NOVEL AQUATIC STRATEGIES FOR OSTEOARTHRITIS & OSTEOPOROSIS

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PT Degree from University of Illinois-Chicago and DPT from Des Moines University
• Prior to PT worked in aquatic industry for 15 years
• Part owner of an Outpatient Physical Therapy Clinic
• Taught with ATRI since 1997
• Various Positions with APTA Aquatic Section
• Co-authored chapters in several aquatic-based books
• Currently serving on the ASA Research committee
• Honored to have worked with the wounded warriors
• Honored to be working with Aquatic Therapy University

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Objectives

After viewing this webinar, attendees will be able to:

1. Recognize those functional deficits that occur due to physical characteristics of osteoporosis and osteoarthritis;
2. Understand the importance of water exercise with respect to the osteoarthritic or osteoporotic client;
3. Given compelling supportive evidence, make a strong case for the use of aquatic therapy for clients with osteoarthritis and/or osteoporosis;
4. Recognize appropriate exercises that are beneficial in the treatment of such conditions; describe how to execute 10 novel aquatic exercises for each condition;
5. Provide defensible documentation of water therapy when addressing osteoporosis and osteoarthritis. Demonstrate how to effectively document progress in both of these populations (populations which tend to progress slowly).
What We Don’t Ask May Come Back to Bite

1. What can you do in the water that you cannot accomplish on land?
2. What is the progression that you believe can be accomplished in water and are you diligently matching it to land-based goals?
3. Do you have a transition back to land-plan before the patient gets in?

#1 Functional Deficits Associated with OA and Osteoporosis

ALTERED MOBILITY

CDC.gov/arthritis/basics/osteoarthritis

#1 Functional Deficits Associated with OA and Osteoporosis

INCREASED FALL RISK

www.swimatu.com
#1 Functional Deficits

The Word is Posture

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#1 FUNCTIONAL DEFICITS

GAIT DEVIATIONS & GAIT SPEED

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#1 Functional Deficits

Gait Speed & Mortality

- Gait Speed and Survival in Older Adults FREE
- Stephanie Studenski, MD, MPH; Subashan Perera, PhD; Kushang Patel, PhD; Caterina Bisson, MD, PhD; Kimberly Lustig, PhD; Marco Jeerkens, MD, PhD; Jennifer Brach, PhD; Julie Chandler, PhD; Peggy Cawthon, PhD; Elizabeth Barnett Conner, MD; Michael Nevitt, PhD; Margaret Visser, PhD; Stephen Kritchevsky, PhD; Stefania Badenelli, MD; Tamara Harris, MD; Anne B. Newman, MD; Jane Cassel, PhD; Luigi Ferrucci, MD, PhD

ABSTRACT

- Context: Survival estimates help individualize goals of care for geriatric patients, but life tables fail to account for the great variability in survival. Physical performance measures, such as gait speed, might help account for variability, allowing clinicians to make more individualized estimates.
- Objective: To evaluate the relationship between gait speed and survival.
#2 Understand the importance of water exercise with respect to the OA or osteoporotic client

What's water got to do with it?

#2 Why Water

*buoyancy*

#2 Why Water

*thermo-neutral warmth*

Cool
26-29°C
Vigorous Exercise

Neutral
33.5-36.5°C
Arthritis Exercise
Typical Aquatic Exercise

Warm
36-38°C
Relaxation

Pictures courtesy of Helen Binkley
#2 Why Water

**Hydrostatic Pressure**
- Improves Myocardial Muscle Efficiency
- Increases the work of respiration by 60%

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**Viscosity**

![Picture courtesy of Jean Iron](image)

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**Wait... there's more to Viscosity**

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#2 Why Water

Effectiveness of Aquatic Exercise and Balneotherapy: A Summary of Systematic Reviews Based on Randomized Controlled Trials of Water Immersion Therapies

Hiroharu Kamioka1, Kichiro Tsutani2, Hiroyasu Okazumi3, Yoshiteru Mutoh4, Miho Ohta5, Shuichi Handa3, Shinpei Okada6, Jun Kitayuguchi7, Masamitsu Kamada7, Nobuyoshi Shiozawa8, and Takuya Honda4


Once again….Why Water

10 Million Americans have osteoporosis
34 Million have low bone density

300,000 Hip + 700,000 vertebral fractures annually

$22 billion spent in 2008 for Osteoporosis + associated fractures


Or this….Why Water

Osteoarthritis affects 12.1% or 27million Americans

➢ 25million or 9.3% entire adult population have activity limitations due to OA

➢ 8.4% are unable to hold jobs; double Non-OA patient population

#3 Given compelling evidence, make a case for the use of aquatic therapy for OA & osteoporotic clients

THINK WATER for
Pain Management
Balance
Strength
Gait Training
Quality of Life

Osteoarthritis and Osteoporosis
Patients

#3 Case for Aquatic Therapy

Defense: Pain Management

Hydrotherapy Versus Conventional Land-Based Exercise for the Management of Patients With Osteoarthritis of the Knee: A Randomized Clinical Trial
Luciana E Silva, Valeria Valim, Ana Paula C Pessanha, Leda M Oliveira, Samira Myamoto, Anamaria Jones, Jamil Natour

Background and Purpose
This study was designed to evaluate the effectiveness of hydrotherapy in subjects with osteoarthritis (OA) of the knee compared with subjects with OA of the knee who performed land-based exercise.

