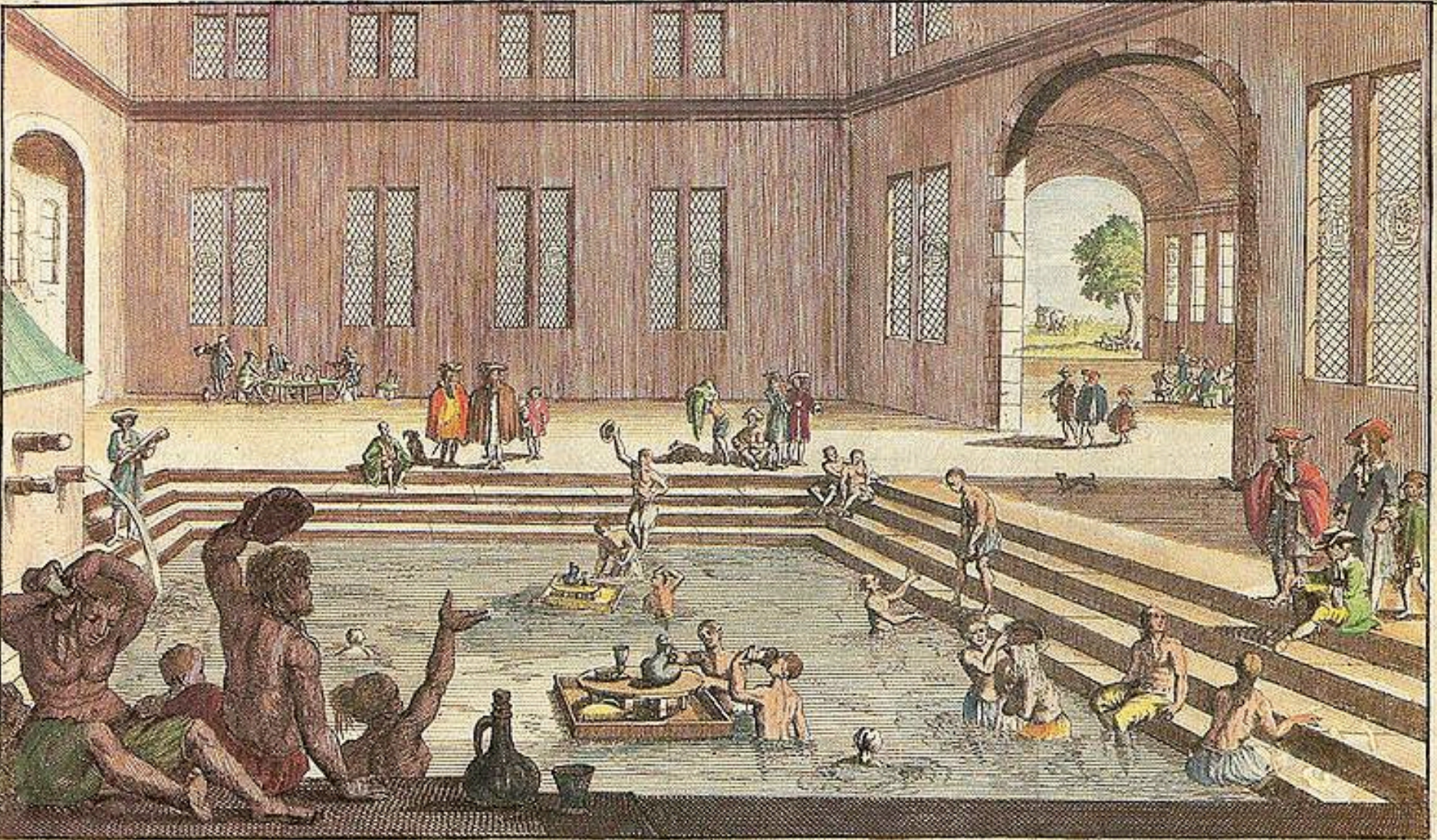




Hydrotherapy

Aquatic physiotherapist
I Shan Tzeng



t' Badt tot Aken.

