



INTRODUCTION TO AQUATICS

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Developing PTA program

Questions....

- 1. Is there a CPT code for aquatic therapy?
- 2. Can you bill aquatic therapy and manual therapy on the same date of service?
- 3. Are there industry standards to how long you can continuously be in the pool on a given day?
- 4. What is thermoneutral?
- 5. What temperature of the water is considered therapeutic?
- 6. What is ANP?
- 7. What is the metacentric effect?
- 8. What properties of water would be utilized in treating a patient with an edematous ankle with a weight bearing restriction?
- 9. What is Bad Ragaz?
- 10. What % of a patient's body weight are they loading their joints when they are at a depth to the level of their Zyphoid process?

OBJECTIVES

1. Students will learn the governing bodies for setting industry standards for aquatic physical therapy.
2. Students will be introduced to some of the key industry standards for aquatic physical therapy.
3. Students will be exposed to both therapeutic exercise and manual therapy techniques in the aquatic environment.
4. Students will demonstrate proper body mechanics when delivering skilled physical therapy interventions in the aquatic environment.
5. Students will learn the indications, contraindications and precautions for aquatic interventions.
6. Students will understand the properties of water and how to not only use them to the patient's advantage but to support justification in the therapist's documentation.

DISCLAIMER

THIS COURSE IS DESIGNED SOLEY TO BE EDUCATIONAL IN NATURE AND IS BY NO MEANS A SUBSITUTE FOR NOR DOES IT CONSTITUTE LEGAL ADVICE



Aquatic Therapy Exposure?

- Who has been exposed to aquatics? How was the model?

PRE TEST

1. Can you bill aquatic therapy and manual therapy on the same date of service?
2. Can you become certified as an aquatic physical therapist or physical therapist assistant?
3. Name 3 different ways to sanitize a pool.
4. What is the metacentric effect?
5. What is the weight bearing percentage when you are submerged to ASIS level?
6. Name 3 properties of water that we use to our advantage?
7. Name 2 resources for aquatic equipment and 2 types of manual interventions in aquatic therapy.
8. Hyrdotone bells are ideal for quad strengthening in the pool: True/False
9. What is thermoneutral temperature?
10. Of the following choose the 2 that are precautions to aquatic therapy:
 1. Epilepsy
 2. Fever
 3. Central Line Catheter
 4. Advanced Renal Failure

COMMON MISCONCEPTIONS AND PERSONAL PET PEEVES



Getting Started In Aquatics

I. Getting Started

- Know your state practice act
- Know the industry standards (ATRI, APTA) ex: 4 hour max continuous exposure per day

II. Pool Specifications

Know the patient population that you are going to be treating. Things to think about...

-Grab bars, Bench, Equipment

-Step Height

-Hydraulic lift

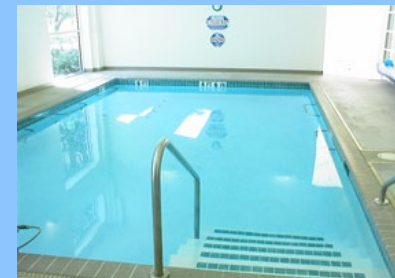
-Depth

-Temperature!!! * Skin temperature is 92 degrees which is considered thermo-neutral

-Sanitization....chlorine, bromine, saline, UV, combo

-Pool Chemistry (who is maintaining your pool?)

-P&P manuals



Getting Started In Aquatics

I. Equipment:

- Kiefer

- Sprint Aquatics

II. Associations:

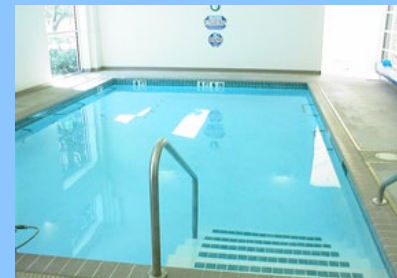
- APTA

 - Academy of Aquatic Physical Therapy (<https://aquaticpt.org/>)

- AEA & ATRI

 - Aquatic Exercise Association (<https://aeawave.org/>)

 - Aquatic Therapy Rehab Institute



Keys To A Successful Aquatic Practice...

