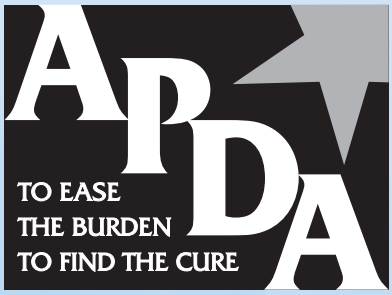

American Parkinson Disease Association

AQUATIC EXERCISE

An Exercise Program for People with Parkinson's Disease

American Parkinson Disease Association, Inc.

THE AMERICAN PARKINSON DISEASE ASSOCIATION, INC.

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An Exercise Program for
People with Parkinson's Disease

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FOREWORD

This manual was developed to assist individuals with Parkinson's disease, their family members and caregivers, as well as fitness professionals to better understand how aquatic exercise can have positive effects on physical and mental wellness.

As authors, the following individuals shared their expertise in the field of aquatic fitness and Parkinson's disease:

Laurie Denomme, BS – is an Aquatic Exercise Association (AEA) training specialist and co-author of The Aquatic After Care Training Manual, a book on special population and post-rehab fitness training. As an aquatic fitness expert, she has traveled internationally to share her unique and personally developed fusion training.

Kathi Sims, RN - is a medical exercise specialist in Sarasota, Florida and has worked in the fitness field for 16 years. Kathi teaches aquatic fitness classes for those who live with the challenges of Parkinson's disease. She provided consultation in the creation of the DVD, Functional Aquatic Fitness Training for Parkinson's Disease.

Helen M. Tilden, RN – is a leader in the field of aquatics for special populations. She has developed wellness programs for multiple sclerosis, arthritis and Parkinson's disease. Helen has also created training manuals for three non-profit organizations, enabling them to expand their wellness programs in the community.

Mary Wykle, PhD – is a college professor, offering workshops through MW Associates and presenting for ATRI, AEA and IAFC. Her Aqua Pi-Yo-Chi™ is now a specialty certificate educational program for AEA. Mary holds multiple certifications and also developed the Risk Awareness and Safety Training course.

Authoring Organization – The Aquatic Exercise Association is a not-for-profit educational organization committed to the advancement of aquatic fitness worldwide.

The Editor – Julie See, President and Director of Education for the (AEA) and co-founder of Innovative Aquatics, has been active in various parameters of the fitness industry for over 25 years. She is the co-author of the book, Aqua Aerobics: A Scientific Approach.

A special thanks goes to the following individuals who in 2001 wrote an excellent resource that has served as the base for this manual. Their dedication to the project is greatly appreciated.

Carla Cothran BS, MSN, MAEd
Barbara Habermann, PhD, RN
Ann Elizabeth Peters O'Nihill, BS

Most importantly, we recognize the commitment of the American Parkinson Disease Association, Inc. (APDA) for sponsoring this project. The APDA continues to strive "to ease the burden and find the cure" for Parkinson's disease.

Julie See, BS
President and Director of Education
for the Aquatic Exercise Association

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INTRODUCTION

Exercise empowers individuals with Parkinson's disease (PD) to feel stronger and more in control. It can help by increasing muscle strength and endurance as well as by enhancing flexibility. Research further supports postive outcomes on personal outlook and mood. According to MacBeth, " The medical literature has shown that medication and surgical intervention alone are not adequate treatment for Parksinson's disease. Exercise, functional training, and education are also integral parts of the management of this disease and its disabilities." It is important to note that the educational aspect extends out to the indivdiual's family and caregivers as well.

Exercise will not reverse the symptoms of PD, but it can enhance quality of life and maintain functional independence for a longer period of time. The goal of aquatic exercise is to rekindle a desire to be proactive with the disease and foster a healthy and active lifestyle. The exercise program should focus on maintenance and, when possible, improvement of joint flexibility, muscular strength and endurance as well as cardio-respiratory (aerobic) ability.

Keep in mind exercise and disease symptoms will vary greatly among individuals. Symptoms for PD may fluctuate hour-to-hour, day-to-day and week-to-week, no matter what exercise program one is following. Training should take into consideration daily responses to medications, stage of the disease and environmental changes (such as air or water temperature).

SECTION 1

PROGRAM DESIGN FOR PEOPLE WITH PARKINSON'S DISEASE

BENEFITS OF AQUATIC EXERCISE

Buoyancy provides support to weak muscles for reassured balance and improved posture by just standing in the pool. Movement will become less guarded as the fear of falling is significantly reduced leading to movement success. This success will translate into feelings of enjoyment and the desire to want to participate regularly. Buoyancy reduces the impact stress to the joints and often allows greater mobility.

Resistance is provided by the water that surrounds the exercise participant. This multi-directional resistance helps the individual to maintain or enhance muscular strength and endurance even with gentle movements. The water resistance also **enhances body awareness**, which can assist with maintaining proper posture and a sense of movement within space during activity.

The warm water aquatic environment is **comfortable**. Each individual can easily adjust his/her level of training, thus avoiding unwanted fatigue, muscle soreness and poor posture. New participants need to begin the aquatic program slowly (15-20 minutes) and be closely observed for fatigue.

Advantages of Warm Water Exercise:

- Freedom of movement promotes increased range of motion (ROM) and improved function.
- Improvement in muscle tone.

  Reduced stiffness and pain.
- Soothing effect helps increase tolerance for exercise.
- Enhanced muscular strength and endurance.
- Continual adjustment to the dynamic environment heightens body awareness that **may** enhance posture and motor control during walking.
- Aquatic exercise participants have reported improved bowel function.
- Social interaction and enjoyment decreases feelings of isolation and depression and creates an overall sense of well-being.

