



# Parkinson's Disease: Fitness Counts

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**Parkinson's Disease**

**Fitness  
Counts**

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## **Introduction**

This book is designed to provide general information and suggestions regarding exercise for all people living with Parkinson's disease (PD). It is also intended to be a resource for increasing your fitness level and for improving your ability to do everyday activities. In addition, this book includes resources for physical and occupational therapists who would like additional information regarding treatment options for people with Parkinson's disease.

While medication has long been the most promising treatment available for Parkinson's disease, a regular exercise program should always be part of managing PD. In fact, many movement disorder neurologists say that exercise is as important as any one of your medications. Though exercise is not a cure, it may help slow the progression of symptoms.

Be creative with your fitness. Exercise indoors and out. Change your routine frequently. Dance. Use music. Try a new exercise. Exercise with a partner, child, friend or animal. Join an exercise program or group. Above all, challenge yourself and HAVE FUN!

**Before starting an exercise program, it is important to discuss your program with your personal physician and/or physical or occupational therapist. They can address your fitness questions and concerns on a more personal level. These health professionals can also design a specific fitness routine for you and keep you updated on current Parkinson's research.**

## CHAPTER 1

### Parkinson's Disease Review

*To understand the role fitness plays in treating Parkinson's disease, we first need to understand the symptoms of the disease. If you're reading this book, you are probably already familiar with Parkinson's disease, but here are some basics:*

Parkinson's is a neurodegenerative disorder that affects about one million people in the United States and 10 million people worldwide. It is called a movement disorder because of the tremors, slowing, and stiffening movements it can cause, but its symptoms are diverse and usually develop slowly over time. Parkinson's disease is not diagnosed with a test or a scan; instead it is diagnosed by your doctor, who asks you questions about your health and medical history and observes your movement. Your doctor may want you to have some tests, such as imaging, to rule out other conditions. The goal of treatment is to help you manage your symptoms. Good symptom management can help you to stay healthy, exercise, and keep yourself in tip-top shape. Although there is no way now to correct the brain changes that cause Parkinson's, we know that exercise can help you fight the disease and that staying healthy can prevent setbacks that make PD progress faster. Great care is the key to living your best life with Parkinson's.

Lack of dopamine – a neurotransmitter, one of several chemicals your brain cells use to send signals to each other – in people with Parkinson's was first described in the 1960s. Soon after, dopamine-replacement therapy using levodopa became – and remains – the gold standard treatment. However, just as your doctor looks at tremors as a sign of changes in your brain, neuroscientists know that the reduction in dopamine in the brain is a sign of changes happening in brain cells. Neuroscientists think of Parkinson's as a disease linked to several things in brain cells, from mitochondria, the power plant of the cell, to lysosomes and proteasomes, the garbage disposals of the cell. You might also hear that Parkinson's is linked to a protein in the human brain called alpha-synuclein. The exact way that all these pieces fit together remains unknown. Researchers continue to study how cells and brain networks are affected in Parkinson's to improve our understanding of the disease and potential for treatments. We also know that dopamine is not the only neurotransmitter to be affected by Parkinson's. The disease process also disrupts other brain chemicals like serotonin, norepinephrine, and acetylcholine, and this causes changes in mood, behavior, and thinking (cognition).

You may not experience all the symptoms below. Symptoms of Parkinson's vary from person to person and change over time.

The four main symptoms of PD are classified as **motor (movement-specific) symptoms**:

- **Tremor**
- **Bradykinesia** (slowness of movement)
- **Rigidity**
- **Postural instability** (problems with balance)

The **non-motor symptoms** of PD can also indirectly affect mobility.

- Mood changes (anxiety, depression)
- Cognitive changes (attention, memory problems)
- Visuo-spatial problems (difficulty detecting changes in the amount of space surrounding objects; e.g., detecting the correct height of a step)
- Orthostatic hypotension (a drop in blood pressure and a feeling of lightheadedness upon standing)
- Bowel and bladder changes (constipation, urinary urgency and frequency, incontinence)
- Sleep disorders
- Sensory changes (pain, tightness, tingling, burning)

Other symptoms:

- Changes in walking
  - Difficulty turning
  - Festination or shuffling (quick, small, involuntary steps forward)
  - Retropulsion (quick, small, involuntary steps backward)
- Freezing episodes (an inability to perform a movement, or a feeling that your feet are stuck to the ground)
- Micrographia (small, cramped handwriting)
- Speech and swallowing changes





## PD Is a Movement and Sensory Disorder

People with PD have difficulty regulating the size or speed of their movements. Movements are bradykinetic and hypokinetic.

**Bradykinetic** = Too Slow      **Hypokinetic** = Too Small

Changes in the movement system (muscles) lead to challenges controlling movements, including the following:

- Starting and stopping movements
- Automatically controlling muscles
- Linking different movements to accomplish one task (e.g., moving from sitting to standing)
- Finishing one movement before beginning the next (e.g., not completely turning around before sitting down)

Changes in the sensory system also lead to challenges, particularly noticing and correcting movement and voice issues. Here are some other examples:

- Slowness or smallness of movements (e.g., when told to make the movement bigger, a person with PD may feel the movement is now “too big”)
- Lack of movement (e.g., an arm that does not swing during walking)
- Changes in posture
- Changes in voice volume (e.g., when told to speak louder, a person with PD may feel they are shouting)



## CHAPTER 2

### Physical and Occupational Therapy

*Rehabilitation specialists, including physical and occupational therapists, play a vital role in the fitness and well-being of people with PD.*

Licensed physical therapists (PT) and occupational therapists (OT) work in a variety of healthcare settings.

**Physical therapists** address balance, strength, and range of motion related to a person's functional mobility (e.g., walking, getting in and out of chairs and changing position in bed). They can also design a personalized exercise routine.

**Occupational therapists** address performance skills related to tasks that occupy a person's time, such as activities of daily living (e.g., dressing, bathing, cooking), work, school, social/communication and leisure activities.

PTs and OTs who work with people with PD have many roles. They can do all of the following:

- Design or modify exercise programs
- Evaluate and treat mobility and walking problems
- Evaluate and treat joint or muscle pain that interferes with activities of daily living (ADLs)
- Help with poor balance or frequent falls
- Teach care partners proper body mechanics and techniques for assisting someone with PD
- Make referrals to movement and exercise programs in the community
- Recommend and teach the use of appropriate adaptive equipment and walking devices

## **Four Stages of Intervention**

PT and OT interventions generally occur in four stages:

### **Stage 1: Pre-habilitation**

This stage is like prevention. You start working on a problem before you even experience symptoms. Begin an exercise program even if there are no noticeable difficulties with balance, stiffness or movement.

### **Stage 2: Rehabilitation**

At this point, you notice symptoms, but you can take steps to fix the problem. Continue your exercise program. Learn how to walk better, get up from bed or a chair, get out of a freezing episode and improve posture.

### **Stage 3: Preservation**

Now you need to make sure you do not lose what you gained, so stay active. Join a group, get physical and social and have fun!

### **Stage 4: Prevention**

The stages come full circle. You do not want any new problems on top of existing challenges. Continue your exercise program. Learn about home modifications, care partner training and ways to stay strong.

**KEY POINT:** It is ideal for every person diagnosed with PD to begin a fitness routine in the pre-habilitation stage. If you were recently diagnosed with PD, speak with your health care provider about beginning therapy.

