

# When should aquatic therapy be considered?



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# What is aquatic therapy?

“Aquatic Physical Therapy is the scientific practice of physical therapy in an aquatic environment by physical therapists and physical therapists assistants. Aquatic Physical Therapy includes but is not limited to treatment, rehabilitation, prevention, health, wellness and fitness of patient/client populations in an aquatic environment. The unique properties of the aquatic environment enhance treatments for patients/clients across the age span with musculoskeletal, neuromuscular, cardiovascular/pulmonary, and integumentary (skin) diseases, disorders, or conditions.”

- Aquatic Section of the APTA



# Physiological Effects

- Musculoskeletal

- Decreased weight bearing
- Strengthening
- Slowed bone density loss
- Reduced fat loss than other exercise

- Cardiovascular

- Increased venous circulation
  - Increased cardiac volume
  - Increased cardiac output
  - Decreased HR, systolic BP and  $\text{VO}_2$

- Respiratory

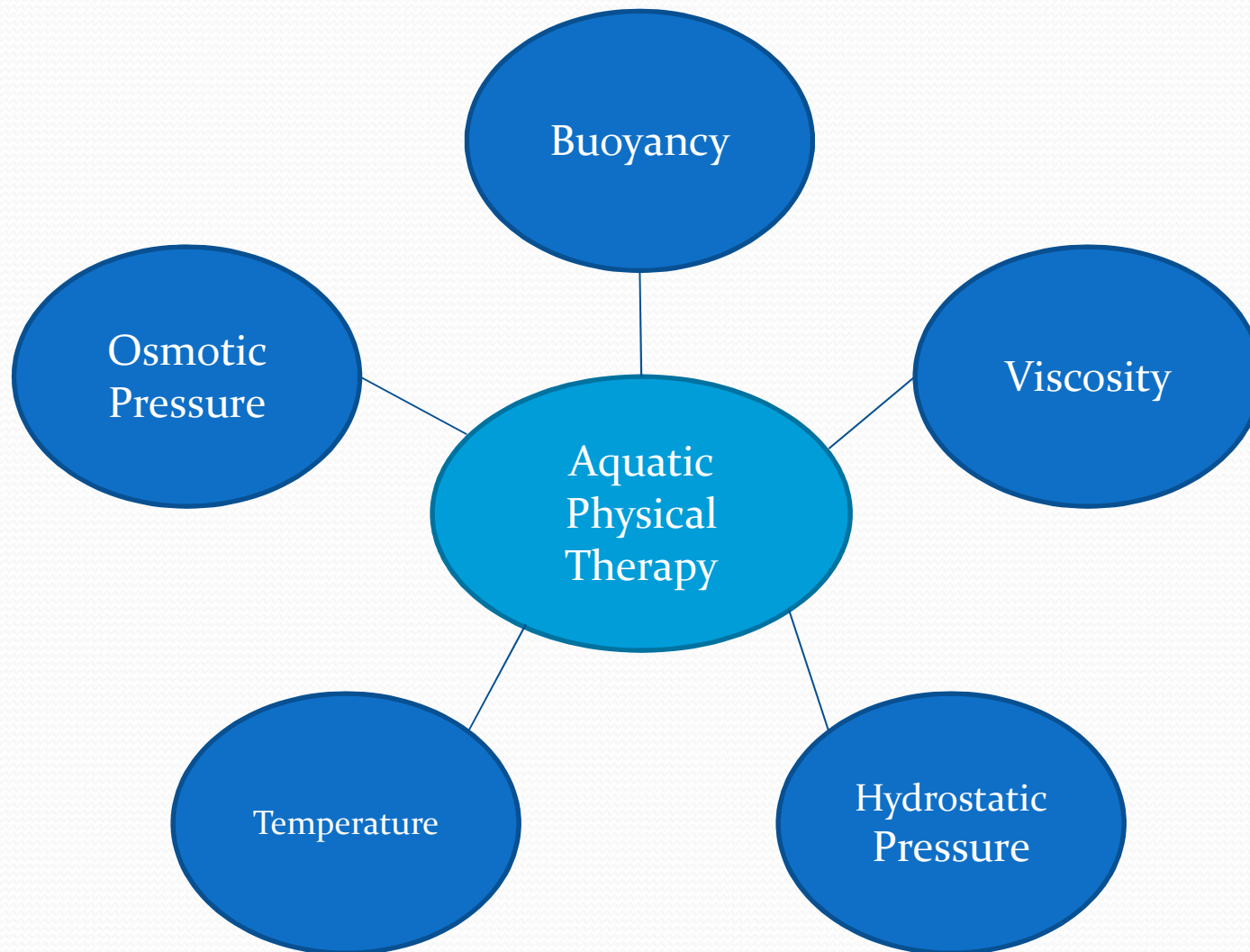
- Decreased vital capacity
- Increased work of breathing
- Decreased exercise induced asthma

