AQUATIC THERAPY

CHRISTINA PETTIE, PT, DPT, MHA

BOARD CERTIFIED IN GERIATRIC PHYSICAL THERAPY

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OBJECTIVES

Following this course, attendees will be able to:

- Identify the basic aquatic therapy principles.
- Identify the benefits of aquatic therapy
- Identify appropriate patient population
- Perform basic aquatic therapy exercises including Ai Chi

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BUOYANCY

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BASIC PRINCIPLES

- An upward thrust which acts in the opposite direction to the force of gravity
- Archimedes Principle
  - When a body is wholly or partially immersed in a fluid at rest, it experiences an upward thrust equal to the weight of the fluid displaced.

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BENEFITS

- Decrease:
  - Weightbearing
  - Joint compression forces
  - Stress on connective tissues
  - Fear of falling (balance deficits)
  - Blood pooling
- Support weak muscles
- Enhance flexibility and ROM
- Strengthen muscles (working in opposition to buoyancy)
- Immersion increases O2 delivery

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CONSIDERATIONS

- May be difficult to stabilize the patient
- Less proprioceptive feedback for the patient
- Flaccid limbs may float
- Spastic limbs may sink
- Center of gravity shifts
  - Typically CoG = pelvis
  - In water CoG = chest
- May be difficult for the therapist to remain in a fixed position

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HYDROSTATIC PRESSURE

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BASIC PRINCIPLES

- Pascal's Law
  - Fluid pressure is exerted equally on all surface area of an immersed body at rest at a given depth

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BENEFITS

- Decreased pain and edema = increased ROM
- Increased venous return and circulation (assists heart pump) = decreases HR
- Evens tactile input, turns down reticular system (like a big hug)
- Inspiration/exhalation (resistance and assistance)
- Retards muscle atrophy

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CONSIDERATIONS

- Vital capacity clients: COPD, DM, Circulatory issues
  - Watch for too much compression initially
  - Patient may have trouble breathing initially
  - Patients may be anxious about the pressure they feel on their chest
- Unstable BP: water can make it more unstable
  - Initially BP increases
  - After 15 minutes it lowers
  - Carry over for 45 minutes to 6 hours
- Enter and Exit slowly

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RESISTANCE

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BASIC PRINCIPLES

- Viscosity/Drag Forces – creates progression
- The friction between the molecules of a liquid which causes resistance to flow as the molecules of the liquid tend to adhere to each other and the surface of the body moving through it
- Speed dependent

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BENEFITS

- Resistance to movements creates benefits for:
  - Tone
    - water passing over skin can reduce tone (i.e. skin brushing)
  - Muscle balance
  - Cardiac
- Increased time to react
- Decreases edema

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CONSIDERATIONS

- Difficulty moving
- Tactile defensiveness
- Vestibular: looking down may increase dizziness/motion sickness

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PHYSIOLOGICAL EFFECTS OF IMMERSION

- Blood is displaced into the heart due to buoyancy
- Heart rate slows down due to longer filling time
- Blood absorbs oxygen more readily under partial pressure conditions
- Borg's RPE is better to use than heart rate

- Musculoskeletal
  - Decrease edema
  - Increased blood supply
  - Decrease joint compression force
  - Constant low-grade sensory input can override pain stimulus
  - Increase ROM
  - Water can assist, support, resist movement
  - Improve balance using turbulence

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PHYSIOLOGICAL EFFECTS OF IMMERSION

- Pulmonary System
  - Water pressure on chest encourages stronger contraction of diaphragm and intercostal muscles
  - Total work of breathing increases 60% with immersion to the neck
  - Pressure reduces residual lung capacity, encourages the whole lung surface to be used

- Renal System
  - Plasma volume loss
  - Increase urine output
  - Mobilization of extra-cellular fluid
  - Increase sodium loss
  - Increase potassium loss
  - The above renal responses increase with the depth of immersion and temperature of the water

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PATIENT POPULATIONS

- Neurological: Stroke, Parkinson's, CP, MS
- Orthopedic: post surgery, post trauma, Significant muscle weakness, Imbalance
- Cardiac: including circulatory disorders
- Respiratory: COPD
- Prenatal
- Obesity
- Other: Arthritis, Fibromyalgia, Frailty, Pain

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INDICATIONS

- Sensory disorders
- Limited ROM
- Weakness
- Incoordination
- Pain
- Spasticity
- Perceptual/Spatial problems
- Arousal problems (can increase/decrease)
- Balance deficits
- Joint replacements
- Orthopedic injuries/trauma

- Obesity
- Prenatal
- Neurological (MS)
- Osteoporosis (stop and start movements)
- Rheumatology (Arthritis/Fibromyalgia)
- Respiratory problems
- Circulatory insufficiency
- Depression
- Cardiac disease
- Motor skill deficiency

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PRECAUTIONS/CONTRAINDICATIONS

Precautions:

- Epilepsy (glare could set off seizure)
- Unstable BP
- Vestibular (due to water movement)
- MS (due to water temperature)
- Incontinence (must be on a program)
- Pregnancy (water temperature/BP)

Contraindications:

- Skin infections
- Open wounds or lesions
- Sore throats
- GI issues
- UTI

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BASIC POOL INFO

Temperature

- Average: 92 degrees F (33 deg Celsius)
- Thermoneutral (skin temperature)
- Temperature changes with certain populations
  - 82-88 deg F
  - Prenatal, MS, children, cardiac, obesity

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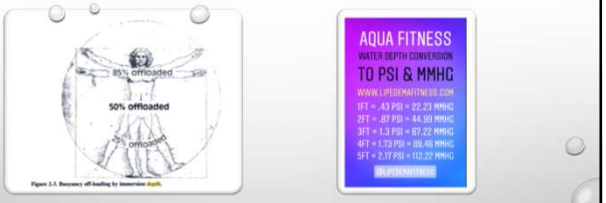

BASIC POOL INFO - PRESSURE

BE Becker, E Bruce, J Andrew - Comprehensive **aquatic therapy**, 2004

https://lipedemafitness.blogspot.com/2020/05/under-pressure-water-pressure-vs.html

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"YOU NEVER WORK THE SAME BODY TWICE.
ASSESS EVERY TIME!"

RUTH SOVA, ATRI

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QUESTIONS?

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REFERENCES

- Aquatic Therapy & Rehab Inatitute (ATRI): www.atri.org
- APTA Aquatic Section: www.apta.org
- BE Becker, E Bruce, J Andrew - Comprehensive **aquatic therapy**, 2004
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