Creating the PAD Rehab Exercise Prescription

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I have no disclosures
Objectives

- Review the pathophysiology of peripheral arterial disease
- Discuss the key components of the exercise prescription for the PAD patient

What is Vascular Disease i.e. Peripheral Arterial Disease – PAD

A disease in which plaque builds up in the arteries that carry blood to your head, organs, and limbs. Plaque is made up of fat, cholesterol, calcium, fibrous tissue and other substances in the blood. This is called atherosclerosis and it is most commonly associated with heart disease.
9 million Americans have PAD / 8.5 million older than 40 years old
200 million globally have PAD
Often, underdiagnosed
Higher risk of coronary artery disease and heart attack (5 to 6 fold increase)
Higher risk of stroke (2 to 3 fold increase)
60% of PAD patients also have heart disease
Untreated, PAD can restrict blood and oxygen flow to vital organs, legs, arms and feet and your brain
Most common type of PAD is lower extremity arterial disease – claudication, limb ischemia and amputation

1 NHLBI Workshop on Peripheral Artery Disease, Bethesda, MD, 2003
Risk Factors for Vascular Disease

- Age (prevalence increases with age)
- Family or Personal history of PAD, CVD or stroke
- Smoking
- High Cholesterol
- Diabetes
- High Blood Pressure
- Lack of Regular Exercise

The Uncontrollable Risk

- Age – older than 60 years old
  - Age 50-59 = 2.5%
  - Age 60-69 = 5.5%
  - Age 70-79 = 10%
  - Age > 80 = 23%

- Family or Personal history of PAD, CVD or stroke
  - 35% to 60% increased risk!
Smoking - #1 Risk Factor

- 4 times greater risk of developing PAD
-Damages blood vessels by making them thicker and less flexible
-Increases heart rate and blood pressure
-Also causes blood to clot more readily
-Impacts organs throughout the body – heart, lungs, brain, kidneys
-One cigarette causes vasoconstriction for 8 hours
-Smoking cessation can immediately lessen symptoms and lower risk

Lack of Regular Exercise

- We have become lazy! It's easy and easy is good! NO! NO!
-Only around 20% of US adults meeting the stated regular exercise requirements
-**GOAL:** 150 exercise minutes or more per week
-**WHY:** Significant reduction in chronic illness including heart disease, cancer and stroke
-For PAD, regular exercise will reduce symptoms (claudication) and to strengthen weak, de-conditioned muscles
-Walking (120 min/wk) has been shown to reduce heart attack risk by 40% compared to no exercise
-Regular exercise impacts HTN, elevated cholesterol, diabetes, smoking, excess weight, stress . . . on-and-on-and-on
Claudication (pain, cramping, heaviness, etc) in the legs, buttock and calves (also called intermittent claudication or IC)

Pain in the legs or feet that impacts daily life

Sores or wounds on legs, feet or toes that heal slowly or not at all

Changes in color in the lower extremities – could be pale or blue

Loss or decrease in hair and nail growth

Marked temperature difference in one leg compared to the other
The first step to establishing the exercise Rx
- History and Physical – medical history and medication review
- Physical Exam – check for pulses, discoloration, wound care
- Diagnostic Testing
  - Ankle-Brachial Index (ABI)
  - Lower Extremity Arterial Study (LEA)
  - Arteriogram/Angiogram
- In Program Testing
  - Walking and claudication assessment (6MWT/Gardner Protocol)
  - VascuQOL / PAQ / PHQ-9
Benefits of Exercise for PAD

- #1 – Reduction in symptoms
- Increase in muscular strength and endurance
- in weak muscles. This leads to enhanced capillaries within the muscle and improvement in the extraction of oxygen
- Exercise-induced enlargement of collateral vessels
- Nitric oxide vasodilatation of the endothelium
- Development of additional collateral vessels and circulation
- Possible adaptation of skeletal muscle to become more efficient with certain types of exercise (aerobic vs. anaerobic)
- Overall risk reduction in relation to active risk factors
  Improvement in blood pressure, blood glucose, cholesterol, stress, body weight
Exercise continues to be the “cornerstone” of managing PAD
Additions to guidelines include the use of statin therapy to reduce cholesterol levels which decreases the risk of atherosclerosis systemically
Also, the use of anti-platelet therapy including aspirin and/or clopidogrel. Dual anti-platelet therapy may be considered after vascular surgery or PTA/stent
Smoking cessation remains important with more attention to exposure to second-hand smoke
Also, new recommendation for annual flu shot to avoid and decrease risk of flu and cardiovascular disease

Walking is the best compared to other modes of exercise
Claudication symptoms are the limiting-end point
Evidence shows that pushing to maximum pain is more beneficial than stopping at the onset - OUCH!
These patients also have CVD risk factors which can cause angina, heart failure and COPD. Orthopedic limitations can also play a factor in achieving success
Encouraging regular exercise and being active in itself can be limiting
Regular attendance or frequency also appears to be a key to success
Exercise Recommendations for the PAD Patient

- **Frequency** – More than 3 sessions per week
  
  Goal: 6-7 days/week

- **Intensity** - How hard? “Supply and Demand”
  
  Might have to be low intensity for longer duration

- **Time** - greater than 30 minutes (short bouts initially)
  
  Example: 4 min ex, rest, 4 min ex, rest, etc.

- **Type** - *Aerobic exercise - walking/strength training*
  
  Initial: Non-weight bearing exercise might be more beneficial for those severe patients. Build up strength and confidence!
Exercise Prescription and the PAD Patient Summary

- Many studies verifying that regular exercise is the key component to managing PAD, symptoms and improving QOL
- Regular exercise and walking can play a role in the development of collateral circulation, enhancement of vasodilation and the adaptation of muscle fibers to tolerate exercise better
- “Exercise is Medicine” for the treatment of PAD
- Walking is #1 – better outcomes when the tobacco use is eliminated
- Frequency and duration are most important – intensity when possible
- Exercise may not be fun but it can be tolerable and can impact many areas besides just intermittent claudication

Questions?