- Renal

- Diuresis
- Increased sodium and potassium excretion

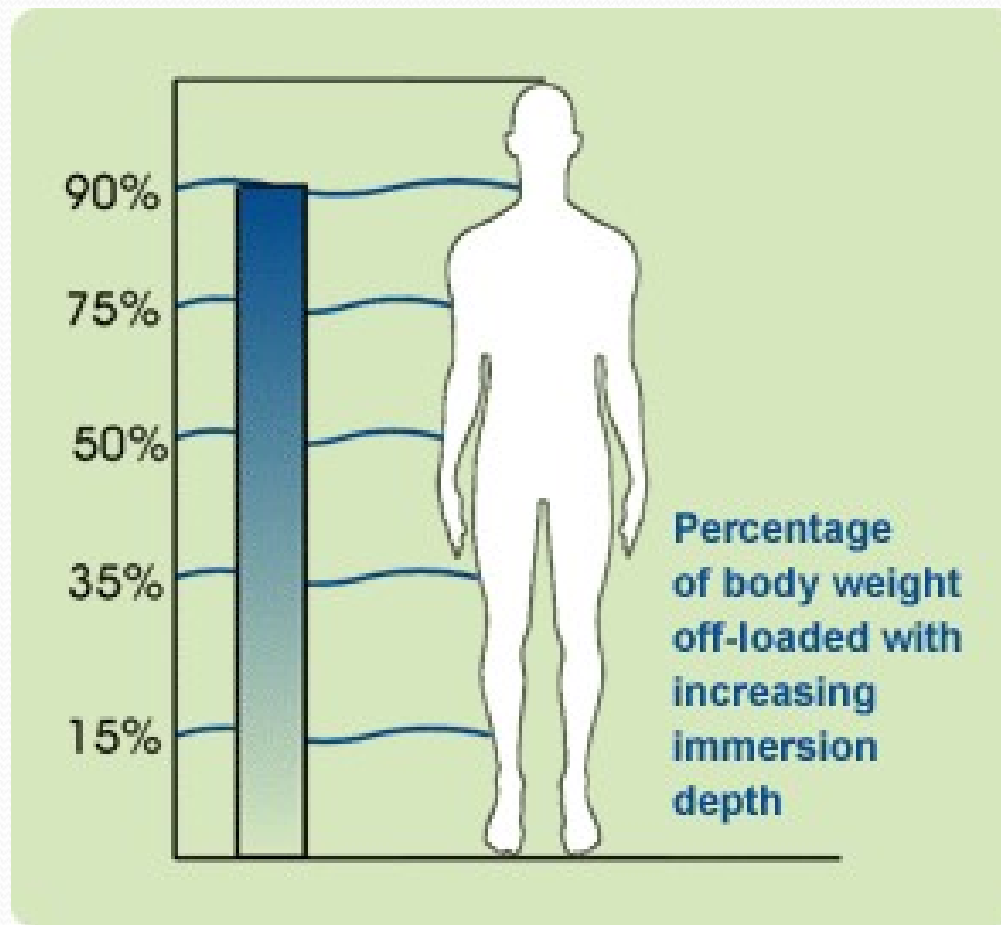
- Psychological

- Relaxing
- Invigorating





# The effects of buoyancy





# Indications for Aquatic PT

- Increase circulation
- Increase strength
- Increase joint mobility
- Increase flexibility
- Increase ROM
- Improve quality of gait
- Improve coordination
- Cardiovascular/  
respiratory conditioning
- Psychological well being
- Decrease pain