Objectives

- A. The physics of water, hydrodynamics and its applications
- B. Aquatic exercises for rehabilitation and training
- C. Learn more about the hydrotherapy pool at Cheng Hsin General Hospital

Relative
Density

Refraction

Buoyancy

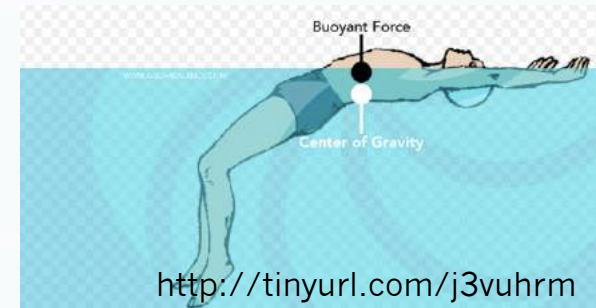
Physical
Properties

Viscosity,
Cohesion,
Adhesion,
and Surface
tension

Hydrostatic
Pressure

Relative Density

- The human body has a RD of 0.974.
- The tendency to sink or float
- Metacentric effect



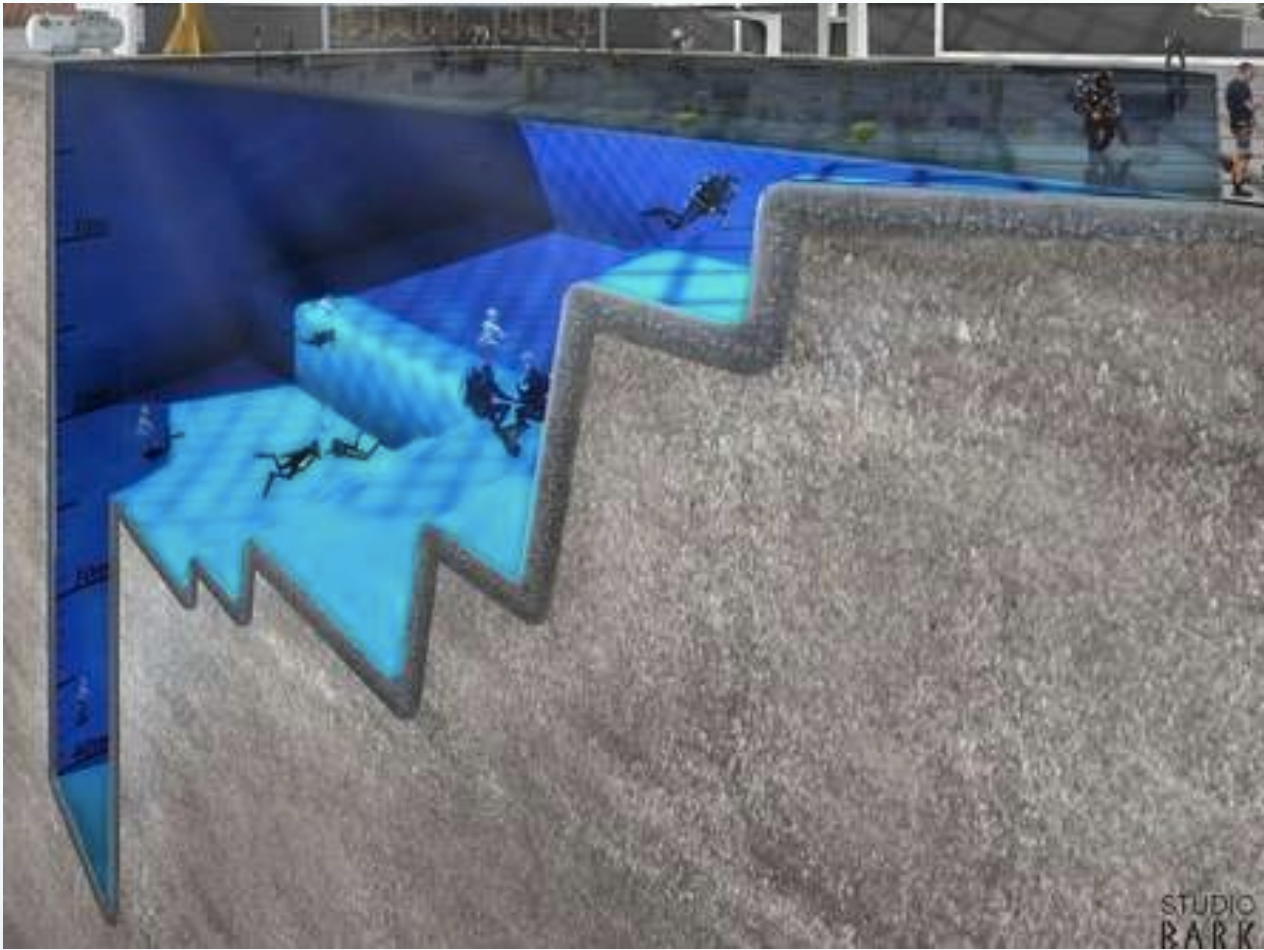
| | Floater | Sinker |
|------------------|------------|----------------|
| Body composition | Fat mass | Lean body mass |
| Muscle tone | Paralysis | Spasticity |
| Body tension | Relax | Tense |
| Breathing | Breathe in | Breathe out |

