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Fundamentals of Aquatic Intervention for the Pediatric Population

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Theraplay Pediatric Rehab & Wellness

Disclosure

The speaker has no financial interest in or conflict of interest related to this presentation. The speaker will not receive compensation from any company and is not paid to represent specific products or services.
Course Objectives

Upon completion of this course, participants will:

• Understand the differences between aquatic physical therapy and water exercise.
• Understand the physiological benefits for choosing aquatic physical therapy as a primary or adjunct method of intervention
• Identify safety risks, precautions, and contraindications for participation in aquatic physical therapy
• Identify functional limitations best-suited for aquatic-based intervention
• List effective handling techniques in four major treatment positions

Why Aquatics?
The Challenge (video)

Why it Matters
It Changes Lives

Then I met Jesus...
Jesus at 22 months

Videos

• Jesus at 30 months
• Movement on land
• Movement in water
• UE Function in Water
• UE function continued
• Bilateral Function
Pearl #1

Aquatic Physical Therapy

Is a Life-Changing Form of Intervention

Our Mission

Transforming society by optimizing movement to improve the human experience.
The Therapist’s Tool Box

CREATE A NEW PARADIGM
The Health Care Relationship

“The degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge”

Skilled Intervention by a physical therapist, performed in water using clinically relevant, evidence-based techniques to remediate or reduce functional impairments.

Pearl #2

Aquatic Physical Therapy is a valuable component to health care and plays an integral part in helping individuals improve function.
Terminology
Aquatic Physical Therapy is NOT:

Water Exercise  Hydrotherapy  Water aerobics
Swim Therapy/Lessons  Aquatics

Aquatic Physical Therapy integrates:

the unique knowledge, skills, and training of a physical therapist or assistant and
cannot be performed by an unlicensed individual, a personal trainer, caregiver, or aquatic instructor.
Aquatic Physical Therapy

- Is a Specialty Practice
- Specific handling techniques
- Manual skills to influence or restrict movement
- Tactile, verbal, and visual cues to guide movement
- Integrates functional skills training
- Little to no floatation support

Aquatic PT or Not?
The What, Why, and How of Aquatic PT
Aquatic Physical Therapy

Uses the properties of water to affect movement and cause physiologic change.

The properties are referred to as Hydrodynamics

Hydrodynamics

Buoyancy

Density Viscosity

Thermodynamics Hydrostatic pressure
Stability

Patient: Water provides uniform support and resistance

Therapist: Lessens work required for handling

Mobility

Near zero gravity
+ buoyancy supports movement
Proprioception

Uniform pressure supports body awareness to improve brain-body connection.

Alertness or Calming

The multi-sensory environment stimulates sympathetic nervous system (alerting) for facilitation or Parasympathetic nervous system (rest and digest) for inhibition.
The Benefits: For Therapists

The Benefits: For Patients:

Aquatic therapy enables the therapist to see what movements the patient can perform without the constraint of gravity.

- Helps focus land-based intervention in the areas where the patient has the ability to make the most gains.

- Efficiency: Allows for training of multiple systems during a single session.

Aquatic PT provides opportunities for movement the patient may otherwise be unable to perform.

Aquatic PT introduces the patient to an activity that allows for life-long participation.

Enables/promotes caregiver participation.

Maximize movement with opportunity and options for participation.
Some clinical impairments treated with aquatic physical therapy:

- Weakness
- Rom deficits
- Dyspraxia
- Dyspnea
- Proprioception
- Coordination/agility
- Pain
- Balance deficits

#3 Aquatic Physical Therapy is beneficial for treating any type of clinical impairment.

- Aquatic Physical Therapy can either inhibit or facilitate movement in one or more body segments.

- Aquatic Physical Therapy is the only treatment that offers continuous, fluid, velocity-dependent, uniform resistance.

- Aquatic Physical Therapy is the only treatment that enables therapists to use controlled pressure to support all or a portion of the patient’s body weight.

