

Vascular Disease Patient Information Page: Exercise for peripheral artery disease

Vascular Medicine
2020, Vol. 25(1) 95–97
© The Author(s) 2019
Article reuse guidelines:
sagepub.com/journals-permissions
DOI: 10.1177/1358863X19891221
journals.sagepub.com/home/vmj



Diane Treat-Jacobson¹  and Elizabeth V Ratchford²

Keywords

claudication, exercise, peripheral artery disease (PAD), supervised exercise therapy (SET)

What is peripheral artery disease (PAD)?

Peripheral artery disease (PAD) is a common cardiovascular condition that affects more than 8 million Americans and over 20% of people over the age of 70.^{1,2} Arteries are the blood vessels that carry oxygen-rich blood away from the heart to the rest of the body. With PAD, atherosclerotic plaque narrows the arteries, which can deprive the muscles of blood flow. The muscles then may not get enough oxygen, especially during exercise when more oxygen is required. This lack of oxygen can cause pain, cramping, heaviness, or aching in the legs and can interfere with walking. The medical term for this discomfort that comes on with exercise (and typically goes away with rest) due to PAD is ‘claudication’. Fortunately, exercise is an excellent treatment for PAD symptoms.

Why is exercise important?

Exercise is an effective ‘medicine’ that greatly improves the cardiovascular system as well as overall health.³ It lowers blood pressure, improves blood sugar levels and the cholesterol profile, helps prevent weight gain and obesity, reduces depression symptoms, improves sleep quality, and decreases the risk of developing diabetes. Thus, exercise clearly lowers the risk of cardiovascular problems such as heart attack and stroke. Exercise has an added benefit for patients with PAD because it directly improves leg symptoms as well.

How does exercise improve PAD symptoms?

The exact mechanism for how exercise helps in patients with PAD is complicated and not completely understood. However, research studies dating back to the 1960s have proven that exercise is quite effective in improving leg symptoms due to PAD. Exercise probably has multiple effects that together improve walking ability, including reducing inflammation, improving appropriate blood vessel dilation, and causing changes in muscle structure, function, and metabolism. Regular exercise likely ‘trains’ the muscles to extract oxygen more efficiently.

What is supervised exercise therapy (SET)?

Supervised exercise therapy (SET) is a program similar to cardiac rehabilitation, although a heart monitor is not required. It involves going to a hospital outpatient-based setting or physician office for 30–60 minutes three times per week for 12 weeks. The focus of SET is walking on the treadmill because the goal is to improve the patient’s walking ability. If a patient cannot walk on a treadmill, other forms of aerobic exercise, such as seated arm and leg stepping or leg or arm cycling, can also help.⁴ Other exercises may also be added to build muscle strength. A physician, physician assistant, or nurse practitioner supervises the program, and an exercise therapist, nurse, or other trained professional often implements the exercises.

The exercise therapist develops an exercise plan for each individual patient. The plan may vary in terms of the exercise intensity, duration, and frequency.⁴ During a session, the goal is to reach 30–45 minutes of actual walking time, not including rest periods.

Is SET covered by insurance?

In 2017, the Centers for Medicare & Medicaid Services (CMS) announced that SET would be a covered benefit for patients with symptoms from PAD, thus providing access to SET for millions of patients with PAD who are Medicare beneficiaries. Many commercial insurance plans also cover SET for PAD, which is typically 36 individual sessions over 12 weeks. Certain requirements must be met, including educational counseling regarding PAD and cardiovascular risk reduction.

¹School of Nursing, University of Minnesota, Minneapolis, MN, USA

²Johns Hopkins Center for Vascular Medicine, Johns Hopkins University School of Medicine, Baltimore, MD, USA

Corresponding author:

Elizabeth V Ratchford, Johns Hopkins Center for Vascular Medicine, Johns Hopkins University School of Medicine, 600 North Wolfe St, Baltimore, MD 21287, USA.

Email: evr@jhmi.edu

Twitter: @evratchford

How does SET compare to stents?

SET is particularly effective in improving claudication symptoms. Several research studies have shown that supervised exercise, when conducted according to best practices, is equally or more effective in improving walking ability as compared to a balloon and stent procedure (angioplasty; also called endovascular revascularization).⁴ For example, the CLEVER (Claudication: Exercise Vs. Endoluminal Revascularization) study found that SET improved treadmill walking performance more than endovascular revascularization (the balloon and stent procedure) for patients with PAD in the aorta and iliac arteries, the large blood vessels in the lower abdomen that supply blood flow to the legs.⁵

For some patients, leg symptoms due to PAD may still cause problems after a few months of exercise and medications, in which case restoring the blood flow to the leg may be necessary. Restoration of blood flow (with a balloon and stent procedure or bypass surgery) may also be required to heal a wound or to relieve pain at rest in patients with severe PAD. However, for most patients with PAD, exercise is the best place to start because the symptoms may resolve and an invasive procedure can be avoided.

How is progress measured with exercise for PAD?

