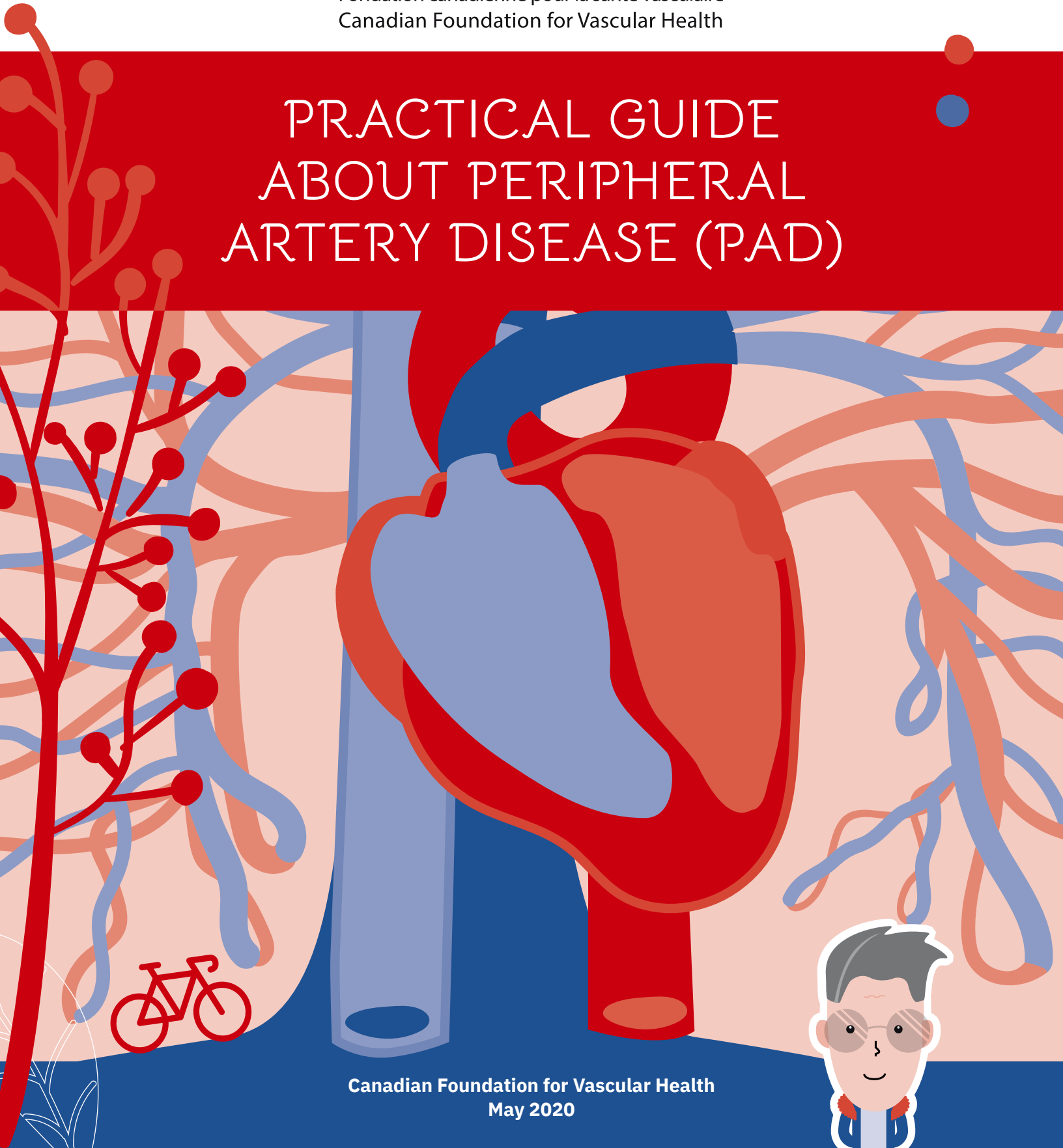




Fondation canadienne pour la santé vasculaire
Canadian Foundation for Vascular Health

PRACTICAL GUIDE ABOUT PERIPHERAL ARTERY DISEASE (PAD)



Canadian Foundation for Vascular Health
May 2020

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WHO ARE WE?

Founded in the fall of 2014, the Canadian Foundation for Vascular Health (CFVH) is a non-profit corporation. In 2017, the CFVH obtained its status as a charitable organization from the Canada Revenue Agency with the goal of supporting patients who are at risk of developing or who have peripheral artery disease (PAD). Using this practical guide, the Foundation's objective is to help individuals with PAD better understand their disease, how it develops, its consequences for their quality of life and how to prevent and treat it.

WHO IS THIS GUIDE FOR?

This guide is basically intended for patients with PAD and their families. Healthcare professionals working with PAD patients may also benefit from the information provided in this guide and earn education credits. The CFVH encourages all individuals with PAD signs and symptoms to consult their healthcare professional.

DISCLAIMERS

This guide does not replace a medical consultation. If you suspect you have PAD, or are at risk of having it, please consult your healthcare professional.

This document is based on professional practice incorporating the most recent medical data at the time of its publication. However, it is possible that new scientific, technological or other knowledge may change the understanding, development and treatment of PAD described in this document. This guide is valid to the extent that no contrary or incompatible legal or regulatory standard obviously or indirectly affects or changes it for this year and subsequent years.

This guide was written during the Covid-19 pandemic. In this document, what may appear to be contrary to the instructions of the Public Health Agency of Canada should be avoided until further notice. In the meantime, all Canadians should follow the recommendations of the Public Health Agency of Canada, namely washing hands, coughing in your elbow, observing physical distancing and wearing a mask under certain circumstances.

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GLOSSARY

Ankle-brachial index: Ratio between blood pressure at the ankle and at the arm.

Artery: A blood vessel which transports oxygen-rich blood to the organs.

Atherosclerosis: Appearance of fatty deposits in the arteries.

High blood pressure: Abnormal elevation of pressure in the blood circulating in the arteries.

Hyperlipidemia: A high level of lipids in the blood (excessive fat), including cholesterol and triglycerides.

Intermittent claudication: Lameness. May be caused by cramping pain in the calf when walking due to peripheral artery disease.

Type 2 diabetes: A disease in which regulation of sugar (glucose) in the blood does not work very well. In some individuals, the pancreas cells produce insufficient insulin.

Vein: A blood vessel which transports oxygen-depleted blood to the heart.

LIST OF ACRONYMS

CFVH: Canadian Foundation for Vascular Health

CT angio: Computed tomography angiography

HIIT: High-Intensity Interval Training

IUCPQ: Quebec Heart and Lung Institute

MHI: Montreal Health Institute

MRI: Magnetic resonance imaging

PAD: Peripheral artery disease

SSVQ: Société des sciences vasculaires du Québec [Quebec Society of Vascular Sciences]

Stroke: A cerebrovascular accident (CVA)



INTRODUCTION

Peripheral artery disease (PAD) is a condition affecting nearly 3 million Canadians aged over 50. Unfortunately, a significant proportion of individuals with this disease do not experience any symptoms and do not know they have it. However, the consequences of this disease are serious and individuals with PAD are at high risk of developing heart disease or having a stroke. Therefore, it is important to learn about this disease in order to prevent its health consequences.

Let me explain!



1. What is peripheral artery disease?

Peripheral **artery** disease (shortened to PAD) is the name for the narrowing of the peripheral blood vessels (more specifically, the arteries) that causes symptoms for patients. Symptoms vary, depending on the location and disease severity, and will be discussed below.

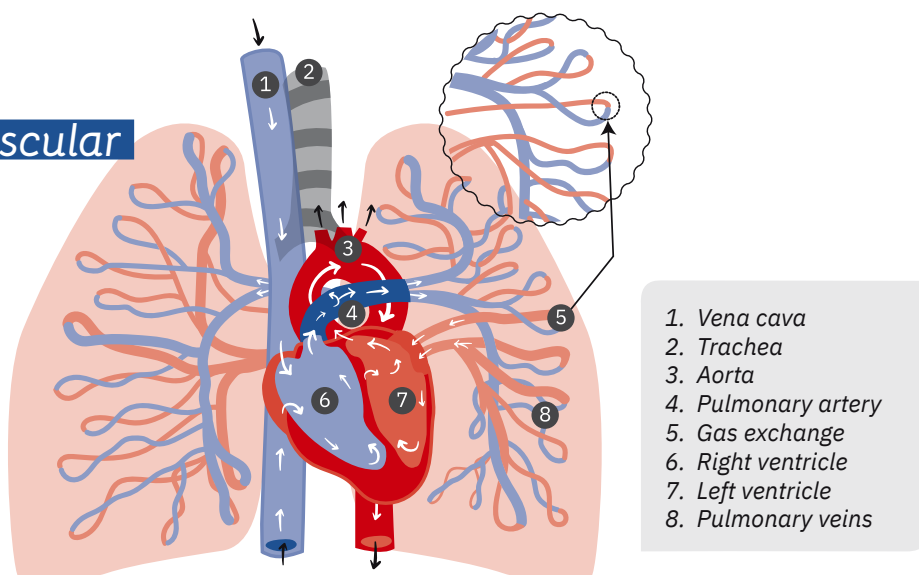
The organs in our bodies, such as the heart, kidneys and muscles, need fuel to work. That fuel is oxygen. Oxygen has to be able to reach the different organs so it can be used. It is transported by our blood system, made up of **veins** and arteries.