WHAT TO LOOK FOR IN A POOL FACILITY

Most states and/or counties have established codes regulating aquatic facilities that can be obtained from the state or county boards of health. Regulations vary from state to state, but all include minimum standards for the physical site, water sanitizing materials and safety procedures for patrons and personnel. Additionally, various federal statutes exist relating to pool safety.

Facility Checklist:

- State and/or County Board of Health monthly inspection ratings should be available for the public to view. This rating will list any problems and give a total score.
- Compliance with the Americans with Disabilities Act (ADA).
- Assisted unisex dressing rooms and shower areas allowing caregivers to aid with dressing and undressing.
- Nonskid floor surfaces in dressing rooms, restrooms, showers and pool deck areas.
- Pool access via steps with handrails, ramp with handrail and/or pool chair lift for safe entry and exit.
- Poolside seating available.
- Licensed pool operator/manager with the appropriate credentials as designated by the state or national codes should be on staff.
- Certified lifeguards on duty at the pool during the exercise program.
- Facility parking should be convenient to the pool area and easily accessible for a person with special needs.

AQUATIC SAFETY ISSUES SPECIFIC TO PD

General Precautions

Individuals with PD should seek approval from their primary caregiver before beginning any new exercise program or altering a current program. Program participation may require a medical release form.

Getting Started

Some pool facilities may require that each individual be physically independent. If assistance is required, inquire about policies to bring an attendant or caregiver before joining a facility. Attendants and caregivers often enjoy the aquatic program as much as the client, as the water is an excellent stress reducer. The program can also provide an enjoyable opportunity for family interaction.

Initiation to the pool may be stressful and cause an acute attack of PD symptoms. Some stressors include: being in a new environment; wearing a bathing suit; meeting new people; and simply not knowing what to expect. Increased rigidity or slowness during the first few exercise sessions in the pool may be noticed. A calm and knowledgeable aquatic fitness professional will guide participants through this phase, quickly creating a sense of comfort.

Energy Depletion

Even though you may feel relaxed during and after the exercise session, you are expending large amounts of energy while exercising. As you move through the water, you are working against the constant resistance of the water. Simply breathing in neck deep water requires more energy than on land. Your physician may suggest bringing an extra dose of medication to the pool.

Exit the pool slowly and be aware of any signs of weakness, rigidity or dizziness. If any of these signs are present, the individual should sit in the pool area until their body readjusts to being “on land” with the effects of gravity.

Water Temperature

A side effect of some PD medications is orthostatic hypotension (low blood pressure). Additionally, the PD nervous system is more vulnerable to sudden or unexpected changes, such as cool water temperatures. Fainting may result from a sudden drop of blood pressure.

For this reason, water temperature is important to consider when engaging in aquatic activities – both indoors and outdoors. A pool designed for traditional water aerobic programs is typically within the range of 83°to 86°° F (28° to 30° C). Spas and hot tubs are in the range of 105° F (40.6° C) and therapy specific pools targeting low function/low intensity programs range

from 91° to 95° F (33° to 35° C). Thus, a pool labeled as "heated" may not necessarily have the appropriate water temperature for a Parkinson's population to exercise comfortably and effectively.

Other considerations are air temperature, humidity and air circulation. Pool conditions vary from facility to facility and possibly day-to-day. Although **water temperature of 90° to 92° F (32.2° to 33.3° C) is often ideal for PD programs**, it is not always available. For individuals able to exercise at a higher intensity, cooler water may still be a viable option. Be aware of the environment and make adjustments as needed for comfort, such as wearing a long-sleeve jacket designed for water exercise to add warmth.

Each individual will have specific comfort levels – learn to "listen to your body". It is important not to become chilled to the point of discomfort or adding stress. "Chill bumps" and "shivering" are signs that the water temperature is too cold for the current level of exercise intensity. Options include appropriate clothing and exercise intensity modification.

Skin Care

Most facilities require patrons to shower before entering the pool to remove body oils, perspiration and any skin care products to maintain the water quality. After an exercise session, a shower removes pool chemicals that contribute to skin irritation or dryness. Use a moisturizing lotion before dressing.

Do not enter the pool if you have a skin rash, open sores or wounds. Individuals with small cuts or abrasions should apply a water proof bandage to these areas.

Balance

Postural instability may lead to loss of balance, even in the water. Flotation devices such as inner tubes, belts, noodles and hand bars do not solve the problem and may make the situation worse in some cases. Even a good swimmer with Parkinson's may have difficulty regaining footing and upright posture.

Some PD programs include a Functional Reach Test (conducted on land) prior to beginning aquatic exercise. This assessment test, administered by an exercise physiologist or therapist, determines the individual risk for falling on land.

Prior to joining a class, the aquatic fitness professional will assess each individual for water safety, comfort and awareness. The following skills are important to increase safety and awareness:

- Water walking forward, backward and side-to-side.
- Submerging the face and blowing bubbles.
- Floating on the back and ability to return to standing.
- Floating face down and ability to return to standing.

These simple skill assessments indicate the amount of assistance each individual needs in the water during the exercise program. A companion can provide support for the first few classes, until skills improve and comfort levels increase to the point of feeling at ease with the water and the program.

Improved balance in the water does not always transfer to similar improvements on land. For example, individuals may still need to use a walker for movement on land, even after walking independently in the water.

For more details on safety issues, see the next topic area, WHAT TO LOOK FOR IN AN AQUATIC PROGRAM. *The Safety in the Pool* section on page 10.

