Aquatics for Pediatrics

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Learner Objectives

- Identify how occupational therapists can provide a unique occupation-based prospective to swimming and other aquatic activities
- List at least two physical properties of water that provide a therapeutic medium for treatment
- Translate land based goals and activities to the water
- Identify at least one other way to use water in a land-based treatment

Aquatic Therapy

- Many disciplines engage in aquatics
  - Aquatic Fitness Professionals
  - Physical Therapists
  - Athletic Trainers
  - Personal Trainers
  - Recreational Therapists
  - Swim Coaches
- Many different goals in mind
  - Increase overall fitness
  - Rehab a specific joint or muscle
  - Competitive swimmers or runners

Occupational Therapy

- What’s unique about our perspective?
  - Occupation-based
  - Client-centered
  - Holistic
  - Environmental
  - Familial
  - (Fisher, et al, 2001)

Water, Water Everywhere

- Shower or Bath
- Jacuzzi or hot tub
- Sink to wash hands or brush teeth
- Water to drink
- Sprinklers or Rain
- Buckets and Puddles
- Pool and Water Slides
- Lakes and Ponds
- Rivers, Creeks and Streams
Areas of Occupation

- Leisure
  - Family vacations
- Social Participation
  - Friends at the pool
  - Family outings
- Play
  - Pretend play, cooperative play

Swimming

- Occupational Therapy
  - "Supporting Health and Participation in Life Through Engagement in Occupation"
  - (AOTA, 2008)
- Mother and child engaged in co-occupation

Client Factors

- Body Functions
  - Discrimination of sensation
  - Muscle tone, endurance
  - Joint mobility, stability
  - Righting and supporting reflexes
  - Bilateral integration
  - Eye-hand and voluntary motor control
  - Cardiorespiratory function

Properties of Water

- Buoyancy: is the upward acting force, caused by fluid pressure, that keeps things afloat. (Wikipedia, 2010)

Buoyancy + Client Factors

- Change center of gravity and provide a new motor planning challenge
- Increase freedom of movement
- Less stress on joints and muscles; at ASIS (Anterior Superior Iliac Spine), weight bearing is approximately 50% (ATRI Conference, 2002)

Properties of Water

- Viscosity: measure of resistance of fluid, the less viscous, the easier it is to move through it. (Wikipedia, 2010)
Viscosity

- Provide opportunity for strengthening without weights
- Increase proprioceptive opportunities
- Increase or decrease by using tools such as barbells, kickboards and speed of movements
- Can stop this by stopping the movement

Properties of Water

- **Hydrostatic Pressure**: pressure exerted by a fluid at equilibrium due to the force of gravity

Hydrostatic Pressure

- Provides compression to the body to facilitate blood circulation, heart rate, edema
- Increases respiratory capacity: need to work to inspire, facilitated expiration
- Tactile input to entire body to facilitate motor planning, body awareness and can be calming

Properties of Water

- **Streamline flow**: continuous, steady movement of a fluid (current)
  - Increases resistance, fun to move against!

Properties of Water

- **Turbulent flow**: irregular movement of fluid, creates rotary movements called eddys.
  - Use to increase resistance for strength
  - Increase proprioceptive input
  - Work on balance and stability problems

Properties of Water

- **Relative Density**: mass/volume
  - RD of lean body mass is approximately 1.1
  - RD of fat is approximately 0.90
  - Average human body is 0.974
  - Males have higher RD, females and children have a lower RD.
  - A person with deflated lungs has an RD of 1.05-1.08
  - Flaccid and edematous extremities have a lower RD than normal
  - Spastic extremities have a higher RD than normal
Properties of Water

- R.D. + Rotational forces
  - Hemi will roll toward side of spasticity
    - To counteract: abduct unaffected arm, put unaffected leg under affected leg, bring affected arm to midline, turn head away from affected side
  - Edema will roll away from affected side
    - To counteract: turn head toward affected side, abduct arm on affected side

  (ATRI Conference, Shoedinger, 2002)

Properties of Water

- Temperature: measure of energy
  - Warm water provides neutral warmth to muscles to relax tone/spasms
  - Cool water can be alerting
  - Specific heat principles
  - Neutral warmth: water temp of 89-90 degrees
  - Spa is over 104 degrees

Contra-indications & Precautions

- Contra-indications
  - Open wounds
  - Incontinence
  - Infectious disease or cold/flu
  - Extreme blood pressure, high or low

- Precautions
  - Asthma, COPD or CHF
  - Cognition
  - Other motor control deficits

Assessment:

- Standard "land-based" evaluation addressing
  - ROM
  - Strength
  - Coordination
  - Endurance
  - Sensory
  - Cognition
  - Social/Emotional
  - Communication
  - Environmental/Cultural
  - Areas of Occupation

Determining if aquatics is appropriate:

- Plateau with land-based interventions
- Interest in community based intervention that can be carried on by caregivers/family
- Intensity of intervention
- Generalization of settings
- Availability of water!

