Aquatic Physical Therapy

Physiological Changes During Warm Water Exercise

- Increased respiratory rate
- Decreased blood pressure
- Increased blood supply to the muscles
- Increased muscle metabolism
- Increased superficial circulation
- Increased heart rate

Physiological Changes During Warm Water Exercise

- Increased amount of blood returned to the heart
- Increased metabolic rate
- Decreased edema of submerged body parts
- Reduced sensitivity of sensory nerve endings
- General muscular relaxation

Caution

Submersion has a diuretic effect. Be Prepared.

Therapeutic Benefits of Warm Water Exercise

- Promotes muscular relaxation (due to neutral warmth and decreased sympathetic nervous system influence)
- Reduces pain sensitivity (decreased production of epinephrine and norepinephrine (sympathic n.s hormones)
- Decreases muscle spasm
- Increases ease of joint movement
- Increases muscular strength and endurance

Therapeutic Benefits of Warm Water Exercise

- Reduces gravitational forces
- Increases peripheral circulation (reduces edema, increased 02 delivery to muscles)
- Improves respiratory muscles (due to hydrostatic pressure

Therapeutic Benefits of Warm Water Exercise

- Improves body awareness, balance, and trunk stability
  - Walking in H20 is applies 10-14 x resistance than walking on land while decreasing WB forces
  - Viscosity of H20 allows pt increased response time to correct balance
- Improves patient morale

Goals

- Facilitate range of motion exercise
- Initiate resistance training
- Facilitate weight-bearing activities
- Enhance delivery of manual techniques
- Facilitate cardiovascular exercise
- Initiate functional activity replication
- Minimize risk of injury or re-injury
- Enhance patient relaxation

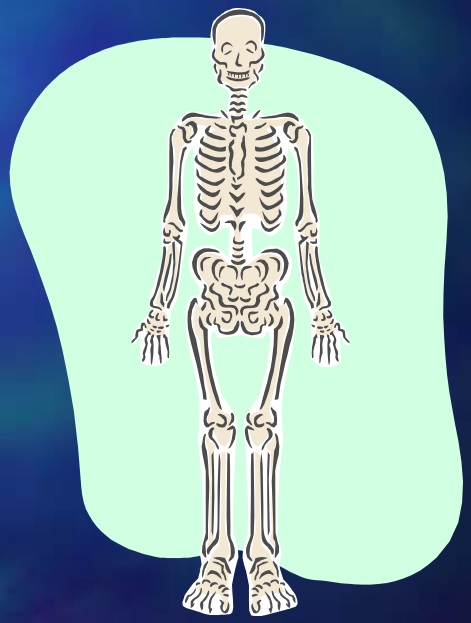
Weight Bearing With Immersion

Percentage of weight bearing at various immersion depths:

C7 equals 10%

Xiphoid equals 33%

ASIS equals 50%

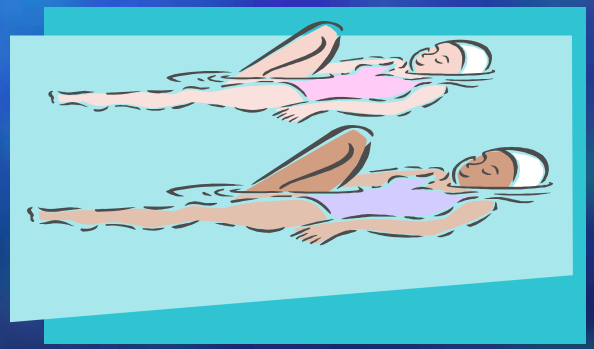


Indications for Aquatics

- Sprains, strains, contusions
- Tendonitis, bursitis
- Fractures without external fixation devices
- Pre-op and post-op
- Reflex sympathetic dystrophy (RSD)
- Proprioceptive deficits
- Degenerative diseases
- Low endurance

Indications for Aquatics

- Neurological conditions
- Elderly clients (individual or group)
- Pregnancy with MD approval



Contraindications

- Severe weakness
- Open wounds
- Fear of water
- Contagious rash, infection
- External fixators
- Urinary infections
- Allergies to pool chemicals
- Water or airborne infectious diseases, such as typhoid, cholera, and flu

Contraindications

- Current or recent radiation treatment
- Low vital lung capacity
- Fever
- Cardiac failure, including unstable angina
- Kidney disease where there is an inability to adjust to fluid loss
- GI disorders
- Perforated eardrums

