

Aquatic Exercise: Applications for Pompe Disease

Presented By:
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Meet the Mermaid

Aquatic Physical Therapist
Certified Wellness Coach
Specializes in Chronic Pain and Genetic Conditions

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Disclaimer

I cannot provide individual medical advice
in this presentation

The information provided here is generally
applicable to late-onset Pompe disease

Discuss options with your healthcare
provider before starting a new
management approach

I do not have any conflicts of interest to
report

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Learning Objectives

At the end of the session, participants will be able to:

1. List the properties of water.
2. Describe the benefits of aquatic therapy for patients with Pompe disease.
3. Understand effects of immersion on the musculoskeletal and respiratory body systems.
4. Identify aquatic exercise safety precautions, implications, and concerns for patients with Pompe disease.

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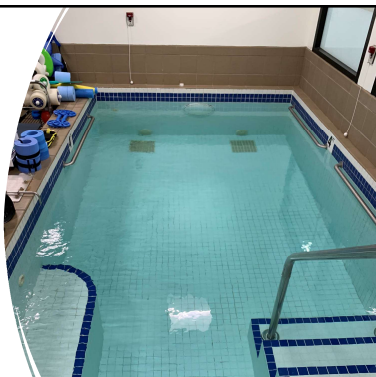
What does your exercise routine look like?



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What is Aquatic Therapy?

- Long history of aquatic interventions in rehabilitation
 - Early 1900s and the Polio epidemic
- Aquatic therapy provides an alternate therapeutic environment



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Research Highlights

"Over 30 years of research demonstrates that aquatic exercises are beneficial for reducing pain and disability in many musculoskeletal conditions including LBP, OA, fibromyalgia and RA." (2012, Verhagen et al.)

"Improvement in postural stability in Parkinson's disease was significantly larger after aquatic therapy compared to land-based therapy." (2011, Arias et al.)

"Aquatic physical therapy brings neuromotor benefits in the functional daily life and well-being to the population with muscular dystrophy." (2018, Israel et al.)

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Research Highlights

"Improved pulmonary function in (SCI) aquatic exercise group when compared to land group." (2014, Jung et al.)

"Aquatic therapy improves walking in patients post stroke." (2015, Zhu et al.)

"Aquatic exercise program for individuals with MS improved walking speed, arm function, memory, mental health, and generic QOL and reduced fatigue, pain, and perceived cognitive impairment in individuals with moderate to severe disability without adverse symptoms." (2021, Sames, et al.)

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Indications for Aquatic Therapy

Impaired Gait	Restricted Weight Bearing	Impaired Balance	Postural Dysfunction	Neuromuscular Weakness
Restricted Range of Motion	Pain	Edema	Tissue Injury	Hypertonicity or Muscle Spasm
Dependent Mobility	Sensory Integration Dysfunction	Difficulty Managing Stress	Cardiovascular Dysfunction	Pulmonary Dysfunction

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Properties of Water

Thermodynamics
Hydrostatic pressure
Buoyancy
Density
Resistance



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Thermodynamics

Ideal water temperature:

- Vigorous (aerobic) exercise
 - 82-86 deg. F
- Therapeutic exercise
 - 91-95 deg. F



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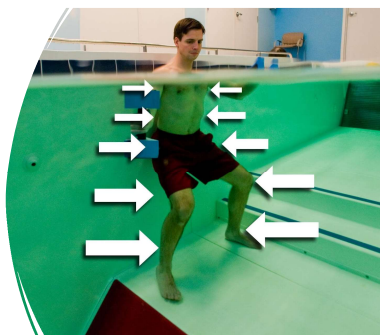
Hydrostatic Pressure

• Pools are like giant compression stockings

- 4 ft deep pool = 90 mmHg

• Helps with edema and lymphatic drainage

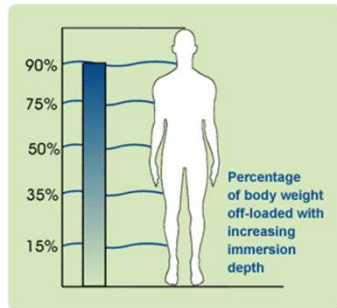
• Improves circulation and range of motion



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Buoyancy

- Weightlessness feeling
- Provides body weight support
- Decreases compressive forces