WHAT TO LOOK FOR IN AN AQUATIC PROGRAM

Aquatic Therapy vs. Aquatic Exercise

Aquatic therapy is traditionally defined as an individual client working on a one-on-one basis with a therapist. This is usually very short term and is reimbursed by third party payers (insurance). For long term benefits, an aquatic exercise class may be more appropriate and affordable. Your local PD support group, hospitals and rehabilitation centers are good sources of information regarding the best opportunities in your community. If cost is a factor, the local support group may be able to negotiate with a local facility to provide aquatic classes at a reduced rate. Generally, insurance will pay for physician-prescribed therapy for a limited num ber of sessions, and may even pay for group sessions if viewed as wellness activities or as health promotion. Local YMCAs, health spas, universities and recreational centers may provide general aquatic classes that are appropriate and beneficial.

- **Aquatic Therapy** – is a part of physical and rehabilitative medicine. The term refers to various therapeutic techniques performed by licensed practitioners, occurring in the aquatic environment. The scope of practice is limited in the water to that of what would be permitted on land according to the state regulations of the particular licensed professional.

  Licensed and/or professionals that may provide aquatic therapy include clinical exercise physiologists, kinesiotherapists, kinesiologists, massage therapists, physical therapists, physical therapy assistants and recreational therapists.

  Currently, only the Aquatic Therapy & Rehabilitation Institute (ATRI) offers certification in the field of aquatic therapy. ATRI has certification procedures and is working to establish credentials and continuing education programs for aquatic therapists. Sitting for the certification examination is not limited to licensed professionals, therefore attaining ATRI Certification does not legally permit one to practice “aquatic therapy.”

- **Aquatic Exercise** – the intent is to improve muscular and cardio-respiratory health, flexibility, strength and joint range of motion; aquatic fitness is not considered to be a therapy technique by the American Medical Association (AMA). An Aquatic Fitness Professional is trained to work with apparently healthy individuals and/or special populations/post-rehab individuals that have been given medical clearance to participate in an exercise program.

The Aquatic Exercise Association (AEA) is an internationally recognized organization of aquatic fitness education for professionals conducting aquatic exercise programs. AEA offers certifications and numerous continuing education programs throughout the world. There are other organizations that offer certification and education in aquatic exercise.

What a Safe and Effective Parkinson Program Should Look Like

The goals of this program are to:

1. Lessen the degree of disability.
2. Assist the individual to become more functional in activities of daily living,
3. Promote independent functioning for a longer period of time.

This will be achieved by focusing on improving balance, gait and flexibility while increasing muscular strength and endurance as well as cardio-respiratory strength and endurance.

The aquatic program could be composed of individuals at various stages of the disease, ranging from early onset to more advanced stages. Meeting the needs of each individual presents a challenge and requires understanding, patience and flexibility on the part of the aquatic fitness professional. The aquatic fitness professional understands that an individual's functioning can change on a daily basis and will make allowances for those changes and encourage individuals to do only what they can do on any given day. Rest periods will be given as necessary. As needs change, the aquatic fitness professional will re-evaluate and modify the program on a regular basis.

Being in a program with others who are experiencing similar challenges promotes an atmosphere that is supportive, and that will meet emotional and socialization needs as well as physical needs.

In order to enhance quality of life, exercise is ESSENTIAL. When fun, playful activities are incorporated into the program, this will make the program enjoyable and promote exercise adherence.

Safety in the Pool

Prior to beginning an exercise program, it is vital for each individual to obtain a letter of permission from his/her physician.

Individuals with Parkinson's disease should never go into the pool alone. Problems with balance and "freezing" may cause a person to lose footing or tip forward or backward and be unable to recover to a standing position.

Proper clothing is essential for comfort and safety in the pool. Bathing suits should fit properly. Loose-fitting suits could fill with water, creating extra weight. They also increase drag that could interfere with the performance of exercise and possibly create balance problems. A suit that is too tight could restrict movement and interfere with circulation. If pool temperatures are

cooler, or if a person is particularly susceptible to cooler temperatures, wearing thermal clothing is advisable. Clothing appropriate for the pool is available through various swimsuit companies. *(See HELPFUL RESOURCES.)*

It is advisable for individuals to wear water shoes in the pool. Shoes will provide traction and will also protect the soles of the feet from scrapes on the pool bottom. Shoes that resemble regular exercise shoes, but are specifically made for water, will provide more support for those who experience serious balance problems. Other shoes look more like socks or slippers and, while not as supportive, they will still provide some traction and protection for the soles of the feet.

Getting into the pool could present challenges for some people with Parkinson's disease. Pools with steps should have a rail so that people will have support while walking into the pool. Some pools may have dry ramps or moveable floors. In some cases, a chair lift may be necessary for some to enter/exit the pool. When entering and exiting the pool, it is advisable to have someone walk with the individual to guard against slips and falls.

Exercise is best performed in the shallow end of the pool, and the water should be no higher than chest level. It is advisable in some cases for individuals to remain within arms distance from the side of the pool. If "freezing" occurs or balance is lost, the individual can use the side of the pool to help to re-establish alignment and safe movement. For security, some individuals may benefit from holding onto a noodle or foam hand bars while performing exercises.

It is usually necessary for the aquatic fitness professional to have volunteers, family members or caregivers in the pool to provide assistance as needed while performing exercises. Not only can they provide physical support, but they can offer emotional support and encouragement as well.

Class size should be limited so that careful consideration of various needs can be accommodated. With one instructor, it is suggested to limit the class to no more than 10 participants but often six to eight is more feasible. When possible, it is beneficial to have two aquatic fitness professionals teaching the program. The class can then be divided into levels of functional ability, with one instructor working with those of greater functioning ability and the other with those of lesser functioning ability. Each group can then be challenged according to their own abilities.