Everything starts in the lungs, where blood absorbs the oxygen we breathe in. The now oxygen-rich blood then needs to be transported to the organs in our body. The heart is a powerful muscle which acts like a pump and sends blood all around our body. Lastly, it is the role of the blood vessels to transport the oxygen in the blood to the various organs. In this way, the organs can use it to work.

This disease is very similar to other diseases of the blood vessels that fuel specific organs. In fact, heart attack (also called myocardial infarction) and stroke are diseases caused by damage to the blood vessels of the heart and brain.

↳ Figure 1:

The cardiovascular system and the lungs



2 types of blood vessels

There are 2 types of blood vessels: arteries and veins. In general, arteries transport oxygen-rich blood to the organs. Veins take oxygen-depleted blood back to the heart and lungs so the cycle can start again (Figure 1).

In this guide, we will talk about disease affecting the arteries of the arms and legs. These parts of the body are peripheral to, meaning far from, the heart and lungs, which is why it is called peripheral artery disease.

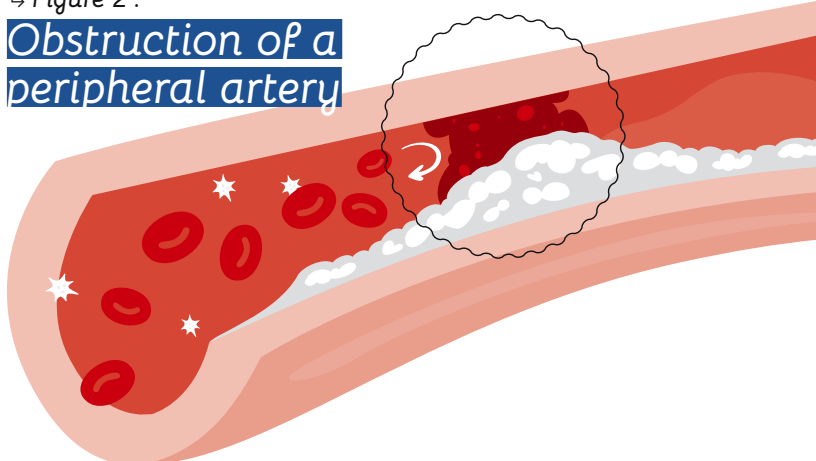


2. What is happening in my legs?

Arteries are much more than just tubes transporting oxygen-rich blood. They are sensitive to several elements which can damage them. Damage caused to arteries is called **atherosclerosis** (Figure 2). Several factors may contribute to the damage. Once the **artery** wall is damaged, our body tries to repair the damage and a scar is formed. The greater the damage and the longer it persists, the larger the scarring will be. If it grows very large, scarring can even make the **artery** narrower. When the scar reaches a certain size, it blocks the blood flow and the organs supplied by that **artery** start to be deprived of oxygen. The speed of scar formation may vary, depending on several factors (see Risk Factors). Generally, it develops over several years.

↳ Figure 2 :

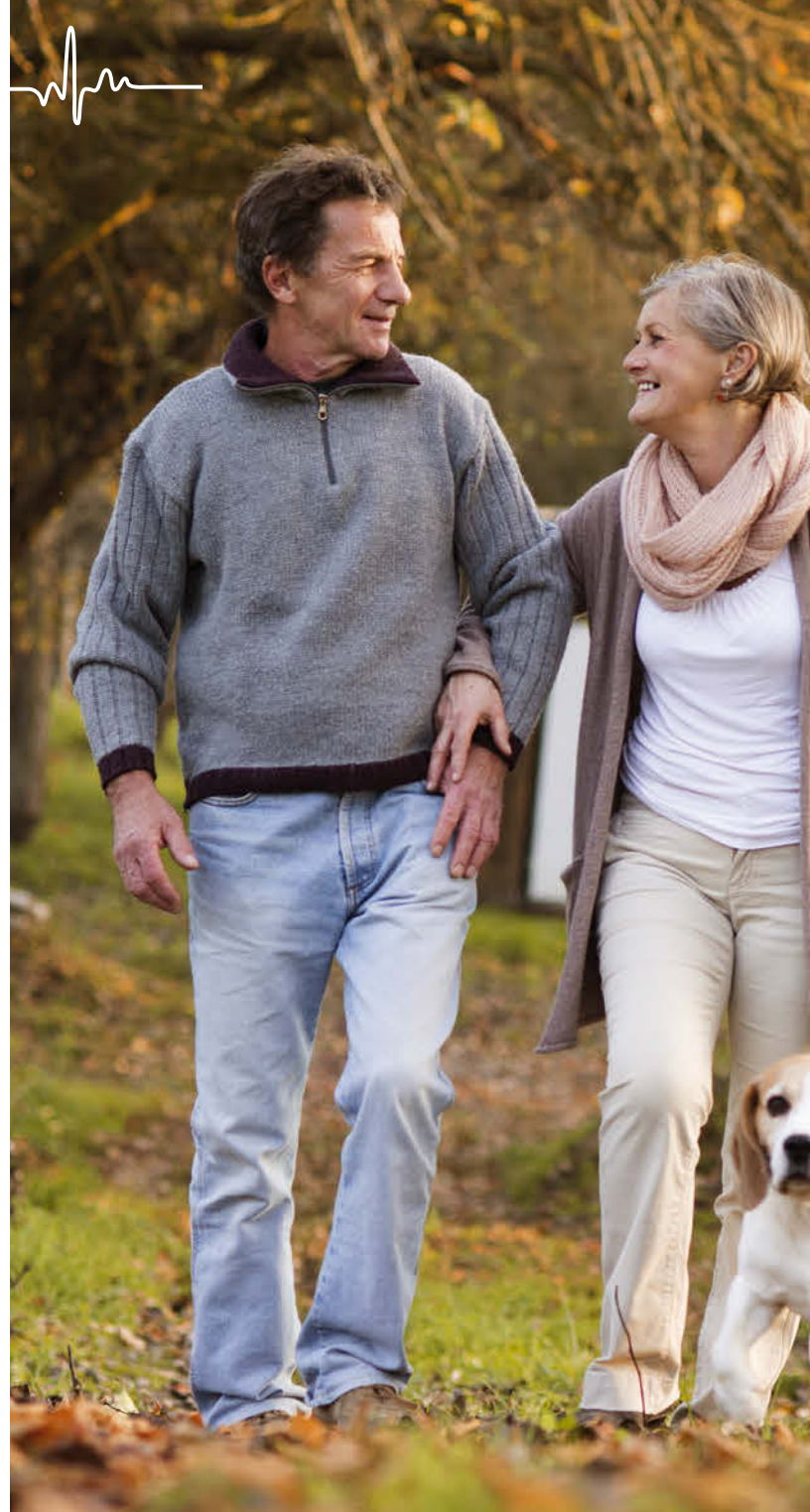
Obstruction of a peripheral artery



Between 20% and 50% of people with PAD have no symptoms. However, an absence of symptoms does not mean that the disease has no consequences. Its presence increases the risk of having a heart attack or stroke by up to 20% five years after the diagnosis.

1 to 3 people in 10 have classic symptoms

It has been found that 1 to 3 people in 10 have classic symptoms, i.e., they experience cramping pain in the calf when walking, which is relieved by rest. This pain is called **intermittent claudication**. In addition, 3 to 4 people in 10 may feel pain when walking which is in a different site, either the thigh or buttock; this is then called **atypical claudication**.



The majority of people (70%-80%) with claudication progress favorably, with their symptoms remaining stable. A minority (10%-20%) will have claudication which worsens and a small proportion (5%-10%) will develop damage which threatens the limb and may even progress into gangrene and potentially amputation.

↳ Figure 3 :

Intermittent claudication (difficulty walking)



3. What are the risk factors for peripheral artery disease?

One risk factor is any characteristic or exposure of a person which increases the likelihood of developing a disease or suffering a trauma. Risk factors may be modifiable, i.e., ones we can take action against, or non-modifiable, meaning we cannot take action against them, they are part of the individual.

