

Postural Orthostatic Tachycardia Syndrome (POTS) Introduction & Exercise Guide

A Restoration Healthcare guide to understanding POTS, identifying and treating POTS' underlying causes, lifestyle recommendations for POTS patients, and recommended exercises for POTS patients



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Postural Orthostatic Tachycardia Syndrome (POTS) Diagnosis and Exercise Guide

Introduction

Millions of Americans suffer from repeated bouts of lightheadedness (sometimes fainting), brain fog (difficulty thinking and concentrating), fatigue, exercise intolerance, headache, blurred vision, heart palpitations, tremor, and nausea. Many are told they have been diagnosed with anxiety, depression, or chronic fatigue syndrome. The usual lab tests don't reveal anything abnormal, so doctors assume the problem must be in the patient's head – a psychiatric issue, not a physical medical condition.

What could be more demeaning and discouraging than the suggestion that your illness is “all in your head?”

You're certain that your symptoms are caused by a physical illness, but nobody with medical credentials will take your concerns seriously. Lacking the knowledge to test for and treat the underlying medical condition, they fall back on what they do know how to do – chase symptoms, usually with medications. At best, some symptoms are alleviated, but usually the patient gets little relief, and their health deteriorates, in part due to medication side effects. If you have the symptoms described above, we encourage you to obtain a thorough medical evaluation at a functional medical clinic to identify and treat the underlying causes. Your symptoms may be caused by anything from a tick bite (Lyme disease) or other hidden infection, to exposure to toxic mold, to any of a dozen or more other conditions.

One possibility is *postural orthostatic tachycardia syndrome (POTS)*, which is the topic of this Restoration Healthcare guide. (However, keep this in mind: We strongly caution against jumping to conclusions. Nobody can determine the cause of symptoms just by looking at the symptoms. A thorough examination is necessary. And that includes a physical exam, a careful analysis of your medical and family history, and results from relevant lab tests.)

What is POTS?

POTS is a blood circulation disorder related to a dysfunction of the *autonomic nervous system (ANS)* – the part of your nervous system that regulates vital bodily functions, such as heartbeat, blood pressure, and digestion.

Normally, when you stand up from a lying position, your ANS automatically adjusts blood flow to maintain circulation throughout your body – upper and lower body. With POTS, that doesn't happen. Too little blood returns to the heart, resulting in poor circulation through the upper body.

The classic symptoms of POTS are lightheadedness and fainting and an uncomfortable rapid increase in heartbeat (an increase of 30 beats per minute or more) within 10 minutes of standing up. Symptoms are relieved by sitting or lying back down.

Risk Factors


POTS can affect people of all genders and age groups but is most common among women in their teens through 50s. Initial onset is often after a pregnancy, major surgery, trauma, or an infection. Other factors and pre-existing conditions that may increase the likelihood of developing POTS include:

- ▶ Diabetes
- ▶ Amyloidosis
- ▶ Sarcoidosis
- ▶ Alcoholism
- ▶ Lupus
- ▶ Sjogren syndrome
- ▶ Chemotherapy
- ▶ Heavy metal poisoning
- ▶ Exposure to environmental toxins, such as toxic mold

Diagnosis

The doctors and staff here at [Restoration Healthcare](#) have a great deal of experience with POTS. We can diagnose the condition with a noninvasive test that takes about 20 minutes. It features sophisticated computer software that processes and analyzes data gathered from probes attached to your body. Based on the results of this test and others (if needed), we can determine an accurate diagnosis and develop an effective treatment plan. Most people's

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POTS symptoms respond well to a combination of dietary changes and proper exercise. Identifying and treating the underlying cause is more important and is the bigger challenge. We often see patients who develop POTS after an infection caused by a tick bite. In addition to POTS, they may have Lyme disease, human granulocytic anaplasmosis (HGA), or babesiosis – all borne by the same family of tick. So, patients with POTS need a practitioner who’s experienced in diagnosing and treating not only POTS but also any and all underlying conditions.

We approach the search for a diagnosis much as a detective goes about seeking clues to a crime – by examining all possible factors that may be causing or contributing to the condition. Call us scientific snoops – we don’t stop until we uncover and treat all the root causes of an illness and get you back to feeling like yourself again.

Treatment & Lifestyle Considerations

In addition to diagnosing and treating the root causes of POTS, changes to diet and exercise are often helpful. We identify any foods or substances consumed on a regular basis that could be causing or aggravating the condition. Certain foods, such as those containing gluten or dairy, can trigger autoimmune reactions in people who are sensitive to those foods, so eliminating them from your diet may be an essential part of your treatment protocol. Caffeine and alcohol can also exacerbate symptoms.

Included in our POTS treatment protocol are lifestyle recommendations personalized to your POTS subtype and how you respond to certain changes. Speak with your Restoration Healthcare doctor before making any changes to your treatment plan. Lifestyle adaptations may include one or more of the following:

- ▶ **Fluids and Salt:** Increase your fluid and salt intake to increase your blood volume.
- ▶ **Smaller Meals:** Eat small meals throughout the day instead of just two or three large meals.
- ▶ **Simple Carbs:** Reduce consumption of simple carbs (sugar and refined flour) and increase consumption of healthy protein.
- ▶ **When Sleeping:** Elevate your head when sleeping.
- ▶ **Clothing:** Use compression garments, such as support hose and abdominal binders, to reduce peripheral pooling.
- ▶ **Counter Maneuvers:** Use counter maneuvers, such as tensing your leg muscles or crossing your legs when standing.
- ▶ **Daily Routines:** Develop daily routines to improve sleep, reduce your activity load, and plan activities for the times of day you feel best.

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- ▶ **When Waking Up:** Drink a large glass of water soon after getting up in the morning and get up in stages – from lying to sitting to standing.
- ▶ **Standing:** Avoid prolonged standing.
- ▶ **Showering:** Try showering just before bed, use a shower chair, and try lukewarm instead of hot or cold water. Avoid putting your hands above your head when washing your hair – instead, bend over as if you’re washing your hair in the sink.
- ▶ **Driving:** Get a disability plate or placard for your car. A mobility scooter or wheelchair may also be helpful.
- ▶ **Maintain an even temperature:** Air conditioning, cold packs, body cooling vests, sun shirts, personal fans/misters, hats, quick-drying clothing and sheets, and dressing in layers can all be effective.
- ▶ **Be Prepared:** Keep a bag packed with all your equipment and supplies, so you don’t wear yourself out looking for items when you’re getting ready to leave your house or apartment.

The right exercise can also be highly effective. Due to fatigue, POTS patients often have a low tolerance for exercise, so starting with light exercise while sitting or lying down and working up gradually to more intense exercise in an upright position is the best approach for most patients with POTS.