Practice...

Coding, Billing and Documentation



Properties

- Properties of Water as a Medium:
 - Buoyancy
 - Hydrostatic Pressure
 - Viscosity/Resistance
 - Turbulence
 - Metacentric Effect
 - Transfer of Thermal Energy
 - Safety

Properties

- **Buoyancy:**

- **Definition:** *Force acting in the opposite direction of gravity. Felt as an upward thrust. Center of buoyance in the vertical position is the sternum.*

- **Benefits:** *Unloads painful joints; decreases weight bearing; decreases stress on connective tissue; decreases blood pooling; supports weak muscles; enhances flexibility, decreases fear of falling. Unloading extremities and spine increases blood flow into joint spaces.*

- **Populations:** *Neurological; orthopedic; pain.*

- **Hydrostatic Pressure:**

- **Definition:** *Force exerted on immersed body of fluid molecules; equal pressure everywhere.*

- **Benefits:** *Decreases pain; edema reduction; increases venous return, cardiac output and circulation; evens tactile input. In shoulder deep water, venous return is assisted, stroke volume in turn increases and pulse rate is slowed therefore the heart works with less stress.*

- **Populations:** *COPD; diabetes, edema.*

Properties

- **Resistance:**

- **Definition:** *A force that opposes motion.*

- **Benefits:** *Improves and challenges strength and coordination.*

Promotes trunk stability and postural alignment. The harder the patient pushes, the greater the resistance.

- **Populations:** *General weakness/ orthopedic conditions, core instability.*

- **Turbulence:**

- **Definition:** *Unstable flow of a liquid.*

- **Benefits:** *Challenges balance, coordination and strength.*

- **Populations:** *General weakness/ orthopedic conditions, core instability, balance disturbances, fear of falling.*

Properties

- **Safety:**

- **Definition:** *Freedom from the risk of injury.*

- **Benefits:** *The water will cause slower movements promoting a safe environment, allows for more reaction time, multidirectional resistance prevents ballistic movement patterns, improves patient's confidence by reducing fear of falling.*

- **Populations:** *Fear of falling, increased risk of falls.*

- **Thermal Conductivity:**

- **Definition:** *The quantity of heat that passes through molecules of opposing surfaces with different temperatures.*

- **Benefits:** *Immersion in warm water reduces muscle tone, dilates blood vessels and increases circulation, increases flexibility and decreases stiffness, increases proprioception. Can be used to intensify exercise to increase muscle activity and provide strengthening opportunities.*

- **Populations:** *Fibromyalgia, arthritis, CP, stroke, poor flexibility.*

Properties

Metacentric Effect: relationship between center of buoyancy and center of gravity. Can use to your advantage with your patients.



Immersion Effects

- Immersion Effects:
 - Atrial Natriuretic Peptide (ANP: polypeptide hormone secreted by atrial myocytes, responsible for homeostatic control of body water, sodium, potassium)
 - Weight Bearing
 - 50% Weight at ASIS Level
 - 33% at Zyphoid Process Level
 - 10% at C7 Level

Contraindications

- Open Wounds Unable To Be Covered By A Bio-Occlusive Dressing
- Skin Infections
- Fever
- Bowel Incontinence
- Contagious water or air borne infections/disease
- Unstable Angina
- Uncontrolled Epilepsy
- Tracheotomy
- Vomiting or Diarrhea
- Advanced Renal Failure
- Acute DVT/Pulmonary Embolism