Modifiable factors (ones we can take action against)

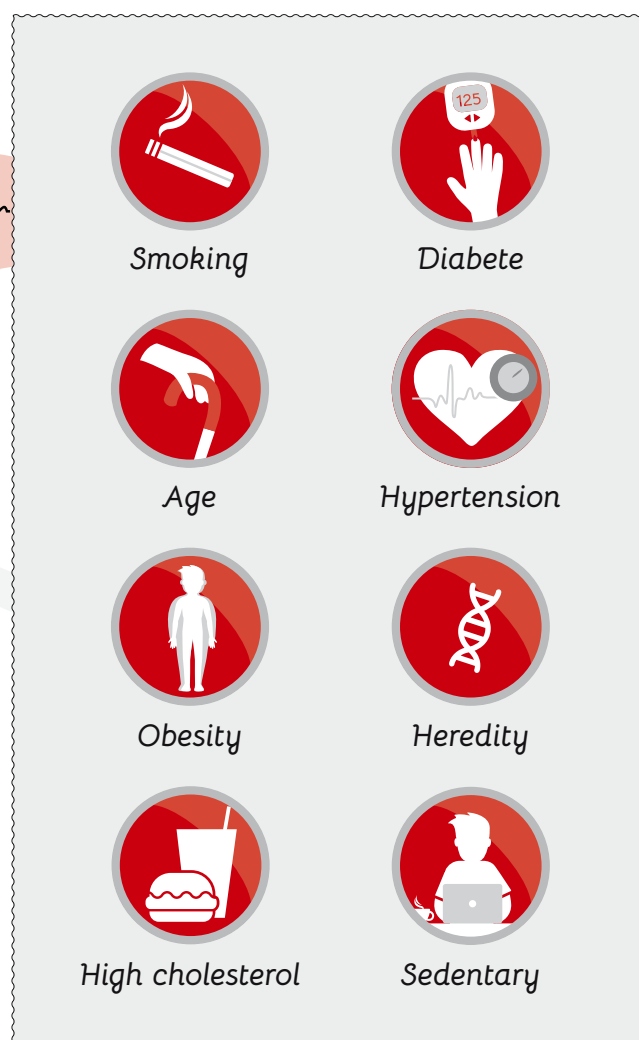
- **Type 2 diabetes**
- **High cholesterol (hyperlipidemia)**
- **High blood pressure (hypertension)**
- Obesity
- Sedentary lifestyle
- Physical inactivity
- Stress
- Current smoker
- Diet

Non-modifiable factors

- Age
- Ethnicity
- Heredity (genetics)
- Sex

↳ Figure 4 :

People with some of these risk factors are more likely to suffer from PAD.



4. How is peripheral artery disease diagnosed?

4.1. Screening exam

After the medical questionnaire and physical examination, a doctor who suspects PAD should try to confirm the diagnosis and its severity using more in-depth investigation methods.

Generally, this process starts with a simple calculation called the **ankle-brachial index**. This inexpensive screening exam basically consists of calculating the ratio between blood pressure at the ankle and at the arm.

After a 15 to 30 minute rest period, the patient lies on his/her back and a blood pressure cuff and a Doppler probe are used to measure blood pressure at the arms and ankles.

Two results are obtained: one for the left leg and one for the right leg. These results are usually in proportion to the severity of the PAD, namely the lower the **ankle-brachial index**, the more severe the disease. When blood vessels are intact, blood pressure in the arm and leg are almost identical and the index is about 1.0. An index below 0.9 indicates PAD. If a patient with characteristic PAD symptoms has a normal index, a treadmill walking test may be recommended. The step described above is repeated after the treadmill stress test.

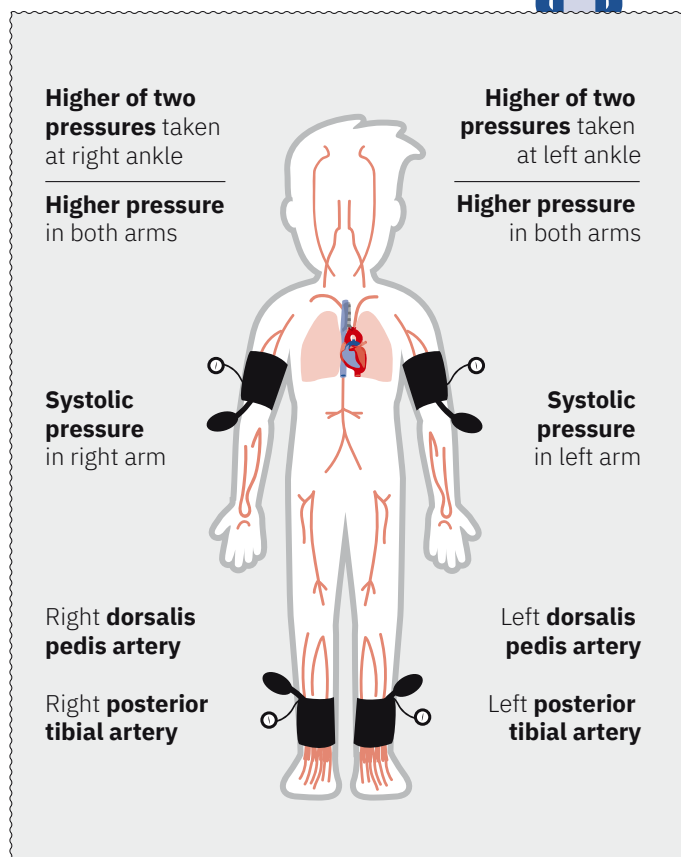
4.2. Doppler and Doppler ultrasound

In patients with strongly suspected PAD and/or with a low **ankle-brachial index**, the investigation may be complemented by a Doppler exploration or Doppler ultrasound. These inexpensive techniques can define the degree and extent of impairment. Combining ultrasound and Doppler makes it possible to visualize blood vessels and their blockages, if any, by scanning the skin with an ultrasound probe and being more precise about disease severity.

Although quite useful, this technique does have its limitations. It is considered to be less optimal in obese patients and patients with calcified arteries (arteriosclerosis), in which the vessel walls are calcified. Diabetics with kidney failure in particular may have calcified arteries.

↳ Figure 5 :

A measurement tool: the ankle-brachial index



4.3. More thorough examinations

In some patients, more thorough examinations are sometimes necessary. They are particularly helpful ahead of a procedure to unblock an **artery** or perform a bypass. There are 2 imaging exams: computed tomography angiography (CT angio) and magnetic resonance imaging (MRI).

For a **CT angio**, the patient lies on an examining table. A liquid, iodine, is injected into a **vein** in the arm to highlight the arteries when an X-ray is used to take images. Although very effective, this technique is expensive, exposes patients to radiation and is relatively contraindicated in patients with severe kidney disease.

For an **MRI**, the patient also lies in a tunnel and may, in some cases, receive a product in the **veins** (gadolinium). Using a magnet which generates an electromagnetic field, the MRI produces very precise images of blood vessels without exposing the patient to X-rays. However, this exam is very expensive and less accessible. This exam is not recommended in patients with very severe kidney failure.



The good news!

The good news is that the impact of regular physical activity on PAD symptoms is often felt in the first three months of making the change. As well, introducing physical activity and improving lifestyle habits are associated with increased energy and physical endurance, along with improved psychological well-being and general quality of life.

5. How will peripheral artery disease affect my daily life?

PAD often has significant impacts on the quality of life and daily functioning of individuals who have it. In particular, it may limit getting around, which is necessary for the vast majority of activities such as work, household tasks, recreation and family/social activities. Feeling more tired may also impact carrying out some daily activities. As well as these limitations, PAD may cause fairly intense and frequent pain or discomfort, which can also affect mood and quality of life generally. Since PAD is chronic, in other words, it persists and lasts over time, its impacts may have a ripple effect to varying degrees.

Fortunately, there are effective interventions for managing it and reducing its consequences. In all cases, managing PAD includes **regular physical activity such as walking and long-term changes to other lifestyle habits, such as quitting smoking, eating well and reducing stress/anxiety, etc.** These changes are often very beneficial, but usually require many significant daily changes.

However, it is important to recognize that changing lifestyle habits is a major challenge which can be difficult to overcome, and also to maintain over time.

For guidance regarding the nature of changes to make and help facing the challenges of living with PAD, doctors may refer patients to a variety of healthcare professionals, such as a kinesiologist, nutritionist, nurse or psychologist. It may be surprising to see a psychologist on the list of professionals who can help patients manage PAD better. In fact, a psychologist can contribute in many ways to psychological and physical well-being. As soon as PAD is diagnosed, patients may experience many “negative” emotions, such as sadness, anger, stress/anxiety and dejection. Even though these are completely normal, they are not always easy for patients and their loved ones to handle. A PAD diagnosis can also be accompanied by broader questions about health, such as disease progression and its consequences, which can be worrying. Another significant challenge is adopting healthier lifestyle habits and maintaining the changes over time. Here are a few more specific areas for reflection about the challenges involving lifestyle changes and managing “negative” emotions.

5.1. Changing lifestyle habits

It is possible to change several lifestyle habits at the same time, but that is generally more difficult to do and to maintain over time than changing one habit at a time. Therefore, it can be beneficial to first put our energy into the changes that seem more achievable or important, and then gradually move to the ones that seem more complex. It is often helpful to set concrete objectives which can be achieved in the short and medium term (see template in APPENDIX i). The objective of better physical health is noble, but is still fairly vague and will not be as helpful for guiding daily actions. So, adding a concrete, short-term objective will be more helpful. This might be something like: When going out for walks, alternating 1 minute of fast walking with 1 minute of rest. Over a period of weeks, increase the walking time and/or reduce the rest time. A medium-term objective might look like: Follow an exercise program to be fit enough to play in the park with my children or grandchildren in the summer (or carry out another activity which is appealing in the near future). In both cases, the objectives are concrete and measurable. Next, it is important to integrate the new behaviors into your daily routine so they become a

habit (this takes about a month, so allow yourself time). Do not hesitate to talk about this with your family/friends; they can support you with your new lifestyle habits and may also help you achieve your objectives.