Goals: Cognitive

- Safety
- Impulse Control
- Following Directions
- Sequencing
- Multi-tasking
- Directionality
Goals: Visual-Perceptual
- R/L Discrimination
- Spatial Awareness
- Depth Perception

Goals: Sensory Processing
- Vestibular
  - Skill development influences
    - Movement & balance
    - Muscle tone
    - Bilateral integration
    - Gravitational security
    - Motor planning

Goals: Sensory Processing
- Proprioception
  - Body Awareness
  - Motor Control, Muscle Gradation
  - Postural Stability
  - Emotional Security

Goals: Sensory Processing
- Tactile
  - Body Awareness
  - Motor Control
  - Gross & Fine Motor
  - Oral Motor Control
  - Motor Planning
  - Water Adjustment

Goals: Physical Functioning
- Strength
  - Trunk, core control, rotation, abdominal
  - Upper & Lower Extremities
- Coordination
  - Bilateral
  - Reciprocal
  - Upper & Lower
  - Manipulating tools in the water
  - Movement in environment (over, under, around)

Goals: Physical Functioning
- Cardiovascular
  - Respiratory capacity
  - Heart rate
  - General endurance
  - Increased circulation
- Balance
- Tone inhibition
Goals: Social-Emotional
- Self-esteem
- Peer play, socialization
- Family engagement
- Community based rather than isolated in home or clinical setting

Goals: Health Promotion
- Leisure
- Sensory Diet
- Physical exercise
- Competitive (Swim Team)
- Life-long

Goals: Caregiver Education
- Handling skills in the water
- Limit setting & safety
- Strengthening, coordination
- Family involvement in community
- Sensory diet

Activity Demands
- The possibilities are endless!

Where to start for swim skills?
- Water adjustment
- Blow bubbles
- Pull them along in prone to get feet off the floor
- Hold them with their back to you and 'swoosh' sideways until you can dip them into supine
- Kicking
- Then add arms last

Tools and Toys in Water
- Sponges
- Squirt guns
- Meat Basters
- Noodles
- Rafts
- Tongs
- Nets
- Scoopers
- Kick boards
- Straws or tubes
- Buckets
- Plastic Eggs
- Shovels
- Balls
- Basketball Hoops
- Hula Hoops
- Paintbrushes
- Boats
- Goggles
- Fins
- Rings
- Flotation Mats
**Clinic-based**

- Do you have a sink?
- Large buckets?
  - Meat basters for hand strength
  - Make bubble monsters
  - Play in the sink for tactile input
  - Water works that spin when you pour water
- Maybe you have an old shower from inpatient?
  - Wear your swimsuits! Think tactile and tool use!
  - Paintbrushes, buckets, shovels, collanders

**Clinic-based**

- Squirt guns
  - Squirt off the shaving cream from the mirror
  - Squirt off the table
- Water table (instead of beans)
  - Shovels, buckets, meat basters, balls
- Paint with water
- Use different types of sponges on your body, netting, soft, hard

**Clinic-land-school**

- Using a large bucket and some animal friends can be a great way to act out, write social stories, about an upcoming trip to the pool.
- Animals jump in
- Animals play

**Songs!**

- This is the way we wash our arms, our head, neck, belly, back
- Five green and speckled frogs
- Use marching music and march in circles in the pool

**Other Activities in the Water**

- Obstacle Course
  - Motor Planning, Strength, Endurance
  - Noodles, hula hoops, plastic eggs, ball
- Sensory Exploration
  - Paintbrushes, sponges, washclothes
  - Crazy Jumps!
    - Strength to get in/out of the pool
    - Sensation adjustment to tactile and temperature
- Dressing race
  - Sequence articles of clothing opposite sides of pool
  - Strength to get in/out of pool
  - Fine motor fastener and tie shoe manipulation
  - Proprioception with weight of accumulated clothing

**Performance Patterns**

- Building positive experiences
- Habits, Roles and Routines
  - Avoid water or embrace it?
  - A bad experience can form aversive habits for a lifetime
Context and Environment

- Community Pool such as YMCA
- Therapy Warm Water Pool (if you're lucky!)
- Lake Erie beaches
- Water Parks like Kalahari or Great Wolf
- Camping at Mohican
- Play in the rain and puddles at home
- Social Environment of family and friends
  backyard pools or slip n slides
- Cultural such as lakeside living

Questions?
References

- Aquatic Therapy and Rehabilitation Institute, Annual Conference, 2002, Florida. Including presentations by Bruce Becker, MD, Peggy Schoedinger, PT, Dori Maxon PT, Rodna Metz, OTR and Susan Grosse

Resources

- [www.atri.org](http://www.atri.org)  
  - Aquatic Therapy and Rehabilitation Institute for all providers of aquatics  
- [www.aquaticnet.com](http://www.aquaticnet.com)  
  - Several websites and authors came together to create this clearinghouse of information  
- [www.aquatictherapist.com](http://www.aquatictherapist.com)  
  - Blog and information by Andrea Salzman, PT  
- [www.aquatic-therapy-university.com](http://www.aquatic-therapy-university.com)  
  - Continuing education and books written by PT, OT, SLP and MD  
- [www.halliwick.net](http://www.halliwick.net)  
  - A 10 step approach to modified swimming  
  - APTA aquatic therapy section  
- *Sponges, Splashes and Sprinkles* by Susan Grosse