Contraindications

- Incontinence (bowel or bladder)
- Menstruation (without internal protection)
- Epilepsy with uncontrolled seizures
- Abnormal blood pressure
- Severe peripheral vascular disease

Precautions

- Impaired cough reflex
- Inability to close the mouth

Precautions

- Cooler water temperature needed for patients with multiple sclerosis
- Watch for signs/symptoms of hypoglycemia in patients with diabetes (blood sugars go DOWN in water or with any exercise
- Monitor the cardiovascular response closely
- Use water shoes to protect the feet, especially when pt's have impaired sensation

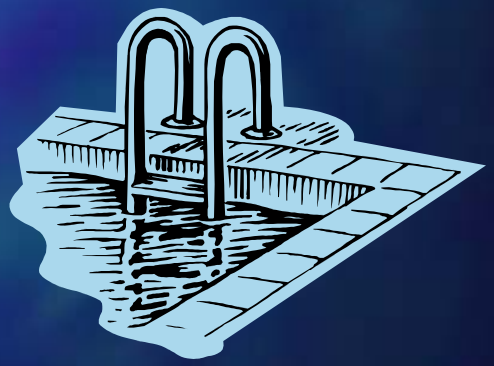
Aquatic Facility

Water Temperature

Therapeutic pool versus Swimming pool

Pool Design

- Pool shape? Depth?
- Floor surface should be non-slip
- Appropriate markings
- Entering and exiting the pool
- Surrounding deck
- Changing areas
- Soiled linen collection
- Utility, maintenance room



Pool Design

- Emergency alert system
- Emergency procedures posted
- Accessibility issues
- Ambient temperature
- Ventilation

Pool Lift Example

Pool Lift Example

Pool Access

Water Purity

- Optimal chemical levels
- pH between 7.5 and 8
- Document water purity
- Keep proper records of this information

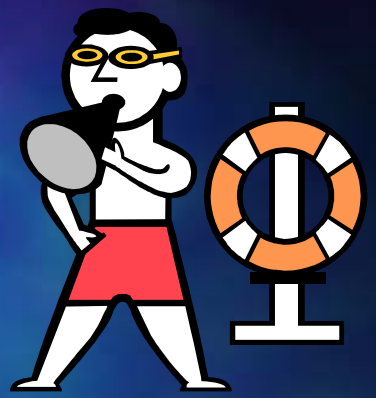
Physical Properties of Water

- Buoyancy
- Hydrostatic pressure
- Viscosity
- Surface tension
- Cohesion
- Turbulence

Refraction

- Refraction is the bending of light rays as they move from one medium into another of different density. Images in the water appear distorted making visual feedback difficult. Instructors often find it easiest to stand on the pool deck and instruct/monitor the exercises from there.

Safety Issues



- Water safety
  - Never swim or do water exercise alone
  - In unable to swim, stay in the shallow water zone. Avoid deeper water.
- Safety personnel and equipment
  - Water safety certification
- Protection against the sun
- Informed consent
- Participant responsibility regarding safety