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POTS Exercise Program

The POTS exercise program we recommend is designed to build strength and endurance gradually over eight months. It provides all the guidance you need, including the following:

- ▶ Exercises to build strength
- ▶ Cardio exercises to build endurance
- ▶ Eight monthly training calendars (you can progress at your own rate or follow the calendars)
- ▶ Heart rate zones to motivate you without overdoing it

What you bring to the program is equally important – a 100 percent commitment to persist – even when the going gets tough. Access to a variety of gym equipment is beneficial but not essential. Having a personal trainer, physical therapist, family member, or friend supervise your progress is also helpful.

Note: We are available for questions or concerns, but if you have a sudden change in symptoms, contact your primary care provider first. They can assess whether you need emergency treatment or an office visit and whether the issue can be handled over the phone, through their office, or by calling us.

Getting Started – What to Expect

This program is not an easy fix for POTS. You won't experience a notable difference in a matter of days or even a few weeks. Most people start to notice results only after several months of training. The first month is often the most difficult because 1) you're making a significant lifestyle change and 2) you're likely to experience increased fatigue. *Push through it!* The second month may still be tough. *Don't give up!*

By the third month, you may start to feel less fatigue, begin to sleep better, and experience fewer or less intense symptoms in your daily life. Continue through the eight-month program and beyond, making exercise part of your weekly routine.

Here are a few tips that will help you stay committed:

- ▶ Make a firm commitment to stick with the program for at least three to five months. The benefits are often just one small step beyond where less committed individuals give up.
- ▶ Listen to your body. When you begin training or a new phase of training, increased fatigue is common. Stay the course. Repeat a prior week's training schedule if you feel the need to. Push forward when you can.

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- ▶ Write down a list of what you want to resume in your life, tape it to your bathroom mirror, and read it every day, especially on days you don't feel like exercising. Your list will help motivate you to get your quality of life back.
- ▶ Get a workout buddy if you think you'll like that. They can't follow your heartrate zones (presented later in this guide), but they can work out with you!
- ▶ Get your family on board. Help them understand that you may feel *more* tired in the beginning, but you're focused on the long-term benefits. (Note that while family support can help, *you* are the one making the commitment.)

Note: Exercise in heat is not recommended for patients with POTS.

Warmups, Cool Downs, and Training Modes

The calendars in the following section reference warmups, cooldowns, and different training modes:

- ▶ Warmups and cooldowns can be done on any exercise equipment and should *never* be skipped.
- ▶ Warm up very gradually, starting with little to no resistance, until your heart rate approaches the target range for your workout.
- ▶ Adhere to the prescribed cardio training mode:
 - ▶ **Training Mode 1:** Supine cycling, recumbent biking, swimming laps (starting with a kickboard, no arm strokes), rowing, or seated stepper
 - ▶ **Training Mode 2:** Upright bike
 - ▶ **Training Mode 3:** Treadmill walking (flat grade) or elliptical (stationary arms)
 - ▶ **Training Mode 4:** Treadmill walking (incline), elliptical (with use of arms), jogging if able
- ▶ Cool down very gradually by slowing down and reducing or eliminating any resistance.
- ▶ After your cooldown, stretch. Instructions for some effective stretches are presented later in this guide.

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The Eight-Month Training Program

Our training program is broken down into eight months. Where you begin depends on your current condition. If the exercises recommended in the first months' calendars in the series seem too easy, feel free to skip ahead. However, don't push yourself so hard and so fast that you end up quitting. The purpose of the calendars is to help you maintain a pace of progress that's doable.

The program gets progressively more difficult. Here's the overall approach:


- ▶ **Months 1-3:** Exercise only lying down or seated; for example, using a recumbent bike or a rowing ergometer, swimming laps (starting with kicking laps with a kickboard), or using a seated stepper machine
- ▶ **Month 4:** You can transition to exercising in the upright position; for example, riding an upright exercise bike
- ▶ **Month 5:** Increase your upright training at your own pace; for example, using an elliptical (without arm motion for the first few weeks) or walking on a treadmill (without incline at first)
- ▶ **Months 6-8:** Continue to increase your upright training; for example, add arm motion to your elliptical or an incline to your treadmill. If neither of those worsens your symptoms, you can try jogging or stair stepping. (Jogging is optional, never required.) Week 6 also marks the introduction of high-intensity interval training for some patients – a topic we cover later in the section "Long-Term and High-Intensity Cardio."

Follow the weekly training sessions. You can move sessions around but complete all sessions recommended for the week before moving forward to the next week.

The day after a Maximal Steady State (MSS) workout, be sure to complete a Recovery workout the next day. A Recovery workout involves any activity that gets you moving continuously for the prescribed time, during which you keep your heart rate below the zone prescribed. Examples of Recovery workouts include:

- ▶ Slow cycling on a recumbent bike
- ▶ Leisurely kick laps in a pool using a kickboard
- ▶ Taking a walk outdoors
- ▶ Playing in the yard

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If you miss a period of workouts (illness, injury, etc.), go back in the calendar to repeat workout sessions as follows:

- ▶ If you miss more than two cardio workouts in a week, repeat the entire week.
- ▶ If you miss a week, repeat the previous week's sessions.
- ▶ If you miss more than two weeks in a given month, return at least to the beginning of the previous month. If the exercises are too hard, back up even further. You may also need to return to horizontal modes of training before moving ahead again to vertical modes.

When you take time off, you lose some of your hard-earned conditioning. Repeating exercises from a previous week or month gets you back on track. Here are a few additional tips:

- ▶ Starting slow with exercises performed while sitting or lying down is key.
- ▶ Doing strength training and cardio on alternating days is best, but it's OK to combine a strength and cardio session on one day and take the next day off.
- ▶ Rowing is great for strengthening your heart muscle! Rowing with the rowing ergometer is preferred because it mimics open-water rowing. People who row in the open water tend to have the largest, strongest hearts of all competitive athletes.
- ▶ Keep the workouts spread out across the entire week. This is more beneficial than bunching them up, then taking several days off from exercising.
- ▶ Don't take more than two consecutive days off from exercising.
- ▶ Keep an exercise log to create a record of your sessions, your progress, and how you feel.