A person with Parkinson's disease should be careful not to over-exercise. This can cause fatigue, affecting one's ability to exercise safely and effectively and possibly even limit the ability to exit the pool at the end of class. A person who is just beginning a program may only be able to tolerate 20-minute sessions two or three times a week. Some individuals will gradually

progress to where they can tolerate 45 minutes to one hour of aquatic exercise. Rest periods during the class may be necessary. A person should leave a class feeling energized, not frustrated. This will promote exercise adherence.

For more details on safety issues, see the previous topic area, AQUATIC SAFETY ISSUES SPECIFIC TO PD on page 5.

When Parkinson-Specific Programs Are Not Available

If Parkinson-specific classes are not available, facilities within the community may offer aquatic programs that would be appropriate for persons with PD. Such programs could include arthritis programs, water walking classes, and senior fitness classes. Any form of exercise is better than no exercise at all, so it is wise to explore all available options.

There are several factors that need to be explored when considering involvement in these programs. Individuals need to be aware of their own functioning abilities in order to determine if available programs will meet their needs. Being able to observe the programs will help in this determination.

The facility must also be carefully examined. It is important that there is adequate parking near the building, ease of access for those with disabilities, roomy and easily accessible change areas, appropriate access into the pool, and an appropriate pool temperature.

Aquatic fitness professional qualifications are of utmost importance. The instructor needs to have knowledge of Parkinson's disease and its various symptoms and challenges. He/she must meet with each person to get some background information on each individual's level of functioning and particular challenges so that appropriate exercise advice can be given and modifications suggested.

As well as training specific to PD, the aquatic fitness professional should be certified by a national organization specializing in aquatic fitness or therapy. This is important so that he/she is well aware of the environmental considerations that must be accounted for in pool programming. In addition to having a certified lifeguard on deck, it is highly recommended that the Aquatic Fitness Professional have a certification in water safety skills. There are many water safety courses available including the National Recreation and Parks Association, American Red Cross, YMCA and Starfish Aquatics. One course that is targeted directly toward the aquatic professional working with exercise and therapy concerns is the Risk Awareness and Safety Training (RAST) offered by MW Associates.

Personal Training As An Option

Individuals may choose personal training if there are no Parkinson-specific classes available in the community, if existing programs are not appropriate for certain individuals, or if this is a personal preference.

There are many advantages to personal training. This enables the aquatic fitness professional to get to know the client and their spouse and family members on a more personal level. By seeing the client and their family on a regular basis, education about the disease and management of symptoms can be supplied and emotional support provided. Whereas a group program is more general in nature, the one-on-one program can be individualized to the specific needs of the client and altered as needs and functioning abilities change.

To find a qualified aquatic fitness professional, contact various facilities in the community for recommendations. A hospital-based rehabilitation center would be a great place to start since personal trainers working in those centers have specific medical knowledge and probably some experience working with individuals with Parkinson's disease. Once personal trainers have been found, it is a good idea to meet with each one individually to determine who would be best suited to meet the needs of the client. The trainer's credentials and experience must be carefully examined. The trainer working with this population must be knowledgeable about the disease, patient, flexible, compassionate and caring. He/she must be passionate about working with special populations and be committed to challenging the client's existing capabilities with the goal of improving quality of life and extending independent functioning.

Checklist to Choose an Appropriate Aquatic Exercise Program & Leader

√ Individual should have written consent from their healthcare provider to participate in an aquatic exercise program. Ask the healthcare provider if there are any recommended exercises or precautions he/she should follow.

√ Choose whether to attend a group class, small group training or personal one-on-one training.

√ Know the qualifications of your Aquatic Fitness Professional (AFP).

- Does the AFP have a current and nationally recognized certification related to aquatic exercise, such as that offered by the Aquatic Exercise Association?
- What additional training/professional development has the AFP done in the past 2-3 years?
- How many years has the AFP been teaching/training clients?
- Is the AFP knowledgeable about PD?
- Are you compatible with the AFP?
- How long are the classes/training sessions?
- Does the AFP have a current CPR Certification & AED Training?
- Is the AFP trained in basic water rescue skills?

√ If you are planning to have an AFP provide training sessions in your home pool, some questions you may want to ask include:

- Does the AFP have a current and nationally recognized personal training certification?
- Does the trainer provide the equipment?
- How are the sessions paid for? After each session/in advance, etc.
- If exercising outdoors, what is the procedure for bad weather?
- Does the AFP have personal liability insurance?

SECTION 2

PROGRAM DESIGN FOR AN AQUATIC EXERCISE LEADER

PROGRAM DESIGN FOR PD AQUATIC EXERCISE

Teaching an aquatic exercise class for people with Parkinson's disease (PD) includes a class design with a focus on "what they can do today" in addition to promotion of a healthy, independent lifestyle. If there is one ever-present thought in the mind of a person with Parkinson's disease, it is to live independently today. Tomorrow is tomorrow, but an effective exercise program contributes to a better tomorrow.

The aquatic fitness professional's teaching role expands to include educator and coach to support the ups and downs of each person in the disease process. This includes assessment of each person's physical ability, endurance, cognition and the effects of their current treatment plan. This expanded role requires keeping close track of the participants' progress and understanding that the fitness program must be highly individualized.

Before selecting exercises for the class, refer to the American Parkinson's Disease Association Web site for educational materials to learn about the clinical manifestations of the disease and their impact on movement and motor control. This information will help you understand the symptoms of PD to develop a lesson plan of exercises that are effective and performed with relative ease.

Teaching Tips

1. When designing the class and selecting exercises, consider the following symptoms:
    - Tremors in arms and/or legs
    - Stiffness of limbs and/or trunk
    - Impaired balance and coordination
    - Bradykinesia (slow movement)
    - Postural instability

2 Make frequent eye contact with each participant before, during and after each class to observe for weakness, rigidity or dizziness.

