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The Benefits of Aquatic Therapy for Older Adults

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The Benefits of Aquatic Therapy for Older Adults

Throughout human history, water has served many purposes for human civilizations. It helps humans with tasks ranging from generating power to washing clothing; this versatility is possible because of water's unique physical properties. In the therapeutic domain of rehabilitation and exercise, the natural aquatic environment is used to treat and prevent human disorders and injuries. While the majority of research supporting aquatic therapy practices was conducted after 1960, humans have used water therapeutically throughout history. For example, ancient civilizations used spas or springs for therapeutic purposes (Gangaway, 2010). According to Gangaway, aquatic therapy developed a medical structure when it was used to rehabilitate World War II veterans and polio survivors. Now the body of research supporting aquatic therapy is growing, and a large portion of the research shows that aquatic therapy can treat conditions that commonly affect the geriatric population. As the baby boomer generation continues to age into late adulthood, it will be increasingly important for health care practitioners to have an extensive repertoire of evidence-based practices available to treat the geriatric population. Since older adults frequently develop "chronic problems which often result in the utilization of more costly services," the American Physical Therapy Association recommends that preventive health programs "should be supported for the older adult" (as cited in Gangaway, 2010, p. 82). Aquatic therapy can be a preventive and—relative to complex surgeries—inexpensive form of therapy.

The laws of physics explain why water is a unique therapeutic medium. The aquatic environment is safe for older adults to exercise in because of buoyancy (Becker, 2009). When an object is placed in water, a force pushes up on the object; this is called a buoyant force. Since the direction of the buoyant force is upward, it offloads (or removes) a percentage of a person's weight, or the force of gravity on the body (Gangaway, 2010). This effect is especially useful in aquatic rehabilitation for older adults who cannot load weight on a certain body part or for adults

who struggle to support their weight on land. The amount of weight that is offloaded can be manipulated by changing how deep a person is submerged under the water (Gangaway, 2010). For example, 25% of a person's weight is offloaded when they enter the water to their knees, 50% of their weight is offloaded at waist level, and 85% of their weight is offloaded at shoulder level.

A submerged body also experiences the effects of hydrostatic pressure. For each foot that a body is submerged, the body feels an additional 22.4 mmHg of pressure; consequently, the hydrostatic pressure on a body submerged under 4 feet of water is greater than normal diastolic blood pressure of approximately 80 mmHg (Becker, 2009). This pressure difference increases circulation in the body because the greater pressure on the outside of the body helps push fluids from the extremities to the central region of the circulatory system (Gulick, 2010). As more blood returns to the heart, cardiac preload increases. Gulick explains that this stimulation of venous return starts the Starling reflex: the muscle fibers in the heart stretch more due to the increased preload, and as a result they contract more, which increases the amount of oxygenated blood that the heart can pump out to the body. The hydrostatic pressure can also reduce edema, or swelling, by pushing fluid away from the swollen body part (Gulick, 2010).

A therapist can manipulate the water temperature to create the desired aquatic therapy environment. While the average competitive swimming pool is 27-29 degrees Celsius, most therapy pools are 33.5-35.5 degrees Celsius (Becker, 2009). Warm water relaxes muscles and reduces muscle tone (Morris, 2010). Since water transfers heat 25 times faster than air (Becker, 2009), therapists can choose aquatic therapy over land therapy for adults who need to relax their muscles to prepare for exercise. In contrast, therapists can use colder water to stimulate a person's body so that their body is alert during therapy sessions (Morris, 2010).

Water resistance creates an exercise challenge and can also be manipulated by therapists. When a person moves their body through water, there is an opposing force from the water called the drag force (Becker, 2009). This opposing force requires a person to work harder to move a body part in water compared to moving on land, which makes aquatic therapy a form of strength training. Therapists can increase the surface area of a person's body by adding equipment such as paddles (Becker, 2009); the increase in surface area increases the resistance and makes exercise more difficult. Therapists can also manipulate the exercise intensity level by adding a current to the water. Laminar current, which moves in the same direction of a person's body movement, makes it easier for beginner exercisers to participate in exercise, while turbulent flow, which moves in the opposite direction of a person's body movement, makes it harder for a person to move through water and harder to balance while moving forward (Morris, 2010).