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BP = Base Pace
 MSS = Maximal Steady State
 RP = Race Pace
 Recovery = Slowing down, reducing resistance, or taking a drink without totally stopping

Note: If you're taking a beta blocker (such as Metoprolol or Nebivolol), use the following Rating of continued Perceived Exertion (RPE) Scale instead of the Heart Rate Scale:
 0-2 = Very easy 7-8 = Very difficult
 3-4 = Easy 9-10 = As difficult as it gets
 5-6 = A little difficult

MONTH 1						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	Training Mode — 1 — 5-10 min warmup 3 min BP 2 min recovery 3 min BP 5-10 min cooldown	Strength Training	Training Mode — 1 — 5-10 min warmup 3 min BP 2 min recovery 3 min BP 5-10 min cooldown	Strength Training	Training Mode — 1 — 5-10 min warmup 3 min BP 2 min recovery 3 min BP 5-10 min cooldown	
	Training Mode — 1 — 5-10 min warmup 4 min BP 3 min recovery 4 min BP 5-10 min cooldown	Strength Training	Training Mode — 1 — 5-10 min warmup 4 min BP 3 min recovery 4 min BP 5-10 min cooldown	Strength Training	Training Mode — 1 — 5-10 min warmup 4 min BP 3 min recovery 4 min BP 5-10 min cooldown	
	Training Mode — 1 — 5-10 min warmup 5 min BP 3 min recovery 5 min BP 5-10 min cooldown	Strength Training	Training Mode — 1 — 5-10 min warmup 5 min BP 3 min recovery 5 min BP 5-10 min cooldown	Strength Training	Training Mode — 1 — 5-10 min warmup 5 min BP 3 min recovery 5 min BP 5-10 min cooldown	
	Training Mode — 1 — 5-10 min warmup 6 min BP 3 min recovery 5 min BP 5-10 min cooldown	Strength Training	Training Mode — 1 — 5-10 min warmup 7 min BP 3 min recovery 5 min BP 5-10 min cooldown	Strength Training	Training Mode — 1 — 5-10 min warmup 7 min BP 3 min recovery 5 min BP 5-10 min cooldown	

BP = Base Pace
MSS = Maximal Steady State
RP = Race Pace
Recovery = Slowing down, reducing resistance, or taking a drink without totally stopping

Note: If you're taking a beta blocker (such as Metoprolol or Nebivolol), use the following Rating of continued Perceived Exertion (RPE) Scale instead of the Heart Rate Scale:
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3-4 = Easy 9-10 = As difficult as it gets
5-6 = A little difficult

MONTH 2						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	Training Mode — 1 — 10 min warmup 6 min BP 2 min recovery 6 min BP 2 min recovery 6 min BP 10 min cooldown	Strength Training	Training Mode — 1 — 10 min warmup 7 min BP 2 min recovery 7 min BP 2 min recovery 7 min BP 10 min cooldown	Strength Training	Training Mode — 1 — 10 min warmup 8 min BP 2 min recovery 8 min BP 2 min recovery 8 min BP 10 min cooldown	
	Training Mode — 1 — 10 min warmup 6 min BP 2 min recovery 6 min BP 2 min recovery 6 min BP 10 min cooldown	Strength Training	Training Mode — 1 — 10 min warmup 5 min BP 2 min recovery 5 min BP 2 min recovery 5 min BP 10 min cooldown	Strength Training	Training Mode — 1 — 10 min warmup 5 min BP 2 min recovery 5 min BP 2 min recovery 5 min BP 10 min cooldown	
	Training Mode — 1 — 10 min warmup 10 min BP 3 min recovery 10 min BP 10 min cooldown	Strength Training	Training Mode — 1 — 10 min warmup 11 min BP 3 min recovery 11 min BP 10 min cooldown	Strength Training	Training Mode — 1 — 10 min warmup 12 min BP 3 min recovery 13 min BP 10 min cooldown	
	Training Mode — 1 — 10 min warmup 13 min BP 3 min recovery 13 min BP 10 min cooldown	Strength Training	Training Mode — 1 — 10 min warmup 14 min BP 3 min recovery 14 min BP 10 min cooldown	Strength Training	Training Mode — 1 — 10 min warmup 15 min BP 3 min recovery 15 min BP 10 min cooldown	
	Training Mode — 1 — 10 min warmup 20 min BP 10 min cooldown	Strength Training	Training Mode — 1 — 10 min warmup 24 min BP 10 min cooldown	Strength Training	Training Mode — 1 — 10 min warmup 28 min BP 10 min cooldown	

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MSS = Maximal Steady State
RP = Race Pace
Recovery = Slowing down, reducing resistance, or taking a drink without totally stopping

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0-2 = Very easy 7-8 = Very difficult
3-4 = Easy 9-10 = As difficult as it gets
5-6 = A little difficult

MONTH 3						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	Training Mode — 1 — 10 min warmup 30 min BP 10 min cooldown	Strength Training	Training Mode — 1 — 10 min warmup 30 min BP 10 min cooldown	Strength Training	Training Mode — 1 — 10 min warmup 30 min BP 10 min cooldown	
	Training Mode — 1 — 10 min warmup 30 min BP 10 min cooldown	Strength Training	Training Mode — 1 — 10 min warmup 30 min BP 10 min cooldown	Strength Training	Training Mode — 1 — 10 min warmup 20 min BP 10 min cooldown	Training Mode — 1 — 40 min recovery
	Training Mode — 1 — 10 min warmup 30 min BP 10 min cooldown	Strength Training	Training Mode — 1 — 10 min warmup 30 min BP 10 min cooldown	Strength Training	Training Mode — 1 — 10 min warmup 30 min BP 10 min cooldown	
	Training Mode — 1 — 10 min warmup 30 min BP 10 min cooldown	Strength Training	Training Mode — 1 — 10 min warmup 25 min MSS 10 min cooldown	Training Mode 1 40 min recovery	Strength Training	Training Mode — 1 — 10 min warmup 30 min BP 10 min cooldown

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RP = Race Pace
Recovery = Slowing down, reducing resistance, or taking a drink without totally stopping

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3-4 = Easy 9-10 = As difficult as it gets
5-6 = A little difficult

MONTH 4						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	Training Mode – 1 – 10 min warmup 30 min BP 10 min cooldown	Strength Training	Training Mode – 2 – 10 min warmup 20 min BP 10 min cooldown	Strength Training	Training Mode – 2 – 10 min warmup 20 min BP 10 min cooldown	
Training Mode – 1 or 2 – 10 min warmup 30 min BP 10 min cooldown	Strength Training	Training Mode – 2 – 10 min warmup 30 min BP 10 min cooldown	Strength Training	Training Mode – 1 or 2 – 10 min warmup 25 min MSS 10 min cooldown	Training Mode – 1 – 40 min recovery	
Training Mode – 1 or 2 – 10 min warmup 30 min BP 10 min cooldown	Strength Training		Training Mode – 1 or 2 – 10 min warmup 30 min BP 10 min cooldown	Training Mode – 1 – 40 min recovery	Strength Training	Training Mode – 1 or 2 – 10 min warmup 35 min BP 10 min cooldown
	Strength Training	Training Mode – 1 or 2 – 10 min warmup 35 min MSS 10 min cooldown	Training Mode – 1 – 40 min recovery	Training Mode – 2 or 3 – 10 min warmup 30 min BP 10 min cooldown	Strength Training	Training Mode – 1 or 2 – 10 min warmup 40 min BP 10 min cooldown

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 Recovery = Slowing down, reducing resistance, or taking a drink without totally stopping

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 0-2 = Very easy 7-8 = Very difficult
 3-4 = Easy 9-10 = As difficult as it gets
 5-6 = A little difficult