# Things to consider...

## Contraindications

- Infected wound
- Cardiac instability
- Bleeding
- Bowel/bladder incontinence
- Severe epilepsy

## Precautions

- Multiple Sclerosis
- Pregnancy
- Confusion/dementia
- Respiratory problems
- Fear of water



# Case Study

Burmester et al (2016) performed a case study on a 73yo non-smoking female with chronic, non-retracted, medium size full thickness tear of supraspinatus. Patient was s/p arthroscopic RTC repair with SAD. Patient began course of land based and aquatic therapy at 2 weeks post-op for total of 6 weeks, 18 visits total. PMH included cervical fusion 11 years ago and fibromyalgia. Patient was still working as registered nurse.

Burmester C, Eckenrode BJ, Stiebel M. Early Incorporation of an Evidenced-Based Aquatic-Assisted Approach to Arthroscopic Rotator Cuff Repair Rehabilitation: Prospective Case study. *Phys Ther.* 2016;96:53-61.



## Evidence-Based Approach to Rotator Cuff Rehabilitation

**Table 2.**

Continued

| Start Aquatic Exercise (Water)  | Start Shoulder AROM (on Land)   | Start Shoulder Isometric Exercise  | Start Shoulder PREs (on Land)   |
|---|---|--|---|
| After 2 wk:<br>L bar AAROM and water noodle<br>AAROM: FF and scaption to $\leq 90^\circ$ ,<br>HAB/HAD and IR/ER $\leq 45^\circ$ | After 4 wk<br>(day 29):<br>Supine FF to $\leq 90^\circ$ prone row ( $0^\circ$<br>abd), supine serratus muscle<br>reaches<br>After 6 wk<br>(day 43):<br>Standing: FF and scaption $\leq 90^\circ$<br>Side lying: ER, prone row ( $90^\circ$ abd) | After 4 wk<br>(day 29):<br>FF, ext, add, IR (no abd or ER)<br>After 6 wk: Abd, ER  | After 6 wk<br>(day 43):<br>IR, scapular protraction,<br>depression, prone row ( $0^\circ$ abd)<br>After 8 wk:<br>FF, ER, scaption, standing rows<br>After 12 wk:<br>Prone full can and prone ER,<br>tubing exercise |
| Week 4:<br>Light AROM exercises   | Weeks 4–5:<br>Prone row to neutral, prone ext,<br>biceps muscles<br>Weeks 5–6:<br>FF in scapular plane, abd   | Days 4–5:<br>FF with EF, ER, IR, biceps muscles<br>Day 7:<br>Ext with EF<br>Abd with EF<br>IR/ER in scapular plane, biceps<br>muscles (submaximal/pain-free) | Weeks 4–5:<br>IR/ER with tubing at $0^\circ$ abd, side-<br>lying ER, manual ER supine in<br>scapular plane  |
| Week 4:<br>Light AROM exercises   | Weeks 4–5:<br>Prone row ( $30^\circ$ abd)<br>Prone ext with EF, biceps muscles<br>Weeks 5–6:<br>Scaption and abd to $90^\circ$  | Days 4–5:<br>FF with EF, ER, IR, biceps muscles<br>Day 7:<br>Ext with EF<br>Abd with EF  | Weeks 4–5:<br>IR/ER with tubing ( $0^\circ$ abd),<br>manual ER supine in scapular<br>plane  |
| Weeks 2–3: PROM<br>Weeks 5–6: Light AROM  | Week 6:<br>Scaption, abduction, ER, IR  | Weeks 6–8:<br>“For rotator cuff”   | Week 10:<br>Tubing IR/ER, full can, side lying:<br>ER, prone row, ext and HAB   |
| Week 4:<br>AAROM (only $1 \times /wk$ )   | Week 6:<br>FF with EF, abd with EF (IR/ER<br>AROM with elbow supported day<br>1)  | Week 6:<br>“Isometrics”  | Week 8:<br>IR and ER with tubing, FF with EE<br>and abd with EE<br>Eccentrics at week 12  |