Precautions

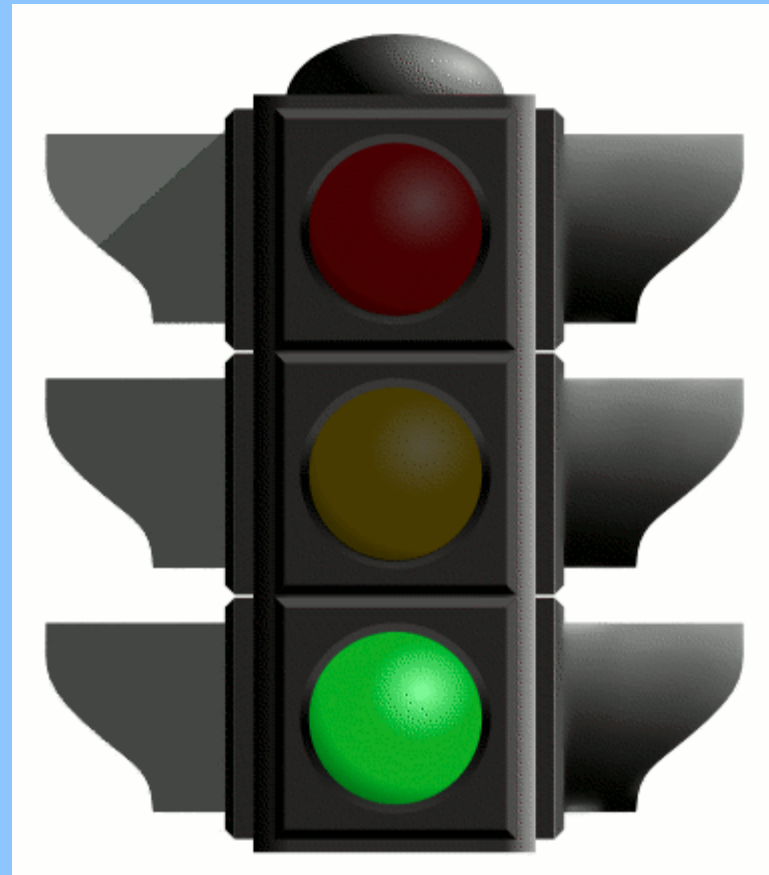
- Unstable Blood Pressure
- Hydrophobia
- Decreased Vital Capacity
- HIV
- Epilepsy
- Ostomy
- IV Site
- Central Line Catheters
- Low Endurance Conditions
- Severe Impulsivity
- Current Radiation/Severe Burns
- Inability for Thermal Regulation
- Excessive or Hypersensitivity to Chlorine
- Perforated Eardrum



Indications

AQUATIC PHYSICAL THERAPY INDICATIONS

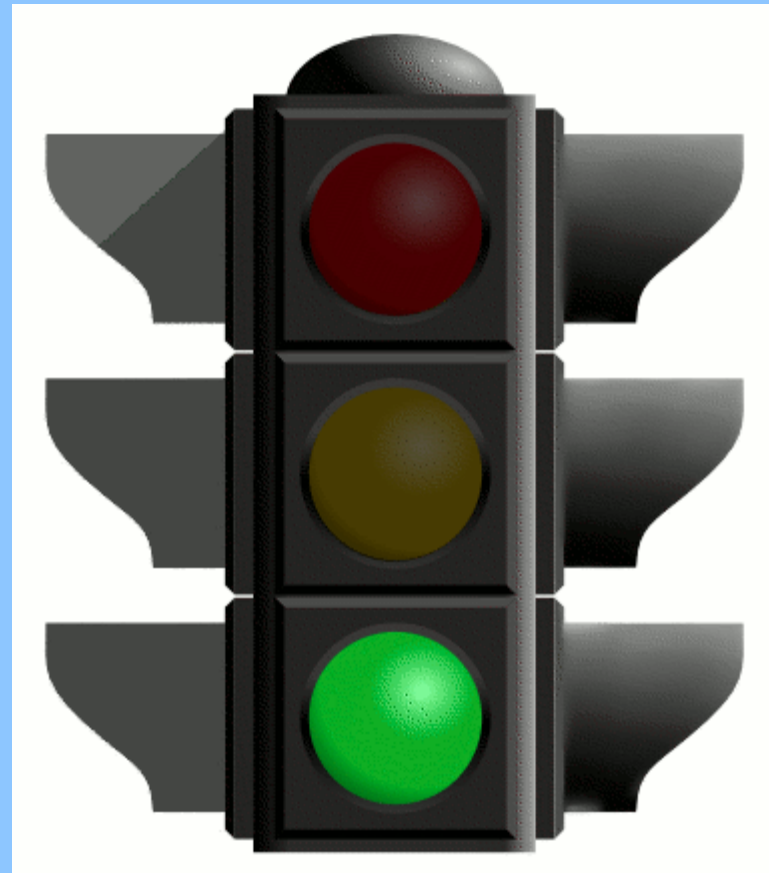
- Back Pain
- Pre-Surgical Preparation
- Post Surgical Rehabilitation
- Poor Gait, Fear of Falling
- Fibromyalgia
- Chronic Fatigue Syndrome
- Arthritis
- Orthopedic Conditions
- Diabetes
- Multiple Sclerosis
- Obese
- Osteoporosis
- Balance Disorders
- Weakness/Incoordination
- Acute/Chronic Pain Conditions