## **How to Find a Physical or Occupational Therapist**

Most states allow you to go directly to a physical or occupational therapist without a referral from a health care professional. However, depending on your health insurance plan, there may be limitations on where you can receive treatment or the number of visits that are covered.

For help locating a physical or occupational therapist near you, particularly one with experience in PD, try the following options.

### **1. Call the National Parkinson Foundation Helpline**

Call **1-800-4PD-INFO (473-4636)** or email **helpline@parkinson.org** to speak with a PD information specialist. When you call the NPF Helpline, you can ask about Chapters and/or exercise classes in your area. You can also find out if there is a physical therapist in your area who has completed the ATTP (Allied Team Training for Parkinson's) program. This is a special training program for allied health professionals, including physical and occupational therapists, to help them develop a deeper understanding and appreciation of the skills needed to help people living with PD.

### **2. Search the American Physical Therapy Association**

Visit **www.moveforwardpt.com** or call **1-800-999-2782** to find a physical therapist near you. Click "Find a PT" and search based on location and specialty (choose Geriatrics or Neurological). Once you locate a PT in your area, ask them about their experience with PD.

### **3. Search the LSVT® Global Directory**

Visit **www.lsvtglobal.com** or call **1-888-438-5788** to find LSVT BIG-certified physical and occupational therapists. Click on "Find a Clinician," choose "LSVT BIG" and follow the instructions.

### **4. Call your local Movement Disorder Center**

### **5. Call the Department of Physical Therapy at the closest university**

### **6. Call your local hospital**

**KEY POINT:** Ask for a referral to a physical or occupational therapist with geriatric or neurological experience. Explain that you are looking for someone with experience working with individuals with PD.

## CHAPTER 3

### Why Exercise?

There are two main reasons that exercise is important when you have PD.

#### **1. Your body is coping with PD and the general effects of aging.**

As we age, certain changes occur in our bodies:

- Loss of tissue elasticity (skin wrinkles, muscles can tighten)
- Mineral loss in bones (fractures can occur more readily)
- Loss of muscle mass (muscles are not as toned): We lose 1% of muscle mass per year over the age of 60!

If you combine normal, age-related changes with a sedentary lifestyle, you could end up with an increased risk of developing cardiovascular disease, osteoporosis, diabetes and cognitive impairment. Without regular exercise, our bodies and minds become weaker, stiffer and more likely to suffer an injury.

#### **2. Research has shown that exercise benefits those with PD.**

Studies in both animals and humans have demonstrated the brain and body benefits of exercise.

### **Exercise Is Medicine**

The symptoms of Parkinson's disease include more than just what doctors call the motor features – the slowness, stiffness and tremor that characterize the disease. Parkinson's impacts thinking: the disease can affect working memory, decision-making, staying attentive and concentration. Parkinson's also affects behavior; PD is linked to depression and anxiety, and it can disturb sleep.

From a biological perspective, Parkinson's results in low levels of the brain chemical dopamine, and this leads to the loss of effective communication between the higher brain structures on the surface of the brain (called the cortex) and the deep part of the brain that manages more basic functions (called the basal ganglia). The higher brain structures are where you think, and the deep structures are where those thoughts are translated into actions, particularly movement. The loss of these connections is also linked to the behavioral changes observed in Parkinson's.

In the last decade, studies and ongoing research have clearly shown us that exercise and physical therapy can help restore lost behaviors and function in people with Parkinson's. In total these studies have shown that physical therapy and exercise can improve many diverse aspects of Parkinson's by incorporating feedback, repetition, challenge, problem solving, engagement and motivation. In addition to improving symptoms, scientists are increasingly convinced that exercise may slow disease progression.

Reported benefits of exercise include:

- Improved gait and balance
- Reduced falls
- Increased flexibility and posture
- Improved endurance
- Reduced freezing of gait
- Improved working memory and decision making
- Improved attention/concentration
- Reduced depression and anxiety
- Improved quality of sleep

Based on findings from the National Parkinson Foundation's Parkinson's Outcomes Project, the largest-ever clinical study of Parkinson's, it is recommended that people with PD engage in at least 2.5 hours of exercise a week for a better quality of life. Establishing early exercise habits is an essential part of overall disease management.

## **Exercise Effects on Cognition**

Across medicine, researchers have long linked exercise to cognitive function or thinking. More recently, researchers are finding that exercise seems to improve aspects of how you think that are frequently affected in Parkinson's. About half of people with Parkinson's experience challenges with what doctors call *executive functioning*, which involves planning activities, keeping a schedule, organizing things on your desk or in your house and similar tasks. Executive function can be impaired by problems with working memory (measured by how many things you can keep track of simultaneously), problems with keeping focused on a task and responding to changes.

The parts of the brain that perform executive function tasks are the same ones that help you to apply motor learning in changing environments. For example, you use these executive function centers when you go from walking inside the house to walking outside. You also use your executive function centers when you think about how to improve a motor skill – how to do a task you know how to do better or faster.

Today, we have ideas about how to exercise better. In the past, when scientists studied how exercise affected the brain they always studied basic aerobic training such as biking or walking on a treadmill, track or around the community. When you exercise aerobically, you make your heart healthier and you improve how your body uses oxygen. Studies of aerobic exercise have shown that it can help improve age-related changes in executive function. Scientists are now working to determine how well aerobic exercise works to slow Parkinson's disease. They are studying what is the right “dose” of exercise to get the

best benefits, including looking at how to balance the benefits of exercise versus the risk that exercising too much might increase your risk of falls or injury.

Studies of Parkinson's have already shown that exercise helps. Studies of skill-based exercise have been shown to improve motor function, too. So far, we don't know which is better. In fact, the answer may be both: doing skill-based exercise *and* aerobic exercise may work best of all, in particular for targeting cognition. Your physical therapist may incorporate skills and aerobic training by having you do exercises with set goals. A goal might be to stay at a certain speed or finish a task at a certain time.

How can you try to do both skill-based exercise and aerobic exercise together?

- Learn to play tennis
- Spin training
- Walk a course (through your neighborhood) with the goal of finishing in a pre-set time

**KEY POINT:** Mixing up exercises that are skills-based and/or aerobic offers the opportunity to get both motor and cognitive benefits.

## Exercise and Neuroplasticity

We've known for years that exercise improves muscle strength, flexibility, bone density and cardiovascular health. However, new research is showing us that the brain isn't just a passive beneficiary of these health benefits. When you take up a new sport, you *learn* it, and that is about your brain – not just your muscles – learning the movements. This process of teaching your brain a new pattern (whether it is a movement, being comfortable in a new place, or even learning a way to think) is called *neuroplasticity*. We have actually measured in animals that exercise leads to the following Parkinson's-fighting changes:

- Exercise changes how your brain uses the chemicals that signal from one cell to the next (*neurotransmitters*). Exercise actually made brain cells use dopamine more effectively.
- Exercise caused the animals to grow new blood vessels, helping brain cells to get the oxygen and nutrients they need to stay healthy and participate in the activities of thinking.
- Exercise changes brain circuits by changing the way the network of brain cells are connected. Exercise helps neurons grow new connections – synapses – and grow new neurons that become part of a more efficient brain network by releasing brain growth factors and other effects.
- Exercise helps the body's immune system to work more effectively, and recent research has suggested that the immune system may be a part of PD, too.

It really is amazing that by doing something enjoyable to make your body healthier, you are making your brain healthier, too!