This is a short overview of how to motivate yourself and maintain the motivation in the longer term, but there are many other effective strategies. Do not hesitate to discuss this with healthcare professionals.



5.2. Lifestyle habits and “negative” emotions

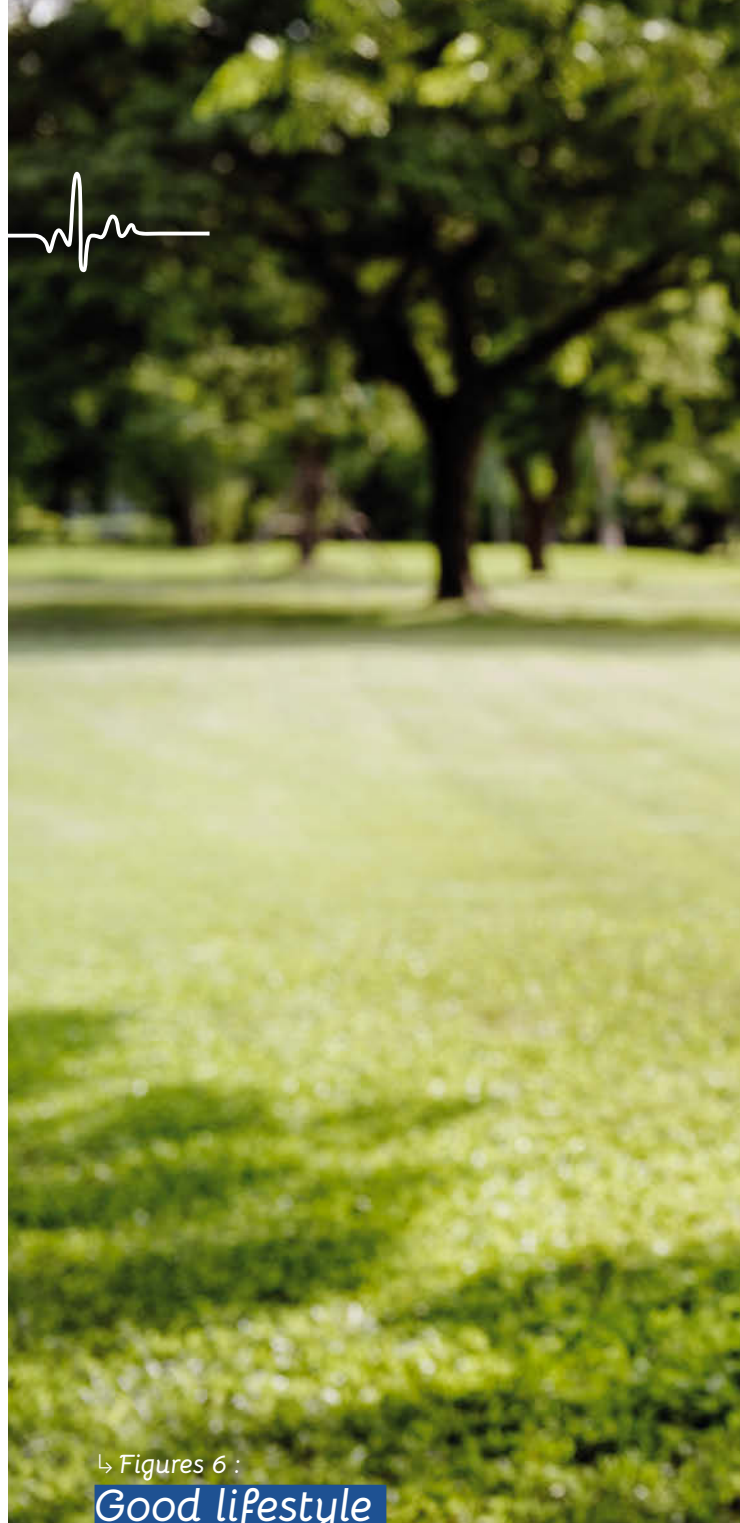
Another challenge of adapting to PAD may be managing stress/anxiety and other “negative” emotions. It is not possible to make these emotions go away completely and, even if they are considered negative, they are normal and helpful. However, there are many strategies for better managing them and limiting their negative impacts on quality of life.

Healthy lifestyle habits, such as regular physical activity, sleeping well and good hydration are associated with better health, but they are also beneficial for psychological well-being. Not only do they help towards better physical health, but also better psychological well-being, especially by providing better resistance to negative emotions. For example, not eating as well can make us feel more irritable and less cheerful. Lack of sleep can cause anxiety and a more depressed mood.

Aside from changes in lifestyle habits, several strategies can be helpful for better managing these emotions and improving quality of life. For example, getting involved in many areas of our lives (e.g., family, recreation, friends, etc.) can improve our ability to face difficulties. If a problem or difficult situation arises in one of these areas, it is easier to keep a sense of proportion and recharge if we are also involved in other areas. Studies actually show that happier people give priority to areas other than work, such as family.

Talking with family/friends, spending time with them and socializing in general is associated with better mental and physical health. Many other strategies can be applied to help better manage PAD, such as problem-solving, some relaxation techniques or changing thoughts which can be harmful to our well-being. They are not covered here, but can be found in other readings (there are a few suggestions at the end of this guide).

In short, living with PAD is a major challenge, but also an opportunity to make changes which will improve well-being and quality of life.



↳ Figures 6 :

**Good lifestyle
habits with PAD:
physical exercise,
sleep and hydration**



6. How is PAD treated?

6.1. Lifestyle habit interventions

- i. Smoking cessation: Quitting smoking is crucial, because it slows down disease progression, improves symptoms and reduces the risk of a heart attack. As well, if surgery was performed to unblock an **artery**, smoking cessation helps keep the **artery** open longer. Healthcare professionals can provide many tips for quitting smoking and suggest medications for individuals who are ready to quit. Medications may include, for example, gum, patches and tablets.
- ii. Physical exercise: Physical exercise is the first-line therapy for patients with **intermittent claudication** and has demonstrated improvement in symptoms of pain in this population when walking. Section 7 of this guide describes exercise programs recommended for managing PAD in greater detail.

6.2. Medical interventions

- i. Antihypertensive treatment: Treating **high blood pressure** reduces adverse cardiovascular events in the general population and should be basic treatment for patients with established cardiovascular risk factors. Blood pressure targets may vary and are determined by the healthcare professional.
- ii. Statin therapy: Treatment with a statin (a drug which reduces bad cholesterol) is recommended for all patients with PAD, regardless of blood cholesterol level. It is reasonable to treat with the maximum dose tolerated. As well, some data suggest that claudication improves with statins.
- iii. Antiplatelet therapy: Antiplatelet therapy is recommended for all patients with symptomatic PAD, to reduce the risk of major cardiovascular events. Possible antiplatelet therapies are clopidogrel and aspirin.
- iv. Anticoagulant therapy: Recent studies have shown that aspirin combined with an anticoagulant (rivaroxaban) may be beneficial⁶⁻⁷.
- v. Glycemic control: It is important to control glycemia (blood sugar level) in diabetic patients².



Adapted treatments!

There are many, complementary ways of treating PAD. Treatments include changes in lifestyle habits, medication, and surgery. Your healthcare professional will discuss with you how to treat PAD, adapted to your specific situation. Do not hesitate to ask your healthcare professional questions about these different possible interventions.

6.3. Surgical Therapy

Surgical therapy is divided into 3 types of intervention:

- i. **Endovascular therapy** This therapy is performed by physicians specialized in radiology and consists of unblocking arteries using balloons and a metal stent. This technique is similar to the technique used in patients who have a heart attack. For example, arteriography consists of visualizing the body's arteries using an X-ray camera (fluoroscopy) and direct injection of iodine into the arteries.
- ii. **Open-heart therapy** This therapy is performed by surgeons specialized in vascular surgery and consists of creating a bypass, i.e., creating an alternative blood flow route. The bypass is made using either the patient's own **vein**, taken from the thigh, or a synthetic prosthesis.
- iii. **Hybrid therapy** This treatment consists of combining endovascular and open-heart therapies.



↳ Figure 7 :

**Surgical
treatments**



7. What else can i do?

7.1. Peripheral artery disease and exercise

Although the interventional approach (surgery or dilation) is often effective for treating advanced stages of peripheral **artery** disease (PAD), medical therapy (medication and/or exercise) is still an important step in the treatment of PAD, but often underestimated¹¹. Exercise is not only effective, but beneficial¹⁶.

Walking is a privileged exercise to treat the patient with PAD!

Walking exercise has always been the preferred type of exercise for treating patients with PAD. It is also strongly recommended for patients who have had a peripheral vascular intervention as well as surgical treatment.