MONTH 5						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	Training Mode – 2 or 3 – 10 min warmup 35 min BP 10 min cooldown	Strength Training	Training Mode – 2 or 3 – 10 min warmup 35 min BP 10 min cooldown	Strength Training	Training Mode – 2 or 3 – 10 min warmup 35 min BP 10 min cooldown	
	Training Mode – 2 or 3 – 10 min warmup 40 min BP 10 min cooldown	Strength Training	Training Mode – 3 – 10 min warmup 3 min MSSP 10 min cooldown	Training Mode – 2 or 3 – 40 min recovery Strength Training	Training Mode – 2 or 3 – 10 min warmup 35 min BP 10 min cooldown	
	Training Mode – 2 or 3 – 10 min warmup 60 min BP 10 min cooldown	Strength Training	Training Mode – 2 or 3 – 10 min warmup 3 min BP 10 min cooldown	Training Mode – 3 – 10 min warmup 35 min MSS 10 min cooldown	Training Mode – 2 or 3 – 25 min recovery Strength Training	Training Mode – 2 or 3 – 10 min warmup 50 min MSS 10 min cooldown
	Training Mode – 3 – 10 min warmup 35 min BP 10 min cooldown	Strength Training	Training Mode – 2 or 3 – 10 min warmup 45 min BP 10 min cooldown	Training Mode – 3 – 10 min warmup 40 min MSS 10 min cooldown	Training Mode – 2 or 3 – 25 min recovery Strength Training	

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 3-4 = Easy 9-10 = As difficult as it gets
 5-6 = A little difficult

MONTH 6						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Training Mode — 1 - 4 — 10 min warmup 45 min BP 10 min cooldown	Strength Training	Training Mode — 1 - 4 — 10 min warmup 40 min BP 10 min cooldown	Training Mode — 1 - 4 — 10 min warmup 60 min BP 10 min cooldown	Strength Training	Training Mode — 1 - 4 — 10 min warmup 45 min BP 10 min cooldown	
Strength Training	Training Mode — 1 - 4 — 10 min warmup 30 min BP 10 min cooldown	Training Mode — 1 - 4 — 10 min warmup 3x 1 min intervals 10 min cooldown 20 min recovery	Training Mode — 1 - 4 — 10 min warmup 45 min BP 10 min cooldown	Strength Training	Training Mode — 1 - 4 — 10 min warmup 30 min BP 10 min cooldown	
Strength Training	Training Mode — 1 - 4 — 10 min warmup 35 min BP 10 min cooldown	Training Mode — 1 - 4 — 10 min warmup 35 min MSS 10 min cooldown	Strength Training	Training Mode — 1 - 4 — 10 min warmup 4x 1 min intervals 10 min cooldown 20 min recovery	Training Mode — 1 - 4 — 10 min warmup 40 min BP 10 min cooldown	Training Mode — 1 - 4 — 25 min recovery
Training Mode — 1 - 4 — 10 min warmup 60 min BP 10 min cooldown	Strength Training	Training Mode — 1 - 4 — 10 min warmup 5x 1 min intervals 10 min cooldown 20 min recovery	Training Mode — 1 - 4 — 10 min warmup 45 min BP 10 min cooldown	Strength Training	Training Mode — 1 - 4 — 10 min warmup 30 min BP 10 min cooldown	Training Mode — 1 - 4 — 10 min warmup 30 min MSS 10 min cooldown

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Recovery = Slowing down, reducing resistance, or taking a drink without totally stopping

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5-6 = A little difficult

MONTH 7						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	Training Mode — 1 - 4 — 10 min warmup 60 min BP 10 min cooldown	Strength Training	Training Mode — 1 - 4 — 10 min warmup 45min BP 10 min cooldown	Training Mode — 1 - 4 — 10 min warmup 45 min BP 10 min cooldown	Strength Training	
Strength Training	Training Mode — 1 - 4 — 10 min warmup 5x 2 min intervals 10 min cooldown 20 min recovery	Training Mode — 1 - 4 — 10 min warmup 45 min BP 10 min cooldown	Training Mode — 1 - 4 — 10 min warmup 40 min BP 10 min cooldown	Strength Training	Training Mode — 1 - 4 — 10 min warmup 40 min MSSP 10 min cooldown	
Training Mode — 1 - 4 — 10 min warmup 60 min BP 10 min cooldown	Strength Training	Training Mode — 1 - 4 — 10 min warmup 5x 2 min intervals 10 min cooldown 20 min recovery	Training Mode — 1 - 4 — 10 min warmup 45 min BP 10 min cooldown	Training Mode — 1 - 4 — 10 min warmup 5x 2 min intervals 10 min cooldown 20 min recovery	Strength Training	Training Mode — 1 - 4 — 10 min warmup 40 min MSS 10 min cooldown
Training Mode — 1 - 4 — 10 min warmup 60 min BP 10 min cooldown	Strength Training	Training Mode — 1 - 4 — 10 min warmup 40 min MSS 10 min cooldown	Training Mode — 1 - 4 — 10 min warmup 45 min BP 10 min cooldown	Training Mode — 1 - 4 — 10 min warmup 5x 2 min intervals 10 min cooldown 20 min recovery	Strength Training	Training Mode — 1 - 4 — 10 min warmup 60 min BP 10 min cooldown

BP = Base Pace
MSS = Maximal Steady State
RP = Race Pace
Recovery = Slowing down, reducing resistance, or taking a drink without totally stopping

Note: If you're taking a beta blocker (such as Metoprolol or Nebivolol), use the following Rating of continued Perceived Exertion (RPE) Scale instead of the Heart Rate Scale:
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5-6 = A little difficult

MONTH 8						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Strength Training	Training Mode — 1 - 4 — 10 min warmup 45 min BP 10 min cooldown	Training Mode — 1 - 4 — 10 min warmup 45 min BP 10 min cooldown	Training Mode — 1 - 4 — 10 min warmup 45 min BP 10 min cooldown	Strength Training	Training Mode — 1 - 4 — 10 min warmup 40 min MSS 10 min cooldown	
Training Mode — 1 - 4 — 10 min warmup 60 min BP 10 min cooldown	Strength Training	Training Mode — 1 - 4 — 10 min warmup 45 min BP 10 min cooldown	Training Mode — 1 - 4 — 10 min warmup 45 min MSS 10 min cooldown	Training Mode — 1 - 4 — 10 min warmup 45 min BP 10 min cooldown	Strength Training	Training Mode — 1 - 4 — 10 min warmup 7x 2 min intervals 10 min cooldown 20 min recovery
Strength Training	Training Mode — 1 - 4 — 10 min warmup 5x 3 min intervals 10 min cooldown 20 min recovery	Training Mode — 1 - 4 — 10 min warmup 45 min BP 10 min cooldown	Training Mode — 1 - 4 — 10 min warmup 45 min MSS 10 min cooldown	Training Mode — 1 - 4 — 10 min warmup 45 min BP 10 min cooldown	Training Mode — 1 - 4 — 10 min warmup 5x 3 min intervals 10 min cooldown 20 min recovery	Strength Training
Training Mode — 1 - 4 — 10 min warmup 60 min BP 10 min cooldown	Strength Training	Training Mode — 1 - 4 — 10 min warmup 10x 2 min intervals 10 min cooldown 20 min recovery	Training Mode — 1 - 4 — 10 min warmup 45 min BP 10 min cooldown	Training Mode — 1 - 4 — 10 min warmup 45 min MSS 10 min cooldown	Strength Training	Training Mode — 1 - 4 — 10 min warmup 60 min BP 10 min cooldown
Strength Training	Training Mode — 1 - 4 — 10 min warmup 45 min MSS 10 min cooldown	Training Mode — 1 - 4 — 10 min warmup 45 min BP 10 min cooldown	Strength Training	Training Mode — 1 - 4 — 10 min warmup 45 min BP 10 min cooldown	Training Mode — 1 - 4 — 10 min warmup 45 min BP 10 min cooldown	