3. Minimize sudden or unexpected changes in direction, tempo or intensity with cues or choreography.

4. If you use choreography, keep it short and simple to reduce stress and anxiety.

5 Prior to adding equipment for intensity or progression, demonstrate each movement without equipment for each participant to "feel" and understand the mechanics of the movement.

6. Speak clearly and slowly with adequate volume to be heard by each person in the class.

7. If any participant cannot balance body heat to energy expenditure, suggest a hat, shirt or other garment. (See HELPFUL RESOURCES.)

8. Demonstrate the "righting" position to ensure that each participant is aware how to regain an upright position if he/ she falls to face up or face down position during class.

9. Transition to the shallowest level of water (that is possible) in your pool a the end of the class to reduce the effects of gravity when they exit the pool.

10. Class is often a social event and a support network. Make it enjoyable and encourage talking, sharing and socializing in this non-judgmental group that fully understands what each other is experiencing.

11. Safety is priority one! Maintain CPR and First Aid certifications and teach with a lifeguard on deck.

Music

If you choose to use music, it should be slow (even 124 bpm is too fast for most of the suggested protocol) and volume kept low. Consider only using music for part of the session as it may overload the participants response systems. Yoga or New Age music is okay for balance training, but seek the participants' opinions for your final selection. Many of these therapeutic type classes use no music as correct skill movement is the goal and require focused attention. Music can be both a positive or negative influence; the outcome depends on the individual.

Program Design

Select exercises that resemble activities on land such as walking, lifting, rising from a chair or bed and turning a corner. Encourage each person to move at a speed and pace within his/her own comfort and energy level.

Cues and Cueing

Use cues that are simple, clear and "visual". Paint a picture of the desired movement with your words. Examples: "Row the Boat" or "Play the Cymbals". The use of anatomical terminology for cues such as "Hip Flexion" may not process quickly if at all, especially if the participants cannot see you.

Many of the exercises below may be performed on land at home when en-

ergy level is low. The exercise must be performed in short segments with rest periods.

Walking

- Use walking patterns to practice balance, posture, stability and coordination. Walking can be increased in intensity to increase endurance as tolerated on an individual level. Some walking suggestions:

- Forward, backwards and side-to-side are good options to incorporate into any component of the class from warm up to cool down. Add arm movements to increase interest and intensity. When the arms move, such as front to back in a free swing, it decreases scapular elevation and encourages movement of the hips and shoulders plus a slight trunk rotation.

- When cueing the forward walk, use "Heel, Ball, Toe Off". The additional word "off" is a visual and auditory cue of the desired movement and action.

- Encourage a long stride, at least ten inches, when walking in any direction for better balance.

- Create an obstacle course with aqua steps in shallow water to walk up, over or around. Cue to keep head and shoulders in good alignment to reduce amount of time the head is looking down.

- Walk a few steps then practice a turn without crossing one leg over the other. Encourage the pivot and leg lift to complete the turn. Repeat any turning exercise at least 3 times to promote success and practice the correct movement.

- When the legs feel frozen or glued to the floor, cue lift toes to eliminate the spasm and to visualize taking the step. Or, cue to step over a log or tile pattern on the floor.

Balance

Walking patterns, weight shifts and maintaining balance on one leg are good exercise selections to instill efficient, voluntary movement as well as fall prevention. Use two planes when possible.

Use the wall with one or two hands for balance before progressing to a buoyant swim bar (long hand bar) or no assistance for each exercise. Cue slow transitions in balance work to allow the body to acclimate to the change.

Suggestions for balance exercises:

- Walk forward three steps and pause. Lift right leg, flex knee; allow time to balance on left leg, then point, flex, point, flex at the ankle. Lower leg and repeat on left leg. Add any movement on the pause/balance such as ankle circles or knee flexion. Encourage use of arms to maintain balance or use a buoyant swim bar.

- Weight shifts at the wall or, away from the wall with a buoyant swim bar.

- Move arms overhead as if pulling a rope to initiate a small weight shift. Keep eyes ahead and head level during this exercise to allow the shoulders to relax after each pull.

- March in place with a two-count hold on each leg lift. Progress to marching four steps forward with the two-count hold on each step.

- Face the wall with both hands. Squat then rise to start position. Progress to one hand on the wall, then no hands.

- Hold the wall and raise left leg to the front and move the left arm to the back. Return to start position. Repeat on opposite side. Progress to one arm on wall, then no hands. This balance activity also works well with a buoyant swim bar. Cue a pause between changes of sides to regain full balance.

- Incorporate ankle, leg or hip exercises into any standing wall work. Examples: knee flexion then squat while on one leg.

Strengthen

Well-conditioned muscles are energy efficient. Increase the intensity and repetitions as tolerated on an individual level. Add equipment judiciously. A circuit is an option to permit those with low energy levels to move to the station they are able to perform on that day.

Stretch

Static stretching may be uncomfortable if the pool temperature is below 88° F (31° C) or if the air temperature is cool or breezy. Dynamic stretching is effective to increase or maintain range of motion as well as maintain body heat. An alternative is education through demonstration or a printed handout for static stretches of the major muscle groups to be done at home.

Verbal Calisthenics

Low voice volume is a common symptom of PD making it difficult to speak in a tone loud enough to be heard or understood. Word games or speaking letters, vowels or sounds aloud are a fun method to increase voice quality (volume), swallowing and to practice breathing.

It is more effective to sing the vowels than simple over articulation of them to work the tongue, palate and breathing. Take a deep breath and sing on the exhalation a long *aaaaaa*, then a short 'a' in *ahahahah*. Repeat with the remaining vowels. Add humming or whistling of songs such as *Happy Birthday* or the Seven Dwarfs Marching Song, *Hi Ho*. The result is different breathing patterns and swallowing with each song.