Indications

AQUATIC PHYSICAL THERAPY INDICATIONS

- Spasticity
- ROM Limitations
- Cancer
- Sensory Disorders
- Prenatal
- Special Needs
- Parkinson's Disease
- Cardiopulmonary Conditions
- Weight Bearing Restrictions
- Neurological Injury
- Respiratory Problems
- Poor Postural Alignment
- Cerebral Palsy
- Sports Injuries
- Core Instability



Therapeutic Exercise

- Stretching Techniques
- Strengthening Techniques
- Joint ROM Techniques
- Cardiovascular Training Techniques

Therapeutic Exercise

Equipment:

Floats

Weights

Other



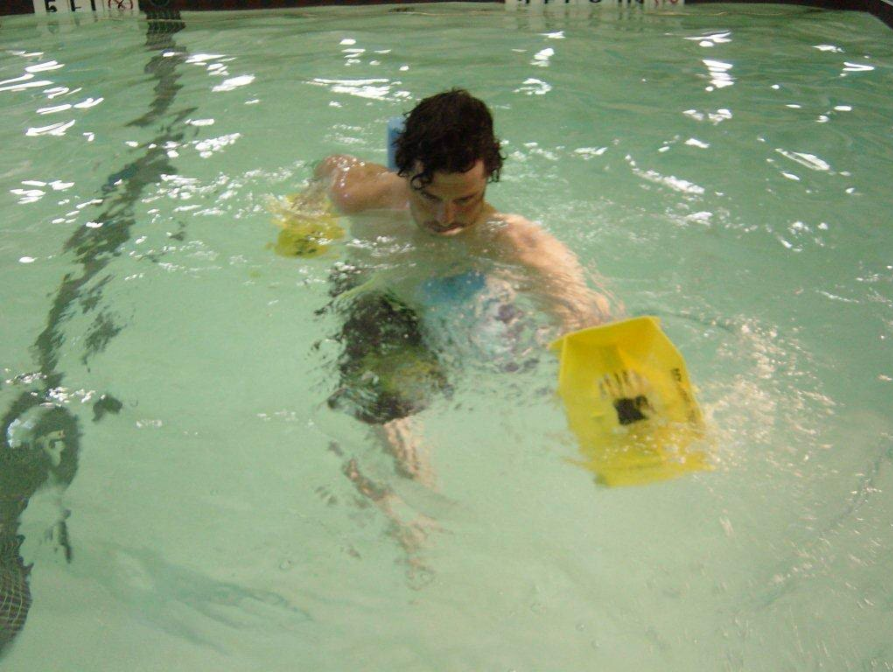
Rationale for using the various pieces of equipment...

