

PERIPHERAL ARTERY DISEASE & EXERCISE

PUBLIC

WHAT IS PERIPHERAL ARTERY DISEASE?

Peripheral artery disease (PAD) is caused by the build-up of fatty deposits and the development of blockages in the main vessels (the arteries) that carry blood to the legs. Many people may not know that they have PAD. Often the first sign of a problem is when people get cramp-like pain or discomfort in their calf, thigh or buttocks. This happens during activities like walking, and is often worse when moving uphill, hurrying or carrying heavy loads. The medical term for this muscle discomfort is 'Intermittent Claudication' (IC). If PAD becomes very severe people may have pain in the legs all the time and it may cause the skin to die (gangrene). There are around 13% of people over the age of 50 years have PAD across the world.

People with PAD are usually treated by their GP, a vascular surgeon and other allied health professionals including exercise physiologists, physiotherapists, podiatrists and dietitians. Treatment for this condition aims to address cardiovascular risk factors, including the reduction of blood pressure and blood cholesterol, the management of diabetes, as well as lifestyle factors including cigarette smoking. Treatment may also include medications to try and reduce the leg symptoms. Everyone with PAD should be offered exercise as part of their initial treatment. Sometimes people will need an operation called an angioplasty or bypass to help improve blood flow in the legs. In very severe cases sometimes people will need to have an operation called an amputation where part of the foot or leg is removed [1,2].

HOW IS PERIPHERAL ARTERY DISEASE DIAGNOSED?

When people have symptoms of PAD, they will have their full medical history taken and tests to assess the blood vessels in the legs and feet. The main test to identify this disease is called an ankle-to-brachial index. This ankle-to-brachial index measures the blood pressure in the arms and the feet [3]. In some cases, people will have a test called an ultrasound to determine the location and severity of any blockages. If a revascularisation procedure is required, imaging tests like an angiogram may be needed.

WHY IS EXERCISE IMPORTANT FOR PERIPHERAL ARTERY DISEASE?

People with PAD have reduced heart and lung fitness and strength in their leg muscles, which makes walking more difficult. Not being able to walk as far can impact on quality of life and sometimes make people feel depressed. To help with this, people with PAD should undertake a supervised exercise program. Taking part in exercise has been shown to improve fitness and leg muscle strength, which allows people to walk further before they need to stop [4,5]. This also reduces how much leg pain is felt. Exercise can also help those who have had surgery on the arteries in their legs [6].

WHAT TYPE OF EXERCISE IS RECOMMENDED FOR PEOPLE WITH PERIPHERAL ARTERY DISEASE?

People with PAD should start by introducing exercise slowly, even just a few minutes a day can help improve fitness. Simple activities such as taking the stairs or walking a little further than usual can help improve overall health. The main type of exercise for people with PAD is walking, however activities should be chosen that are enjoyable, add variety and involve others as it will help you stick with your exercise plan. During a typical session, people will walk until they experience strong but manageable pain in their legs (4 on the scale below). The pain is a result of a lack of oxygen reaching the muscles in the legs, which should not be feared as it does not do any harm. They will then stop and rest until the pain goes away. This is then repeated until the session is over. A session may last 10 - 20 minutes, and will increase as the person gets used to the exercise. Some people may also do some strength exercises with their walking. After going to these supervised sessions for 3 months, people are advised to continue walking at home regularly [5].



CLAUDICATION PAIN SCALE



1

Onset of pain



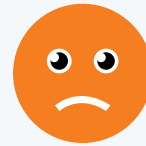
2

Mild pain



3

Moderate pain



4

Intense pain



5

Maximal pain

A summary of exercise program recommendations for people with PAD is outlined in the table below [4,5,7].

WHAT EXERCISE PROGRAMMES CAN PEOPLE WITH PAD DO?