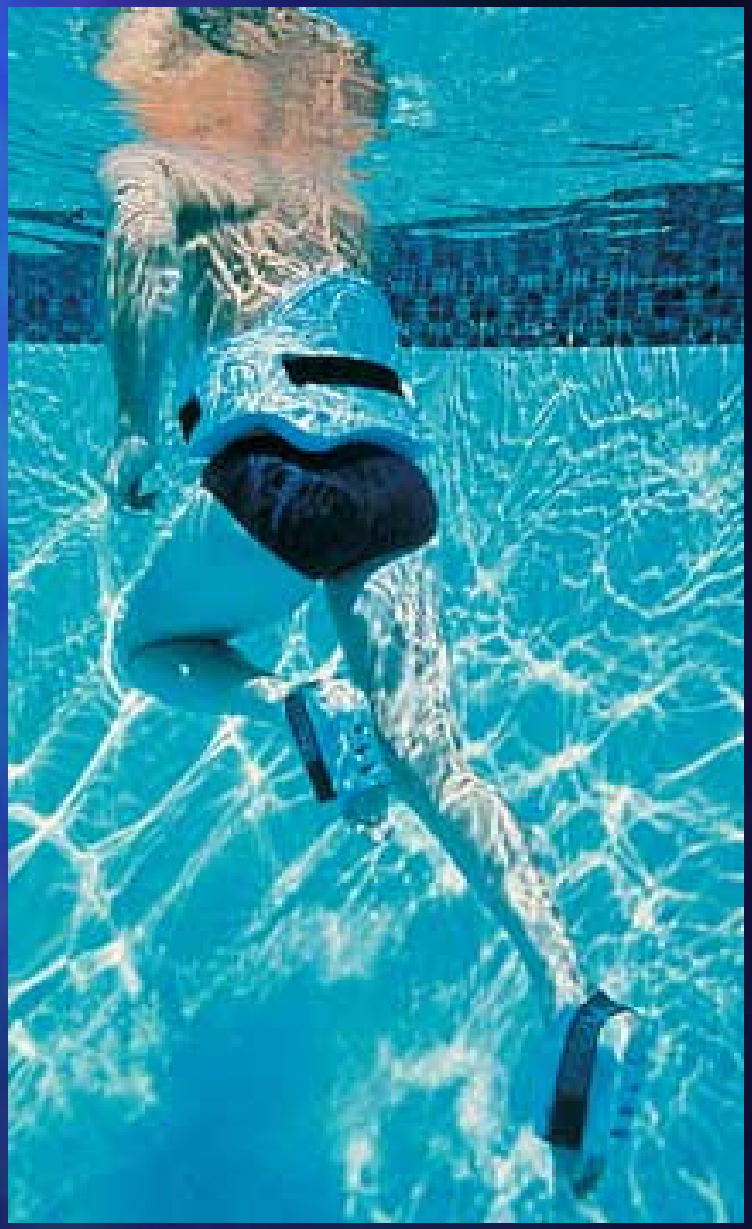
Flotation devices

- Provide buoyant support to the body
- Can assist with positioning
- Examples include a cervical collar, flotation rings, and buoyancy belts

Flotation Devices

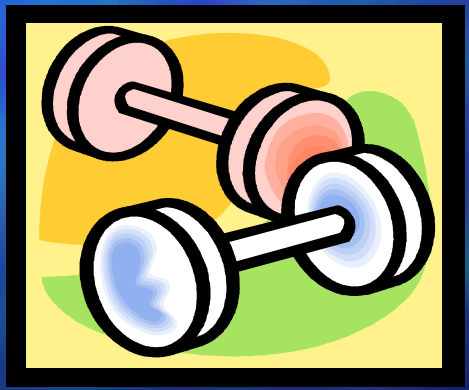
Flotation Devices

Flotation Devices



Exercise Equipment

- Provides resistance
- Kickboards
- Gloves, hand paddles, hydro-tone boots and bells



Exercise Equipment

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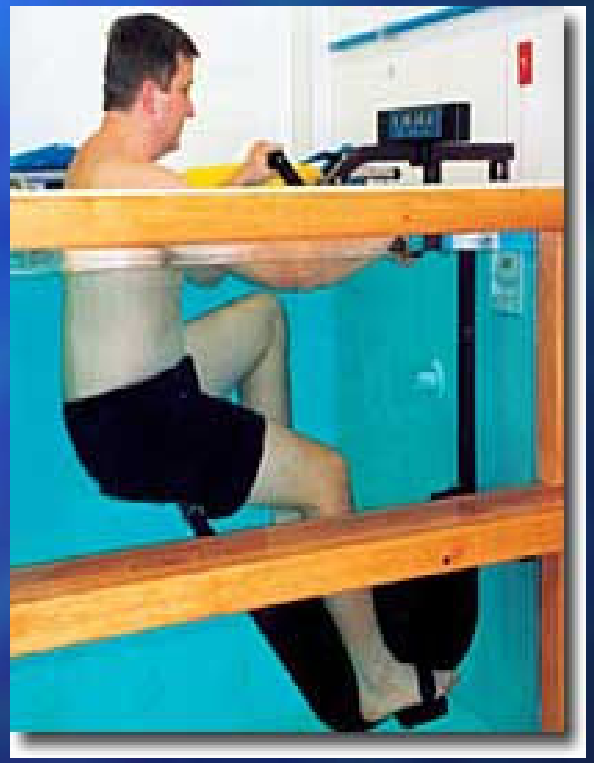

Endless Pool

Aquatic Prosthetics

Texas Medical Center


SPEEDO