**KEY POINTS:** Benefits of exercise include the following:

- Increased blood flow to the brain
- Increased expression of growth factors that strengthen brain connections
- Optimized use of energy by brain cells (improved metabolism)
- Reduced potentially harmful effects of the immune system (inflammation)
- Even better effects of the medicines you take to fight Parkinson's

### **Overall Key Points**

- When you learn a new exercise skill (like tai chi, boxing or yoga) it helps both how you move and how you think.
- There is not just one best exercise – you should do aerobic, strength and skills exercises to get the best benefits.
- Doing a variety of different exercises, as well as pushing yourself to get better at the ones you do helps your neurons to grow new connections, resulting in learning.
- Exercise is a LIFELONG COMMITMENT.
- Exercise is medicine, and we don't see any signs that there ever will be a pill to replace it.



## CHAPTER 4

### What Exercises Are Important for People with PD?

#### Types of Exercise

The general goal of exercise and physical therapy is to improve your symptoms and help you to do activities you enjoy. Your physical therapist will recommend that you practice skills that are relevant to activities that you have trouble with, just as the coach of a sports team might break up a difficult task into pieces and have the team practice the parts that are most challenging. Do you have trouble getting out of a chair? Your physical therapist might ask you to practice with seats at different heights and also to work on muscle strength.

Research has shown that people with Parkinson's often need to work on the sequencing or timing of motions and on compensating for the effects of the disease (and the effects of aging!) on the brain's ability to accurately judge distances. Doctors refer to this as improving temporal and spatial accuracy.

You should talk to your neurologist and work with a physical therapist to design an exercise program that focuses on practicing skills linked to rehabilitation of or compensation for common PD motor deficits. These skills might include walking, maintaining good posture and balance. Your care team will help ensure that the exercise program you design together includes the following elements:

- **Feedback:** So that you will know if you are doing the motion correctly;
- **Correction:** Adjustments of your motion to improve performance;
- **Problem-solving:** Exercises and activities that challenge your limits and require thought;
- **Intensity:** You should challenge yourself with goals for improvement and repetition.

You can get to the *problem-solving* element by mixing up the way you are learning a motor skill and trying different exercise types. Such variability helps push your brain as well as your muscles.

Different types of exercise that have been found to help people with PD include:

- Yoga
- Tai chi
- Boxing
- Treadmill training
- Amplitude training
- Dance

**The most important recommendation is this:** Choose an exercise program that you will actually do! Don't design a great, Parkinson's-optimized exercise program and then skip it because it is too hard or not fun.

**The second most important recommendation is that you should do something new and different.** Pushing yourself to improve is like doing something new, so that is okay, but don't stagnate. Don't just do the same exercise at the same intensity in the same way all the time.

Physical therapists commonly start you out with what you can do and then gradually make the activity more difficult. You will add new challenges and repetitions of a task to force you to problem solve and move better.

This approach to exercise activates the same pathways in your brain that children use to learn motor skills, such as riding a bike or swimming. Scientists believe that learning this way will cause your brain to release growth factors that help your brain cells to know that they should change, too, just like the growth factors that make children's brains so ripe for change.

The relative absence of these growth factors as we age is why we have the adage, *you can't teach old dogs new tricks*. However, physical therapists and scientists studying exercise have learned that you CAN teach an older brain new tricks! The trouble is motivation.

Working with a physical therapist, you might force your brain to improve its performance on a routine skill, like walking, by forcing a focus on a complex one, like walking while bouncing a ball or counting backwards. Training like this is called dual-task practice. Physical therapists can help patients by targeting specific motor impairments, such as freezing of gait, by, for example, practicing walking with distractions. Scientists have found that they can do this using video game-like virtual reality technology linked to a treadmill. If you don't have a virtual reality-equipped treadmill, you can just walk with tape lines or other visual cues on the ground to step over.

Don't forget the emotional aspects of exercise. You need to both find fulfillment in it and believe you can do it! If you are struggling with motivation or with believing in your own ability, ask your care team, friends or family for help. You might get fulfillment from enjoying the exercise or from a sense of accomplishment from what you were able to do or how you feel.

**KEY POINTS:**

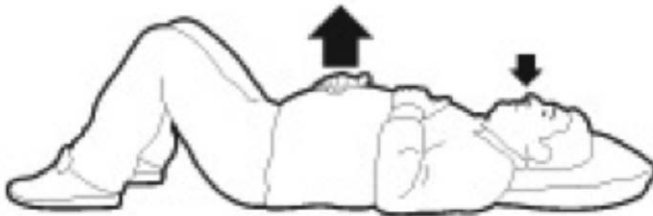
- Research has shown that everyone benefits from exercise. Definitely talk to your doctor before starting a program or changing the intensity of your exercise program, but get started!
- Exercise research has shown that skill-based exercise that is challenging and enjoyable leads to benefits in motor function.
- Exercise incorporates aspects of motor learning that are fundamental to brain health, including forming new and repairing old connections.

## **Deep Breathing**

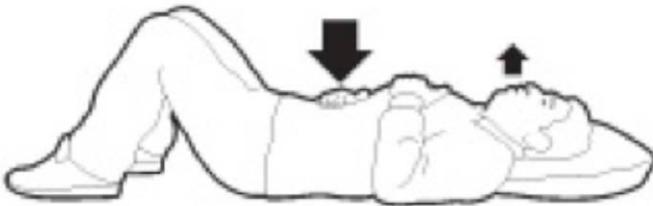
Breathing deeply will help you relax, and relaxing will help you stretch. Do not hold your breath, strain or take shallow breaths while exercising. Full, deep breaths allow the diaphragm to lower and the lungs to expand deeply, ensuring more oxygen is taken in with each breath. Shallow breaths lead to tension and fatigue by overworking the upper chest muscles and upper parts of the lungs.

## **Proper Diaphragmatic Breathing**

Lying comfortably on your back, place one hand on your chest and one hand on your abdomen.



Take in a slow, full breath (inhale) through your nose, and feel the hand on your abdomen rise as the lungs fill with air.



As you breathe out (exhale) through your mouth, feel the hand on your abdomen lower as your lungs empty.



## **Flexibility Exercises**

Regular stretching is the first step in your exercise program, and it can be one of the most enjoyable. Stretching helps you combat the muscle rigidity that comes with PD. It also helps your muscles and joints stay flexible. People who are more flexible tend to have an easier time with everyday movements.

While there are no standard stretching exercises for people with PD, the American College of Sports Medicine and the American Heart Association recommend the following guidelines for everyone:

- Perform at least 10 minutes of stretching at a time.
- Perform stretches at least 3-4 times per week; DAILY is better.
- Hold stretches for 10-30 seconds.
- Perform 3-4 repetitions of each stretch.

The muscles that tend to become tight in PD are those that bend and rotate the joints.