Add letters such as "P" or "B" then "K", and notice the pursing of the lips then the use of the throat to form letters. Add "S" and "T", then ST, TR, CH (as in choir, then church). Use your creativity to develop other letters or words to encourage the movement of lips, tongue, etc., in addition to different patterns of breathing and swallowing.

Cool Down

Begin the transition to the shallowest water to prepare for a return to land and the force of gravity. It is also an opportunity to calm the mind and body. Use slow, loose movements (soft joints) and visualization cues such as see the rainbow or listen to the waterfall to promote a relaxed awareness of the body and breathing.

Stationary standing for an extended period of time during the cool down may increase the normal (hardly noticeable) sway of the body over the base of support. This increase may lead to loss of balance when the sway exceeds the base of support. Cue small, slow movements during the cool down such as weight shift back and forth with broad base of support or slow, small steps side to side. Substitute a cue of lower your eyes to the surface of the water to elicit relaxation and calmness rather than close your eyes to allow peripheral vision to assist in maintenance of balance during this slow or near stationary portion of the class.

SAMPLE EXERCISES

The main objectives of an aquatic program for individuals with Parkinson's disease target balance, posture and gait training. It is important to include forward reach, sit to stands, any type of disassociation exercise (i.e., walk with arm swing or other reciprocal motions), trunk rotation, spiral diagonal or Proprioceptive Neuromusclar Facilitator (PNF) patterns, marching and stepping over objects or colored lines to require movement initiation.

Balance

- Stand with a gradually narrowing base of support until balanced on one foot. Try to stand without movement. Increase the challenge by additional turbulence (movement) of the water. Increase the unilateral stand time to 120 seconds. If the individual has trouble on one side, it may be helpful to utilize equipment to assist in balance. For example, you can use one to three pound weights at the ankle.

- Stand with feet close together or unilaterally (best in chest to waist depths) and try to reach in various directions. Go as far as possible forward, overhead, backward and to the sides without losing balance. This is very beneficial for clients to strengthen the trunk and for them to break some of the spastic patterns that frequently occur.

- Have the individual sit on an inverted v-shaped balance board - the program leader stands behind. Very slowly rock the board side to side or forward and back. This will initially generate increased spastic behavior, but once they know how to respond, it is great. One must be patient with this.

- Have the individual walk forward following your foot pattern (as you walk backward). This helps to improve step-length and step consistency. As the program leader you are able to watch and monitor their response to this and increase or decrease support as needed. This is a one-on-one activity rather than a group exercise activity.

- Sidestepping is often times very difficult, but this can be performed at the wall initially. Increase the step lengths, which assist with breaking the hip adductor (inner thigh) spasms, increases both hip adductor and abductor (outer thigh) strength, and allows them to move without support. Increase the difficulty of this by varying the steps from just sidewise to also stepping backward or forward. The fact that you mix these up drastically increases the level of concentration and increases the potential for spasms as well.

- Have the individual stand with both feet on the pool bottom and both hands on a kickboard. Move the kickboard (movement can be initiated by the individual or the program leader) in all different directions trying to challenge balance.

- Aquatic Yoga is very beneficial. Yoga postures performed by individ uals with PD have reported specific benefits to developing coordination, balance, range of motion, and reduced pain. A basic pose such as combining mountain pose to upward salute emphasizes breathing pattern and body alignment. Other poses are tree, arabesque, chair, spine rotation, and a standing saw exercise from Pilates.

Example: The **tree pose** is performed standing on one foot, which will challenge one's balance, especially when performed with some turbulence in the pool. Individuals with PD often have tight muscles in the trunk and hip region therefore, these poses will help to improve range of motion and increase stability. Leg placement can vary based on the flexibility and balance needs of the individual. Perform with your back against the pool wall to get started. This will provide tactile input and help to reinforce correct body alignment. When first learning the posture have the unsupported leg close to the pool bottom or with the toes slightly touching. Later move this exercise away from the wall and add upper body movements. Performing two activities at once is beneficial to challenge the balance and help with fall prevention.

- Ai Chi practice assists with improved balance and assists breathing patterns that develop voluntary control over tremors.

- Proprioceptive Neuromuscular Facilitation (PNF) patterns should be included.

  Examples from the Aquatic After Care Training Manual:

  - PNF D1 Flexion Pattern:

  Start Position: (Right Arm) Start with the right arm internally rotated at the shoulder and placed slightly behind and out to the side of the body. The fingers should be spread apart.

  Activity: Close the hand to make a fist and flex at the wrist. Simultaneously, externally rotate at the shoulder and at the forearm (supination). Bend (flex) at the elbow and shoulder lifting the arm across the midline of the body toward the opposite shoulder.

- PNF D2 Flexion Pattern:

  Start Position: (Right arm) Start with the right arm diagonally across the body so that the hand is at the hip. The forearm is internally rotated (pronated) with the hand in a fist position facing forward.

  Activity: Start by opening the hand and then simultaneously externally rotating at the shoulder and the forearm (supination). Leading with the thumb, lift the arm overhead crossing the midline toward the right side of the body.

The Upper Extremity D2 flexion pattern will assist in opening up the chest and improve posture. This is especially beneficially for individuals with PD who may experience internally rotated shoulders and a stooped posture. This pattern can be performed unilaterally (single arm movement) or for additional coordination development it can be performed using both arms at the same time.

Gait

- Start with a single step forward and back using one foot for multiple reps before changing to the other side. This allows the individual to figure out how much power needs to be generated to move forward and helps to plan step lengths. For one-on-one training, stand directly in front of the individual and explain that he/she should try to touch his/her foot with your foot, this helps to decrease spasms and intentional tremors.