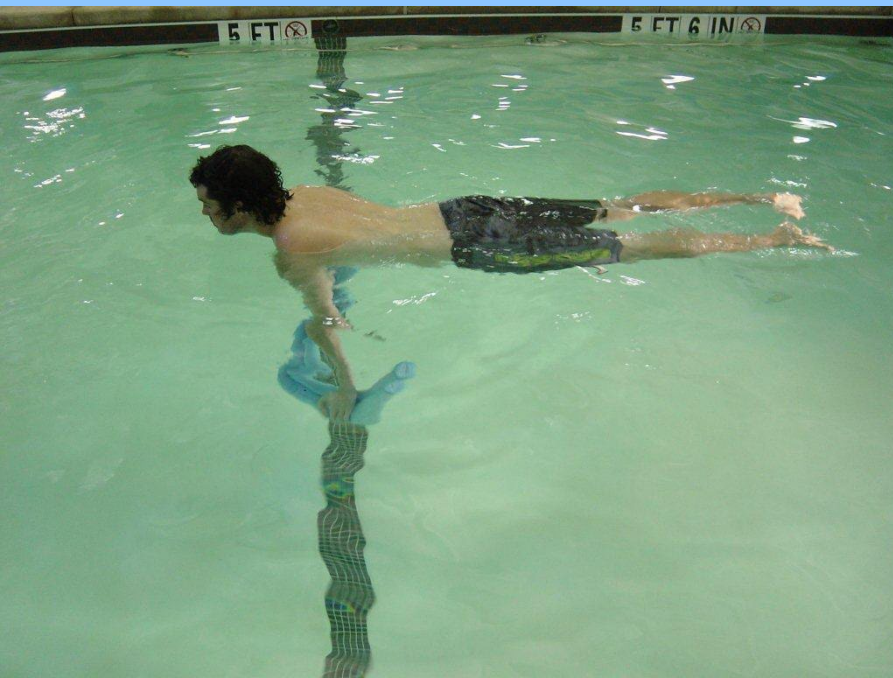
Therapeutic Exercises







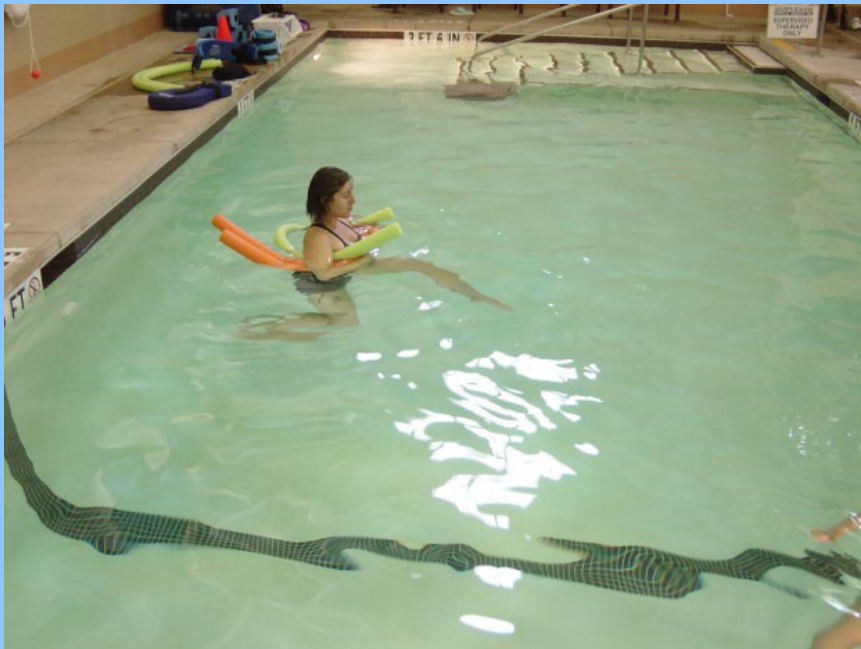




Core Stability



Running



Documentation

- Documentation Tips
 - Rationale for using water as a medium
 - Document the skill involved in the services provided
 - Avoid listing exercises performed
 - Know your CPT Codes, CCI edits and Modifiers
 - Billing for Aquatics and land based therapy on the same date of services.....59 modifier



Payers Are Paying Close Attention!!!