The beneficial effects for walking capacity and reduced mortality are well known. A recent study showed that exercise improves walking time by 50% to 200%, pain-free walking time by 100% and maximum walking distance by at least 100% in PAD patients. Exercise also greatly reduces total mortality and cardiovascular death in patients with PAD. Data in the literature provide convincing evidence that exercise plays a key role in preventing many chronic diseases, particularly cardiovascular diseases⁶.

7.2. Why is exercise so beneficial?

Exercise produces favourable effects on many traditional risk factors, such as obesity, **high blood pressure**, diabetes, smoking, and cholesterol. It is also important to remember that physical activity has multiple positive effects related to aging. Even though the beneficial effect of exercise in cardiovascular prevention is well-known, the precise mechanisms causing that benefit have yet to be determined for PAD patients. Studies are limited and not very recent, meaning that the hypotheses put forward still need to be confirmed or developed.

In a patient with PAD, exercise may improve performance without necessarily providing a significant increase in blood flow to the affected limbs. This suggests that other mechanisms might participate in the beneficial effects of exercise observed in these patients. These mechanisms are complex and are still being studied.

7.3. Walking exercise, and more

Even though walking exercise is the most well-known treatment for PAD, some studies have shown that cycling exercise can also be effective for these patients¹³. Like walking, pedaling improves exercise capacity as well as walking and pedaling distance. Cycling exercise is also safer for patients at risk of falling. However, this modality might be less effective than walking. It seems that cycling exercise may greatly improve the distance pedaled while having less impact on distance walked and pain-free distance walked¹³. There are still positive cardiovascular effects in PAD patients¹³. Some researchers have also investigated exercising with the arms in PAD patients^{3,7,16}. Although surprising, it seems clear in the

literature that there is a benefit from exercise with the arms in PAD patients, who usually have damage in their legs. This type of exercise is particularly beneficial for patients who cannot do walking exercise because of very disabling pain^{18,19}. Lastly, exercising with the arms even has an impact on muscle strength in the legs. All these factors also mean that it is associated with improved quality of life. There are many mechanisms to explain these benefits. Of these, one of the most important is undoubtedly the central, cardiovascular effect of exercise. All types of exercise, with arms or legs, produce an increase in cardiac output (the volume of blood pumped by the heart) and an increase in blood flow to the legs³.





7.4. HIIT: a promising future

In recent years, high-intensity interval training (HIIT) has become popular because it is effective and saves time. HIIT is characterized by exercise intervals at higher intensity, which may last from several seconds to several minutes. Intensity is the most important determinant for improvement in cardiopulmonary health⁹. These intense exercise intervals are separated by periods of active or passive rest. Overall, HIIT makes it possible to spend longer at a high intensity and reduces the unpleasant effects of exercise (e.g., shortness of breath). As a result, HIIT produces similar, if not superior, benefits to ongoing low-intensity training. There are very few studies of HIIT and PAD^{1,17}. Researchers have evaluated its impact on a rehabilitation score characterizing the difficulty of exercising on a treadmill (speed and slope). Following HIIT consisting of 6 minutes of maximum intensity followed by 3 minutes of rest, they demonstrated a significant improvement in the score and patient quality of life¹. Other researchers have also studied HIIT in PAD patients. Participants had to perform 30-minute sessions twice daily at a gradually increasing intensity, with an increase in speed in week 1 and an increase in slope in week 2. Each session contained a succession of five 6-minute cycles. Each cycle consisted of 3 minutes of active work followed by 3 minutes of active recovery. This training was associated daily with muscle exercises and general gymnastic exercises. In the study, all patients had increased their walking distance, which rose on average from 610 meters at the start of the program to 1,252 meters. All reported being motivated by the type of rehabilitation program offered and no adverse effects were noted¹⁷. Another study evaluated the effect of cycling in PAD patients. Patients had to alternate 4-minute intervals of intense pedaling with 3 minutes of rest. Over the 12 weeks of exercise, the intensity was gradually increased. This HIIT program resulted in improved walking distance, increased daily activities and increased cardiopulmonary condition.



7.5. Summary

Therefore, it is clear that exercise should be part of treating PAD, in patients with and without endovascular or surgical treatment. It is the only treatment which reduces cardiovascular mortality and improves most risk factors. Despite the results with cycling or arm exercises, walking exercise has the most benefits. However, there is increasing evidence that resistance training, cycling or HIIT also improve both quality and length of life. More studies should be conducted on this subject. However, there are some contraindications to intense exercise. Therefore, you should talk to your doctor before increasing the intensity of your exercise sessions.

So far, the literature has shown that, in order for exercise to be as effective as possible, it should be: supervised by a kinesiologist, last 30-60 minutes, and be done 3-5 times a week. Walking should be combined with specific bodybuilding. Cycling, use of the arms or HIIT can also be added. If no kinesiologist can be present, you can walk daily. It is important that PAD patients continue walking when pain starts until maximum pain because this greatly increases the effectiveness of the exercise.



8. Tools to help me

Walking more, pain-free, is the wish of many people with PAD. To achieve this, one of the most effective therapies is exercise sessions. This seems to be an easy intervention, but most people do not really know where to start. This section will try to provide information about tools to help individuals with peripheral **artery** disease better manage physical activity and support them in achieving their objectives.



In addition, regularly used muscles resist poorer blood supply longer. If we compare the situation to a road network, moving the legs encourages the opening of secondary roads when the highway is congested. It may take some minutes of movement before blood flow to the legs opens up the arteries to take more oxygen and nutrients to the muscles. If start-up is too quick, the muscles suffer and produce metabolic waste, causing pain and/or difficulty contracting the muscles correctly. That is when limping starts and you should stop the exercise¹.

The strategy is to start exercising more slowly to maximize blood supply to the muscles without causing pain too quickly. It is therefore preferable to start with exercises which can start slowly, i.e., an exercise which seems easy at the start of the session. Once an individual is moving and has been under the pain threshold for a few minutes, he/she can move on to increasing the intensity and risking the onset of pain, meaning he/she needs to stop².

Studies have shown that an improvement in walking distance occurs more quickly if people with peripheral vascular disease work during discomfort. This apparently causes the muscles to become more tolerant and further stimulates circulation into the secondary arteries².

The goal of training!

For individuals with PAD, the goal of exercise is to force the body to push more blood to the legs by activating the cardiovascular system. During exercise, the arrival of blood in the legs pushed by the heart in action promotes dilation of the arteries. Therefore, active limbs allow more blood to flow and fuel the muscles at work. Moving opens a new network of small blood vessels, making it possible to bypass the obstruction of the diseased **artery**.



The tools

We have seen previously that exercise is more effective when the training session is more intense. That is why the clinical practice guidelines indicate a preference for training supervised by an exercise specialist versus exercising alone at home³. On the other hand, the improvements made alone with your own resources can also be extraordinary⁴. Here are some pro tips for maximizing your results.

8.1. Stationary machines

The use of stationary machines means you can control several parameters, such as resistance and speed, and not depend on unpredictable temperatures or terrain. The choice of stationary machine will depend on your budget, available space at home and disease stage.

8.1.1. Treadmill

A treadmill is the preferred machine for optimizing walking distance. It indicates distance and time, so is effective for noticing your progress. The clear advantage of this machine is that you can choose the speed and slope on a smooth surface with grab bars to prevent falls and a belt with slight impact absorption for fragile joints. To start a session on a treadmill, it is suggested that you start with a low speed that causes no pain. You should try walking for a few minutes or seconds at that speed to gradually increase blood flow to the legs. When pain starts, you should take a 1- or 2-minute break to reduce the pain or make it disappear. Then, you should start walking again and gradually increase until pain occurs, then continue with that discomfort until the mechanics of walking become difficult. You should record the speed at which pain occurs and see whether the speed rises as you exercise regularly. If simply increasing the speed no longer produces discomfort, you should gradually increase the slope². Keep a small notebook so you can record the machine parameters (e.g., speed, slope, etc.) and what you feel. You will then be able to discuss them with your kinesiologist or healthcare professional.

8.1.2. Stationary bike

If just walking a few steps causes sharp pain, a stationary bike may be an interesting alternative and is a less expensive machine than a treadmill. When you sit on the bike, your legs no longer carry your body weight. This makes effort easier. Some people have pain in their legs when walking, but not on a bike. So, that may be a more pleasant way of obtaining very beneficial results. You can spend the first few minutes of an exercise session on the bike, before walking on a treadmill or on the ground. This makes it easier to start walking, since the previous warm-up on the bike has caused the blood vessels to open up, making it easier to walk⁵.

8.1.3. Arm exercise bike

If walking is too painful and a bike is too bulky, an arm exercise bike may be an interesting option. These exercise bikes are now available in many big-box stores or pharmacies. These small exercise bikes can be placed on a table to turn with your arms. Please note that these exercise bikes can also be placed on the floor in front of a chair to pedal with your legs. Pedaling with your arms rarely causes the leg muscle pain that can be felt when walking. However, this type of exercise increases the work of the heart, pumping blood all around the body. Providing additional blood to the blood vessels gives nutrients and oxygen to the muscles throughout the body, even muscles which are not working. In this way, making the arms work can produce improvement in breath and walking distance⁶. If you have chest pain while doing this type of exercise, see a doctor right away. Similarly, do not place the exercise bike too high up on a table, so as not to overload the shoulders. The central axis should be aligned with your eyes.

