possible, put the compression garment on immediately in the morning after getting out of bed so that there will be less accumulation of additional fluid,

which may make it difficult to put on the stocking later in the day. Do not sleep in compression garments unless instructed by a health care provider to do so, take the compression garment off just before going to bed. When bathing, remove the stockings and inspect the skin for areas of redness or other color changes. These may be signs that the compression garment does not fit correctly.

How to Put on Your Compression Garment

Compression garments are intended to fit tightly and learning how to use them properly can be frustrating in the beginning. Putting on the garment will may take some time and practice to put on correctly, so be patient when you first begin to use them on a daily basis. Rubber gloves, such as those used to wash dishes or specially made gloves by compression garment companies, may be helpful when applying the stockings. The rubber gloves make it easier to grip the material firmly and smooth out wrinkles. The rubber gloves also protect the compression garment from tears caused by fingernails or jewelry. If you get a tear or run in the garment, the garment will not give the compression that is necessary.

Some compression garments come with a slip-on aid to cover the foot and make it easier to get the garment over the foot and ankle. At first, it may even be difficult to maneuver the compression garment over your toes. Put the slip-on aid over the toes, and put the foot into compression garment. After the garment is on, pull off the slip-aid.

Gently pull the compression garment up the limb, smoothing the extra material while pulling. For custom garments, make sure the heel is in the correct position and the seams are straight. For thigh-high or higher fitting garments, standing up to continue pulling it over the knee, hips and waist may be easier.

Compression garments should be kept smooth, especially at the ankle or behind the knee. For garments which are knee-high and for thigh-high stockings, do not roll down the garment at the top. Do not fold the garment down if it seems too long. Use your gloves to smooth the fabric evenly along the limb.

If you do not wear your compression garment for a day or two, it may be too difficult to get it on. If your limb swells too much and you cannot get the garment on because it is too tight, you should wrap the limb as instructed and contact your health care provider.

Removing the Compression Garment

Pull the garment off slowly. Pull it down so that the compression garment is inside out when it is removed.

Care of the Compression Garment

Wash the garment every other day with a mild soap. Do not use Woolite™. Use warm water and wash by hand or use the gentle cycle in the washing machine. After rinsing the compression garment completely, remove excess water by rolling it in a towel. You can

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Frequently Asked Questions

Question: I have severe PAD and am currently taking clopidogrel. What is the difference between clopidogrel and aspirin? My cardiologist says they are the same, and that clopidogrel is only good if you take it for your heart but it is terrible for your legs. Is that true?

Answer: Both are blood thinners but clopidogrel works differently from aspirin. They are both used to reduce the risk of heart attack and stroke. We are not aware of any research that says it is bad for your legs. With PAD you should be walking daily, watching your cholesterol (and blood sugar if you have diabetes), watching your blood pressure, not smoking and keeping regular check ups. You might benefit from seeing a vascular specialist in addition to your cardiologist who may help clear up some of your questions.

Question: I am using prescribed cortisone cream treatment on my varicose veins and am experiencing itchiness as a reaction. What do you recommend to relieve the itching?

Answer: Cortisone is the treatment for itchiness. It is possible you are not on a strong enough prescription or you are allergic to something in the cream. Talk to your health care provider to see if you can take an over the counter allergy medication.

Question: Do Vibrator exercise machines help DVT? Is it possible that the vibration while exercising could some way help to dissolve clots or prevent DVT?

Answer: Vibrator exercise equipment will not help DVT nor will it dissolve clots. If you have had a DVT you need to talk to your health care provider before using that equipment.

Question: Can (deep vein) thrombosis cause heart failure?

Answer: Not unless there are complications such as pulmonary embolism as the result of a DVT. By itself it should not cause heart failure.

Compression: When and Why continued from page 9

either air-dry the garment or dry on “cool” in the dryer on the delicate cycle. It may be convenient to have two compression garments. Order the second garment after establishing the proper fit.