Research studies have looked at several ways of measuring progress with an exercise regimen, including quality of life surveys, treadmill testing, and the 6-minute walk test. A formal exercise program may focus on one or more of these to track progress. The pain-free walking distance or duration (PFWD) refers to how far the patient can walk before any discomfort in the legs starts. The maximum walking distance or duration (MWD) refers to how far the patient can walk before having to stop due to the discomfort. For example, a patient may be able to walk two blocks before a tightness begins in the lower leg (her PFWD) but she may be able to continue walking another block before she has to rest (her MWD). In tracking PAD symptoms, it is useful to monitor the PFWD and MWD at the exercise program, at home, and/or at clinic visits. Improvements in these measures are typically seen within the first 4–6 weeks of SET.

A patient with PAD shares his experience with SET below:

I have followed this process for a while and have personally seen the results and benefits. The more I exercise, the less discomfort I experience when I walk. One experience that I have had is that participating in the SET program was the catalyst in my continuing to exercise at the Center after the SET program was completed. I made friends during the SET program and enjoyed the social aspect of exercising with the same group of people four to five times a week. This experience was a prime motivation in continuing an exercise program and periodically increasing the incline levels.

Simply stated, my exercise routine at the Center and at home has helped manage my PAD.

How much exercise is enough?

All adults should, on average, achieve at least 30 minutes of brisk (moderate-intensity) exercise on most days of the week.³ This 30-minute goal does not have to be achieved all at one time, but can be broken up into two or three intervals throughout the day if needed. During this brisk exercise, the level of exertion would be around 5 or 6 on a scale of 1–10. Another option is shorter durations of vigorous exercise (7 to 8 out of 10). Two minutes of moderate exercise equals about 1 minute of vigorous exercise. In addition to daily aerobic activity, the exercise program should also include strength training twice per week, using free weights, a weight-lifting machine, or even an elastic therapy band.

Many patients with PAD are not able to achieve a moderate level of aerobic exercise with walking because of their leg pain. In this case, another form of exercise (such as a stationary bike) can be used to get the heart rate up for the cardiovascular benefits of exercise. The walking regimen can be used as a separate program to work on the PAD symptoms.

Can I walk at home or do I need a SET program?

In general, research studies have shown that SET programs work better than walking at home for improving leg symptoms. However, some studies have also shown home-based exercise to be effective. Many patients do not have access to or are not willing or able to attend an in-person program. In that case, home-based exercise is definitely recommended. In addition, the SET program is only 3 days per week, and patients should be exercising at home on the other days.

What is the best method to follow to improve PAD symptoms when walking at home?

Research studies have looked at multiple approaches to walking. In general, patients are advised to walk until they reach a moderate to moderately severe pain level (e.g. to a 3 or 4 on a 0–5 scale or up to a 3 on a 0–4 scale); then to stop and rest until the pain subsides completely (to a zero); and then to start walking again. The goal is to bring on the moderate level of pain within the first 5–10 minutes of walking. If moderate discomfort does not occur within 10 minutes, then the incline and/or the speed of the treadmill should be increased.

Walking on a treadmill provides an objective measure of the speed, incline, and duration of the bouts of walking. The handrails should only be used for balance. Of note, many patients with PAD find walking outside to be more difficult than walking on a treadmill; outdoor terrain is often uneven and may require different muscles at times. However, walking outside may provide more improvements in day-to-day walking ability because it is the ‘real world’ compared to the treadmill.

Whether outside or on a treadmill, one of the most important aspects of any PAD exercise program is tracking

a patient's progress. The data can be written down in a notebook or stored electronically (through an app on a phone or on a spreadsheet) and reviewed at each clinic visit. The date, activity, duration, and distance can be recorded, along with the pain-free and maximum walking distances (or durations). Improvements may not be seen from one day to the next, but noticeable changes will be seen from one week to the next. Activity trackers can also be helpful to monitor progress, ranging from a basic pedometer (step-counter) to a more advanced wristband or smart watch.

Summary

Exercise is an excellent and highly effective treatment for leg symptoms related to peripheral artery disease. Supervised exercise therapy is now covered by Medicare and many other insurance plans. An individualized exercise plan can greatly improve walking ability and quality of life, while also reducing cardiovascular risk.


Declaration of conflicting interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

ORCID iD

Diane Treat-Jacobson  <https://orcid.org/0000-0003-3296-8764>

References

1. Gerhard-Herman MD, Gornik HL, Barrett C, et al. 2016 AHA/ACC guideline on the management of patients with lower extremity peripheral artery disease. *Circulation* 2017; 135: e726–e779.
2. Ratchford EV, Evans NS. Vascular Disease Patient Information Page: Peripheral artery disease. *Vasc Med* 2014; 19: 218–220.
3. Khoury SR, Evans NS, Ratchford EV. Exercise as medicine. *Vasc Med* 2019; 24: 371–374.
4. Treat-Jacobson D, McDermott MM, Bronas UG, et al. Optimal exercise programs for patients with peripheral artery disease: A scientific statement from the American Heart Association. *Circulation* 2019; 139: e10–e33.
5. Murphy TP, Cutlip DE, Regensteiner JG, et al. Supervised exercise versus primary stenting for claudication resulting from aortoiliac peripheral artery disease: clinical perspective. *Circulation* 2012; 125: 130–139.

The 'Vascular Disease Patient Information Page' is a regular feature of *Vascular Medicine*. All articles in the collection are available for free online at <http://journals.sagepub.com/vmjpatientpage>.

The Vascular Disease Patient Information page is provided for educational purposes only and is not a substitute for medical advice.