Cardio Workouts

You can get a good cardio workout by engaging in any of the following exercises:

- ▶ Supine cycling (lying on your back while “pedaling” in the air)
- ▶ Biking (starting with a recumbent bike, then progressing to an upright bike)
- ▶ Swimming laps or kicking laps with a kickboard
- ▶ Rowing (ideally with a rowing ergometer)
- ▶ Using a stair-stepper (starting with a seated stepper first)
- ▶ Walking on a treadmill (starting with no incline)
- ▶ Using an elliptical machine (without arm motion at first)

Here are a few tips that can help you with your cardio exercise:

- ▶ Visit [Concept2’s indoor rowing technique webpage](#) to learn proper rowing technique for *any* rowing ergometer.
- ▶ If you experience unbearable symptoms when transitioning from horizontal to vertical mode, simply return to the prone or seated position and try to transition again a few weeks later.
- ▶ Using two different pieces of exercise equipment during a cardio workout is fine – for example, 15 minutes on an upright bike and then 15 minutes on a rower.

Pro Tip: Complete the prescribed time on the training calendar with your heart rate in the appropriate training zone before cooling down.

Monitoring Your Heart Rate During Cardio Workouts

Prior to starting you on the exercise program, we will provide you with a Training Guidelines sheet, which includes your prescribed heart rate ranges or Rating of Perceived Exertion (RPE) for the different cardio workouts. If you’re not taking a beta blocker, heart rate ranges are provided for the following workout speeds:

- ▶ Base pace (BP)
- ▶ Maximal steady state (MSS)
- ▶ Race pace (RP)
- ▶ Recovery: Slowing down, reducing resistance, or taking a drink without totally stopping

If you’re taking a beta blocker (such as metropolol or nebivolol), use the following Rating of

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Perceived Exertion (RPE) scale instead of the heart rate scale:

- ▶ 0-2: Very easy
- ▶ 3-4: Easy
- ▶ 5-6: A little difficult
- ▶ 7-8: Very difficult
- ▶ 9-10: As difficult as it gets

If your prescribed heart rate or RPE ranges feel too easy or too difficult, please let us know. We can reevaluate your prescribed ranges and make adjustments. Keep in mind that in the beginning most of the workouts may be difficult, and medications can affect your ability to reach your prescribed range.

We recommend using a heart rate monitor (a watch with a chest strap) during cardio exercise. Here are a few tips for monitoring your heart rate:

- ▶ You can find heart rate monitors for sale online or at large sporting goods stores. You do *not* need to purchase an expensive model.
- ▶ If you plan on swimming, get a heart rate monitor that's made for use in pools.
- ▶ If you ever question the monitor's reading (equipment can go bad or need new batteries), feel your pulse at your neck or wrist, count the beats for 15 seconds, and multiply by 4 to determine heartbeats per minute.
- ▶ For additional details on how to determine your heart rate, download the U.S. Dept. of Veterans Affairs' two-page [How to Take Your Heart Rate](#) document.

As you progress through the program, you may notice your resting heart rate decrease or remain the same. Either way, you should notice that the increase in heart rate you typically experience when standing up begins to decline as you progress through the eight-month program. Also, in the beginning, your heart rate may take a long time to recover from an exercise session. But as you train more it will recover (slow down) more quickly.

Long-Term and High Intensity Cardio

Months 6-8 of training are going to be different for each person. While some will choose to maintain the level of training outlined for Month 5 long-term, it's recommended that you attempt to push forward with the plan as outlined above. After you've completed the program, continue to exercise to maintain your conditioning with the exercises you enjoy most.

Continue to alternate cardio and strength training. Cardio is *catabolic* – it breaks down

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molecules to produce energy. Strength training is *anabolic* – it uses energy to build compounds, such as muscle protein. These two metabolic processes help to maintain a healthy balance.

During months 6–8, some patients with POTS may benefit from high-intensity interval training, which has been shown to improve the heart and lung response to exercise for healthy individuals and several patient populations. Here’s an example of this training:

1. Warm up for 10 minutes to get your heart rate up to base pace.
2. Go all out for one minute –hard and fast, increasing the resistance and speed and trying to get your heart rate up to your race pace zone.
3. Recover for one minute, removing all resistance and slowing down but staying in motion. During this interval, you can take a drink.
4. Repeat Steps 2 and 3 two or three times.
5. Cool down for 10 minutes.
6. Perform a 20-minute recovery workout.

Here are a few tips for making the most of months 6–8 and beyond:

- ▶ Begin with the upright bike, rower, or elliptical because these are safer than a treadmill for interval training. Try a treadmill only when you’re ready.
- ▶ You can add any strength training you want, and try other things like yoga, aerobics classes, and returning to competitive sports as you feel able. We discourage exercising in the heat.
- ▶ Consider yourself on a path to wellness and do what you feel you can do! We often hear that symptoms continue to decrease with long-term training.
- ▶ Remember that each patient progresses through the program to upright exercise at a different pace and that’s OK!

Strength Training

The strength training sessions should take about 20–30 minutes to complete. Do all strength training using body resistance or on seated equipment. If you’re using weights or weightlifting machines, consult with a trainer for proper form and technique.

The strengthening exercises are mainly for the lower body and core, which is intentional. Lower body muscles act as pumps when they contract (as you walk, for example) to return blood to your heart. Increased muscle mass in your legs means more blood returned with each step you take.

continued

Here are a few tips to enhance your strength training sessions:

- ▶ Don't use free weights until you're able to do so with proper form and sufficient strength.
- ▶ Expect to feel sore in the beginning, especially one to two days after the workout.
- ▶ If you can exercise only three or four days a week, you can do your strength training right after your cardio workout instead of on separate days, unless it worsens your symptoms.
- ▶ Take at least one day off between strength training sessions to recover and build muscle.
- ▶ If you have joint hypermobility (you're *too* flexible), consult with a physical therapist prior to starting your exercise program. Your therapist can teach you how to protect your joints when you exercise.