Most importantly, be consistent when wearing the compression garment and replace it on a regular basis over time because the garment will lose its elasticity and therefore its effectiveness. Compression garments are good for about four to six months if they are cared for properly. A prescription for a compression garment is good for one year. You may need to be re-measured every year, especially if you have gained or lost weight greater than 15 pounds. Further questions about compression garments should be directed to a health care provider.

Compression therapies may be helpful and often necessary for treating swelling in the legs. In addition, daily leg elevation, walking and exercise programs such as swimming, are all excellent ways to improve circulation and prevent complications detrimental to your health and well-being.

About the Authors:

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To celebrate Mother's Day on May 9, give her something special to let her know how much you care. Get her a copy of the "Keep the Beat Heart Healthy Recipes" cookbook!

For a \$25 tax deductible donation to VDF you'll get a copy for mom. Want a copy of this yummy cookbook for yourself? Get a second cook book for only \$10 more.

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Cardiovascular Healthy Recipe

VDF is proud to offer heart healthy recipe for you and your loved ones from the "Keep the Beat: Heart Healthy Recipes" cookbook from the National Heart, Lung, and Blood Institute (NHLBI).

Chillin' Out Pasta Salad

2 1/2 C (8 oz.) medium shell pasta
1 C (8 oz.) plain nonfat yogurt
2 Tbsp. spicy brown mustard
2 Tbsp. salt-free herb seasoning

1 1/2 C celery, chopped
1 C green onion, sliced
1 lb. small shrimp, cooked
3 C (about 3 large) tomatoes, coarsely chopped

1. Cook pasta according to directions—but do not add salt to water. Drain and cool.
2. In large bowl, stir together yogurt, mustard and herb seasoning.
3. Add pasta, celery and green onion, and mix well. Chill for at least two hours.
4. Just before serving, carefully stir in shrimp and tomatoes.

Yield: 12 servings. **Serving size:** 1/2 cup

Each serving provides:

Calories: 140
Total fat: 1 g
Saturated fat: less than 1 g
Cholesterol: 60 mg
Sodium: 135 mg
Total fiber: 1 g
Protein: 14 g
Carbohydrates: 19 g
Potassium: 295 mg

Leg Swelling



Leg swelling (edema) is a common problem that affects millions of Americans and can be disabling for many. There are various causes of leg swelling, including vascular problems in the legs and also build-up of fluid in the body as a result of kidney disease, liver disease or other conditions. Leg swelling can be caused by fluid back up due to heart disease, which is caused by heart failure. Leg swelling can also be caused by certain medications. A health care provider can determine the cause of leg swelling in most cases with a complete history and physical examination. In some cases, other tests are necessary.

The most common vascular causes of leg swelling are venous insufficiency and lymphedema. The body has two circulatory systems that carry fluid away from the limbs and organs and back towards the heart: the venous system and the lymphatic system. The venous system's purpose is to carry blood back to the heart and lungs to get oxygen. Veins have valves within their walls that open, close, and help push blood back to the heart and prevent it from going in the opposite direction due to gravity. The veins are helped by the muscles of the calf to pump blood back to the heart during each contraction, which occurs with walking. If there is a malfunctioning of the valves in the veins, such as after a blood

clot (DVT) or with severe varicose veins, it can result in chronic venous insufficiency. The lymphatic system also works in getting blood and fluid from the tissues of the body back to the heart. If there is a disruption in the lymphatic system, such as that caused by surgery or infection, swelling can result. This lymphatic swelling is called lymphedema.

It is also important to know that a patient can have more than one cause of leg swelling. What type of information helps a health care provider figure out the cause of leg swelling?

► **Timing.** Swelling that develops all of a sudden is more likely to be due to variables such as a blood clot (deep vein thrombosis or DVT) or a skin infection (called cellulitis). Swelling that occurs slowly over time is more likely to be due to a vascular problem, such as vein disease (called chronic venous insufficiency) or lymphedema.

► **Medical history.** A history of DVT, a family history of varicose veins or leg swelling, a lifestyle which demands standing or sitting for a prolonged period of time, trauma, recent surgery or infection will help determine if the swelling is due to chronic venous insufficiency or lymphedema. Since medications are associated with swelling, they are also important to review. Any decrease in activity can result in swelling, given the inadequate use of the calf muscles as a pump. A history of heart or lung disease can also give clues to the cause.