Program duration	At least 3 months, and up to 6 months, of supervised exercise. Plus, regular walking and activity at home.
Exercise mode	Walking on a treadmill/ or flat surface is recommended, other modes such as cycling also offer some benefit. Strength exercises may also be beneficial, but should not be used as a substitute for walking.
Exercise frequency	3 supervised sessions each week, and additional self-guided sessions as appropriate for the person.
Intensity and claudication end-point	Walk at a speed/grade to induce a 4 out of 5 on claudication scale in 3-5 min. If a person can walk for ≥ 10 min without any pain, the speed and/or grade should be increased. If a person does not have any leg pain, exercise should be maintained at an 11-14 rating of perceived exertion (6-20 scale).
Duration per session	Only 10-20 min of accumulated exercise might be achievable at the start. Aim to progress duration as tolerated to 30-45 min of exercise in a 60 min session.

RELATED RESOURCES AND REFERENCES

Exercise is Medicine Australia www.exerciseismedicine.org.au

Exercise Right www.exerciseright.com.au

Find an Accredited Exercise Physiologist www.essa.org.au

PAD exercise training toolkit. Vascular Disease Foundation and the American Association of Cardiovascular and Pulmonary Rehabilitation. Accessed 25 Nov 2021: https://www.aacvpr.org/Portals/0/Resources/PAD%20Toolkit/pad-exercise-training-toolkit_website.pdf

Pymer, S., Ibeggazene, S., Bearne, L., Tew, G. and Hill, A., 2021. A home-based exercise programme for people with peripheral arterial disease – COVID-19 special edition. Accessed 29 Nov 2021: <https://www.circulationfoundation.org.uk/news/covid-19-special-configure>

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- Song, P., Rudan, D., Zhu, Y., Fowkes, F.J., Rahimi, K., Fowkes, F.G.R. and Rudan, I., 2019. Global, regional, and national prevalence and risk factors for peripheral artery disease in 2015: an updated systematic review and analysis. *The Lancet Global Health*, 7(8), pp.e1020-e1030.
- Morley, R.L., Sharma, A., Horsch, A.D. and Hinchliffe, R.J., 2018. Peripheral artery disease. *bmj*, 360.
- Gerhard-Herman, M.D., Gornik, H.L., Barrett, C., Barshes, N.R., Corriere, M.A., Drachman, D.E., Fleisher, L.A., Fowkes, F.G.R., Hamburg, N.M., Kinlay, S. and Lookstein, R., 2017. 2016 AHA/ACC guideline on the management of patients with lower extremity peripheral artery disease: executive summary: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. *Journal of the American College of Cardiology*, 69(11), pp.1465-1508.
- Harwood, A.E., Pymer, S., Ingle, L., Doherty, P., Chetter, I.C., Parmenter, B., Askew, C.D. and Tew, G.A., 2020. Exercise training for intermittent claudication: a narrative review and summary of guidelines for practitioners. *BMJ Open Sport & Exercise Medicine*, 6(1), p.e000897.
- Treat-Jacobson, D., McDermott, M.M., Beckman, J.A., Burt, M.A., Creager, M.A., Ehrman, J.K., Gardner, A.W., Mays, R.J., Regensteiner, J.G., Salisbury, D.L. and Schorr, E.N., 2019. Implementation of supervised exercise therapy for patients with symptomatic peripheral artery disease: a science advisory from the American Heart Association. *Circulation*, 140(13), pp.e700-e710.
- Meneses, A.L., Ritti-Dias, R.M., Parmenter, B., Gollidge, J. and Askew, C.D., 2017. Combined lower limb revascularisation and supervised exercise training for patients with peripheral arterial disease: a systematic review of randomised controlled trials. *Sports Medicine*, 47(5), pp.987-1002.
- Askew, C.D., Parmenter, B., Leicht, A.S., Walker, P.J. and Gollidge, J., 2014. Exercise & Sports Science Australia (ESSA) position statement on exercise prescription for patients with peripheral arterial disease and intermittent claudication. *Journal of Science and Medicine in Sport*, 17(6), pp.623-629.