

Exercises for Intermittent Claudication in Peripheral Vascular Disease: A Conservative Method of Revascularization

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Abstract

This review article focused on providing an evidence-informed integrative overview of reviews on exercises for Intermittent Claudication in Peripheral Vascular Disease as a Conservative Method of Revascularization. The existing evidence comprised of four narrative reviews, one controlled clinical trial and seven systematic reviews which recommended the beneficial effects of aerobic exercise training for reducing intermittent claudication in terms of relative and absolute claudication time in people with peripheral vascular disease.

Keywords: Cardiovascular Rehabilitation; Exercise Training; Peripheral Vascular Disease; Intermittent Claudication.

This review article focused on providing an evidence-informed integrative overview of reviews on exercises for Intermittent Claudication in Peripheral Vascular Disease as a Conservative Method of Revascularization.

Metabolic inefficiency, poor cardio-respiratory reserve and exercise-induced inflammation contribute to a poor physical status of a patient with PVD, and exercises improve blood rheology, cardio-respiratory status, skeletal muscle oxidative capacity and oxygen cost [1]. Exercises improved walking tolerances, alterations in skeletal muscle metabolism, and improved blood distribution in PVD [2].

Regular aerobic and resistance training increases exercise capacity and played an important role both in the primary and secondary prevention of peripheral vascular disease and also its associated comorbidities such as renal, neurologic, and retinal disease [3]. People with peripheral vascular disease have a high risk of coronary artery disease which becomes greater in presence of lower extremity amputation, and hence exercise testing and training could be done using arm exercise ergometry [4].

Collins et al [5] evaluated the efficacy of Pole Striding exercise (a form of walking that uses muscles of the upper and lower body in a continuous

movement similar to cross-country skiing) and vitamin E (alpha-tocopherol) to improve walking ability and perceived quality of life (QOL) of 52 patients with claudication pain secondary to peripheral arterial disease (PAD) who were randomized into four groups: Pole Striding with vitamin E (N = 13), Pole Striding with placebo (N= 14), vitamin E without exercise (N= 13), and placebo without exercise (N = 12). Pole Striding significantly improved exercise tolerance on the constant work-rate, perceived distance and walking speed, perceived physical function, and incremental treadmill tests, with reduced ratings of perceived claudication-related pain unlike the vitamin-E group.

Systematic Reviews

Frans et al [6] reviewed eight randomized clinical trials (RCTs) comparing percutaneous transluminal angioplasty (PTA) with (supervised) exercise therapy {(S)ET} in patients with intermittent claudication (IC) and found equivalent effectiveness of PTA and (S)ET, although PTA plus (S)ET improved walking distance and some domains of QoL scales compared with (S)ET or PTA alone.

Galea et al [7] reviewed six RCTs on 11 behavior-change techniques (barrier identification with problem solving, self-monitoring and feedback on performance) and found limited high-quality evidence and findings were inconclusive regarding the utility of behavior-change techniques for improving walking in people with intermittent claudication.

Parmenter et al [8] identified 24 RCTs of which 19 studied aerobic training interventions and 5 studied progressive resistance training (PRT) on 924 participants, commonly measuring aerobic capacity, 6-minute walking distance, muscle strength, initial and absolute claudication time, initial claudication distance and total claudication distance, all of which improved significantly in exercise trained subjects compared to control subjects. Other performance-based tests of function such as chair stand, balance scale, stair climb and gait speed were understudied in peripheral arterial disease (PAD).

Parmenter et al [9] systematically reviewed 36 trials on 1644 subjects for effectiveness of walking exercise on claudication in PAD for outcomes of initial (ICT/D) and/or absolute claudication time or distance (ACT/D) measured via a treadmill protocol. Among the included studies, 32 were on aerobic (including 20 walking); 4 were on progressive resistance training (PRT) or graduated weight lifting exercise. Exercises other than walking were also beneficial for claudication, with insufficient evidence for benefits of PRT and upper body exercise.