8.1.4. Additional machines

Elliptical or step machines are also excellent ways of improving symptoms. However, minimum intensity on these machines is often great and even very short sessions can cause pain, which may be less beneficial. These machines are preferential for individuals at a more advanced level or a less severe stage of the disease.





↳ Figure 8 :

A good start to a more active life with the stationary bike



8.2. Follow-up tools

It is important to quantify and monitor your progress with the attending medical team. This category of tools includes pedometers, telephone apps and smart wristwatches/devices.

8.2.1. Pedometer

Essentially, a pedometer is a device which counts every step taken. It is worn at your waist and ranges in price from \$15 to \$40. By using it, you can set a number of steps as a walking goal for yourself. Steps can be taken continuously (during a walk) or be broken up (by moving around multiple times). The pedometer is worn at your waist in line with your foot, on your belt or waistband, as close as possible to the hip bone. To check whether the pedometer is good quality and correctly positioned, it is suggested that you do the 20-step test, which consists of setting the pedometer to zero and simply walking 20 steps. If the result is between 19 and 21, the error is acceptable and the pedometer will yield reliable results. If the error is greater, you need to move the device toward the center or side of your body. To get valuable results with the pedometer, it is preferable to wear it all day long and record the result for the full day. That will become the reference day. Then, you need to set yourself the goal of increasing that number. A realistic goal is to increase the count by 500 to 1,000 additional daily steps above the reference value⁷. Every step counts, whether taken doing daily chores or away from home. The results can be recorded and given to healthcare professionals who will be able to review the results and give advice for optimizing treatment.



8.2.2. Smart devices

Technology now makes it possible to find a device on the phones called an accelerometer which allows the phone to calculate the amplitude of horizontal and vertical movements. Phones can analyze movements when they are being carried. In the health app of the phone, the pedometer function can be activated in order to have feedback on the number of steps. Many phones allow an alarm to be set, which gives the motivation to achieve the targeted daily steps. Pedometers have demonstrated improved motivation for walking in the first few weeks of use. They encourage looking for strategies to increase daily movement. As a result, it is a very good way for starting walking. A large number of people are involved in fitness and many apps are being developed to meet the needs of individuals wanting to improve their physical activity. With an app, you can add walking routes on GPS maps. So far, there do not seem to be any apps intended specifically for individuals with peripheral **artery** disease. Therefore, apps are tools, but they do not replace professional services⁸. However, some apps are being studied and should be on the market soon. Overall, the information available in apps increases motivation, especially in the first few weeks of use⁹.

8.2.3. Devices worn on the wrist

Watches and bracelets are also popular and have the advantage of calculating more data than the phone in your pocket. These devices can notify you if you are being too inactive during the day. For example, you can breaking up periods of inactivity by standing up which sends more blood to the legs. Forcing the heart to pump more blood to the blood vessels helps to keep the **artery** open so that a maximum amount of blood can go through it. Devices worn on the wrist can also provide a fairly accurate heart rate reading, which helps to estimate the intensity of periods of walking¹⁰. This information is valuable if used properly. Do not try to follow the heart rates requested by the software. The targets do not take individuals' health conditions into account. The item to monitor, which may be relevant in the case of

heart rate, is to notice that, with the same amount of effort, your heart rate will get slightly lower with exercise, demonstrating better quality of heart beats. For judging intensity, it is preferable to use perception of effort, rather than monitoring data on a device. Generally, effort should be moderate and intense for short periods during walking, which may need to be stopped due to claudication.



CONCLUSION

Forewarned is forearmed. In order to better understand the disease or the effects of exercise on your condition, there are many websites available in French and English. The Canadian Foundation for Vascular Health (CFVH) and Société des sciences vasculaires du Québec (SSVQ) websites present good information. The observatoireprevention.org/en/ of the Montreal Heart Institute (MHI) and American Heart Association websites are also excellent sources of relevant information about peripheral **artery** disease.

Physical exercise is a crucial component of treatment for peripheral **artery** disease. A variety of strategies should be used to encourage adherence and optimize the effectiveness of this intervention. The number of available tools continues to grow, helping to make exercise easier and more accessible. Try them and find the best fit for you!

REFERENCES

Section 1

1. Morley RL, Sharma A, Horsch AD, Hinchliffe RJ. Peripheral artery disease. BMJ (Clinical research ed) 2018;360:j5842.
2. Shanmugasundaram M, Ram VK, Luft UC, Szerlip M, Alpert JS. Peripheral arterial disease – what do we need to know? Clin Cardiol 2011;34:478-82.

Section 2

1. Overview of Lower Extremity Peripheral Artery Disease. In Uptodate website. Accessed October 30, 2018, www.uptodate.com/contents/overview-of-lower-extremity-peripheral-artery-disease?source=history_widget#H16453406

Section 4

1. Fondation Suisse de Cardiologie, Brochure sur l'Occlusion d'une artère de la jambe - halte au danger insidieux.
2. Revue "Le médecin du Québec", volume 47, numéro 3, mars 2012

Section 5

1. Anderson L, Oldridge N, Thompson DR, et al. Exercise-Based Cardiac Rehabilitation for Coronary Heart Disease: Cochrane Systematic Review and Meta-Analysis. J Am Coll Cardiol. 2016;67(1):1-12.
2. Conn VS. Depressive symptom outcomes of physical activity interventions: meta-analysis findings. Ann Behav Med. 2010 May;39(2):128-38.
3. Ensari I, Greenlee TA, Motl RW, Petruzzello SJ. Meta-analysis of acute exercise effects on state anxiety : An update of randomized control trials over the past 25 years Depress Anxiety. 2015;32(8):624-634.
4. Gerhard-Herman MD, Gornik HL, Barrett C, Barshes NR, Corriere MA, de Souza Moura AM, Lamego MK, Paes F, et al. Effects of Aerobic Exercise on Anxiety Disorders: A Systematic Review. CNS & neurological disorders drug targets. 2015;14(9):1184-1193.
5. Gerhard-Herman MD et al. Treat-Jacobson D, Walsh ME. 2016 AHA/ACC Guideline on the Management of Patients With Lower Extremity Peripheral Artery Disease: A Report of the American College of Cardiology/ American Heart Association Task Force on Clinical Practice Guidelines. J Am Coll Cardiol. 2017 Mar 21;69(11):e71-e126.
6. Glanz K, Kegler M. Processes of Health and Behavior Change. In: Baum A, Revenson T, Singer J, eds. Handbook of Health Psychology, Second Edition. New York, London: Psychology Press - Taylor & Francis Group; 2012.
7. Greenberger D., & Padesky C. (2008). Dépression et anxiété : comprendre et surmonter par l'approche cognitive – un guide pratique. Montréal : Décarie.
8. Lawall H, Huppert P, Espinola-Klein C, Zemmrich CS, Ruemenapf G. German guideline on the diagnosis and treatment of peripheral artery disease – a comprehensive update 2016. Vasa. 2017 Mar;46(2):79-86.
9. Miller WR, Rollnick S. Motivational Interviewing Third Edition: Helping people change. New York, New York: The Guilford Press; 2013.
10. LeBlanc M, Beaulieu-Bonneau S, Mérette C, Savard J, Ivers H, Morin CM.
11. Psychological and health-related quality of life factors associated with insomnia in a population-based sample. J Psychosom Res. 2007 Aug;63(2):157-66
12. Parmenter BJ, Dieberg G, Phipps G, Smart NA. Exercise training for health-related quality of life in peripheral artery disease: a systematic review and meta-analysis. Vasc Med. 2015 Feb;20(1):30-40



13. Treat-Jacobson D, McDermott MM, Bronas UG, Campia U, Collins TC, Criqui MH, Gardner AW, Hiatt WR, Regensteiner JG, Rich K; American Heart Association Council on Peripheral Vascular Disease; Council on Quality of Care and Outcomes Research; and Council on Cardiovascular and Stroke Nursing. Optimal Exercise Programs for Patients With Peripheral Artery Disease: A Scientific Statement From the American Heart Association. *Circulation*. 2019 Jan 22;139(4):e10-e33