- Aquatic physical therapy allows therapists to affect 360 degrees of movement simultaneously.
Getting Started

The Basics

Think Safety First
Develop or Review safety policies prior to commencing aquatic treatment.

For each patient, provide written precautions and contraindications and discuss with caregivers.

Provide written pool guidelines and review with caregivers (hygiene, dress, jewelry, food, drink, outside toys, etc.)
Consider Logistics
Is the environment suitable for treating children?

How will the client enter/exit the facility?

What plans are in place to address an emergency?

Are there two forms of communication in the event of an emergency?

What are the evacuation procedures?

Who is responsible for water quality and maintenance?

Checklist for participation

<table>
<thead>
<tr>
<th>Patient has a stable medical status</th>
</tr>
</thead>
<tbody>
<tr>
<td>The patient has no precautions or contraindications against participation.</td>
</tr>
<tr>
<td>The patient has caregivers committed to support participation.</td>
</tr>
<tr>
<td>The family/caregiver has the financial resources to attend regular sessions.</td>
</tr>
<tr>
<td>The therapist has the skills required to provide effective intervention.</td>
</tr>
<tr>
<td>The aquatic environment is accessible for the patient.</td>
</tr>
<tr>
<td>The aquatic environment is compatible with the patient’s needs.</td>
</tr>
<tr>
<td>Patient has had no negative experience with water.</td>
</tr>
<tr>
<td>Safety issues have been addressed and plans put in place before participation.</td>
</tr>
<tr>
<td>Policies and procedures are developed to address all aspects of aquatic PT.</td>
</tr>
</tbody>
</table>
Precautions and Contraindications

- A comprehensive list of precautions and contraindications can be found under the “Resources” section of this presentation

The How to:
First Steps

- Land-based Evaluation
- Determine the clinical impairments suited for treatment in water.
- Discuss the option of aquatic PT with caregivers
- Review “checklist for participation” with caregiver
- Review logistics, provide handouts on policies, precautions, safety, etc.
- Take patient/caregiver on tour of pool site

Ready to Dive In
Videos

- Entry: Vertical with support at upper trunk, facing child.
- Supported Entry

Exiting the pool
Videos

- Vertical movement face to face
- Vertical+Lateral Movement face to face
- Vertical facing away (passive)
- Vertical facing away (active)
- Prone
- Sidelying
- Supine
- Combination Movements (Toes Up, Toes Down)
- The Dolphin
- Snaking
- Turning and Rolling
- Rolling

The Wango
Movement

The Four Basic Positions:
Vertical, Prone, Sidelying and Supine

Position 1: Dance pose
Side Dip

Dance Pose 2
Up and Rotate to facing away

Toward Supine
Sidelying to Prone

Progression to Prone
Prone with Movement

Videos

- Body Segment Training: Legs
- Water walking
- Frog kicking
- Straight Leg Raise
- Plyometrics
- Core
- Intermediate Core
- Weighted Core
- Upper Extremities
- Upper Extremity Basic Movement
- UE Progression
Using Equipment

• Use equipment only:

• To stabilize a body part while manipulating or working another segment;

• To promote independent movement when the patient is otherwise unable to move;

• To provide additional resistance.

Videos

• To support head
• To support independent movement
• To challenge movement
• To support participation
WHEN YOU GIVE A CHILD THE GIFT OF MOBILITY, YOU CHANGE THEIR LIFE FOREVER.