At a minimum, a flexibility program should focus on the following body areas:

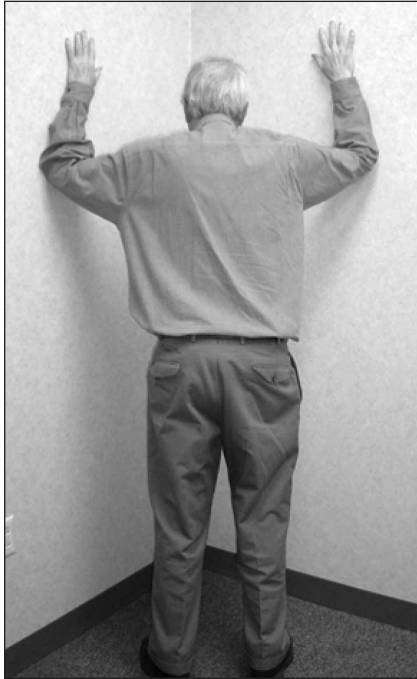
1. Chest wall
2. Shoulders and elbows
3. Back of the thighs (hamstrings) and knees
4. Calves
5. Front of wrists and palms
6. Low back and neck

## **Stretching Tips**

- Your stretch should feel like a gentle pull. Do not stretch to the point of pain.
- Remain motionless while holding your stretch. Do not bounce while stretching. Bouncing can cause small tears in muscle fibers, and this can actually lead to less flexibility.
- Breathe evenly in and out during each stretch. Do not hold your breath.

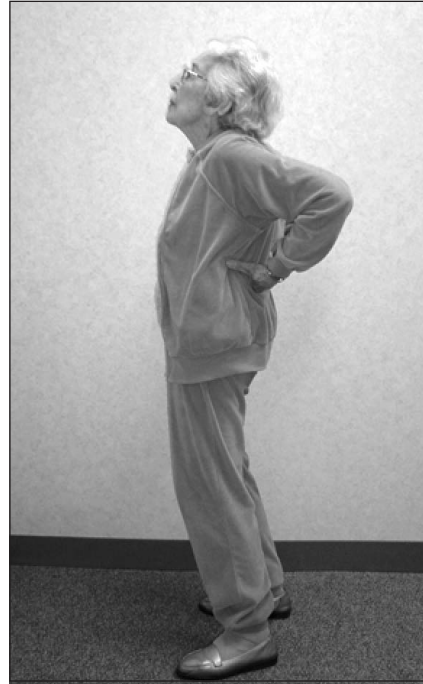
## Standing Stretches

### Chest Stretch



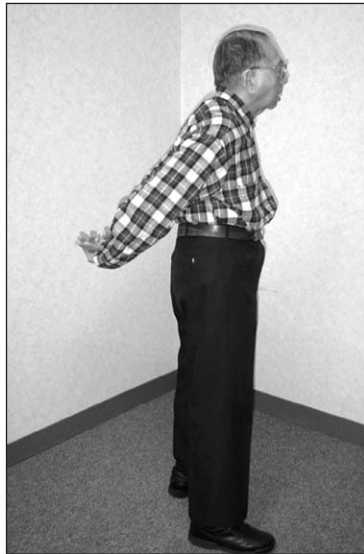
1. Stand facing a corner, placing forearms and hands on each wall.
2. Lean forward into the corner.
3. Keep head up and feet flat on the floor.

### Back Stretch



1. Stand with feet hip-width apart.
2. Place palms on low back.
3. Gently lean trunk and neck back.

### Shoulder Stretch



1. Stand tall with feet hip-width apart.
2. Clasp hands behind back.
3. Gently lift arms up and away from the back, keeping head up.

## Seated Stretches

### Neck and Chest Stretch



1. Sit tall in a chair with hands clasped behind back of chair.
2. Allow neck to gently fall back.

### Hamstring Stretch



1. Sit tall in chair and place one leg straight out on another chair.
2. Keep toes pointed up, knees flat and back straight.
3. Gently reach for toes.
4. Only reach as far forward as you can without your knee bending.

### Rotation Stretch



1. Sit tall in a chair with one arm behind the chair.
2. Reach around in front of you with other arm to grab the back of chair or the arm rest.
3. Turn your neck and look over your shoulder.

### Ankle Circles



1. Kick foot in front of you.
2. Move foot in slow, complete circles.
3. Repeat in both directions.

### Overhead Stretch



1. Sit tall in a chair and interlock fingers together.
2. Turn palms facing out and slowly lift arms overhead.
3. Gently allow neck to fall back.
4. Look up at hands.

### Seated Side Stretch



1. Sit to one side of a chair with arm rests.
2. Reach one arm down toward floor.
3. Reach other arm up and over to side.
4. Keep feet flat on floor.

## Lying Stretches

### Shoulder Stretch



1. Lie flat on your back.
2. If you are using a pillow, do not place it under your shoulders.
3. Slowly lift arms straight up and allow them to fall back overhead.

### Rotation Stretch



1. Lie on your back with knees bent and feet flat. Arms should be outstretched at your side.
2. Rotate both knees to one side, keeping arms and upper torso flat. Turn head in opposite direction.
3. Repeat, rotating knees in the opposite direction.

## Aerobic Exercises

Aerobic exercise is an activity that works the heart, lungs and muscles and helps the body burn calories.

### **Examples of Aerobic Exercise:**

- Walking/jogging/running
- Swimming
- Dancing
- Water aerobics
- Chair aerobics
- Biking: indoor (stationary), outdoor, tandem or motor-powered (bikes that force movement at higher speeds than one would normally go)

We should all try to get at least 150 minutes per week of moderate exercise or 75 minutes per week of vigorous exercise. For moderate exercise, this would be 30 minutes a day, 5 times a week. However, the time can also be split into 10-15 minute segments throughout the day.

**KEY POINT:** For maximum benefit in people with PD, research suggests that aerobic activity should be at a moderately high to high level or pace.





## Target Heart Rate

Your target heart rate is the range in which your heart should be beating to give you the most benefit during exercise. Your target heart rate is important because it helps you determine your fitness level when you start your exercise program and shows you how you are progressing.

### Calculating Your Heart Rate

Calculate your maximum heart rate by subtracting your age from the number 220.

Your target heart rate should stay within 50-85% of your maximum heart rate. Take your pulse every so often while you exercise to make sure you stay within your range.

### Target Heart Rate and Maximum Heart Rate Averages

Age	Target Heart Rate (50-85%)	Max Heart Rate (100%)
30 years	95-162 beats per minute	190
35	93-157	185
40	90-153	180
45	88-149	175
50	85-145	170
55	83-140	165
60	80-136	160
65	78-132	155
70	75-128	150
75	73-123	145
80	70-119	140
85	68-115	135

**Caution!** *If you take high blood pressure medications, be sure to check with your physician before calculating your target heart rate. Certain medications lower your heart rate and will affect your target rate. Also check with your physician if you have a pacemaker or atrial fibrillation.*

## **Strengthening Exercises**

Strong muscles are vital to maintaining and improving functional ability. While there are no specific guidelines for strength training in people with PD, muscles can be strengthened at any stage.

Strength training can take the form of lifting weights, using machines at the gym, using the body's weight as its own resistance or even using common household items like a milk jug filled with sand.

The American College of Sports Medicine and the American Heart Association recommend the following guidelines for everyone:

- Perform at least 1 set of each exercise, 10-15 times.
- Do strengthening exercises 2-3 days per week (but do not work out the same muscles on consecutive days; muscles need a day to rest before training again).

At a minimum, a strengthening program should include the following muscles, which help to combat posture and strength changes common in PD:

1. Core muscles (abdominals)
2. Thigh muscles (quadriceps)
3. Buttocks (gluteals)
4. Back muscles
5. Back of the arm muscles (triceps)

## **Strengthening Tips**

- Stop any exercise that causes pain.
- Concentrate on standing (or sitting) straight while doing the exercises.
- Keep movements smooth and even.
- Do not grip hand weights too tightly.
- Do not hold your breath. Breathe evenly throughout each exercise. As a rule, you should breathe out on the hardest part of the movement, and breathe in on the easiest part.