Section 6

1. Barraclough K, Bradbury A. Chronic limb threatening ischaemia. *BMJ*. 2018;360:j5460
2. Gerhard-Herman MD, Gornik HL, Barrett C, Barshes NR, Corriere MA, Drachman DE, Fleisher LA, Fowkes FG, Hamburg NM, Kinlay S, Lookstein R, Misra S, Mureebe L, Olin JW, Patel RA, Regensteiner JG, Schanzer A, Shishehbor MH, Stewart KJ, Treat-Jacobson D, Walsh ME. 2016 aha/acc guideline on the management of patients with lower extremity peripheral artery disease: A report of the american college of cardiology/ american heart association task force on clinical practice lines. *Circulation*. 2017;135:e726-e779
3. Meneses AL, Ritti-Dias RM, Parmenter B, Golledge J, Askew CD. Combined lower limb revascularisation and supervised exercise training for patients with peripheral arterial disease: A systematic review of randomised controlled trials. *Sports Med*. 2017;47:987-1002
4. Bonaca MP, Nault P, Giugliano RP, Keech AC, Pineda AL, Kanevsky E, Kuder J, Murphy SA, Jukema JW, Lewis BS, Tokgozoglu L, Somaratne R, Sever PS, Pedersen TR, Sabatine MS. Low-density lipoprotein cholesterol lowering with evolocumab and outcomes in patients with peripheral artery disease: Insights from the fourier trial (further cardiovascular outcomes research with pcsk9 inhibition in subjects with elevated risk). *Circulation*. 2018;137:338-350
5. Strobl FF, Brechtel K, Schmehl J, Zeller T, Reiser MF, Claussen CD, Tepe G. Twelve-month results of a randomized trial comparing mono with dual antiplatelet therapy in endovascularly treated patients with peripheral artery disease. *J Endovasc Ther*. 2013;20:699-706
6. Anand SS, Caron F, Eikelboom JW, Bosch J, Dyal L, Aboyans V, Abola MT, Branch KRH, Keltai K, Bhatt DL, Verhamme P, Fox KAA, Cook-Bruns N, Lanius V, Connolly SJ, Yusuf S. Major adverse limb events and mortality in patients with peripheral artery disease: The compass trial. *J Am Coll Cardiol*. 2018;71:2306-2315
7. Zannad F, Greenberg B, Cleland JG, Gheorghiade M, van Veldhuisen DJ, Mehra MR, Anker SD, Byra WM, Fu M, Mills RM. Rationale and design of a randomized, double-blind, event-driven, multicentre study comparing the efficacy and safety of oral rivaroxaban with placebo for reducing the risk of death, myocardial infarction or stroke in subjects with heart failure and significant coronary artery disease following an exacerbation of heart failure: The commander hf trial. *Eur J Heart Fail*. 2015;17:735-742
8. Aboyans V, Ricco JB, Bartelink MEL, Bjorck M, Brodmann M, Cohnert T, Collet JP, Czerny M, De Carlo M, Debus S, Espinola-Klein C, Kahan T, Kownator S, Mazzolai L, Naylor AR, Roffi M, Rother J, Sprynger M, Tendera M, Tepe G, Venermo M, Vlachopoulos C, Desormais I, Group ESCSD. 2017 esc guidelines on the diagnosis and treatment of peripheral arterial diseases, in collaboration with the european society for vascular surgery (esvs): Document covering atherosclerotic disease of extracranial carotid and vertebral, mesenteric, renal, upper and lower extremity arteries endorsed by: The european stroke organization (eso) the task force for the diagnosis and treatment of peripheral arterial diseases of the european society of cardiology (esc) and of the european society for vascular surgery (esvs). *Eur Heart J*. 2018;39:763-816
9. Hussain MA, Wheatcroft M, Nault P, Lindsay TF, Bhatt DL, Anand SS, Verma S, and Al-Omran M. COMPASS for Vascular Surgeons: Practical Considerations. *Curr Opin Cardiol*. 2019 Mar;34(2):178-184.



Section 7

1. Adams J, Ogola G, Stafford P, Koutras P, Hartman J. High-intensity interval training for intermittent claudication in a vascular rehabilitation program. *J Vasc Nurs* 24: 46–49, 2006.
2. Brass EP. Skeletal muscle metabolism as a target for drug therapy in peripheral arterial disease. *Vasc Med* 1: 55–59, 1996.
3. Bronas UG, Treat-Jacobson D, Leon AS. Comparison of the effect of upper body-ergometry aerobic training vs treadmill training on central cardiorespiratory improvement and walking distance in patients with claudication. *J Vasc Surg* 53: 1557–1564, 2011.
4. Ernst EE, Matrai A. Intermittent claudication, exercise, and blood rheology. *Circulation* 76: 1110–1114, 1987.
5. Gardner AW, Skinner JS, Vaughan NR, Bryant CX, Smith LK. Comparison of treadmill walking and stair climbing over a range of exercise intensities in peripheral vascular occlusive disease. *Angiology* 44: 353–360, 1993.
6. Gerhard-Herman MD, Gornik HL, Barrett C, Barshes NR, Corriere MA, Drachman DE, Fleisher LA, Fowkes FGR, Hamburg NM, Kinlay S, Lookstein R, Misra S, Mureebe L, Olin JW, Patel RAG, Regensteiner JG, Schanzer A, Shishehbor MH, Stewart KJ, Treat-Jacobson D, Walsh ME. 2016 AHA/ACC Guideline on the Management of Patients With Lower Extremity Peripheral Artery Disease: 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: e71–e126, 2017.
7. Hiatt WR, Regensteiner JG, Wolfel EE, Carry MR, Brass EP. Effect of exercise training on skeletal muscle histology and metabolism in peripheral arterial disease. *J Appl Physiol* (1985) 81: 780–788, 1996.
8. Iso Y, Suzuki H, Kyuno E, Maeda A, Tsunoda F, Miyazawa R, Kowaita H, Kitai H, Takahashi T, Sambe T. Therapeutic potential of cycling high-intensity interval training in patients with peripheral artery disease: A pilot study. *Int J Cardiol Heart Vasc* 18: 30–32, 2018.
9. MacInnis MJ, Gibala MJ. Physiological adaptations to interval training and the role of exercise intensity. *The Journal of Physiology* (December 7, 2016). doi: 10.1113/JP273196.
10. Parmenter BJ, Dieberg G, Smart NA. Exercise training for management of peripheral arterial disease: a systematic review and meta-analysis. *Sports Med* 45: 231–244, 2015.
11. Pennywell DJ, Tan T-W, Zhang WW. Optimal management of infrainguinal arterial occlusive disease. *Vasc Health Risk Manag* 10: 599–608, 2014.
12. Prior BM, Ren J, Terjung RL, Yang HT. Significant, but limited collateral blood flow increases occur with prolonged training in rats with femoral artery occlusion. *J Physiol Pharmacol* 62: 197–205, 2011.
13. Riebe D, K Ehrman J, Liguori G, Magal M. ACSM's *Guidelines for Exercise Testing and Prescription*. 10 ed. Philadelphia: Wolters Kluwer, 2017.
14. Sanderson B, Askew C, Stewart I, Walker P, Gibbs H, Green S. Short-term effects of cycle and treadmill training on exercise tolerance in peripheral arterial disease. *J Vasc Surg* 44: 119–127, 2006.
15. Tew G, Nawaz S, Zwierska I, Saxton JM. Limb-specific and cross-transfer effects of arm-crank exercise training in patients with symptomatic peripheral arterial disease. *Clin Sci* 117: 405–413, 2009.
16. Treat-Jacobson D, Bronas UG, Leon AS. Efficacy of arm-ergometry versus treadmill exercise training to improve walking distance in patients with claudication. *Vasc Med* 14: 203–213, 2009.
17. Treesak C, Kasemsup V, Treat-Jacobson D, Nyman JA, Hirsch AT. Cost-effectiveness of exercise training to improve claudication symptoms in patients with peripheral arterial disease. *Vasc Med* 9: 279–285, 2004.



18. Villemur B, Marquer A, Gailledrat E, Benetreau C, Bucci B, Evra V, Rabeau V, De Angelis M-P, Bouchet J-Y, Carpentier P, Perennou D. New rehabilitation program for intermittent claudication: Interval training with active recovery: pilot study. *Ann Phys Rehabil Med* 54: 275–281, 2011.
19. Zwierska I, Walker RD, Choksy SA, Male JS, Pockley AG, Saxton JM. Upper- vs lower-limb aerobic exercise rehabilitation in patients with symptomatic peripheral arterial disease: a randomized controlled trial. *J Vasc Surg* 42: 1122–1130, 2005.
20. Zwierska I, Walker RD, Choksy SA, Male JS, Pockley AG, Saxton JM. Relative tolerance to upper- and lower-limb aerobic exercise in patients with peripheral arterial disease. *Eur J Vasc Endovasc Surg* 31: 157–163, 2006.