Parmenter et al [10] systematically reviewed 33 trials on 1237 patients for studying the effect of exercise on lower limb haemodynamic measures of resting and post-exercise ankle brachial index (ABI), resting toe pressure, and resting and reactive hyperaemic calf blood flow in PAD. Exercise was not found to change lower extremity haemodynamics in most trials; nor was clinical improvements related to changes in resting ABI, post-exercise ABI or reactive hyperaemic calf blood flow.

Spronk et al [11] reviewed five studies on 202 patients in exercise group, and three studies on 470 patients in angioplasty group, for short- and long-term effects of exercise training and angioplasty on functional capacity and quality of life of patients with intermittent claudication. Significant improvements for ankle-brachial index and quality of life (physical functioning and bodily pain) domains occurred in the angioplasty group but not in the exercise group.

Wind and Koelemay [12] reviewed 15 randomized controlled trials (RCTs) measuring pain free walking distance (PWD) and absolute walking distance

(AWD) for effectiveness of exercise therapy in 761 patients with intermittent claudication. Increased PWD and AWD following exercise compared to other interventions, with supervised exercise training being better than standard care.

The existing evidence comprised of five narrative reviews and seven systematic reviews which recommended the beneficial effects of aerobic exercise training for reducing intermittent claudication in terms of relative and absolute claudication time in people with peripheral vascular disease.

References

1. Tan KH, De Cossart L, Edwards PR. Exercise training and peripheral vascular disease. *Br J Surg*. 2000; 87(5): 553-62.
2. Sidoti SP. Exercise and peripheral vascular disease. *ClinPodiatr Med Surg*. 1992; 9(1): 173-84.
3. Armen J, Smith BW. Exercise considerations in coronary artery disease, peripheral vascular disease, and diabetes mellitus. *Clin Sports Med*. 2003; 22(1): 123-33.
4. Priebe M, Davidoff G, Lampman RM. Exercise testing and training in patients with peripheral vascular disease and lower extremity amputation. *West J Med*. 1991; 154(5): 598-601.
5. Collins EG, Edwin Langbein W, Orebaugh C, Bammert C, Hanson K, Reda D, et al. Pole Striding exercise and vitamin E for management of peripheral vascular disease. *Med Sci. Sports Exerc*. 2003; 35(3): 384-93.
6. Frans FA, Bipat S, Reekers JA, Legemate DA, Koelemay MJ. Systematic review of exercise training or percutaneous transluminal angioplasty for intermittent claudication. *Br J Surg*. 2012; 99(1): 16-28.
7. Galea MN, Weinman JA, White C, Bearne LM. Do behavior-change techniques contribute to the effectiveness of exercise therapy in patients with intermittent claudication? A systematic review. *Eur J VascEndovasc Surg*. 2013; 46(1): 132-41.
8. Parmenter BJ, Raymond J, Fiatarone Singh MA. The effect of exercise on fitness and performance-based tests of function in intermittent claudication: a systematic review. *Sports Med*. 2013; 43(6): 513-24.
9. Parmenter BJ, Raymond J, Dinnen P, Singh MA. A systematic review of randomized controlled trials:

- Walking versus alternative exercise prescription as treatment for intermittent claudication. *Atherosclerosis*.2011; 218(1): 1-12.
10. Parmenter BJ, Raymond J, Fiatarone Singh MA. The effect of exercise on haemodynamics in intermittent claudication: a systematic review of randomized controlled trials. *Sports Med*.2010; 40(5): 433-47.
 11. Spronk S, Bosch JL, Veen HF, den Hoed PT, Hunink MG. Intermittent claudication: functional capacity and quality of life after exercise training or percutaneous transluminal angioplasty–systematic review. *Radiology*.2005; 235(3): 833-42.
 12. Wind J, Koelemay MJ. Exercise therapy and the additional effect of supervision on exercise therapy in patients with intermittent claudication. Systematic review of randomized controlled trials. *Eur J VascEndovasc Surg*.2007; 34(1): 1-9.
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