## Standing Strengthening Exercises

### Wall Slides



1. Stand with feet 6-8 inches from the wall.
2. Rest your back and hands on the wall.
3. Slowly bend your knees and slide down the wall.
4. Do not let your knees move past your feet.
5. Hold this pose for a count of 5.

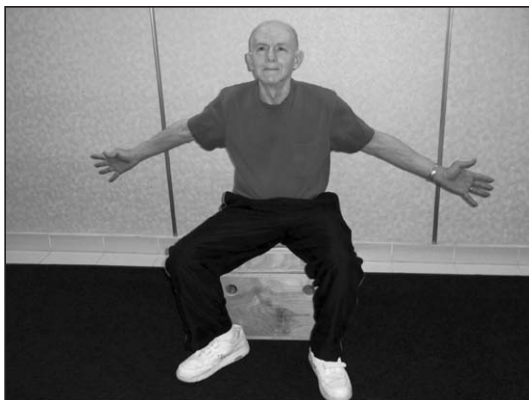
### Quad Strengthening



1. Sit tall on the edge of a chair with your arms crossed on your chest.
2. Slowly lean forward and use your legs to push up to stand.
3. Stand for a moment.
4. Slowly lean forward again and lower yourself to sit.

## Seated Strengthening Exercise

### Shoulder Blade Squeeze



1. Sit tall on edge of chair.
2. Open arms out to the sides, fingers spread.
3. Pull arms back and squeeze shoulder blades together.

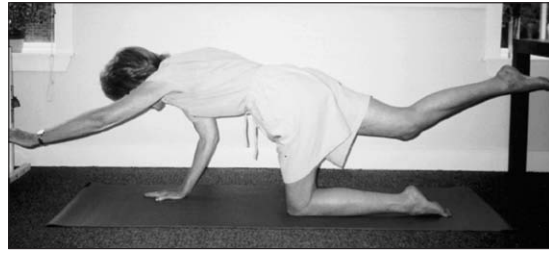
## On-the-Ground Strengthening Exercises

### Bridge



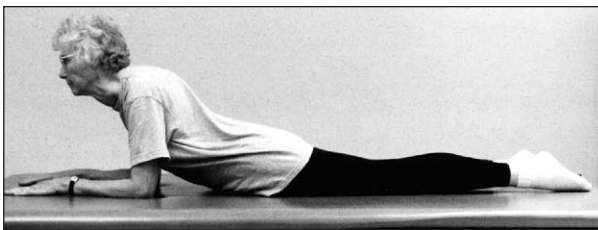
1. Lie on back with knees bent and feet flat.
2. Raise hips and squeeze buttocks.
3. Hold this pose for a count of 5.

### Quadruped



1. Begin on hands and knees. Keep back level.
2. Reach one arm straight forward.
3. Extend opposite leg straight back.
4. Hold for a count of 3-5.
5. Repeat on other side.

### Back Extension



1. Lie on stomach.
2. Lift upper body off surface, supporting body weight on forearms.
3. Hold position for 5 to 10 counts.

**NOTE:** Remember, this is not a push-up. Your back muscles should be doing the work, not your arms.

## Other Strengthening Options



## CHAPTER 5

### Walking, Turning and Falls Prevention

*Problems with walking and balance are common in individuals with Parkinson's. However, the right combination of exercise and new ways of moving can improve balance, limit or prevent falls and put confidence back into your stride.*

People without PD do not think about their walking. Their arms naturally swing, and their feet naturally land on the heels with each step. They can walk and talk and carry bags, purses and plates of food without difficulty.

Individuals with PD tend to lose their automatic movements. Their feet begin to shuffle, and performing two tasks at once becomes more difficult. Turning becomes challenging, often leading to a freezing episode, and sometimes a fall.

Freezing of gait is the sudden inability to move the feet. It generally takes the form of either complete lack of movement or the legs trembling in place.

There are many PD-related walking changes:

- Smaller steps
- Slower speed
- Less trunk movement (especially rotation)
- A narrow base of support (feet too close together)
- Less or absent arm swing (on one side of the body or both)
- The feet land flat on the floor with each step instead of on the heel (this is generally the most problematic as it leads to shuffling which can cause tripping and/or falling.)

### Managing Changes in Your Walking

**KEY POINT:** Individuals with PD must now “tell” their feet how to move. By thinking about what you are doing, you use a different part of your brain than the part affected by PD. You re-route the message from the brain to the feet.

Along with exercise, focusing on movement helps improve the quality of walking.

## Walking Tips

- Tell yourself to land with heel first. You can do this by thinking of each step as a big kick.
- Focus on the size of your steps rather the speed of your steps.
- Avoid carrying many things while walking. People with PD have difficulty performing more than one task at a time.
- The moment you begin to shuffle or freeze, try to come to a complete stop. Take a breath, stand tall and start again, focusing on making that first step a big step.
- Stand tall and look out in front of you; do not look directly down at your feet.
- Use a cane or walker/rollator if recommended by your therapist or doctor.

**KEY POINT:** The golden rule of using a walking device is this: if you need to reach out and touch furniture, walls or people when you are walking, then you most likely need a device.

## Turning Tips

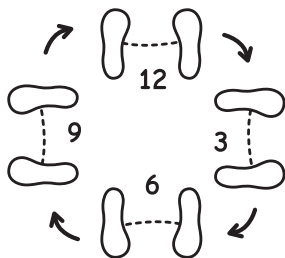


**Incorrect**



**Correct**

- When beginning a turn from a stopped position, be sure to lead with your foot, not your upper body. Planting your feet and turning your upper body frequently leads to a freezing episode.
- If you want to turn right, shift your weight to the left foot and step out with the right foot. To turn left, shift your weight to the right and step out with the left foot.
- Try not to pivot when you turn. Instead, focus on how you lift your feet.



To turn in a small area, or when you are stopped and must turn, try the “clock turn” technique (see illustration at left): start at 12PM and take two slow steps to 3PM, etc. To turn in an open area, use large steps and make a U-turn.

## Freezing Tips

Freeze “Trigger”	Freeze Reduction Strategy
Answering the phone	<ul style="list-style-type: none"> <li>• Never rush to answer the phone.</li> <li>• Keep a cordless phone within easy reach.</li> <li>• Keep pathways open; rearrange furniture to keep floors free of clutter.</li> <li>• Use an answering machine.</li> </ul>
Walking onto/off of an elevator, train or bus	<ul style="list-style-type: none"> <li>• Allow everyone else to get on or off first.</li> <li>• Announce that you have PD and ask people to be patient.</li> <li>• Walk up to the threshold, stop, and then focus on stepping over it.</li> </ul>
Walking through a doorway	<ul style="list-style-type: none"> <li>• Tell yourself not to focus on the doorway; instead focus on how your feet hit the ground.</li> <li>• Guess how many steps it will take to walk from where you are through the doorway, then count your steps as you move through to see how close you were to your guess.</li> <li>• Look through the doorway at an object inside and focus on approaching the object.</li> <li>• Walk up to the threshold, stop, and then focus on stepping over it.</li> <li>• Place colored tape on the threshold to draw attention to stepping over it.</li> <li>• Place colored tape in horizontal stripes in front of and through the doorway to step over.</li> <li>• Keep areas around doorways open and free of clutter.</li> <li>• Keep area well lit.</li> </ul>
Walking in crowds	<ul style="list-style-type: none"> <li>• Try to walk near walls.</li> <li>• Take slow, deep breaths and focus only on how your feet are moving, not on the people around you.</li> <li>• Alternate between walking a few feet and stopping.</li> </ul>
Starting to walk	<ul style="list-style-type: none"> <li>• Stop all movement and take a deep breath.</li> <li>• Make sure weight is evenly placed on both feet.</li> <li>• Visualize stepping over or kicking an object.</li> <li>• Shift weight to the side and step with the unweighted foot.</li> <li>• March in place before stepping.</li> <li>• Have your care partner place their foot ahead of your foot and step to it.</li> </ul>

**KEY POINT:** For all strategies in the table above, focusing on the task is important. Rushing, carrying objects, talking with others or even looking away for a moment may limit how well the strategy works.