Documentation Examples...

- Subjective: Patient reports they are the same
- Objective: Continue per see flow sheet
- Assessment: Patient tolerated treatment well
- Plan: Continue per POC

POOR



Documentation Examples...

- Subjective: Patient states that the water helped after last visit.
- Objective: Patient performed the following: Noodle stretch for hamstrings, adductors, quads. Step down 4” 3 x 10 reps, Flipper kick to surface 2 sets to fatigue, single leg squating 3 x 10, single leg wall push aways 3 x 10 reps.
- Assessment: Noticing improving strength evidenced by the increase in reps for her strength exercises. Continues with loss of knee flexion.
- Plan: Continue 2 x per week for 6 weeks.

VERY COMMON

Documentation Examples...

- Subjective: Patient states she was able to descend stairs for the first time since her injury after her last aquatic session. She continues to report difficulty rising from a low surface with sit to stand transfers.
- Objective: Patient ambulates into the pool area with her assistive device however narrow BOS and guarded gait pattern noted. She required HHA while descending stairs.
 - Aquatic interventions included the following:
 - Gt. Training with vc for proper form and frequent reminders for maintaining upright posture while engaging core.
 - Single leg balance on LLE with viscosity of water for safety and therapist generated turbulence to encourage NM control and proprioception. Patient unable to stand > 5 seconds without LOB.
 - Single leg squat on LLE to improve strength to aid with low sit to stand transfers on land. Patient required tactile cuing for safety and balance.
- Assessment: Patient demonstrates improvements in gait on land after exiting the pool immediately after aquatic therapy today with an increased stride length and wider BOS. She continues with balance deficits and strength loss in her LLE noted by her difficulty with functional exercises today. She would benefit from continued skilled intervention to advance her program while providing a safe environment in the water to reduce her future falls risk.
- Plan: Plan to continue 2 x per week in aquatic therapy for 4 weeks f/b re-assessment on land to determine progress toward her land based goals.

What does the literature say??

– Fibromyalgia

- **In pain management, only AT seems to have long-term effects. Showed AT to have beneficial effects on FIQ.**
 - Evcik D, Yigit I, Pusak H, Kavuncu V Rheumatol Int 2008; 28(9): 885-890.
- **DWR is a safe ex that has been shown to be as effective as LBE re: pain. Shown to have more advantages related to emotional aspects.**
 - Arthritis Rheum. 2006 Feb 15;55(1): 57-65. Randomized controlled trial of DWR: clinical effectiveness of aquatic ex to rx FM.
- **Exercise therapy 3 x per week for 16 weeks in a warm pool could improve most of the symptoms of FM and cause a high adherence to exercise in unfit women with heightened FM symptomatology.**
 - Arch Phys Med Rehabil. 2008 Dec; 89(12):2250-70. Assessment of the effects of AT on global symptomatology in patients with FM.

What does the literature say??

– Fibromyalgia

- **Improvements in symptom severity, physical function and social function were still found 6 and 24 months after the completed rx program**
 - Scand J Rheumatol. 2002;31(5):306-10
- **AT is more effective than conventional physiotherapy to improve TST and to decrease TNT in patients with FM**
 - Sleep Med. 2006 Apr;7(3):293-6

What does the literature say??

– Low Back Pain

- **Although both aquatic and land interventions produced significant increases in overall spinal height, the AT produced greater pain relief and centralization response in subjects with LBP and signs of nerve root compression**
 - **PM R.2011 May;3(5):447-57. Immediate changes in spinal height and pain after aquatic vertical traction in patents with persistent LB symptoms.**
- **Exercises in water may be one of the most useful modes of exercise for a patient with LBP**
 - Kurume Med J. 1999;46(2):91-6.
- **Water-based exercises produced better improvement in disability and quality of life of the patient's with CLBP than land-based exercise.**
 - Spine (Phila Pa 1976). 2009 Jun 15;34(14):1436-40. Clinical effectiveness of aquatic exercise to treat CLBP.

What does the literature say??