Strength Training with Exercise Equipment

If you have access to a gym or fitness center, perform three sets of 8-10 repetitions of the following exercises:

- ▶ Seated leg press
- ▶ Leg curl
- ▶ Leg extension
- ▶ Calf raise
- ▶ Chest press
- ▶ Seated row

Do as many repetitions as you can on the third set. When you can do more than 10 on the third set, increase the weight or resistance for your next session.

Also perform exercises for your belly muscles such as:

- ▶ Abdominal crunches
- ▶ Back extensions
- ▶ Anything Pilates-based that you can do on the floor

Strength Training without Exercise Equipment

If you don't have access to gym equipment, you can perform exercises using body resistance or exercise bands such as the exercises covered in the following sections.

As you engage in strength training, keep the following tips in mind:

continued

- ▶ Adding new strength training exercises to your routine is fine. Do so slowly and know that working new muscle groups may make you sore again. If you're unsure what exercises to add, consult a trainer or physical therapist.
- ▶ The specified reps and sets are general guidelines. Do as many as you can, slowly building repetitions and resistance.
- ▶ Perform strength training slowly to maintain good form and prevent injuries.
- ▶ If you're unsure how to perform an exercise, consult with your physician, trainer, or physical therapist.

Bridges

Perform three sets of 8-10 repetitions and hold each one for 10 full seconds:

1. Lay with knees bent up and hip-distance apart, feet flat on the floor, and hands down at your sides (Figure 1). Try to keep your shoulders relaxed and away from your ears.
2. Squeeze together your gluteal (buttocks) muscles and slowly lift your buttocks off the surface *without* arching your back (Figure 2).
3. Count out loud to 10 to ensure that you continue to breathe while holding the position.
4. To make this harder, place a pillow or cushion under your feet (Figure 3).

Do *not* arch your back. Your shoulder blade area should be touching the floor, and your belly muscles squeezing tight (to protect your lower back).

Figure 1



continued

Figure 2



Figure 3



continued

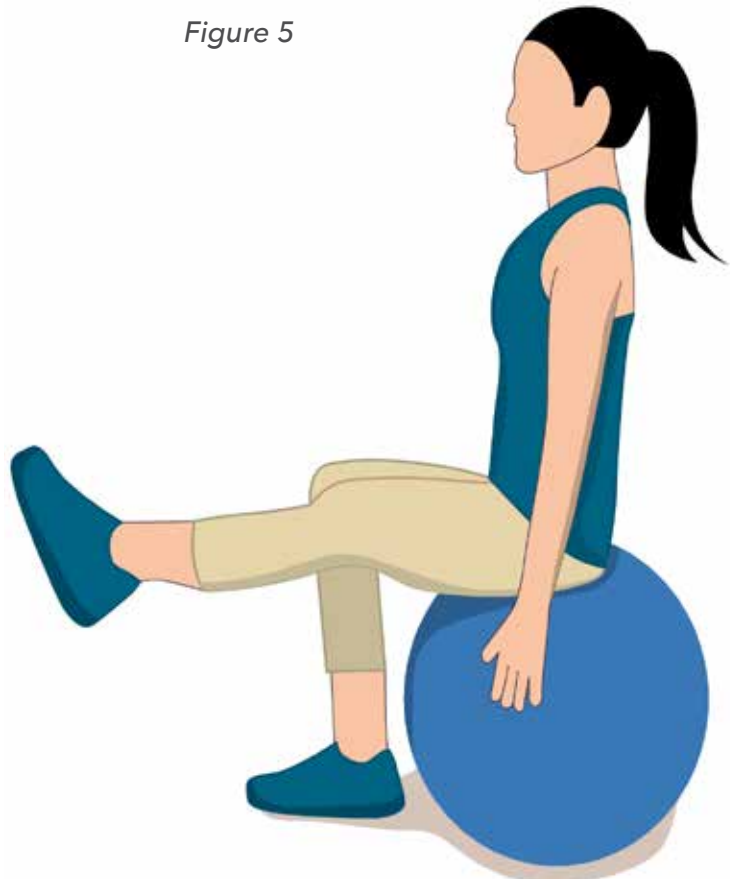
Seated ball exercises

1. Begin seated on an exercise ball in a safe area. Your hips and knees should be at a 90-degree angle forming an L shape. Sit up tall keeping your belly muscles engaged and your shoulders relaxed with your arms down at your sides. (As you improve, you can perform the exercise with arms crossed over your chest to make it more challenging.)
2. Alternate lifting your left and right legs as though you're marching. Repeat 15 times while maintaining your posture throughout (Figure 4). Perform three sets.
3. Slowly kick one leg out to straighten your knee, hold it for three seconds, then bring it back to starting position (Figure 5). Perform three sets of 15 alternating kicks.

Figure 4



Figure 5



continued

Straight leg raises

1. Lie on your back with one knee bent and the other one straight (Figure 6).
2. Squeeze the thigh muscle of your straight leg to make your knee straight, then lift the leg up slowly until it gets near the height of the other knee (Figure 7). The goal is to keep the hips on the floor and keep the knee you are lifting straight.
3. Hold your position for one second, then slowly lower your leg.
4. Perform three sets of 8-10 reps per leg.

To make this harder, try it while propped up on your elbows (Figure 8) or try it with a weight strapped around your ankle.

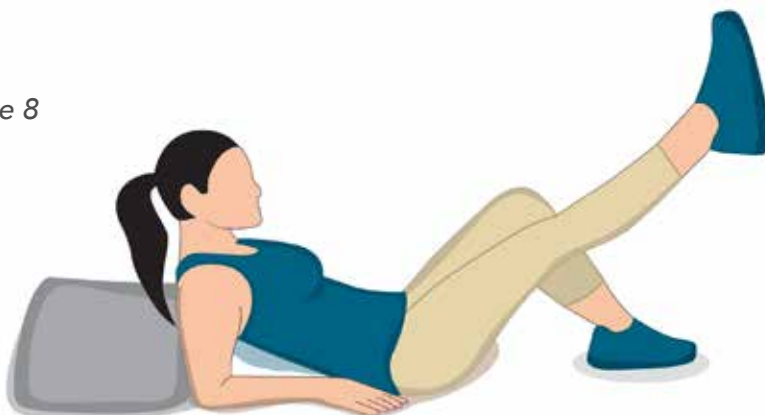
Figure 6



Figure 7



Figure 8



continued

Side lying straight leg raises

1. Lie on your side with your bottom knee slightly bent and your top leg straight. The top leg should be in line with your body and not coming in front of your body (Figure 9).
2. Slowly lift your top leg 8-12 inches, hold for one second, then slowly lower it without turning or twisting your body (Figure 10).
3. Perform three sets of 8-10 repetitions.

To make this harder, perform it with an elastic band around your thighs (Figure 11).