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Density

- Rich sensory experience
- More body fat = float
- More muscle mass = sink

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Resistance

- Viscosity
 - Thickness
- Drag
 - Heaviness
- Turbulence
 - Water Current
- Speed
 - Fast vs. Slow



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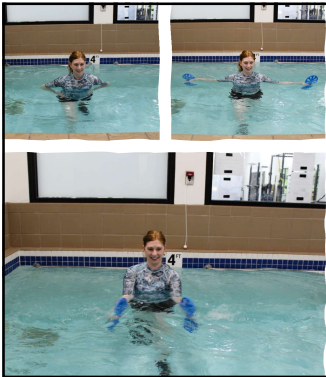
Resistance Examples



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Lunge Series

- Progressions:
- Float wall push offs
 - Hold rail
 - Center pool
 - Alternate legs
 - Add resistance
 - Increase speed



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What happens to your body when you get in the water?



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Effects on the Musculoskeletal System

- Blood flow to muscles doubles
- Edema decreases
- Circulation increases
- Unloads weight-bearing structures
- Promotes relaxation of tight muscles

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Effects on the Respiratory System

Increased work of breathing by **60%**

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Pompe Disease

- Rare genetic condition resulting from an enzyme deficiency
- Glycogen accumulates in tissues, particularly in skeletal, respiratory, and cardiac muscles
- Leads to progressive muscle weakness
 - Mostly proximal
 - Lower limbs more affected than upper limbs
 - Paraspinal muscles often involved
- Abnormal posture
- Gait difficulties
- Respiratory insufficiency

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Aquatic Exercise Goals for Pompe Disease

- Preserve muscle strength
- Avoid deconditioning
- Optimize endurance
- Reduce pain/fatigue
- Decrease muscle stiffness
- Promote upright posture
- Prevent contractures
- Improve mental and physical well-being

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Prepared By: Kendra Lucas

Home Exercise Program Login Instructions

Login

To access your Home Exercise Program:

Scan



Or

Visit

KetteringHealth.medbridgego.com

Access Code: GRZ8FCW8

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Aquatic Exercise for Pompe Disease

Breathing

- Diaphragmatic breathing
- Ai chi

Endurance

- Water walking
- Aqua step
- Aqua jacks

Core Strength & Stability

- Posterior pelvic tilts
- Core noodle press
- Oblique (side) noodle press
- Series with fan paddles
- Prone plank

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Aquatic Exercise for Pompe Disease

Hip Strength

- Lunges (forward, side, clocks)
- March/hip extension combo
- Abduction/adduction (side kicks)
- Hip circles
- Prone series (flutter kicks, frog kicks)
- Hip hinge squats

Arm Strength

- Arm circles
- Bicep curls
- Tricep press

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Aquatic Exercise for Pompe Disease

Balance & Posture

- Single leg stance
- Noodle leg press
- Aqua yoga
- Aqua pilates

Flexibility & Mobility

- Hamstring curls
- Hip flexor stretch
- Hamstring/sciatic nerve glide stretch
- Hip flexion/extension stretch
- Hip adduction/IT band dynamic stretch
- Manual stretching in float

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Breathing

- Incorporate breathing with exercises
- Diaphragmatic breathing
- Ai chi



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Ai Chi: Mind-Body

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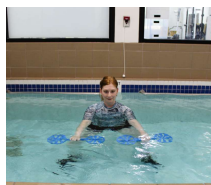
Water Walking