– Low Back Pain

- **Sig reduction in pain scores and improvement in activity of daily living skill scores and inc L ROM**
 - J Aquatic Phys Ther 2002; 10(1):11-20
- **Low back pain decreased in pregnant women immediately following AT sessions**
 - Int J Aquatic Res Educ 2010; 4(2):147-152
- **AT enhances low back strength and reduce c/o low back pain in elderly women**
 - J Phys Ther Sci 2011; 23(1): 57-60
- **Aquatic backward locomotion exercise is as beneficial as progressive resistance exercise for improving lumbar ext in patients after lumbar diskectomy surgery**
 - Arch Phys Med Rehabil. 2010 Feb;91(2):208-12

What does the literature say??

– Low Back Pain

- **Sig inc in L ext in AT compared to LBE with patients with chronic LBP**
 - J Musculoskelet Res 2010;13(4):159-165
- **AT produced better improvement in disability and physical components of quality of life of pts with chronic LBP compared to LBE**
 - Spine 2009;34(14):1436-1440

What does the literature say??

– General

- **10 week of AT can enhance MM strength and reduce LBP in elderly females.**
 - Han G, Cho M, Nam G, Moon T, Kim J, Kim S, Hong S, Cho B J Phys Ther Sci 2011; 23(1): 57-60.
- **+ Effects immediately following AT rx for pregnancy and LBP**
 - Intveld E, Cooper S, van Kessel G Int J Aquatic Res Edu 2010; 4(2); 147-152
- **Aquatic therapy is an effective means of increasing joint flexibility and functional ability while reducing pain and difficulty with daily tasks**
 - J Orthop Sports Phys Ther. 1996 Jun;23(6):376-81.
- **Aquatic plyometrics provided the same performance enhancement benefits as land plyometrics with significantly less muscle soreness.**
 - J Strength Cond Res. 2004 Feb; 18(1);84-91. Effects of land vs. aquatic plyometrics on power, torque, velocity and muscle soreness in women.
- **For elite athletes with acute ligament sprains in the lower limb, aquatic exercise may provide advantages over standard land-based therapy for rapid return to athletic activities**
 - PM R. 2010 Aug; 2(8): 703-12. Epub 2010 Jul 3. Aquatic versus land-based exercises as early functional rehab for elite athletes with acute lower extremity ligament injury.

What does the literature say??

– General

- **Older women with OP had sig improvements in balance and global change**
 - Physiother Can. 2008 Fall;60(4):296-306
- **Inpatient AT has a + effect on early recovery of hip strength after THA**
 - Arch Phys Med Rehabil. 2009May;90(5):745-55
- **Combo of AT and education was effective in improving fall risk factors in older adults with arthritis**
 - J Aging Phys Act.2010 Jul;18(3):245-60
- **Early AT s/p TKA had the same magnitude as the effect size of NSAIDS in the rx of osteoarthritis of the knee**
 - Arch Phys Med Rehabil. 2012 Feb;93(2):192-9
- **Following orthopedic surgery AT improves function and does not inc the risk of wound-related adverse events**
 - Arch Phys med Rehabil. 2012 Aug 6

What does the literature say??

– General

- **Shoulder elevation in water at slower speeds resulted in significant lower activation of RTC which allows for earlier active motion in post op period without compromising pt. safety**
 - J Orthop Sports Phys Ther. 2000Apr;30(4):204-10
- **AT was determined to be effective to make an anabolic effect on the bone of postmenopausal, sedentary subjects**
 - Am J Phys Med Rehabil. 2003 Dec;82(12):942-9
- **APT produced significant changes in balance and quality of life but not fear of falling**
 - Aust J Physiother. 2005;51(2):102-8
- **APT and volleyball training resulted in larger improvements in VJ than in control group (which also included volleyball training)**
 - Med Sci Sports Exerc. 2005Oct;37(10):1814-9

What does the literature say??