Appendices

Resources to make life easier
Precautions and Contraindications
• Bowel incontinence with firm stools (pt should be on stool program and wear protective pants into pool)
• Diarrhea
• Fever
• Communicable diseases (cold flu, Hepatitis)
• Autonomic dysreflexia
• Sensitivity to disinfection chemicals
• Sensitivity to heat/ humidity (e.g Multiple Sclerosis)
• Rashes, skin conditions with flaking or open areas (psoriasis)
• Orthostatic hypotension
• Hydrophobia

Precautions
• Behavior issues, combative or difficult to control
• Poor cognition
• Dependence in mobility skills
• Controlled seizures, exercise-induced angina, controlled diabetes
• Open wounds with bio-occlusive dressing
• Compromised immune system (e.g. low T-cell count)
• On chemotherapy for cancer
• On dialysis for renal/kidney dysfunction
Precautions and Contraindications

- Uncontrolled seizures, unstable angina or uncontrolled diabetes
- Bowel incontinence with diarrhea, and no stool program
- Open wounds or bleeding without bio-occclusive dressing (including menstruation without internal protection)
- Tracheotomy without cap
- Acute flare-up active joint inflammation (rheumatoid arthritis, hemophilia)
- Orders for NPO (nothing by mouth)
- Presence of DVT (deep vein thrombosis) without anticoagulation therapy or filter

Professional Components

Do I have the experience needed to work with this patient? To handle emergencies?

Do I have the insurance coverage needed to cover treatment in a pool (on or offsite)?

Does the patient’s insurance cover aquatic physical therapy?

For leased pools, is there a binding contract?
Pools

• Good accessibility: external and internal

• Adequate changing facilities to accommodate children of all sizes and levels of mobility.

• Good, consistent water quality: Chlorine (1-3) ppm; pH (7.2-7.8); alkalinity (80-120 ppm); calcium hardness (200-400 ppm)

• Water Temperature 90-92 degrees; Air temp 78 degrees+

<table>
<thead>
<tr>
<th>Targeted Body Action</th>
<th>Position/Activity</th>
<th>Contact Points: Initial (I) and Progression (P)</th>
<th>Associated Land-based activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head Control: frontal plane</td>
<td>Supine position; toes up/toes down; Prone position:</td>
<td>I: occiput/lumbar P: thoracic; lumbar; no contact I: facing patient with floatation and chin touching water, progress same w/out floatation P: sternum at varied depths, upper trunk, mid trunk beside patient.</td>
<td>Pull to sit on wedge, ball, or floor; a/p movements in sitting; Head down on decline, ball, peanut bolster. Prone carry, Prone prop on flat surface with/without upper chest support; prone on ball/peanut/bolster; prone with linear movement.</td>
</tr>
<tr>
<td>Head Control: Sagittal plane</td>
<td>Front facing carry w/ sidestepping, Side lying; Lateral sway, tick-tock</td>
<td>I: Upper chest/axillae P: upper chest bilateral; lateral chest on bottom side combined with proximal ASIS on top side.</td>
<td>Side to side movement on bolster or ball; rocker board; lateral reach outside BOS.</td>
</tr>
<tr>
<td>Head Control global</td>
<td>Rolling, tick tock</td>
<td>Chest wall top side and lumbar or unilateral PSIS</td>
<td>Upright with movement (passive and active)</td>
</tr>
<tr>
<td>Techniques</td>
<td></td>
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<td><strong>Chest Wall Expansion</strong></td>
<td>Vertical, supine, side lying, prone. Passive or guided aiki “accepting”, wango, stand and reach behind body.</td>
<td><strong>I:</strong> Generally, one hand at anterior chest wall, contralateral arm guides movement into horizontal abd of shoulder. <strong>P:</strong> CGA with active movement.</td>
<td>Prone flying on ball, bolster, or swing; supine or sit and reach overhead (hyper flexion of humerus)</td>
</tr>
<tr>
<td><strong>Trunk Flexion</strong></td>
<td>Supine supported trunk curls on floatation mat, trunk curls holding noodle or barbell, trunk curls with lower legs on pool deck or edge of pool. Standing unilateral or bilateral hip and knee flexion with or without resistance.</td>
<td><strong>I:</strong> Head to upper thoracic spine, increase lever arm to increase intensity; <strong>P:</strong> Contact guard at lumbar to sacral level, support at legs for advanced participants.</td>
<td>Supine to sit trunk flexion on incline, progress to flat surface with or without contact on hands or allowing patient to use hands to help pull upward; passive forward acceleration on scooter board or jettmobile.</td>
</tr>
<tr>
<td><strong>Trunk Extension</strong></td>
<td>Prone position, forward walking</td>
<td><strong>I:</strong> Upper chest support facing patient or stand beside patient and move hands to mid or lower trunk to facilitate greater extension, use noodle or board, <strong>P:</strong> Contact guard or move support inferiorly</td>
<td>Prone scooter board, prone flying on swing with forward reach. Prone over bolster or peanut with alternating weight shifting on upper extremities.</td>
</tr>
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</table>