- Forward
- Side
- Backward
- March
- Straight leg
- Tandem

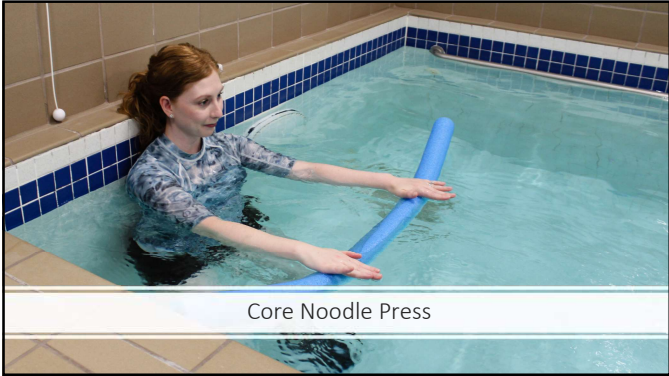


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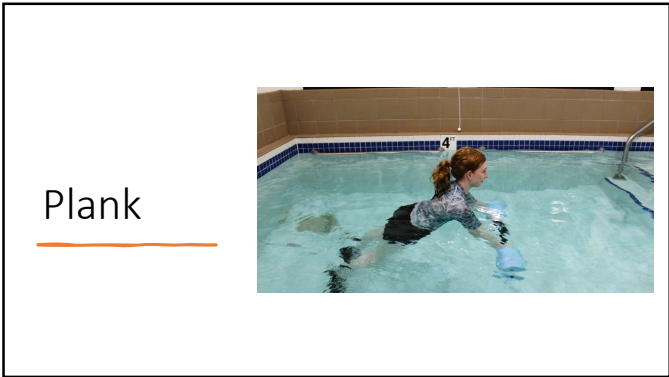
Back/Core Strength and Stability



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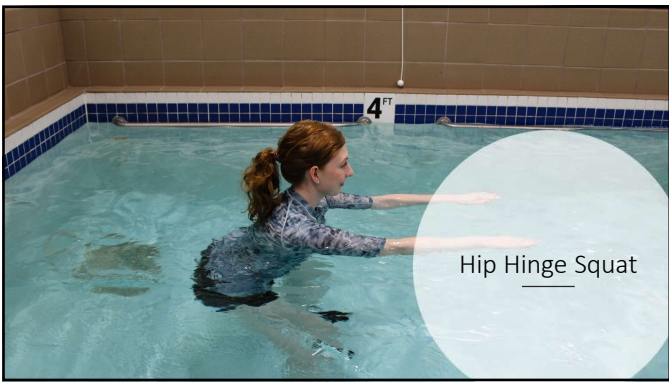
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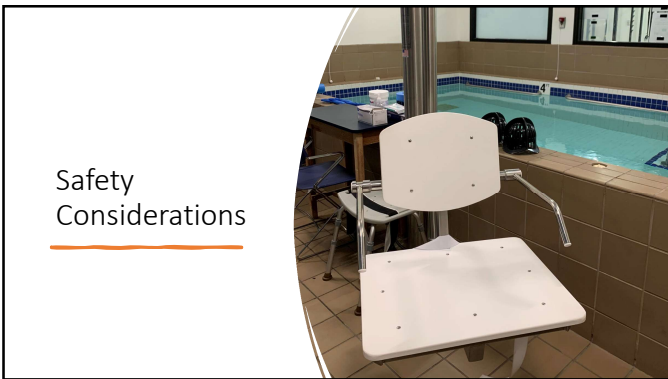
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Precautions and Contraindications:

Please check if any of these apply to you currently

- | | |
|--|---|
| <input type="checkbox"/> Open wounds | <input type="checkbox"/> High blood pressure |
| <input type="checkbox"/> Contagious skin rashes | <input type="checkbox"/> Cancer |
| <input type="checkbox"/> Incontinence of feces or urine | <input type="checkbox"/> HIV/AIDS |
| <input type="checkbox"/> Epilepsy/seizures | <input type="checkbox"/> Pregnant |
| <input type="checkbox"/> Perforated ear drum or ear infection | <input type="checkbox"/> Surgery in the last 3 months |
| <input type="checkbox"/> Dialysis | <input type="checkbox"/> Fear of water |
| <input type="checkbox"/> Lung condition | <input type="checkbox"/> Heat intolerance |
| <input type="checkbox"/> Heart condition | <input type="checkbox"/> Chlorine allergy |
| <input type="checkbox"/> DVT | <input type="checkbox"/> Hearing aids |
| <input type="checkbox"/> Diabetes (controlled or uncontrolled) | <input type="checkbox"/> Lines, tubes, catheters |

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Risk vs. Reward



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Aquatic Exercise Recommendations

- 2-3 days per week
- 30–45-minute sessions
- Light to moderate activity
 - You can still hold a conversation



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Find an Aquatic Therapist

How to find an aquatic therapist in your area:

1. Access APTA Aquatic's website: aquaticpt.org
2. Go to the patient's tab and wait for the drop-down box to appear
3. Click on Find a PT
4. Once you are at the Find a PT section, you can input your address to find physical therapists near you

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Resources

- Aquatic Exercise Equipment
 - <https://www.theraquatics.com/>
- Swimwear
 - <https://www.swimoutlet.com/>
 - <https://aquadesign.com/>
- Therapy Pools
 - <https://www.swimex.com/>
 - <https://www.hydroworx.com/>

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Thank You!

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