## **Falls and Balance in PD**

Loss of balance and falls can be problematic in PD. People with PD are two times as likely to fall compared to the general older population. Once falls begin, they are likely to continue. Falls lead to injuries, fractures, pain and fear of falling. Ultimately, falls can cause a decline in mobility, strength and cardiovascular health – all things to be avoided.

### **Causes of Falls in PD**

- Slowed reaction time
- Freezing of gait
- Leg weakness
- Dizziness
- Shuffling steps that lead to tripping
- Poor safety awareness
- Difficulty doing two things at once
- Balance difficulties

### **Preventing Falls**

You can lower your risk of falling by performing specific exercises and using new movement techniques.

A physical or occupational therapist can recommend specific exercises, equipment and techniques to improve balance and mobility.

### **Balance Exercise**



1. Stand with a bed or couch behind you and a sturdy chair next to you.
2. Place two large soup cans or heavy containers on the floor in front of you.
3. Shift your weight onto one leg. Lift the other leg up so that your foot taps the can or container, then bring it down.
4. Switch to the other leg and repeat.

**NOTE:** You can hold the chair to steady yourself as needed. To make the exercise more challenging, try to tap the can or container more than once before you put your foot down.



## **Safe Movement Techniques**

### **Sitting in a Chair**

When sitting, turn all the way around and make sure that the backs of both legs touch the chair. Reach back with both arms to slowly lower yourself down.

NEVER reach forward for the chair first and then turn to sit. This can lead to landing sideways on the end of the chair, landing too hard in the chair or missing the chair and falling to the floor.



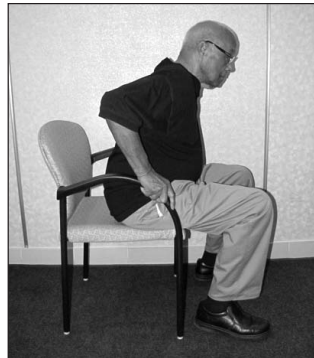
**Incorrect**



**Correct**

### **Standing up from a Chair**

When moving from sitting to standing, do not push yourself straight up out of the chair. This frequently leads to falling back on to the chair. Instead, do the following:



1. Move to the front of the chair.
2. Place legs wide apart.
3. Bend knees so feet are under you.
4. Place hands on chair rail.
5. Lean forward so your weight is on the balls of your feet and your bottom begins to lift up (“nose over toes”).
6. Push to stand.

## Reaching Tips

There are many strategies you can use to make reaching safer.

- Stand in the “Power Stance” (see picture to the right) with feet wide apart and staggered. This allows you to shift your weight side to side and front to back.
- Stand directly in front of the object you are reaching for.
- Place one hand on the counter, wall or other stable object while you reach with your other hand.
- Avoid reaching for an object that is further than arm’s length.
- Never lean your center of gravity (near the belly-button area) too far forward. If you reach for an object and your weight moves up onto the balls of your feet or your toes, you are too far from the object.



## Tips for Preventing Backward Falls

- Avoid stepping backward.
  - Step sideways.
  - Make a safe turn, then walk forward.
- Do not stand directly in front of the oven door, refrigerator door, microwave, or other appliance you are trying to open. Instead stand slightly to the side and use a “Power Stance,” with one hand on a stable surface.



### Incorrect

This stance can lead to retropulsion or falls.



### Correct

This technique is safer. Note the Power Stance position of the feet.

## **Environmental Tips for Preventing Falls**

For a complete safety review of your home, contact a physical therapist, occupational therapist or certified aging-in-place specialist (CAPS). You can locate a CAPS by contacting the National Association of Home Builders at **1-800-368-5242**.

### **General Recommendations**

- Remove throw rugs
- Keep areas well lit
- Install grab bars in the bathroom
- Install handrails on all stairs
- Avoid clutter
- Avoid rolling chairs
- Use nightlights
- Do not be afraid of change

## **When a Fall Occurs**

1. First, remain calm. Feel and look for any pain or possible injuries before you try to get up. Plan your strategy carefully.
2. Use a heavy piece of furniture to assist you in getting up. If you doubt your ability to safely get up alone, crawl or scoot to a phone and call for help.
3. If you are someone who frequently falls, it is recommended that you enroll in a home emergency response system.

## **Getting up from a Fall**



Begin to bend your knees up.



Once your knees are bent and your feet are flat on the floor, reach one arm out to the side.



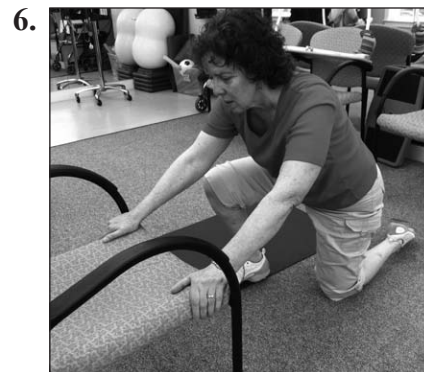
Reach the arm that was out to the side across your body while allowing your knees to fall over so that you can roll onto your side.



Push yourself up to a side sit.



Then push yourself up onto your hands and knees.



Crawl to a sturdy piece of furniture, like a chair.

- a. Hold onto the chair with both hands.
- b. Bring your strongest leg up in front of you so that your foot is flat on the floor under your knee.
- c. Be sure your legs are wide apart.



Push up with your strong leg. Bring your other leg up so that the foot is flat on the floor. Pause here for a moment to be sure you are not lightheaded.



Slowly push your trunk up to stand tall.

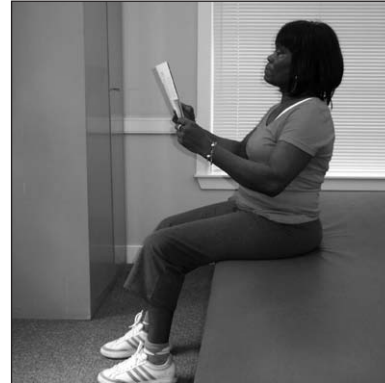
## CHAPTER 6

### Posture

*Your mother was right. You do need to sit up straight!*



**Incorrect**



**Correct**

Even without PD, it is easy to fall into the habit of bad posture. Some typical positions we place ourselves into contribute to bad posture:

- Sitting and watching TV for too long
- Leaning over to work on the computer
- Sitting for too long while driving/riding in the car
- Looking down while reading or propping your head against the headboard while lying down in bed

The following tips are helpful for maintaining good posture in all positions.