Buoyancy



<http://tinyurl.com/j3vuhrm>

- Buoyancy is a force that can assist, resist, or support movement in the water.
- The progression of weight-bearing status in the water
- Use of the water for decreased joint loading allows earlier, safer, and more comfortable rehabilitation.



<http://tinyurl.com/z7f3xsu>



<http://tinyurl.com/hjz33kl>

Hydrostatic Pressure (HP)

- HP is directly proportional to the depth of immersion with a pressure of 22.4 mmHg/30 cm of water depth.
- HP has a significant effect on the cardiopulmonary system.
- To reduce edema, challenge cardiopulmonary fitness, and improve the stability of trunk and joints.

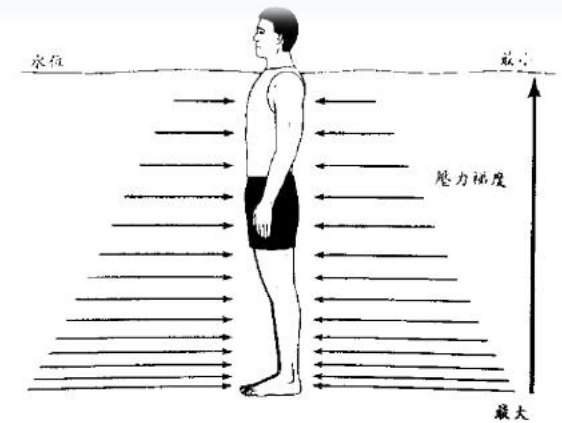
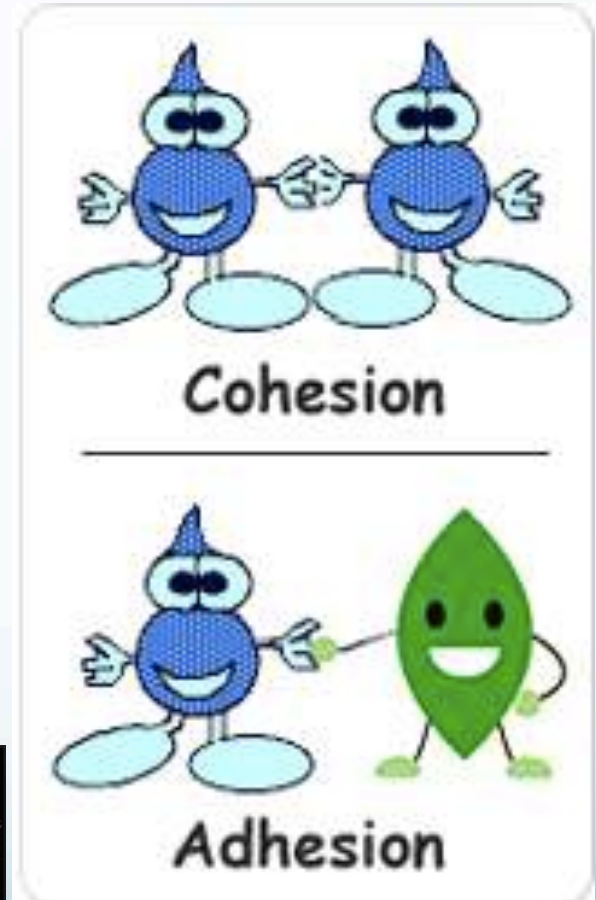
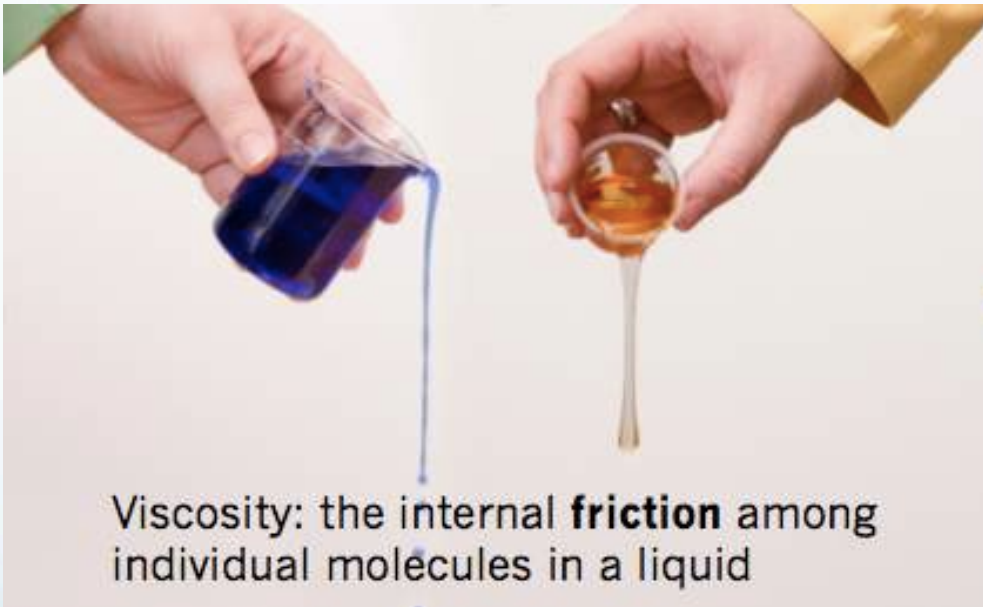