As people age and the structures and systems of their bodies weaken, it becomes more difficult for them to exercise. Older adults have a higher risk for developing chronic or disabling conditions that interfere with activities of daily life, but research has shown that aquatic therapy can reduce the effects of these conditions. Since older adults also need to perform high-impact exercises to maintain healthy bone mineral density and reduce the risk of osteoporosis, aquatic exercise should be practiced in addition to an overall conditioning plan that incorporates high-impact activity or weight lifting on land (Skelton, 2009). As a supplement to land-based activity, aquatic therapy is useful for older adults who experience difficulties with balance, joint pain, injury, surgery, stroke, cardiovascular problems, or back pain.

Morris defines balance as "the ability to control one's body position for stability and orientation" (2010, p. 104). People with reduced balance control are at higher risk for falling. According to Morris, falls cause the most injuries for adults in the United States; more than one

in three adults fall each year in the United States. Morris explains that as people age, their body alignment changes so that their body weight is no longer centered over their base of support. Additionally, when older adults gain weight, it is more likely that their weight gain will be deposited unevenly over the body. Older adults also have weaker muscles, which makes it harder for them to hold an upright posture. Unfortunately, when a person falls once, they are more likely to fear falling again. When a person fears falling, they are less likely to exercise. Lack of exercise further weakens the body, which puts the person at an even higher risk for falling. Aquatic therapy can help break this cyclical effect

Morris explains several reasons why aquatic therapy can combat balance challenges. Buoyant forces support patients in the water. Water offloads weight, is safe to fall in because it slows falls, and makes it easier for a therapist to position patients safely. It also helps the body hold proper posture. Receptors in the spine detect the proper posture and learn how to hold the body in this postural position. Therapists can add a turbulent current to create an intentional balance threat to build core strength. In one balance study, stroke patients completed either standard stroke treatment plans or aquatic therapy (Tripp & Krakow, 2013). Patients had improved balance after completing aquatic therapy. Furthermore, in a study of participants with balance coordination disorders, participants who completed aquatic vestibular rehabilitation had improved balance (Vasile & Stanescu, 2013).

People with arthritis experience joint pain. This pain discourages people from moving their affected body parts; reduction in physical activity then leads to reduced strength and reduced range of motion (Suomi & Lindauer, 1997). During aquatic exercise, the buoyant force offloads weight from the joints, which reduces pain in the affected joints. Warm water can also help reduce joint pain. Suomi and Lindauer studied the effects of the Arthritis Foundation

Aquatic Program on participant strength and range of motion. When participants completed three 45-minute sessions per week, they became stronger and had increased range of motion in the joints that were affected by arthritis. Aquatic therapy can also decrease the effects of arthritis that contribute to fall risk (Arnold & Faulkner, 2010). During this study, patients with hip osteoarthritis completed land therapy sessions, aquatic therapy sessions, or aquatic therapy sessions and weekly educational sessions. The educational sessions were designed to help patients transfer skills learned in the pool to functional land mobility skills, to promote self-confidence in the ability to prevent falls, and to teach patients how to recognize fall risks. Patients who attended both educational and aquatic therapy sessions had the best physical health gains and the highest self-confidence in their ability to prevent falls. This study showed the importance of reducing both physical and psychological fall risk factors; therefore, aquatic therapists should educate and motivate their clients in addition to helping them exercise.