► **Location of a prominent swelling.** The location of the swelling helps the doctor to determine its cause. Swelling due to chronic venous insufficiency tends to result in swelling throughout the leg, sparing the feet. Lymphedema tends to have more foot involvement, although, as it progresses, it can also involve the entire leg.

► **Pain.** The presence of pain can be a clue that the leg swelling may be due to deep vein thrombosis or infection (cellulitis).

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Leg Swelling *continued from page 12*

► **Swelling in areas other than the legs.** If swelling occurs in the arms, fingers, abdomen or buttocks, it is more likely to be due to a systemic health problem such as liver or kidney disease, heart disease or even poor nutrition (in severe cases).

► **Rashes and skin findings.** There may be other skin problems that develop with leg swelling that can help the doctor figure out the cause of swelling. Patients with chronic venous insufficiency may also have varicose veins, a redness or bluish discoloration of the skin, dark discoloration of the skin (called hyperpigmentation) and ulcers (open sores). Patients with lymphedema can have wart-like changes in the skin.



What types of testing can be used to further evaluate the cause of leg swelling? After a thorough history and physical examination, evaluations for leg swelling can include:

► **Ultrasound of the legs** to look for DVT. An ultrasound can also detect leakage of the valves of the veins and varicose veins, which suggests chronic venous insufficiency. An ultrasound cannot evaluate the lymphatic system.

► **CAT scan of the abdomen and pelvic area** to look for any masses that may be compressing the veins or lymphatics of the legs or a blood clot (DVT) in the abdomen or pelvis that cannot be seen with ultrasound

► **Tests of kidney and liver function and also protein level.** The urine can also be checked for protein.

► **Thyroid function tests.** An abnormal thyroid level can also result in edema.

► **Echocardiogram of the heart** to look at the heart pump function and heart valves.

How can leg swelling be treated?

The treatment of leg swelling is based on the cause of swelling. If the swelling is due to chronic venous insufficiency or lymphedema, compression therapy may be used to help pump blood out of the legs and back to the heart. Compression may be in the form of compression stockings or wraps similar to ACE bandages. In some cases, special compression pumps may be used to treat chronic venous insufficiency or lymphedema. There is no cure for chronic venous insufficiency or lymphedema, but compression therapy can help reduce swelling and prevent worsening swelling and leg ulcers (sores).

Walking and calf muscle exercises are helpful, along with elevating the legs above the level of the heart, to use gravity to help blood flow back to the heart.

Diuretics (water pills) may be used if the cause of leg swelling is a heart problem (known as congestive heart failure), but usually not for leg swelling due to vein or lymphatic problems.

All patients with leg swelling, regardless of the cause, should take good care of the skin of the feet and legs by regularly washing the legs and applying a moisturizer daily.

All photos are provided courtesy of the Cleveland Clinic.

About the Author: Carmel Celestin, MD, is a vascular medicine specialist at Cleveland Clinic Foundation, Cleveland, OH, and is involved in the diagnosis and treatment of a wide variety of vascular diseases.



If You Have DVT Your Help Is Needed!

New Clinical ATTRACT DVT Trial: A new clinical trial, the ATTRACT Trial, is now open for patient enrollment. **This study will determine if the use of new clot-busting treatments for patients with large blood clots of the leg (deep vein thrombosis or DVT) prevents long-term disability.**

Despite the use of standard blood-thinning drugs, 25-50 percent of DVT patients will develop the post-thrombotic syndrome (PTS), a long-term condition that typically causes daily pain, heaviness, fatigue and swelling of the leg. Because these symptoms are aggravated by standing or walking, affected patients are often forced to alter their daily activities to include periods of rest or leg elevation in order to avoid severe pain and swelling. In the more severe cases, PTS can lead to an inability to walk without pain, inability to hold a steady job or perform household duties, changes in leg skin color and texture, and/or open sores (leg

ulcers). As a result, PTS has been shown to significantly reduce quality of life in DVT patients.