Figure 9



Figure 10

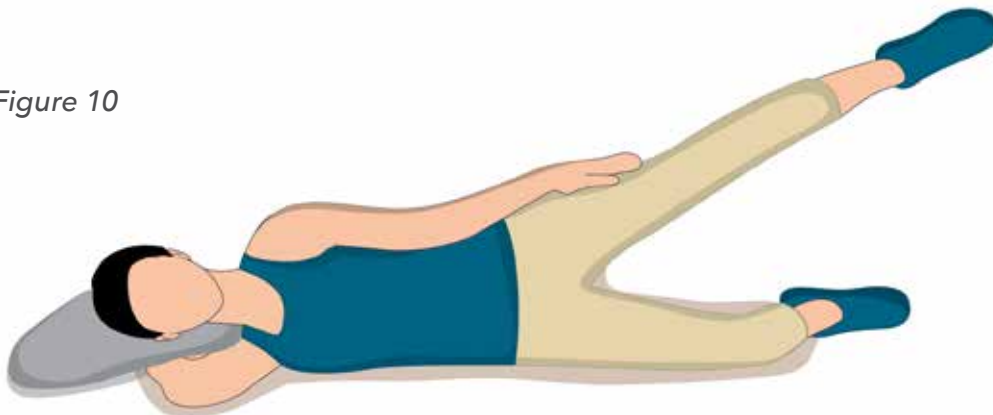
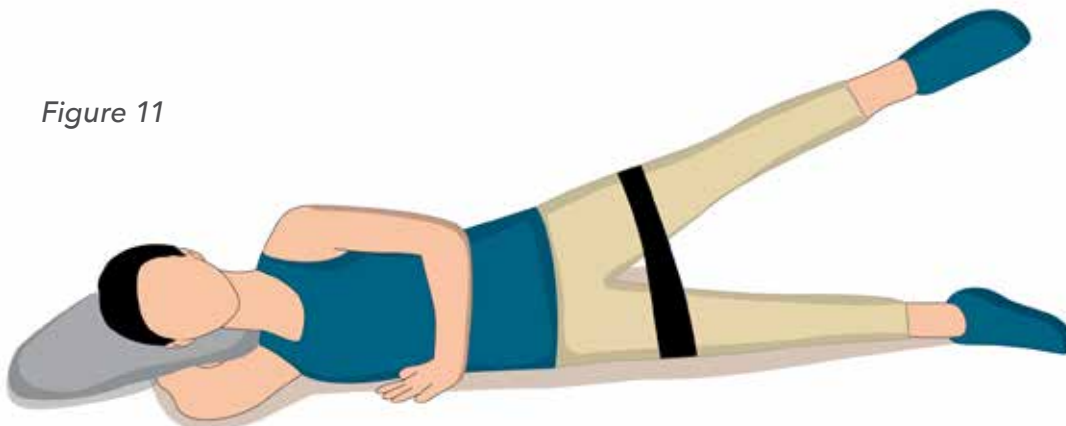


Figure 11



continued

Leg presses inward

1. Lie with knees flexed up, hip-distance apart, feet flat on the floor, and hands down at your sides.
2. Place a pillow or soft ball between your thighs (Figure 12).
3. Squeeze your legs together into the pillow or ball, hold for five seconds, then release your legs.

To make this harder, hold for 10 seconds instead of five.

Figure 12



Clamshells

1. Lie on either side with your knees and hips bent just a little (Figure 13).
2. Lift the top knee off the bottom knee, keeping your ankles together (Figure 14) without twisting your hips or body.
3. Perform three sets of 8-10 repetitions on each side.

To make this harder, try with a resistance band around your thighs.

Figure 13

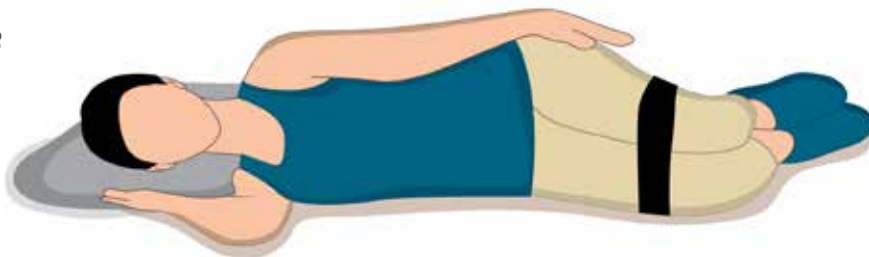
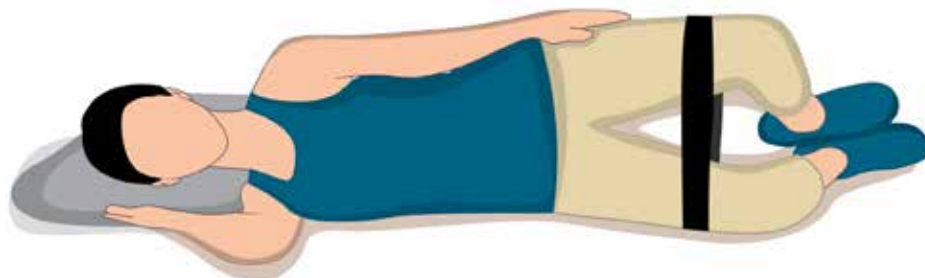


Figure 14



continued

Plank hold

1. Get down on all fours.
2. Lower your upper body so that your elbows touch the ground and are aligned directly below your shoulders.
3. Straighten your body so that your head, neck, back, buttocks, and legs are all aligned (Figure 15). Continue to breathe while pulling your belly button in toward the ceiling with your eyes looking a few inches beyond your fingers to keep your head properly aligned.
4. Hold your position for 15-30 seconds.
5. Perform three repetitions.

To make this harder, hold your position for 30-60 seconds.

Figure 15

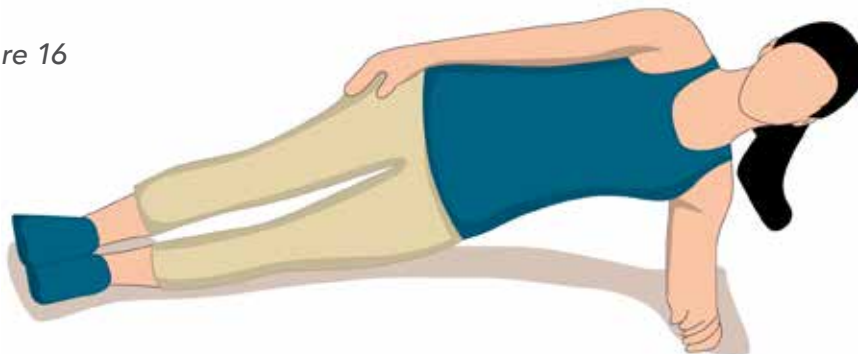


Side plank hold

1. Lie on your side with your body, neck, and head in a straight line. You may position your feet one on top of the other or one in front of the other.
2. Prop yourself up on your elbow, positioning your elbow directly below your shoulder, and keeping your legs, body, neck, and head aligned (Figure 16).
3. Continue to breathe while maintaining alignment.
4. Hold for 15-30 seconds.
5. Perform three repetitions per side.