Phys Ther 2008

#3 Case for Aquatic Therapy

Defense: Balance

Asian Biomedicine Vol. 4 No. 5 October 2010; 739-745
Original article
Effects of aquatic exercise and land-based exercise on postural sway in elderly with knee osteoarthritis
Pawina Yennana, Areerat Suputtitadab, Pongsak Pukatanamanas
#3 Case for Aquatic Therapy

**Defense: Strength**

Does hydrotherapy improve strength and physical function in patients with osteoarthritis—a randomized controlled trial comparing a gym based and a hydrotherapy based strengthening programme

A Foley, J Halbert, T Hewitt, M Crotty


Objective: To compare the effects of a hydrotherapy resistance strengthening programme to a gym based resistance exercise programme on strength and function in the treatment of osteoarthritis (OA).

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**#3 Case for Aquatic Therapy**

**Defense: Gait Training**

Acute Aquatic Treadmill Exercise Improves Gait and Pain in People with Knee Osteoarthritis

Roper JS, Bressel E, Tillman MD.

*Arch Phys Med and Rehabil.* 2013

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**#3 Case for Aquatic Therapy**

**Defense: Quality of Life**

Aquatic Physical Therapy for Hip and Knee Osteoarthritis: Results of a Single-Blind Randomized Controlled Trial

Rana S Hinman, Sophie E Heywood, Anthony R Day

Background and Purpose

Aquatic physical therapy is frequently used in the management of patients with hip and knee osteoarthritis (OA), yet there is little research establishing its efficacy for this population. The purpose of this study was to evaluate the effects of aquatic physical therapy on hip or knee OA.

*Phys Ther.* 2007;87:32–43.
#4 Appropriate Exercises to Manage OA & Osteoporosis

**Exercise & Osteoporosis**
- Positional Concerns
- Water exercises for osteoporosis...Really??

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**#4 Appropriate Exercises Consider for Osteoporosis**

<table>
<thead>
<tr>
<th>BENEFICIAL</th>
<th>AVOID</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Trunk Strengthening Exercises</td>
<td>1. Dynamic Abdominal Exercises</td>
</tr>
<tr>
<td>2. Dynamic Balance Training</td>
<td>2. Trunk Flexion Positions</td>
</tr>
<tr>
<td>3. Aerobic Conditioning</td>
<td>3. Trunk loading Motion performed to end range</td>
</tr>
<tr>
<td>5. Trunk, Shoulder Complex and Lower Extremity Flexibility</td>
<td>5. High impact loading initially</td>
</tr>
</tbody>
</table>

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**#4 Appropriate Exercises for OA**

**Beneficial Exercises for OA Clients**

- Strength Exercises for Trunk + Extremities
- Flexibility for LL’s + Trunk
- Dynamic Balance
- Gait Training
- Aerobic Emphasis
- Functional Strengthening Drills
- Water Walking for Speed + Balance
# Executing the Exercises for STRENGTH

**Speed Increases Resistance**

**Increased Surface Area Increases Effort**

# Executing the Exercise for:

**STRENGTH**

**Osteoporosis Considerations**
#4 Executing the Exercises for FLEXIBILITY

- Upright Posture
- Better Gait Biomechanics
- Increased LE AROM
- Improved Dynamic Balance

IMPROVED FUNCTION

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#4 Executing the Exercises for BALANCE

- Posture
- Strength
- ROM
- Sensory Input
- Anticipatory Response
- Endurance
- Co-morbidities
- Medications
- Age
- Gender
- Vision

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#4 The Exercises for BALANCE

- Static
- Dynamic
- Unpredictable

Pictures courtesy of Dr. Mary Wykle

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#4 Executing the Exercises for

**BALANCE**

**DIRECTIONAL CHANGES**

*FUNCTIONAL BALANCE*

Pictures courtesy of Dr. Mary Wykle

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#4 Executing the Exercises for:

**Posture**

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#4 Executing the Exercises for:

**Posture**

**Functional Postures**
#4 Executing the Exercises for: GAIT
normalize, emphasize, practice

#4 Executing the Exercises for: GAIT
The assistance? The resistance?

#4 Gait Sequence + Speed

WALKING SPEED: Best measurement of functional criteria for gait regardless of quality.

- Slowed gait is indicative of increased energy cost.
- Integrates unrecognizable disturbances in multiple organ systems.
#4 Executing the Exercises for: Functional Activities

- Sit to stand
- Stairs
- Overhead Reach
- Squat
- Pull/Push
- Carry
- Look over shoulder

Pictures courtesy of Dr. Mary Wykle

#5 Provide Defensible Documentation

- **Justify water:** What could be accomplished more effectively in water than on land at this point in rehab process?
- **Skilled PT Intervention:** Does this Rx merit skilled intervention? Was skill acknowledged in documentation?
- **Transition to Land:** Is it obvious that land transition is part of the Rx plan?
- **Maintain Goals:** Does the aquatic component relate to land?
- **Pain Documented:** Decreased pain during aquatic Rx may provide the justification for water.
Some Thoughts:
- **Focus is on primary limitation:** If it is balance, aquatics might be safer, more easily adaptable to training since decreased fear of falling, easier for the therapist to handle patient. This needs to be spelled out—safer, easier, slower, less fear of falling.
- **Functional Limitation Selection:** If it is walking, specify what continues to be limited—distance, different surfaces, climbing stairs. How is water addressing a specific limitation?
- **Standardized Functional Assessment Tool:** To date, these are all land-based—but if progress can be noted using aquatic intervention, this may provide a temporary reason to stay in the pool... Make sure tool is appropriate for Dx and patient.

**Additional Resources:**
- Links to evidence cited
- Links to download detailed descriptions of each precaution
- Links to find out more about this topic

**Questions?**

**Thanks for attending!**

**QUICK LINKS:**
- Email: martybiondi14@AOL.com
- Phone: (800) 680-8624
- Downloads at: [www.swimatu.com/Arth13](http://www.swimatu.com/Arth13)

Post-test: Email lsalzman@aquaticnet.com to get your post-test invite