圖26-5 當患者站在水中時淨水壓的效應。隨著水加深，密度上升且壓力隨之上升。

Viscosity, Cohesion, Adhesion and Surface Tension



<http://tinyurl.com/jsffufr>

<http://tinyurl.com/hf2vuwm>

Refraction

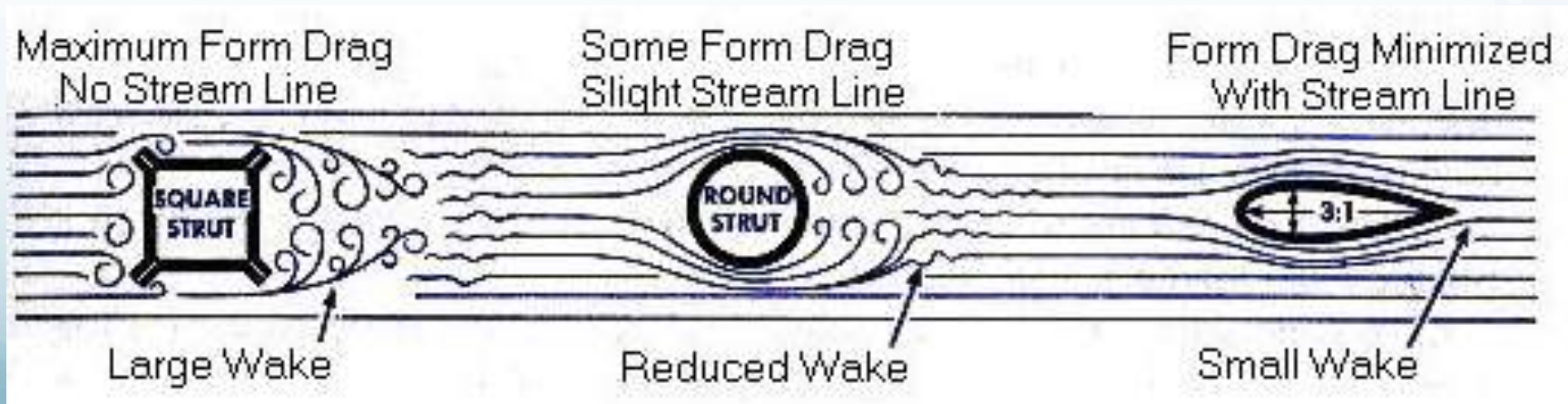
- In aquatic therapy, refractions occur when light rays pass from the air to the water.
- Use the goggles to observe underwater



<http://tinyurl.com/zupjvn3>

Fluid Dynamic Properties

- Streamlined Versus Turbulent Water Flow
- Eddies, Wakes and Drag Force
- Streamlined or Unstreamlined Movement





Small drag in streamlined position



Large drag in unstreamlined position

Aquatic equipment



Thermodynamics

Water's heat capacity is 1,000 times greater than an equivalent volume of air. The therapeutic utility of water depends greatly on both its ability to retain heat and its ability to transfer heat energy. Water is an efficient conductor, transferring heat 25 times faster than air.

This thermal conductive property, in combination with the high specific heat of water, makes the use of water in rehabilitation very versatile because water retains heat or cold while delivering it easily to the immersed body part. Water may be used therapeutically over a wide range of temperatures (*Figure 1*). Cold plunge tanks are often used in athletic training at temperatures of 10°–15°C to produce a decrease in muscle pain and speed recovery from overuse injury, although there are some contradictory studies regarding this [6-8]. Most public and competitive pools operate in the range of 27°–29°C, which is often too cool for general rehabilitative populations, because these populations are usually less active in the water. Typical therapy pools operate in the range of 33.5°–35.5°C, temperatures that permit lengthy immersion durations and exercise activities sufficient to produce therapeutic effects without chilling or overheating. Hot tubs are usually maintained at 37.5°–41°C, although the latter temperature is rarely comfortable for more than a few minutes, and even the lower typical temperature does not allow for active exercise.

Heat transfer begins immediately on immersion, and as the heat capacity of the human body is less than that of water (0.83 versus 1.00), the body equilibrates faster than water does.