**Techniques**

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<td><strong>Trunk rotation</strong></td>
<td>Supine (rock the boat), stand or sit and rotate with barbell or small ball; supine or recumbent unilateral kick across midline.</td>
<td><strong>I:</strong> supine/recumbent the patient’s head rests on your shoulder to free up both hands for stabilizing and moving. <strong>P:</strong> increase distance moved, place and hold strategies against turbulence or resistance created by therapist moving.</td>
<td>Rolling, reaching across midline with upper or lower body, bilateral reach to end ranges right and left with lower body static, Russian twist.</td>
</tr>
<tr>
<td><strong>Lower extremity separation: frontal and sagittal</strong></td>
<td>Vertical, supine or prone. Passive guided LE separation, reciprocal, kicking, scissoring, walking, sidestepping, step ups.</td>
<td><strong>I:</strong> supine behind patient with bilateral arms beneath axilla or one arm beneath axilla and other guides leg separation. <strong>P:</strong> sba to cga for stabilization.</td>
<td>Walking, Cycling, kicking, straddle sitting, unilateral standing with contralateral leg movements.</td>
</tr>
<tr>
<td><strong>Dorsiflexion</strong></td>
<td>Vertical in standing; static squat holds, heel rocks, walk with flippers; supine drags with and without flippers.</td>
<td><strong>I:</strong> Bilateral ASIS for standing and walking; <strong>P:</strong> use noodle, barbell or kick board to stabilize body in supine and drag patient forward with toes/fins up.</td>
<td>Long sit forward drags with patient on scooter board or “magic carpet”, rocker board, tricycle; walking decline</td>
</tr>
<tr>
<td><strong>Plantar flexion</strong></td>
<td>Vertical, supine, prone</td>
<td>Toe walking, forward jumping, hopping, supine push-offs from wall, walking into progressive depths.</td>
<td>Straddle sitting on peanut with legs dangling and rocking side to side; walking inclines (wedges, slides), pushing weighted sled etc forward.</td>
</tr>
</tbody>
</table>
POOL CHEMICAL SAFETY: USE

BEFORE YOU USE POOL CHEMICALS

• Get trained in pool chemical safety (for example, during operator training course).
• Ask for help if you are NOT trained for specific tasks.
• Read entire product label or Material Safety Data Sheet (MSDS) before using.
• Learn your pool’s Emergency Chemical Spill Response Plan and practice steps.
  (For example, evacuation)

USING POOL CHEMICALS SAFELY

• Dress for safety by wearing appropriate safety equipment (for example, safety goggles, gloves, and mask).
• Read chemical product label before each use.
  • Handle in a well-ventilated area.
  • Open one product container at a time and close it before opening another.
  • Miscarce used, cleaning, and solution.
  • Measure carefully.
  • Never mix.
  • Chlorine products with acid; this could create toxic gases.
  • Different pool chemicals (For example, different types of chlorine products) with each other or with any other substance.
  • Only pre-dissolve pool chemicals when directed by to product label.
  • If product label directs pre-dissolving, add pool chemical to water: NEVER add water to pool chemical because violent (potentially explosive) reaction can occur.
Always refer to pool chemical labels immediately. Follow your pool’s Emergency Chemical Spill Response Plan, and be sure to contact the proper authorities and management.