- Walking with one pound weights helps to decrease significantly the intention tremors. This can be used only if the patient is strong enough to tolerate the weights. The use of weights is controversial. If ankle weights are used, keep the weight very light. Physical therapists suggest using weights on the waist (weight belt) to increase weight bearing through the hips, knees, and ankles. This will increase proprioception (a sense of awareness of one's limbs in water) of in addition to the water giving proprioceptive feedback.

- If the client has significant strength, using elongated steps also helps with strength, balance and sequencing.

- Oftentimes an individual with PD cannot move the upper body correctly while walking. Try water walking with either drag equipment or one-pound weights at the wrist. This helps to correctly sequence opposition movement between the arms and legs. This also increases

upper body awareness, which is often a challenge for persons with PD. This gain drastically decreases spasms and tremors.

- Difficulty with balance and water walking can be assisted by using buoyant swim bars (long hand bars), noodles, or other specialized equipment available. Social dance steps adapted for the water and appropriate for clients include the Cha-Cha, the Charleston, and the Tango. The first step shifts balance in vertical alignment from center of body to center of active leg. This is done from a narrow base of support, allowing weight shift more readily in any direction and includes variances in stride length, step length, and foot angle.

Strength

- The recommendation is to begin with straight plane motions, preferably with long lever arm movements. In the water, you may find that there are positions of weakness that are not apparent when testing on land since the individual may be in spasm when tested and appear strong. In the water, when these spasms are broken, you may realize that they are accommodating the movements with spasms vs. strength.

- Try to complete movements for a designated length of time rather than a set number of repetitions. This is because the movements are often difficult, especially when utilizing added resistance.

- Focus on correct alignment and movement execution. Performing the correct movement in the water may assist with function on land. Viscosity helps to strengthen and to dampen the tremor/spasm effects.

- Advance to movements in more that one plane. Add functional movement patterns and, when able, include repetitions for speed.

Endurance

Because individuals with PD often experience difficulty with movements, it is easier “not to move” and thus endurance can become a factor in maintaining overall health and function. Water walking, deep water movements and swimming can be good endurance activities if the individual is able to safely participate based upon abilities and comfort levels.

MONITORING RESPONSE TO AQUATIC EXERCISE

As this manual is primarily intended to assist the individual with Parkinson's disease and their family members, monitoring response to aquatic exercise will be on a personal level. Consider activities of daily living. Has it become easier to walk from room to room at home? Has balance improved making it easier to shower and dress after the aquatic class? Have you noticed greater range of motion and improved flexibility when getting out of bed in the morning? Also consider the class programming. Are the exercises too easy? Do you struggle to complete the skills included in the class? Do you leave class feeling exhausted or rejuvenated? In reality, personal comfort, performance of day-to-day activities and overall enjoyment of participating in water exercise will be significant factors in evaluating the benefits of the program.

Individuals qualified either by certification, licensing or job training may conduct more objective assessments of physical performance. These assessments should be performed on land following established protocol. Two options to consider are the Functional Fitness Assessment (Dr. Jessie Jones and Dr. Roberta Rikli) and the Berg Functional Balance Scale (Berg K., Wood-Dauphinee S.L., and Williams, J.L.). Neither protocol is specific to Parkinson's disease, but instead is developed for assessing performance of older adults. However, common factors will be found, such as balance issues, muscular strength and endurance. In order to actually monitor the individual's response to the exercise program, the assessment would need to be completed prior to beginning the program and then successively throughout the program. A 12-week reassessment is a suggested time frame.

Please note that certification in group exercise and/or personal training would not qualify an aquatic fitness professional to perform physical assessments on an individual with Parkinson's disease. In this situation it is suggested that the aquatic fitness professional (1) have additional training specific to PD, (2) have specialized training in assessment protocol, and (3) perform assessments in conjunction with, or under the supervision of, a therapist or other medical professional.

HELPFUL RESOURCES

PD Information & Resources

American Parkinson Disease Association
135 Parkinson Avenue, Staten Island, NY 10305
800-223-2732 or www.apdaparkinson.org

Clothing for the Water

Requirement is ease of getting into and out of aquatic apparel. The following meet this requirement and can be contacted for a catalog of products.

H2O Wear
800-321-7848 or www.h2owear.com

Sprint Aquatics
800-235-2156 or www.sprintaquatics.com

Kiefer
800-323-4071 or www.kiefer.com

HYDRO-FIT
800-346-7295 or www.hydrofit.com

Shoes for the Water

Shoes used in the pool should not be worn for other activities as this can contaminate the water in the pool.

H2O Wear
800-321-7848 or www.h2owear.com

Sprint Aquatics
800-235-2156 or www.sprintaquatics.com

Kiefer
800-323-4071 or www.kiefer.com

HYDRO-FIT
800-346-7295 or www.hydrofit.com

Equipment for Water

NOTE: Not all equipment is acceptable for all individuals. Consult with your AFP to determine the product appropriate for use.