Psychological benefits

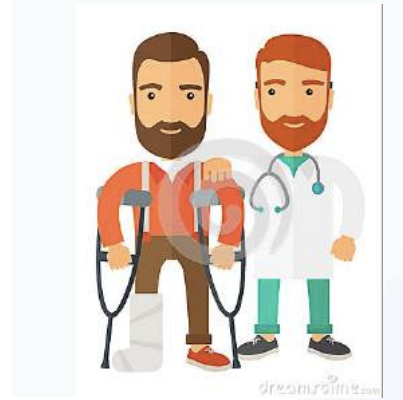
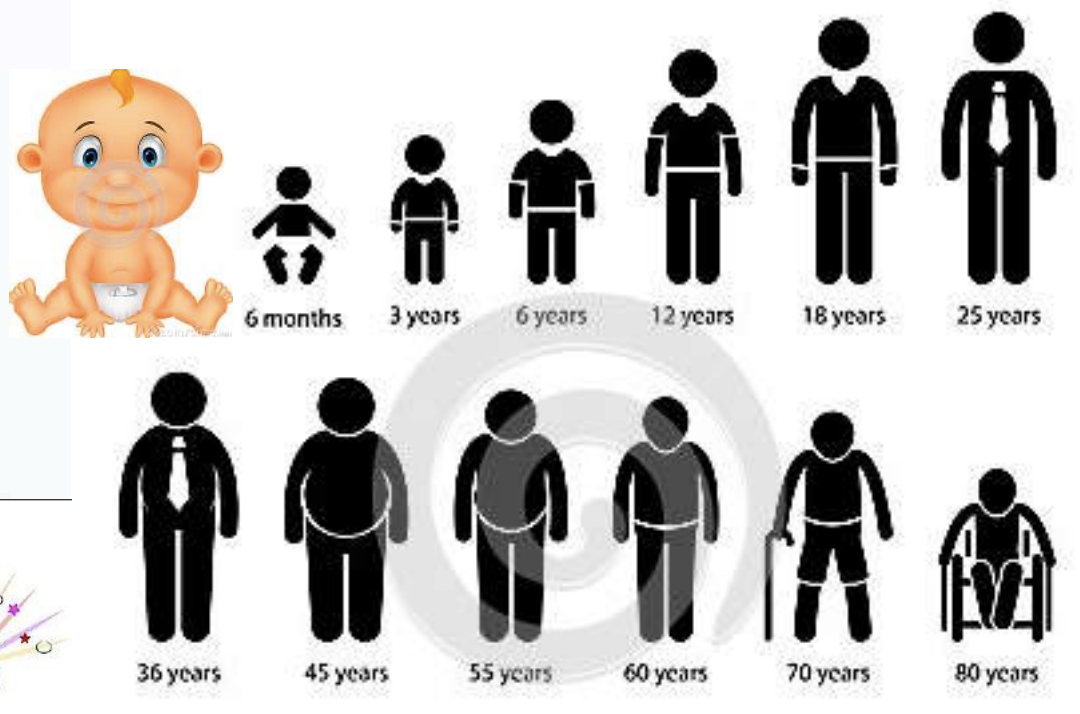
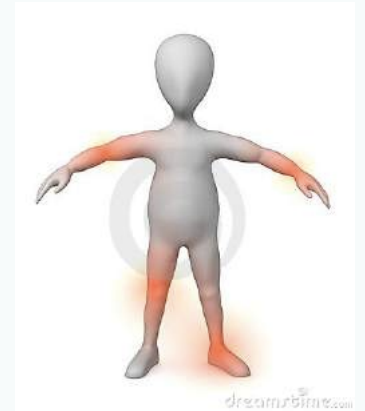
- Establish camaraderie and compliance may dispel feelings of isolation, anger, depression, or anxiety that commonly accompany an injury or disease process.



Aqua aerobics class can be fun. Photo Credit Maria Adelaide Silva/iStock/Getty Images

<http://tinyurl.com/zzbjfq>

Indications



Contraindication

- Unstable vital signs
- Uncontrolled: cardiac conditions, hypertension, DM, seizures
- Incontinence
- Infections
- Skin disease
- Open wounds