Pool Address and Phone Number:
Emergency Response Phone Number:
Local Health Department Phone Number:

POOL CHEMICAL SAFETY: STORAGE

BEFORE YOU STORE POOL CHEMICALS

• Get trained in pool chemical safety (for example, during operator training course).
• Ask for help if you are NOT trained for specific tasks.
• Read entire product label or Material Safety Data Sheet (MSDS) before storing.
• Learn your pool’s Emergency Chemical Spill Response Plan and practice steps.
  (For example, evacuation)

STORING POOL CHEMICALS SAFELY

• Follow product label directions for chemical storage:
  • Uses for safety by wearing appropriate safety equipment (for example, safety goggles, gloves, and mask).
  • Separate incompatible chemicals (For example, acid and chlorine).
  • Lock chemicals up to protect people and animals.
  • Keep chemicals dry and do not mix different chemicals (For example, different types of chlorine products).
  • Keep chemicals cool in a well-ventilated area away from direct sunlight.
  • Keep chemicals clean in original, labeled containers.
  • Store liquid chemicals low to prevent accidental contact (For example, by testing) with chemicals or containers stored below them.

DISPOSAL OF POOL CHEMICAL CONTAINERS

• Follow product label directions for safe disposal, never use containers:
  • Contact local or state hazardous materials agency for proper disposal procedures for pool chemicals in unlabeled containers.
Always respond to pool chemical spills immediately. Follow your pool’s Emergency Chemical Spill Response Plan, and be sure to contact the proper authorities and management.

Pool Address and Phone Number:
Emergency Response Phone Number:
Local Health Department Phone Number:
**SIX Steps for Healthy Swimming**

**Protection Against Recreational Water Illnesses (RWIs)**

Six steps to protect yourself and others from getting sick. Without your help, bugs and other microorganisms can spread germs.

**THREE steps for All Swimmers**

- PLEASE don't swim when you have diarrhea. You can spread germs in the water and make other people sick.
- PLEASE don't swallow pool water. Avoid getting water in your mouth.
- PLEASE practice good hygiene, shower (with soap) before swimming, and wash your hands after using the toilet or changing diapers. Germs on your body can end up in the water.

**THREE steps for Parents of Young Children**

- PLEASE take your kids on bathroom breaks or check diapers often. Waiting to hear “I have to go” may mean that it’s too late.
- PLEASE change diapers in a bathroom or diaper-changing area and not at pool side. Germs can be spread in and around the pool.
- PLEASE wash your child thoroughly (especially the rear end) with soap and water before they go swimming. Invisible amounts of fecal matter can end up in the pool.

For more information visit

www.cdc.gov/healthyswimming

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**SHARE THE FUN... not the germs**

Protect yourself, your family, and your friends from germs in the water!

- Pool, waterparks, hot tubs, splash pads, and spray parks are great places to have fun, be active, or just relax. But you can get sick if germs contaminate the water.
- People who get into the water can carry and spread germs.

**Why is this so important?**

If you get into the water while you have diarrhea, you could make others sick.

Most outbreaks linked to the water are caused by chlorine-resistant Cryptosporidium or other microorganisms. These germs can remain active in the water even after chlorine treatment. If you go swimming when you have diarrhea:

- You can spread germs to other swimmers
- Other swimmers can get sick

**Follow these easy steps to help keep germs out of the water and stay healthy!**

1. Stay out of the water if you have diarrhea.
2. Shower before you get in the water.
3. Don’t pee or poop in the water.
4. Don’t swallow the water.

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CONTINUED
Resources

Swimwear/Floatation Supports/Gear: Kiefer, Swim Outlet, Theraquatics


Therapy Pools: SwimEx, Hydroworx, Endless Pools

APTA Section on Aquatics: http://www.aquaticpt.org

Aquatic Therapy and Research Institute (ATRIC): http://www.atri.org

Aquatic Physical Therapy International: http://www.wcpt.org

Aquaticnet.com
American Red Cross: safety
Centers for Disease Control: safety, chemical, printable posters

WOTA: Water Orientation Test: www.alyn.org/WOTA
References


References