# Results

## Evidence-Based Approach to Rotator Cuff Rehabilitation

**Table 1.**

Left (Involved) Shoulder Range of Motion and Strength Values Over the 6 Weeks of the Aquatic-Assisted Protocol<sup>a</sup>

| Measurement (Taken at End of Each Week)  | Week 2        | Week 3        | Week 4        | Week 5        | Week 6        | Week 7        | Week 8 | Improvement               |
|--|---------------|---------------|---------------|---------------|---------------|---------------|--------|---------------------------|
| PROM, flexion (°)                        | 92°           | 106°          | 128°          | 135°          | 143°          | 138°          | 142°   | 50°                       |
| PROM, abduction (°)                      | 72°           | 92°           | 108°          | 122°          | 131°          | 128°          | 135°   | 63°                       |
| PROM, ER (°) (position of shoulder)      | 30° (45° abd) | 44° (45° abd) | 58° (45° abd) | 68° (90° abd) | 68° (90° abd) | 68° (90° ab)  | 75°    | 45°                       |
| PROM, IR (°) (position of shoulder)      | 60° (45° abd) | 63° (45° abd) | 68° (45° abd) | 70° (90° abd) | 76° (90° abd) | 80° (90° abd) | 85°    | 25°                       |
| AROM, shoulder flexion (°), land based   | N/A           | N/A           | N/A           | N/A           | 87°           | 87°           | 97°    | 10° (in 2 wk)             |
| AROM, shoulder abduction (°), land based | N/A           | N/A           | N/A           | N/A           | 77°           | 80°           | 80°    | 3° (in 2 wk)              |
| Functional, IR (behind back)             | N/A           | N/A           | N/A           | PSIS/S2       | L5            | L4            | L4     | 3 spinal levels (in 3 wk) |
| Grip strength (kg) (grip position 2)     | 17.7          | 20.9          | 23.6          | 26.8          | 24.9          | 24.9          | 23.1   | 5.4                       |
| Strength, flexion (kg)                   | NA            | N/A           | N/A           | N/A           | 8.6           | 8.6           | 13.6   | 5.0                       |
| Strength, abduction (kg)                 | N/A           | N/A           | N/A           | N/A           | 7.7           | 12.2          | 14.5   | 6.8                       |
| Strength, ER (kg)                        | N/A           | N/A           | N/A           | N/A           | 4.1           | 5.0           | 5.4    | 1.2                       |
| Strength, IR (kg)                        | N/A           | N/A           | N/A           | N/A           | 8.6           | 9.1           | 9.5    | 0.9                       |

<sup>a</sup> PROM=passive range of motion, AROM=active range of motion, PSIS=posterior superior iliac spine, ER=external rotation, IR=internal rotation, abd=abduction, S2=second sacral spinous process, N/A=not applicable (too early to be tested). Active range of motion and strength were not tested until the end of week 6 (6 weeks postoperatively) due to healing constraints.





# References

1. Aquatic Section of the American Physical Therapy Association. <http://www.aquaticpt.org>
2. Burmaster C, Eckenrode BJ, Stiebel M. Early Incorporation of an Evidenced-Based Aquatic-Assisted Approach to Arthroscopic Rotator Cuff Repair Rehabilitation: Prospective Case study. *Phys Ther.* 2016;96:53-61.
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5. Wade J. Sports splash. *Rehab Mgmt.* 1997;10:64-70 as cited in Cameron MH.