<http://www.dreamstime.com>

Precaution

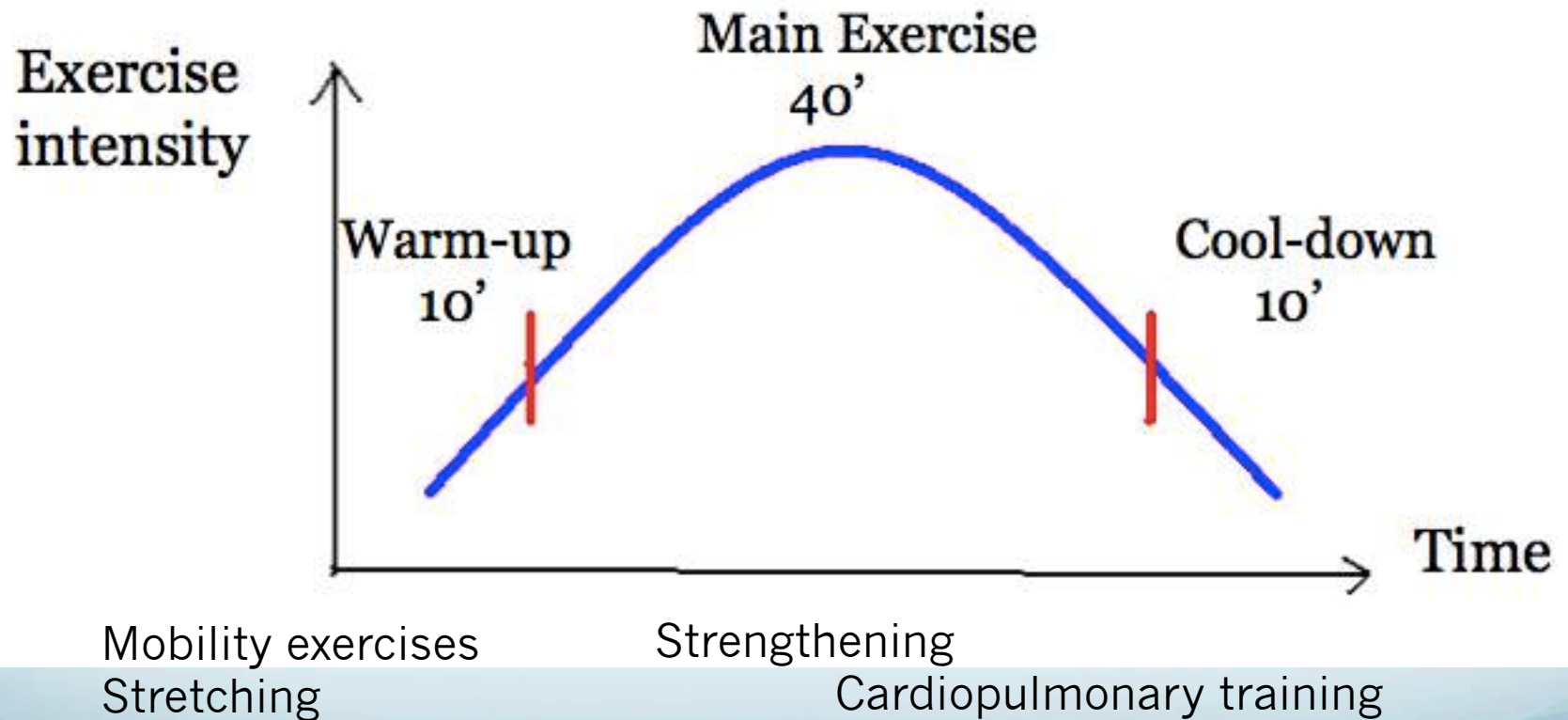


- Limit the treatment time
 - Metabolic syndrome
 - Pregnancy
 - Limited chest expansion: SCI, COPD, PPS, Smoker
 - Low tolerance to vestibular stimulation
 - Multiple Sclerosis



Aquatic exercises for rehabilitation and training

Aquatic intervention



Aquatic techniques



Halliwick

<http://tinyurl.com/z5383gx>



BRRM

<http://tinyurl.com/jxaoa8e>



Watsu

<http://tinyurl.com/hgq35d5>



Spinal
mobilization

<http://tinyurl.com/j4s3c7c>

Aquatic exercises



Ai Chi

<http://tinyurl.com/h5njdfp>



Water aerobics

<http://tinyurl.com/z342qp7>



Therapeutic
swimming

Five of the exercise program



Five of the exercise content



Learn more about the
hydrotherapy pool

Observations



History taking

1. Name, Sex, Age, Occupation, ideal ADL
2. Sign and Symptom
 - a) Where (local or radiating, superficial or deep...)
 - b) How (weakness, numbness, swelling, spasm...)
 - c) When (with a specific posture or movement, daytime or night...)
 - d) How long (acute, sub-acute, chronic, with other treatments...)
 - e) Injury Mechanism
3. Education
4. Home program