Sprint Aquatics
800-235-2156 or www.sprintaquatics.com

Kiefer
800-323-4071 or www.kiefer.com

HYDRO-FIT
800-346-7295 or www.hydrofit.com

Susan Grosse
sgrosse@execpc.com
"Poly Spots" for balance and gait training

Music Sources For Exersice – For The Professional & Consumer

Dynamic Music
800-843-6499 or www.dynamixmusic.com

Power Music
800-777-2328 or www.powermusic.com

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APDA Information and Referral (I&R) Centers

Alabama, Birmingham
University of Alabama at Birmingham
205-934-9100

Arizona, Phoenix
Banner Good Samaritan Medical Center
602-239-3542

Arizona, Tucson
University of Arizona
520-626-5055
866-897-1261

Arkansas, Hot Springs
St. Joseph's Regional Health Center
800-345-6621
501-622-3990

California, Fountain Valley
Orange Coast Memorial Medical Center
714-378-5022
877-610-2732

California, Laguna Hills
Saddleback Memorial Medical Center
877-610-2732
714-378-5022

California, Long Beach
Long Beach Memorial Medical Center
877-610-2732
714-378-5022

California, Los Angeles
Cedars-Sinai Health System
310-423-7933
877-223-3277

California, Los Angeles (UCLA)
Reed Neurological Research Center
310-206-9799

California, Northridge
Center for Aging Research
818-885-8623
866-499-2732

California, Pasadena
Huntington Hospital
626-397-2684

California, San Diego
Information & Referral Center
858-273-6763

California, Stanford
Stanford University Medical Center
650-724-6090
866-250-2414

Connecticut, New Haven
Hospital of Saint Raphael
203-789-3936

Florida, Jacksonville
Mayo Clinic, Jacksonville
904-953-7030

Florida, Deerfield Beach
North Broward Medical Center
800-825-2732
954-786-2305

Florida, St. Petersburg
Edward White Hospital
727-328-6246

Georgia, Atlanta
Emory University School of Medicine
404-728-6552

Idaho, Boise
St. Alphonsus Medical Center
208-367-6570

Illinois, Chicago
Glenbrook Hospital
800-223-9776 (out of IL.)
847-657-5787

Iowa, DesMoines
Iowa Health - DesMoines
515-241-6379
877-872-6386

Kentucky, Lexington
University of Kentucky
859-257-2732
866-544-2732

Louisiana, New Orleans
Ochsner Clinic Foundation
504-842-4272

Louisiana, Shreveport
Louisiana State University
318-813-1549

Maine, Falmouth
Maine Medical Center
207-781-1735
800-832-4116

Maryland, Baltimore
University of Maryland
800-862-5457

Massachusetts, Boston
Boston University School of Medicine
617-638-7737
800-651-8466

Minnesota, Minneapolis
Abbott Northwestern Hospital
Minneapolis Neuroscience Inst.
612-863-5850
888-302-7762

Mississippi, Gulfport
Gulfport Memorial Hospital
228-575-1330
601-618-2772

Missouri, St. Louis
Washington University Medical Center
314-362-3299

Montana, Great Falls
Benefis Health Care
406-455-2964
800-233-9040

Nebraska, Omaha
Creighton University
402-449-4535
866-626-7347

Nevada, Las Vegas
702-464-3132

Nevada, Reno
V.A. Medical Center
775-328-1715

New Hampshire, Lebanon
Dartmouth-Hitchcock Medical Center
603-650-5280

New Jersey, New Brunswick
Robert Wood Johnson University Hospital
732-745-7520

New Mexico, Albuquerque
APDA Information & Referral Center
877-515-4560

New York, Albany
The Albany Medical College
518-262-6402

New York, Far Rockaway
Peninsula Hospital
718-734-2876

New York, Manhattan
New York University
212-983-1379

New York, Old Westbury
New York College of Osteopathic Medicine
516-626-6114

New York, Smithtown
St. Catherine's of Siena Hospital
631-862-3560

New York, Staten Island
Staten Island University Hospital
718-226-6129

Ohio, Kettering
Kettering Medical Center
513-948-9355

Oklahoma, Tulsa
Hillcrest Medical Center System
918-747-3747

Pennsylvania, Erie
Health South Rehabilitation Hospital
814-456-4210

Pennsylvania, Philadelphia
Crozer-Chester Medical Center
610-447-2911

Pennsylvania, Pittsburgh
Allegheny General Hospital
412-441-4100

Rhode Island, Warwick
Kent Hospital
401-736-1046

Tennessee, Memphis
Methodist Hospital
901-516-0677

Tennessee, Nashville
Centennial Medical Center
615-342-4635
800-493-2842

Texas, Bryan
St. Joseph Regional Rehabilitation Center
979-821-7523

Texas, Dallas
Baylor University Medical Center
214-820-3800

Texas, Lubbock
Convenant Hospital
806-785-2732
800-687-5498

Texas, San Antonio
The University of Texas HSC
210-567-6688

Texas, Tyler
East Texas Medical Center
903-596-3648
866-491-2732

Utah, Salt Lake City
University of Utah
801-585-2354

Vermont, Burlington
University of Vermont
802-847-3366
888-763-3366

Virginia, Charlottesville
University of Virginia Medical Center
434-982-4482

Washington, Seattle
University of Washington
206-543-5369

Wisconsin, Madison
University of Wisconsin
608-263-7991

Wisconsin, Neenah
The Neuroscience Group of Northeast Wisconsin
920-721-1522
888-797-2732

DEDICATED CENTERS

Armed Forces Veterans
Reno, NV
775-328-1715

Young Onset Center
Glenbrook Hospital
Glenview, IL
877-223-3801

Please contact the nearest I & R Center for information regarding Support Groups and Chapters or call the National Office at 1-800-223-2732.

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American Parkinson Disease Association

The American Parkinson Disease Association, Inc.
Parkinson Plaza
135 Parkinson Ave.
Staten Island, NY 10305-1946
1-800-223-2732
www.adpaparkinson.org
adpa@adpaparkinson.org

ADPA Young Onset Center
Glenbrook Hospital
2100 Pfingston Road, Rm B100
Glenview, IL 60026
1-877-223-3801
www.youngparkinsons.org
adpa@youngparkinsons.org

APDA West Coast Office
10850 Wilshire Boulevard, Suite 730
Los Angeles, CA 90024
1-800-908-2732
www.parkinsonsapda.org
apdawc@earthlink.net

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