Section 8

1. McDermott MM. Lower extremity manifestations of peripheral artery disease: the pathophysiologic and functional implications of leg ischemia. *Circ Res*. 2015;116:1540-50.
2. Lauret GJ, Fakhry F, Fokkenrood HJ, Hunink MG, Teijink JA and Spronk S. Modes of exercise training for intermittent claudication. *Cochrane Database Syst Rev*. 2014:CD009638.
3. Gerhard-Herman MD, Gornik HL, Barrett C, Barshes NR, Corriere MA, Drachman DE, Fleisher LA, Fowkes FG, Hamburg NM, Kinlay S, Lookstein R, Misra S, Mureebe L, Olin JW, Patel RA, Regensteiner JG, Schanzer A, Shishehbor MH, Stewart KJ, Treat-Jacobson D and Walsh ME. 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. *J Am Coll Cardiol*. 2017;69:1465-1508.
4. Gardner AW, Parker DE, Montgomery PS, Scott KJ and Blevins SM. Efficacy of quantified home-based exercise and supervised exercise in patients with intermittent claudication: a randomized controlled trial. *Circulation*. 2011;123:491-8.
5. Sanderson B, Askew C, Stewart I, Walker P, Gibbs H and Green S. Short-term effects of cycle and treadmill training on exercise tolerance in peripheral arterial disease. *J Vasc Surg*. 2006;44:119-27.
6. Zwierska I, Walker RD, Choksy SA, Male JS, Pockley AG and Saxton JM. Upper- vs lower-limb aerobic exercise rehabilitation in patients with symptomatic peripheral arterial disease: a randomized controlled trial. *J Vasc Surg*. 2005;42:1122-30.
7. Mankowski RT, Anton SD, Axtell R, Chen SH, Fielding RA, Glynn NW, Hsu FC, King AC, Layne AS, Leeuwenburgh C, Manini TM, Marsh AP, Pahor M, Tudor-Locke C, Conroy DE, Buford TW and Group LR. Device-Measured Physical Activity As a Predictor of Disability in Mobility-Limited Older Adults. *J Am Geriatr Soc*. 2017;65:2251-2256.
8. McDermott MM, Spring B and Treat-Jacobson D. Use of a Wearable Activity Monitor in a Home-Based Exercise Intervention for Peripheral Artery Disease-Reply. *JAMA*. 2018;320:1286.
9. Gal R, May AM, van Overmeeren EJ, Simons M and Monninkhof EM. The Effect of Physical Activity Interventions Comprising Wearables and Smartphone Applications on Physical Activity: a Systematic Review and Meta-analysis. *Sports Med Open*. 2018;4:42.
10. Xie J, Wen D, Liang L, Jia Y, Gao L and Lei J. Evaluating the Validity of Current Mainstream Wearable Devices in Fitness Tracking Under Various Physical Activities: Comparative Study. *JMIR Mhealth Uhealth*. 2018;6:e94.



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Kate Runacres, Program Coordinator, CPD Accreditation Unit of the Royal College of Physicians and Surgeons of Canada has confirmed the following information. This activity is eligible for credit in the Maintenance of Certification (MOC) Program under Section 2: Personal Learning Project (PLP) for 2 credits per hour. In order to claim credit, you must record the activity in your MAINPORT ePortfolio and complete all the required fields, including at least one (1) learning outcome.

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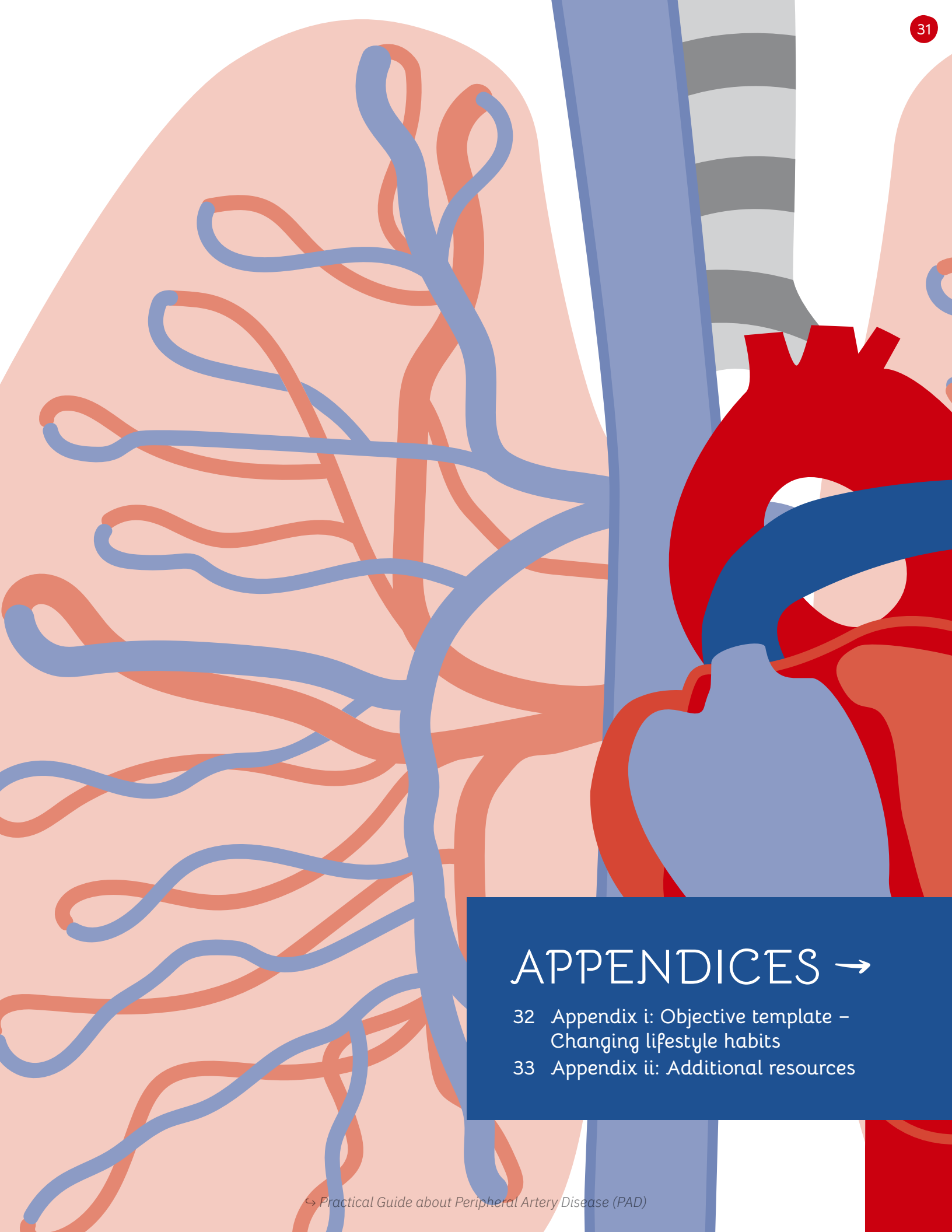
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APPENDICES →

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APPENDIX i

Objective template – Changing lifestyle habits

My short-term objectives

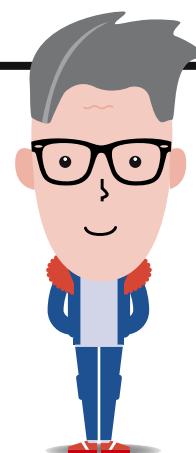
Activity	Objectives	Achieved?
Walking excursions	Alternate 1 minute of walking with 1 minute of rest	✓
1) 2) 3)		

My medium-term objectives

Activity	Objectives	Achieved?
Exercise program	To be fit enough to play in the park with my children or grandchildren	✓
1) 2) 3)		

My long-term objectives

Activity	Objectives	Achieved?
Program of physical activity combined with a healthy diet	Controlling and maintaining my healthy weight	✓
1) 2) 3)		



APPENDIX ii

Additional resources

For examples of relaxation techniques:

- www.aide.ulaval.ca/apprentissage-et-reussite/textes-et-outils/stress-et-anxiete-scolaire/la-relaxation/
- www.passeportsante.net/fr/audiovideobalado/balado.aspx

To find a psychologist offering services in your region:

- Ordre des psychologues du Québec referral service: 1-800-561-1223 or www.ordrepsy.qc.ca/trouver-de-aide

For more information about stress and how to manage it:

- Lupien S. (2010). *Par Amour du Stress*. Montreal: Les Éditions Au Carré.

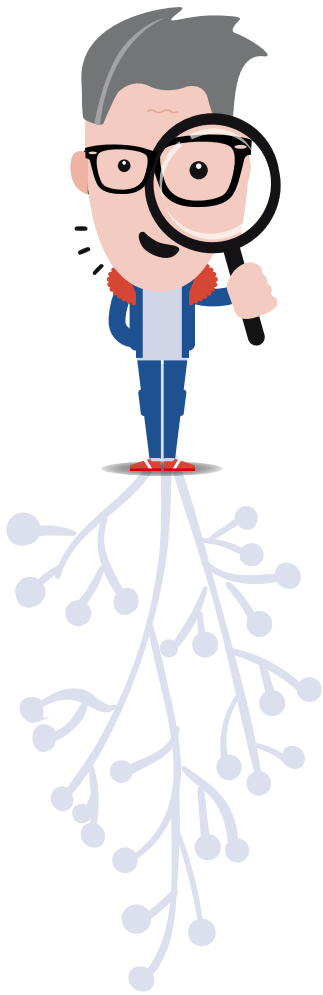
For tools for better managing anxiety and depression:

- Greenberger D., & Padesky C. (2008). *Dépression et anxiété : comprendre et surmonter par l'approche cognitive – un guide pratique*. Montreal: Décarie.

For more information about difficulty sleeping and how to handle it:

- Morin C. (2009) *Vaincre les ennemis du sommeil*. Montreal: Les Éditions de l'Homme





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NOTES

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rehabilitation of the CFVH, make an online donation to
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