To make this harder, hold your position for 30-60 seconds.

Figure 16



continued

Pilates hold

1. Lie on your back with knees bent, feet on floor, and arms at your sides.
2. Gently reach your hands toward your feet so that your shoulder blades lift off the floor (Figure 17). Maintain a slight bend in your elbows and imagine holding an apple between your chin and your chest to avoid straining your neck.
3. Hold your position for 10 seconds while continuing to breathe.
4. Perform 8-10 repetitions on per side.

Figure 17

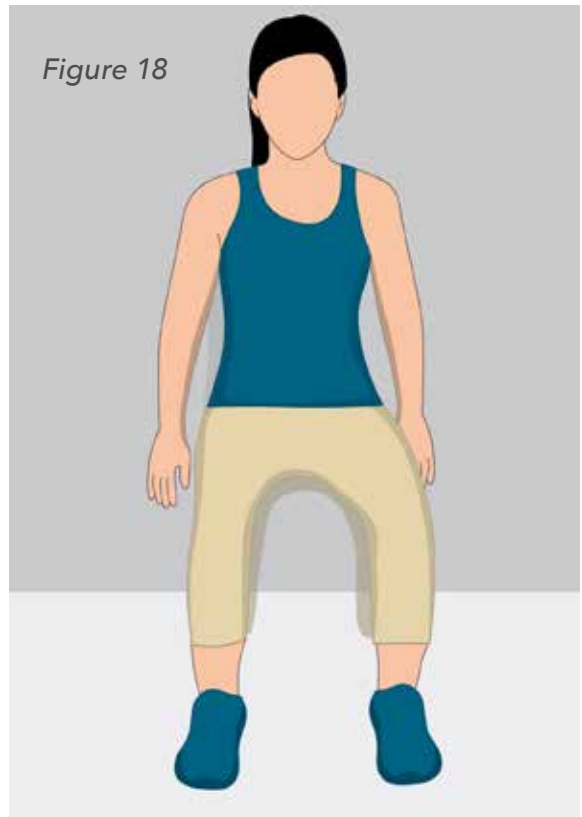


Wall sit

1. With your back against a wall, lower your buttocks to knee height so that your thighs and calves form an L shape and your back is flat against the wall (Figure 17). Your knees and feet should be hip-distance apart and pointing straight forward.
2. Hold your position for 15-30 seconds.
3. Perform three repetitions.

To make this harder, hold your position for 30-60 seconds.

Figure 18



Post-Workout Stretches

After your 10-minute cooldown, stretch your hamstrings, quadriceps, and calves, as instructed in the following sections. Stretch only to the point at which you begin to feel resistance. It should feel a little uncomfortable, but it shouldn't hurt. Hold each stretch for 30 seconds and repeat 3–4 times on each side.

Hamstring stretch

1. Sit upright with one leg long (knee straight) and the other bent so that the bottom of your foot is against the opposite thigh (Figure 19). Keep your shoulders relaxed (away from your ears).
2. Slowly and gently bend forward from the waist (do *not* round your back) until you feel tension in the back of your leg or thigh.
3. Hold this position for 30 seconds.
4. Repeat three times for each leg.

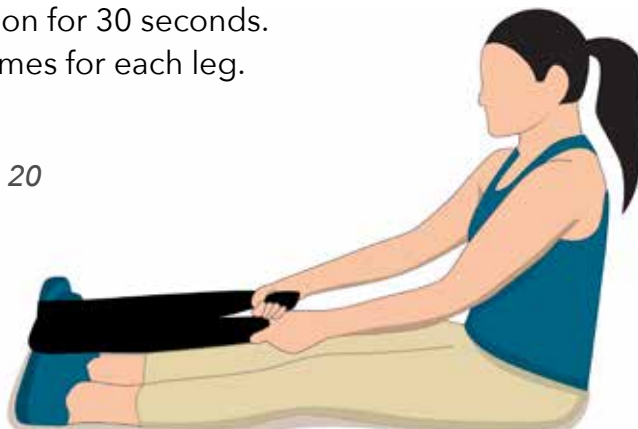
Figure 19



Calf stretch

1. Sit upright with your legs stretched out long straight out in front of you.
2. Loop a towel or sheet around the bottom of your foot and use this to gently pull your toes and foot toward you (Figure 21). You should feel a gentle stretch behind your lower leg and ankle.
3. Hold this position for 30 seconds.
4. Repeat three times for each leg.

Figure 20



Quadriceps stretch

1. Lie down comfortably on your stomach and bend your knee to bring your foot toward your head.
2. Loop a long towel, sheet, or dog leash around your foot and gently pull until you feel tension in the front of your thigh (Figure 20).
3. Hold this position for 30 seconds, keeping the rest of your body relaxed. Do *not* let your leg rotate out to the side. Your heel should come straight toward your buttocks and not to the outside of it.
4. Repeat three times for each leg.

You can rest your head on a pillow to decrease tension on your lower back.

Figure 21



Exercise as Lifelong Therapy

If you find that exercise is helpful for you, maintaining exercise will then be important in order to keep the benefits and continue to see further improvements in your health and quality of life. Furthermore, you will experience the benefits of regular exercise in many other areas of your life and health. Many patients successfully resume caring for their children, full-time work, full-time school, or enter college where previously, they believed these things might be impossible. We sincerely hope that this is the case for you as well.

Keep in mind that according to the American College of Sports Medicine (ACSM), every healthy adult should perform 30–60 minutes of exercise more days than not. Most of our patients adopt exercise as part of their daily personal hygiene program. Some patients feel that daily exercise is needed to avoid developing symptoms again.

If you have an illness, setback, or have quit exercise, and you recognize that you felt much better while training, think of it as a good sign! Don't be discouraged. You have a good response to exercise, and you know that it makes you feel better! Just start again. It's that simple. You'll probably need to begin with horizontal modes of training, but now that you've experienced the benefits, you'll have greater motivation to stick with the program.



We're on a mission to restore hope and optimize the body's innate ability to heal from within through the compassionate delivery of functional medicine.

DISCLAIMER

The information in this guide to understanding Postural Orthostatic Tachycardia Syndrome (POTS), identifying and treating POTS underlying causes, and recommended exercises for POTS patients, is provided for general informational purposes only and may not reflect current medical thinking or practices. No information contained in this guide should be construed as medical advice from the medical staff at Restoration Healthcare, Inc., nor is this guide intended to be a substitute for medical counsel on any subject matter. No reader of this guide should act or refrain from acting on the basis of any information included in, or accessible through, this guide without seeking the appropriate medical advice on the particular facts and circumstances at issue from a licensed medical professional in the recipient's state, country or other appropriate licensing jurisdiction.

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