PERSPECTIVE

Exercise for improving management of peripheral arterial disease

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Peripheral arterial disease significantly impacts on the independence, quality of life and health of older adults. Lifestyle management provides an important course of action with exercise being a key contributor to improving long-term patient health. Incorporation of various exercise types and intensities with guidance from qualified exercise practitioners and clinicians will contribute to effective and successful patient management.

Peripheral arterial disease (PAD) is a complex disease incorporating vascular conditions outside of the heart and brain that result from atherosclerosis and its associated pathological progressions. Typically, PAD affects the major arteries, such as the aorta and its branches and the lower limbs, with patients experiencing significant ischaemia within the extremities and reduced mobility, quality of life and life expectancy.[1-3]

Risk factors for symptomatic PAD include black ethnicity, male gender, older age, smoking, hypertension, diabetes mellitus, dyslipidaemia, high C-reactive protein levels and chronic kidney disease.[4] The incidence of PAD has been reported to be 3 to 15% in the general population with the greatest prevalence in those aged 70 years or older.[5-7]

Symptoms experienced by patients with PAD include reduced walking ability, intermittent claudication and reduced peripheral sensation (e.g. in the toes). However, a large proportion of patients are asymptomatic (potentially three to four times more than are symptomatic), with PAD diagnosed only when the disease progresses to severe limb ischaemia or limb loss.[4] Therefore, detection of PAD is vital for better patient management. Screening of high-risk groups for PAD (e.g. the elderly, men, smokers) may

Key points

- **Peripheral arterial disease (PAD) significantly reduces walking ability and quality of life for older adults.**
- **Current recommendations for regular exercise involving aerobic and/or resistance activities contribute substantially to improved patient management.**
- **Accredited exercise physiologists (AEP) are key professionals responsible for the development of an appropriate exercise program for patients.**
- **GPs in combination with AEPs can provide vital advice to reduce cardiovascular risk and enhance health and quality of life in patients with PAD.**

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Table. Exercise prescription recommendations for patients with peripheral arterial disease[26]

Prescriptive element	Aerobic/cardiorespiratory training	Resistance training
Frequency	Minimum of 3 days per week; increase to daily if walking	2 to 3 non-consecutive days per week
Intensity	Moderate claudication pain during walking Moderate intensity or RPE of 13 to 14 = somewhat hard for other modes	Moderate intensity or RPE of 13 to 14 = somewhat hard
Type/mode	Intermittent walking, walking with poles, lower limb aerobics, arm cranking/cycling	Whole body machine based If time is limited, focus on calf, hamstrings, quadriceps and gluteal muscles
Time	10 to 20 minutes of accumulated exercise, increasing to 40 minutes as tolerated	3 sets of 8 to 12 repetitions for each exercise; 6 to 8 exercises
Progression	Maintain moderate intensity (RPE of 13 to 14) by increasing time first, followed by increases in intensity as tolerated	

Abbreviation: RPE = Borg rating of perceived exertion or effort.

provide early detection and therefore earlier treatment.[8] Simple assessments including history and physical examination with determination of the ankle-brachial index (ABI) via standard or oscillometric devices can be used by GPs to assist the diagnosis of PAD in the elderly.[9] An ABI of 0.90 or less has been reported to be sensitive (95%) and specific (100%) for the assessment of PAD in healthy individuals.[4] Once identified, effective management can be undertaken to reduce the impact of PAD on the patient's health.

Due to the extensive nature of PAD, international management guidelines were developed in 2000 and revised in 2007 to assist patient care.[4] These guidelines highlighted the need for cardiovascular disease risk factor control including weight reduction, blood pressure reduction, blood glucose control, smoking cessation, better lipid profiles, antiplatelet therapy and exercise rehabilitation.[4] A recent review highlighted the benefits of regular exercise for patients with PAD showing a significantly improved walking ability (50 to 200%) that was evident for up to two years.[10] Compared with placebo and usual care, exercise programs were considered to be of significant benefit for patients with PAD who are capable of undertaking exercise.[10]

Exercise as a treatment for PAD

Intermittent walking has been the dominant exercise mode prescribed for patients with PAD, with many studies documenting beneficial improvements in patients' walking capacity, quality of life and prognosis.[11-13] The mechanisms for the improvements with exercise are still largely unknown but are likely to be multifaceted. Factors contributing to improved walking ability for patients with PAD have been proposed to involve the following:[14-16]

- improvements in endothelial function, muscle metabolism, muscle strength and endurance
- changes in blood rheology
- reductions in inflammatory and risk factors
- neuromuscular adaptations
- changes in walking economy or cardiorespiratory fitness.

A specific exercise training program prescribed at the right intensity can reduce overall cardiovascular risk in patients with PAD.[17] In addition, exercise capacity or cardiorespiratory fitness has recently been shown to be the strongest predictor of mortality in patients with PAD.[18] Therefore, implementing an exercise program that is aimed at improving cardiorespiratory fitness may not only reduce cardiovascular risk for patients with PAD but may also improve their quality of life and well-being. However, the optimal exercise program for the management of patients with PAD is not known, with recent evidence demonstrating that multiple modes of exercise at various intensities are equally beneficial at improving walking ability and the health of this patient population.[19-21]

Current exercise guidelines and prescription for PAD

With a strong relation between cardiorespiratory fitness and mortality,[18] and physical activity levels and mortality in PAD,[22] exercise programs for patients with PAD should aim to improve walking ability, cardiorespiratory fitness and general physical activity levels.[3,23] Additionally, lower limb muscle strength has been related to walking ability in this cohort,[24] therefore, exercise programs should also target lower limb muscle strength and endurance.