### Sitting

**KEY POINT:** After about 15-20 minutes of sitting, get up and move around. DO NOT sit for long periods at a time.

- Sit so that your back is fully in contact with the chair back.
- Use a roll or pillow along your low back, especially for long car and plane rides and in the theater – it will help you to sit tall.
- Keep the computer screen and TV at eye level to minimize neck and eye strain.
- While reading, use a bookstand or rest your elbows on a pillow or a table. This allows you to look directly ahead at the pages.

- When reading in bed, sit with your entire back resting on the headboard, not just your head and neck.
- Maintain eye contact during conversation. This holds the head erect.
- Avoid sitting in chairs without back support or arm rests.
- Avoid recliners. They promote rounding of the neck, shoulders and head, as well as tightness in the hips.
- Avoid low, soft couches and chairs. The height of your chair should allow for your hips and knees to be level with one another.

### **In Bed**

- Avoid using too many pillows or a pillow that is too thin under the head.
- The best position for sleeping is lying on your side with a pillow between the knees.
- Avoid sleeping in a chair. Lie down on a bed to nap.

### **More Tips**

- Perform frequent neck and shoulder stretches to relieve muscle tension.
- Place written reminders on commonly used items like the bathroom mirror, computer screen and television: “STAND TALL.”
- See a physical or occupational therapist for specific posture exercises.

## CHAPTER 7

### Complementary Therapies

*Many therapies that feel good and are fun are also good for you!*

#### **Massage**

Massage therapy has been shown to increase circulation, reduce muscle tension and promote relaxation. It can be particularly helpful if you have problems with rigidity, anxiety and/or stress.

Massage is not a substitute for regular movement and exercise, but it can be a wonderful addition to your overall exercise program. Self-massage and care partner-assisted massage can be helpful. Most drug or department stores sell items such as wooden rollers and hand-held electric massagers that you or your care partner can use.

If you want a professional massage, select a massage therapist who is certified by the American Massage Therapy Association (AMTA). To find one near you, visit [www.findamassagetherapist.org](http://www.findamassagetherapist.org) or call **1-877-905-0577**.

It is important to note that massage services are often not covered by health insurance.

#### **Yoga**

Yoga increases flexibility, breathing and posture awareness and helps with relaxation and stress reduction. Yoga is a self-paced activity, which means that not everyone has to perform a pose in the same way or hold it for the same amount of time. Most poses can be modified depending on your needs. Yoga can even be performed in a chair.

Yoga classes and private sessions are held at many fitness centers, senior centers and community recreation centers. Since there are many types of yoga, it is important to contact the instructor prior to beginning a class. Search for an instructor in the Yoga Journal online directory at [www.yogajournal.com/directory](http://www.yogajournal.com/directory). You can also contact The Yoga Alliance for more information by phone at **1-888-921-YOGA (9642)**, by email at [info@yogaalliance.org](mailto:info@yogaalliance.org) or on their website: [www.yogaalliance.org](http://www.yogaalliance.org). Finally, there are many books and videos on yoga for people with PD that you can order or access online.

#### **Tai Chi**

Tai chi is an ancient Chinese form of exercise that involves slow, gentle movements, each flowing into the next. Tai chi incorporates posture, mental focus and deep breathing as the body is in constant motion.

Recent research supports the role of tai chi in improving balance for individuals with PD. Many people with PD also report improvements in flexibility, strength and relaxation after doing tai chi.

Many fitness centers, senior centers and community recreation centers might offer tai chi classes. It is important to speak with the tai chi instructor to learn if the class will be beneficial for you.

You can learn more about tai chi and other therapies discussed in this chapter from the National Center for Complementary and Alternative Medicine at the National Institutes of Health: [www.nccam.nih.gov](http://www.nccam.nih.gov).

## **Pilates**

The Pilates method focuses on developing strong core muscles to help build strength and teach body awareness, good posture and graceful movement. The exercises can be performed using a floor mat and a variety of equipment. Pilates can help improve flexibility and agility and may also help with back pain.

Classes are often offered at fitness centers, senior centers and community recreation centers. It is important to first speak with the Pilates instructor to learn which exercises are best for you.

To learn more about Pilates or for help locating an instructor, visit the Pilates Method Alliance at [www.pilatesmethodalliance.org](http://www.pilatesmethodalliance.org) or contact Balanced Body at [www.pilates.com](http://www.pilates.com) or **1-800-PILATES (745-2837)**.

## **Dance**

Dance classes engage participants' minds and bodies in a social environment. Many people with PD who cannot walk well report they can still dance, and dance well! Studies show that dance can help with:

- Balance
- Walking ability
- Balance and walking confidence
- Movement initiation
- Quality of life and sense of well-being



There are many dance options for people with PD, including general dance therapy as well as specific types of dance, such as tango. Dance/movement therapists work with individuals and groups in a variety of settings. To locate a dance therapist, visit the American Dance Therapy Association at [www.adta.org](http://www.adta.org) or call **1-410-997-4040**.

Two programs that are popular across the country are Dance for PD® and Let Your Yoga Dance®. Learn more and find classes at [www.danceforparkinsons.org](http://www.danceforparkinsons.org) and [www.letyouryogadance.com](http://www.letyouryogadance.com), respectively.



## **Boxing**

It might seem counterintuitive to pick up boxing as therapy for Parkinson's, since there is some evidence that the head trauma from boxing can contribute to the disease. However, when done without contact, safely and in the proper setting, boxing can be fun and as beneficial as other types of exercise. If you want to fight PD in the ring, learn more about Rock Steady Boxing, which works exclusively with people with PD: [www.rocksteadyboxing.org](http://www.rocksteadyboxing.org).



## **Certified Personal Trainers**

Certified personal trainers generally work at fitness centers, senior centers, private gyms and in the home. Certification is available through a number of national organizations. Make sure your trainer is certified and ask about their knowledge and experience working with people with PD. Working with a trainer is a good way to continue with your exercise routine once you are no longer receiving physical or occupational therapy. Encourage your therapist to review and explain your program to your trainer to ensure a smooth transition.

## **Music**

Many people with PD are aware of the positive effect that music has on them. Now researchers are taking notice of these benefits. Studies show that music can reduce stress, improve breathing and voice quality and promote self-expression.

Music therapists work in a variety of settings, and some insurance companies will pay for their services. Music therapists work with individuals or groups through the use of some of the following:

- Singing
- Interpreting music through movement
- Using music for relaxation
- Using music to help initiate movement
- Song writing
- Lyric discussion
- Imagery
- Performing music
- Therapeutic drumming

For more information on music therapy, visit the American Music Therapy Association at [www.musictherapy.org](http://www.musictherapy.org) or call 1-301-589-3300. You can also visit the Institute for Music and Neurologic Function at [www.musictherapy.imnf.org](http://www.musictherapy.imnf.org) or call 1-718-519-5840.