As people age, their cardiovascular systems become less efficient. Older adults tend to have higher blood pressure, thicker arteries, fewer pacemaker cells to control heart rate, decreased maximum heart rate, and weaker valves in their veins (Gulick, 2010). These factors contribute to a decrease in cardiac output. In a study of patients with severe heart failure conducted by Tei and Tanaka, patients who spent ten minutes in a warm bath had increased cardiac output (as cited in Becker, 2009, p. 861). Becker explains that this effect occurs because the hydrostatic pressure in the water pushes blood from the peripheral parts of the body back towards the heart and because warm water can cause the peripheral vasodilation.

Many older adults experience chronic back pain. People with chronic back pain are more hesitant to exercise because exercise can exacerbate the pain. Aquatic exercise is a less painful alternative form of exercise for people with chronic back pain because buoyancy decreases the

amount of compressive forces on joints and decreases the amount of weight that the spine must support (Baena-Beato et al., 2013). During this study, adults who had chronic back pain (and who previously did not exercise because of the pain) completed an hour of aquatic exercise five times each week. After completing the aquatic exercise program, the participants reported less back pain, less disability due to back pain, better overall physical fitness, and better quality of life.

Aquatic therapy is not only for members of the geriatric population who have a chronic or disabling health condition; rather, it can be useful for all older adults to promote physical health and well-being during the later stages in life. Gangaway reminds older adults that the American College of Sports Medicine recommends that older adults perform 30 minutes of moderate aerobic exercise five times each week and perform resistance training exercises at least twice per week (as cited in Gangaway, 2010, p. 83). Essentially, older adults should exercise regularly. Since the aquatic environment is safe and provides an adequate exercise challenge for older adults due to the physical properties of water, aquatic exercise is an effective way for older adults to exercise regularly and reduce the effects of several chronic health problems.

References

- Arnold, C. M., & Faulkner, R. A. (2010). The effect of aquatic exercise and education on lowering fall risk in older adults with hip osteoarthritis. *Journal of Aging and Physical Activity*, 18, 245-260.
- Baena-Beato, P. A., Artero, E. G., Arroyo-Morales, M., Robles-Fuentes, A., Gatto-Cardia, M. C., Delgado-Fernandez, M. (2013) Aquatic therapy improves pain, disability, quality of life, body composition and fitness in sedentary adults with chronic low back pain. A controlled clinical trial. *Clinical Rehabilitation*, 28, 350-360.
doi: 10.1177/0269215513504943
- Becker, B. E. (2009). Aquatic therapy: Scientific foundations and clinical rehabilitation applications. *PM & R*, 1, 859-872. doi: 10.1016/j.pmrj.2009.05.017
- Gulick, D. T. (2010). Effects of aquatic intervention on the cardiopulmonary system in the geriatric population. *Topics in Geriatric Rehabilitation*, 26, 93-103.
doi: 10.1097/TGR.0b013e3181dfd8bf
- Morris, D. M. (2010). Aquatic therapy to improve balance dysfunction in older adults. *Topics in Geriatric Rehabilitation*, 26, 104-119. doi: 10.1097/tgr.0b013e3181dfda0a
- Skelton, D. A. (2009). Physical activity and osteoporosis. *Bone*, 44, S200-S210.
doi: 10.1016/j.bone.2009.03.007
- Suomi, R., & Lindauer, S. (1997). Effectiveness of Arthritis Foundation Aquatic Program on strength and range of motion in women with arthritis. *Journal of Aging and Physical Activity*, 5, 341-351. doi: 10.1249/00005768-198604001-00239
- Tripp, F. & Krakow, K. Effects of an aquatic therapy approach (Halliwick-Therapy) on functional mobility in subacute stroke patients: a randomized controlled trial. *Clinical Rehabilitation*, 28, 432-439. doi: 10.1177/0269215513504942

Vasile, L. & Stanescu, M. (2013). The aquatic therapy in balance coordination disorders.

Procedia-Social and Behavioral Sciences, 92, 997-1002.

doi: 10.1016/j.sbspro.2013.08.790