The Table provides a simplified overview of exercise recommendations to improve walking ability, cardiorespiratory fitness and quality of life in patients with PAD who are medically stable and considered safe to participate in an exercise program.[25,26] It is important to note that intermittent walking until moderate claudication pain is achieved is one form of exercise that has been shown to improve walking ability.[27,28] Alternative modes of exercise (e.g. arm cycling, lower limb aerobic classes) have also been shown to

be as effective and can be successfully undertaken by patients if they prefer.[19] Programs should generally be for a minimum of eight to 12 weeks with significant improvements achieved at three to six months.[27,29]

Before starting an exercise program, the patient's cardiovascular status and medical risks should be assessed by a qualified health professional such as an accredited exercise physiologist and the patient's GP. Due to the existence of known cardiovascular risk factors, patients with PAD are at a higher risk of abnormal cardiovascular responses during exercise.[30] Therefore, a patient with PAD should be assessed for suitability for supervised exercise.[25]

Although multiple modes of exercise have been shown to be effective for patients with PAD, the key prescriptive element of supervision remains the most important component of a successful exercise program to date.[31] Direct comparisons between supervised and nonsupervised programs, as well as a meta-analysis, have shown that supervised exercise is more effective than the traditional 'go home and walk' advice.[28,31,32] Recently, behavioural programs have shown positive effects on walking ability for patients with PAD and may provide a valuable adjunct to unsupervised programs that requires further examination.[33]

The role of the GP

The GP plays a pivotal role in supporting patients with PAD who are undergoing exercise rehabilitation. Where possible, the GP should refer patients to an accredited exercise physiologist for an initial exercise assessment and advice on exercise programming. This referral can occur through a GP Management Plan whereby patients can receive up to five visits under the Chronic Disease Management referral scheme. In rural areas where accredited exercise physiologists may not be available directly, other allied health professionals such as exercise scientists may be able to assist patients via alternate supervisory means such as telehealth via Skype. Otherwise, accredited exercise physiologists based in metropolitan areas can provide advice and supervision to rural or remote practitioners via electronic means with accredited exercise physiologists contactable through Exercise and Sports Science Australia.

Clinical exercise physiology is a four-year university degree and accredited exercise physiologists are trained professionals who provide exercise guidance to patients with chronic disease, injury or illness.[34] The primary goal of accredited exercise physiologists is to increase patient's exercise capacity and physical activity levels in accordance with the constraints of the disease, injury or illness. Due to the increased cardiovascular risk associated with PAD, a qualified health professional such as an accredited exercise physiologist is crucial to optimise exercise improvements of patients within a safe and monitored setting.

Similar to most patients, those with PAD should be encouraged by their GP to increase their physical activity levels and reduce the amount of sitting and screen time. Some tips that can be given to patients to increase their physical activity include taking the stairs instead of the lift, walking with purpose, parking the car at the back of the car park, not using the TV remote control, moving the printer into another room and walking to the local shops for milk and the paper. Current evidence shows a strong relation between increased sedentary behaviours and increased cardiovascular risk with compelling evidence that physical inactivity affects patients' health and is a contributing factor to several diseases and conditions.[35-37]

Patients limited by intermittent claudication who engage in any amount of weekly moderate-intensity physical activity at baseline have a lower mortality rate than their sedentary counterparts who perform either no physical activity or only light-intensity activities.[22] It is, therefore, important for GPs to support their patients to modify their behaviours and increase exercise initiation and adherence. It should be noted that regular exercise may not change a patient's ABI;[16] more importantly, however, regular exercise will improve walking ability and cardiorespiratory fitness, and reduce overall cardiovascular risk of patients with PAD. Older patients may also notice an improvement in their balance and lower extremity function, factors that play a large role in improving quality of life.[38]

Relationship between the GP and accredited exercise physiologist

The accredited exercise physiologist will work directly with the GP and provide regular reports regarding the patient's progress. These reports will contain details about the patient's response to exercise, results of any assessments completed, exercise prescription and training response information. Changes made to the patient's care with respect to medications, surgery etc., should be communicated to the accredited exercise physiologist as soon as possible, because this may affect exercise prescription and training responses. Additionally, exercise performance may unmask underlying cardiovascular disease. Therefore patients should be warned about signs and symptoms of coronary artery disease and notify their GP and accredited exercise physiologist if they notice any of these symptoms occurring at rest or during physical activity.

Conclusion

Patients with PAD exhibit reduced walking ability and are at an increased risk of cardiovascular disease. Regular exercise of appropriate frequency, intensity, type and time are essential in the overall management of patients with PAD. The accredited exercise physiologist in combination with the GP play a fundamental role in supporting patients to undertake prescribed exercise to reduce the debilitating effects of PAD and improve health. **CT**

References

A list of references is included in the website version (www.medicinetoday.com.au) of this article.

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