Feedback from our patients

- What's your favorite aquatic exercise?
 - The reasons why?
 - How do you feel when you do that?
 - What's the difference between the first time you did and now you perform?
- What's the difficult task in your daily life, is it still bothering you?
- Has hydrotherapy ever changed your life?
 - How about your exercise habits?
 - Your posture adjustments?
- What's the most challenging aquatic task to you?

Online resources-1

- <http://aqua4balance.com/>
- <http://www.aqua-exercises.com>
- <http://www.wcpt.org/apti>
- <http://www.aquaticpt.org>
- <http://aichi-taiwan.weebly.com>

Online resources-2

- Ai Chi
 - a) <http://www.idealife.com/fitness-library/ai-chi>
- Watsu
 - a) <http://www.aquaticwritings.com/watsu.html>
 - b) <https://www.watsu.com>
- For injured athlete
- a) <http://tinyurl.com/n6r7t42>



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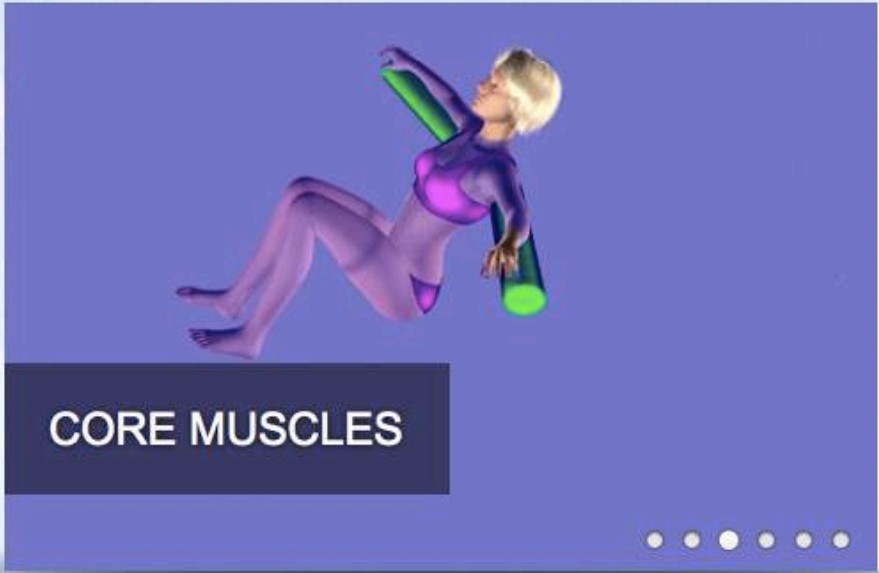
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Aquatic Physical Therapy International (APTI) - A network affiliated to WCPT

Welcome to the home of APTI - Aquatic Physical Therapy International.

Our Mission

To promote evidence based aquatic physical therapy around the world.

The objectives of APTI are to:

- Promote evidence based practice and clinical reasoning in aquatic



NETWORK AFFILIATED TO WCPT

World Confederation
for Physical Therapy

WCPT AFFILIATED NETWORK

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The purpose of the Aquatic PT Section is to meet the needs of physical therapists interested in using the water for various aspects of their careers, provide a means by which Association members with an interest in aquatic therapy can meet, exchange, develop and promote aquatic therapy as an important component to the physical therapy profession

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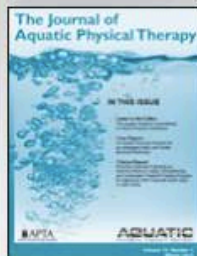
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for your time