Preliminary studies suggest that patients who have their blood clots removed using new clot-busting treatments may be less likely to develop PTS. However, because these procedures are somewhat more invasive and costly up front, doctors do not agree on when to use them. The ATTRACT Trial is being performed to answer this important question

The ATTRACT Trial is primarily sponsored by the National Heart, Lung and Blood Institute, part of the National Institutes of Health and additional support is being provided by BSN Medical, Covidien – Bacchus Vascular, Genentech and Medrad Interventional – Possis. For more information, please visit the ATTRACT Trial Web site at www.attract.wustl.edu or call **866.974.CLOT (2568)**.

VDF HealthCasts Continue

The Vascular Disease Foundation is proud to continue its audio HealthCasts that cover all aspects of vascular disease. Our guests are the leading scientific and clinical experts in their respective fields.

Here are the latest HealthCasts episodes and topics:

Episode 34: Prevention! Prevention! Prevention!

Though there have been major advances in the medical and surgical treatment of diseases that affect the heart and blood vessels, the best strategy for good health and longevity is still prevention, which is the topic of this discussion.

Episode 35: Ten Surprises Patients Hear from Their Doctors.

Dr. David Meyerson, Director of Cardiology Consultation Services at Johns Hopkins and a member of the VDF Scientific Advisory Board, shares "Ten Surprises Patients Hear from Their Doctors." A must-listen!

HealthCasts may be found on VDF's Web site at www.vdf.org/resources, iTunes, Feedburner, Yahoo, and other sites. Listening instructions and a complete description of each episode may be found on VDF's Web site.



**HealthCast Hosts Dr. David Meyerson (left)
and Dr. Kerry Stewart (right)**

**Listen to HealthCasts at
www.vdf.org**



“Ask the Doctor” Live Chats

VDF is proud to offer live online chats with a health-care professional about different areas of vascular disease. Chats occur during the first Tuesday of the month at 4 pm EST/ 3pm CST/ 2pm MST. Join us on the following dates to chat live with a medical professional:

Tuesday, May 4 — *Heather Gornik, MD from the Cleveland Clinic will answer your general questions about vascular disease.*

Tuesday, June 1 — *Diane Treat-Jacobson, PhD from the University of Minnesota will answer your questions about exercise and PAD.*



Can't sit in on a live chat? You can e-mail us your questions up to 30 minutes prior to each chat at info@vdf.org or view the transcripts online. Please visit www.vdf.org and click the “Interactive Resources” tab for more information.

In the News

DVT Risk Assessment Tool. New! Find out what your risk is for deep vein thrombosis (DVT) and pulmonary embolism (PE). This quick risk calculator was developed by the Venous Disease Coalition. Visit www.venousdiseasecoalition.org today and see if you are at risk for DVT/PE.



Online Patient Support Group Community. VDF's new Inspire network is an online community designed to be a safe place for you to discuss your health with like-minded men and women. Topics will include the following: abdominal aortic aneurysm (AAA), Buerger's disease, carotid artery disease, congenital vascular malformation (CVM), deep vein thrombosis (DVT), lymphedema, peripheral artery disease (PAD), portal hypertension, Raynaud's disease, thrombophilia, varicose veins and vasculitis. Visit <http://vdf.inspire.com>

Call for Nominations.

The Venous Disease Coalition is now accepting nominations for the Venous Disease Research Awards. Visit www.VenousDiseaseCoalition.org for information. The deadline for submissions is June 25, 2010. Send e-mail to ellen.cohig@vdf.org

The P.A.D. Coalition is now accepting nominations for the Stay in Circulation Community Service Awards. Visit www.PADCoalition.org for information. The deadline for submissions is June 30, 2010.



The US AGAINST ATHERO Artery Explorer is hitting the streets again this year to continue to increase awareness of atherosclerosis. To learn if the tour will be in your neighborhood, visit www.usagainstathero.com

Social Media. VDF now has interactive pages on Facebook, Twitter and You Tube!

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