- Neurological

- **PT protocols produced improvement in postural stability in parkinson's Disease that was significantly larger after AT**
 - Archives Pyys Med Rehabil. 2011 Aug;92(8):1202-10.
- **Pts with MS can benefit from AT in physical, emotional, cognitive and social areas.**
 - Vennstra J, Brasile F, Stewart M AM J Recreaton Ther 2003; 2(1): 33-48.
- **Aquatic exercise improves pain, spasms, disability, fatigue, depression and automony in patients with MS**
 - Evid Based Compliment Alternat Med. 2012; 2012:473963. Epub 2011 Jul 14. Hydrotherapy for the treatment of pain in people with multiple sclerosis: a randomized controlled trial.

What does the literature say??

- Neurological
 - **Postural balance and knee flexor strength were improved after AT in stroke survivors**
 - Clin Rehabil. 2008 Oct-Nov;22(10-11):966-76
 - **Unilateral vestibular hypofunction patients undergoing AT achieved improvements in quality of life, body balance and self-perception of dizziness intensity. (regardless of age, time since symptom onset and use of meds)**
 - J Vestib Res. 2008(2-3):139-46

What does the literature say??

- **Pediatrics**

- **Aquatic exercise program was effective for a child with CP noted through outcome measurements**
 - Clin Rehabil. 2006 Nov;20(11):927-36.
- **AT is a useful adjunct to EI to improve children's functional mobility**
 - **Pediatr Phys Ther. 2007 Winter;19(4):275-82.**
- **Significant improvement in hip ROM in children with arthritis when undergoing aquatic exercise**
 - Arthritis Care Res. 1991 June;4(2):102-5.

Manual Aquatic Techniques

- Manual PT
 - Joint Mobilizations
 - PA mobs to spine
 - OA glides
 - Shoulder mobs
 - Talar glides
 - Lumbar distraction
 - Cervical distraction
 - Anterior hip mobs



Cervical spine manual therapy



Manual Aquatic Techniques

- Manual PT (Continued)
 - Soft Tissue Mobilization
 - Cervical spine
 - Teres/Lat complex
 - MET
 - SIJ Correction
 - Stretching/Strengthening
 - PNF patterns
 - Scapular stabilization

Aquatic Manual Techniques

- Bad Ragaz: Technique that uses floats, belts and collars. Patient's are horizontal and the therapist utilizes passive and active techniques
- Halliwick: Developed originally as an instructional swim method. Utilizes a 10 point system. No use of equipment. Encompasses the challenges of the water with controlling rotational movements
- Watsu: Watsu® (Water Shiatsu) began in 1980. Harold Dull began floating people and stretching them using Shiatsu principles

Bad Ragaz (pelvic hold)



Bad Ragaz (scapular hold)



Bad Ragaz (elbow hold)



POST TEST

1. **Can you bill aquatic therapy and manual therapy on the same date of service?**

YES (When you use a 59 Modifier)

2. **Can you become certified as an aquatic physical therapist or physical therapist assistant?**

Clinical Competency Certificate offered through APTA Academy of Aquatic Physical Therapy

3. **Name 3 different ways to sanitize a pool.**

Bromine, Chlorine, Saline, Ozone, UV Light

4. **What is the metacentric effect?**

Relationship between COG and COB

5. **What is the weight bearing percentage when you are submerged to ASIS level?**

55%

POST TEST

6. Name 3 properties of water that we use to our advantage?

Buoyancy, Turbulence, Hydrostatic Pressure, Viscosity, Transfer of Thermal Energy, Safety, ME

7. Name 2 resources for aquatic equipment and 2 types of manual interventions in aquatic therapy.

Kiefer, Sprint Aquatics & Bad Ragaz, Watsu

8. Hyrdotone bells are ideal for quad strengthening in the pool: True/False
False

9. What is thermoneutral temperature?

Skin Temp 91-92 degrees

10. Of the following choose the 2 that are precautions to aquatic therapy:

- 1. Epilepsy**
- 2. Fever**
- 3. Central Line Catheter**
- 4. Advanced Renal Failure**

Central Line Catheter, Epilepsy