## **Service and Therapy Dogs**

Animal-assisted therapy uses animals as a form of treatment. Many people find comfort in the companionship of a pet and experience emotional and even cognitive benefits from being around animals. Some rehabilitation facilities offer animal-assisted therapy, and volunteers bring therapy dogs to various health care settings. Some dogs are specially trained to provide care to people with disabilities. These animals are individually trained to do work or perform tasks for the benefit of an individual with particular needs. Many organizations provide information on service therapy dogs, and you can apply for a service animal yourself if there is no pet therapy at a facility near you:

- Canine Companions for Independence: **[www.cci.org](http://www.cci.org)** or **1-800-572-BARK (2275)**
- Canine Partners for Life: **[www.k94life.org](http://www.k94life.org)** or **1-610-869-4902**
- Service Dog Central: **[www.servicedogcentral.org](http://www.servicedogcentral.org)**



## CHAPTER 8

### Young Onset Parkinson's Disease

Individuals with Young Onset Parkinson's Disease (YOPD) generally have fewer functional difficulties early in the disease. This is because they tend to have fewer medical issues to deal with compared to older adults. However, PD can affect people with YOPD in other ways, impacting how they deal with young children, jobs and body image.

If you have YOPD, empower yourself through knowledge, support and exercise. It is extremely important that you begin a fitness routine as soon as possible to slow the course of your disease.

Take control and do not wait until you need rehabilitation. Start now with pre-habilitation. Your ideal exercise routine includes all the types of exercise described in this book:

- Aerobic activity at moderate to high levels
- Core strengthening
- Flexibility exercises
- Balance exercises that combine physical and mental challenges



## **Appendix**

### **Training the Therapists and Trainers**

*This section provides resources for physical and occupational therapists and other fitness professionals. Show this to or copy these pages for your fitness teams.*

### **NPF's Allied Team Training for Parkinson's (ATTP)**

ATTP is a unique interdisciplinary curriculum where health care professionals from diverse disciplines learn about the best techniques in Parkinson's disease care through a dynamic, team-based approach. The interactive training program includes care strategies for all stages of Parkinson's, interdisciplinary training to foster stronger care teams and continuing education credits.

In a four and one half day curriculum leading to NPF certification, trainees receive in-depth knowledge of how to assess and treat persons with Parkinson's disease in an interdisciplinary setting. Trainees practice integrated care planning in teams, using case study vignettes and videos of actual persons with Parkinson's. Trainees also spend time with their own discipline, learning state-of-the-art assessment and treatment techniques. Panels of persons with Parkinson's disease, including young onset PD, and a panel of family caregivers are brought into the training so that trainees hear, first-hand, the impact of Parkinson's disease on people's lives.

For more information and to find the next ATTP training session, call the NPF Helpline at **1-800-4PD-INFO (473-4636)** or visit **[www.parkinson.org/attp](http://www.parkinson.org/attp)**.

### **Other Trainings for Health Professionals**

There are many certification programs available for allied health professionals to enhance their ability to care for people with Parkinson's disease, including the following:

#### **LSVT<sup>®</sup> LOUD and LSVT<sup>®</sup> BIG**

LSVT<sup>®</sup> LOUD is designed to train professional speech-language clinicians in a voice/speech treatment technique for adults and children with motor speech disorders, with a specialty in Parkinson's disease. LSVT<sup>®</sup> BIG is a specialized rehabilitative therapy for people with PD to improve their quality of movement. Visit **[www.lsvtglobal.com](http://www.lsvtglobal.com)** for more information.

#### **PWR! (Parkinson Wellness Recovery)**

PWR! trains therapists and fitness professionals to increase the availability, quality and standardization of PD-specific exercise programs that adhere to Exercise4BrainChange<sup>®</sup> principles of practice in an enriched (fun, social, engaging) environment. Visit **[www.pwr4life.org](http://www.pwr4life.org)** for more information.

## **Information Resources**

### **Physical Therapists for Parkinson's, [www.parkinsonspt.com](http://www.parkinsonspt.com)**

A blog published by a PT specializing in PD with resources for therapists, patients and caregivers.

### **Association of Physiotherapists in Parkinson's Disease Europe, [www.appde.eu](http://www.appde.eu)**

An organization that initiates and supports knowledge transfer between physiotherapy clinicians, researchers, educators and managers, members of the multidisciplinary team, people with Parkinson's, families, policy makers and healthcare providers to promote best practice physiotherapy for people with Parkinson's across Europe.

## Acknowledgments

To the rehab staff and patients of the Dan Aaron Parkinson's Rehab Center: thank you for volunteering your time as models, photographers, proofreaders and cheerleaders throughout the writing of this book.

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## About the Author

**Heather Cianci, PT, MS, GCS** is a Geriatric Clinical Specialist and founding therapist at the Dan Aaron Parkinson's Rehabilitation Center (Good Shepherd/Penn Partners) at Pennsylvania Hospital in Philadelphia, PA. Heather received her Bachelor's in Physical Therapy from the University of Scranton in Scranton, PA, and her Master's in Gerontology from Saint Joseph's University in Philadelphia. She has been a physical therapist since 1994, with the majority of those years dedicated to working with patients with Parkinson's disease. Heather is a certified LSVT® BIG clinician and PWR (Parkinson Wellness Recovery) clinician, as well as a graduate of the National Parkinson Foundation's (NPF) Allied Team Training Program (ATTP) and the Rock Steady Boxing Method for PD. She authored chapters on rehabilitative strategies in *Comprehensive Nursing Care for Parkinson's Disease* and *What If It's Not Alzheimer's?* and is a co-author of *Activities of Daily Living: Practical Pointers* (NPF). In 2011 Heather became an LSVT® BIG trainer, traveling the US and Europe teaching physical and occupational therapists about exercise for Parkinson's disease. Heather's research includes movement strategies for bed mobility, fall prevention, and freezing of gait. She teaches about rehabilitation and PD to physical therapy students at several Philadelphia area universities. Heather also frequently lectures at support groups, patient and care partner conferences, and continuing education courses for therapists. She is a Board member of CurePSP, the Foundation for PSP/CBD and Related Brain Diseases, as well as the Chair of their Medical Professional Advisory Committee.

**Notes**

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## **About the National Parkinson Foundation**

At the National Parkinson Foundation (NPF) we make life better for people with Parkinson's through expert care and research. Everything we do helps people with Parkinson's actively enjoy life. We continue to bring help and hope to the estimated one million individuals in the United States, and 10 million worldwide, who are living with Parkinson's disease. A wealth of information about Parkinson's and about NPF's activities and resources is available on our website, **[www.parkinson.org](http://www.parkinson.org)**.

## **National Parkinson Foundation Educational Books**

This book is part of the National Parkinson Foundation's Educational Book Series, which addresses important topics for people with Parkinson's disease. To request a free copy of any book(s) in the series, contact the NPF Helpline at **1-800-4PD-INFO (473-4636)** or visit **[www.parkinson.org/books](http://www.parkinson.org/books)**.

## **Your feedback matters!**

We'd like to know what you think of our publications and programs. Please take a few moments to fill out our online feedback form. Your answers will be used to improve our resources and will benefit people with Parkinson's, caregivers, families, and others in the Parkinson's community. Thank you for your help.

**Online form: [www.parkinson.org/feedback](http://www.parkinson.org/feedback)**

**Your generosity makes this publication possible.**

The National Parkinson Foundation is proud to provide these educational materials at no cost to individuals around the globe. If you find these materials helpful, please consider a gift so that we may continue to fight Parkinson's on all fronts: funding innovative research, providing support services and offering educational materials such as this publication. Thank you for your support.

**Donate online:** [www.parkinson.org/donate](http://www.parkinson.org/donate)

**Donate by mail:** National Parkinson Foundation  
Attn: Donor Services  
200 SE 1st St, Suite 800  
Miami, FL 33131

**Donate by phone:** 1-800-4PD-INFO (473-4636)

**Tax ID:** 13-1866796



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