MSAA™

MULTIPLE SCLEROSIS ASSOCIATION OF AMERICA

presents

Advancing Knowledge of Aquatic Exercise and MS

- a webcast for Healthcare Professionals

Presented by

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SWIM FOR MS
ANY POOL, ANY TIME
MULTIPLE SCLEROSIS ASSOCIATION OF AMERICA

Swim For MS

Swim for MS is MSAA's national initiative which encourages:

- water-based exercise for people with MS and
- fundraising events where volunteers can create their own swim challenges.

Funds raised through Swim for MS help support MSAA's services, including our national program on aquatic exercise and MS.

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What is the Goal?

As part of the Swim for MS initiative, MSAA's goal is to increase awareness, understanding and availability of swimming and aquatic exercise as a positive wellness opportunity for the MS community.

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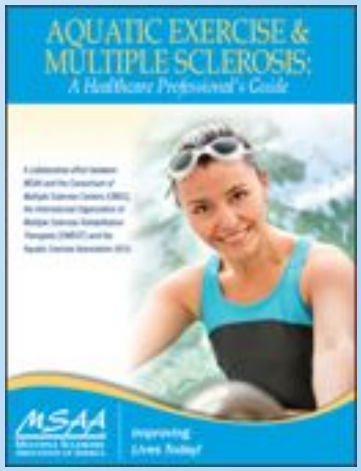
Acknowledgement

MSAA would like to thank Genzyme, a Sanofi company, for supporting the Swim for MS initiative and helping us develop educational materials and resources for MS patients and healthcare professionals, including this webcast.



This information can be accessed on MSAA's online aquatic center, SwimForMS.org. The website features a special section for Healthcare Professionals, including a comprehensive guide produced in collaboration with CMSC and IOMSRT.

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Programs & Services

Providing Information…

Toll-free Helpline
(800) 532-7667

Online response forum
MSquestions@mymsaa.org

Mobile phone application
My MS Manager™

Finding Answers…

Website: www.mymsaa.org

Award-winning publications, videos, webcasts

S.E.A.R.C.H. initiative

MRI Diagnostic and MRI Institute

Easing Daily Life…

Equipment distribution

Cooling program

Staying Connected…

Public education events
Networking Program

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Multiple Sclerosis Association of America

Multiple Sclerosis

Multiple sclerosis (MS) is a demyelinating disease of the central nervous system characterized by unpredictable relapses and remissions. It is the leading neurological cause of disability among adults, affecting an estimated 400,000 people in US.

- Symptoms are varied
  - Fatigue
  - Gait difficulty
  - Stiffness and increased tone
  - Bladder and bowel problems
  - Memory and cognitive issues
  - Depression
  - Pain
  - Visual deficits
  - Dizziness and balance deficits
  - Speech and swallowing deficits

Importance of Exercise

The disabling and progressive nature of the disease makes it imperative for people with MS to participate in exercise and/or PT to maintain functional ability. Exercise can help:

- Improve functional levels, aerobic fitness, balance, and strength
- Reduce risk for cardiovascular disease
- Combat depression
- Enhance of quality of life
- Promote brain chemical production
  - BGH (brain growth hormone)
  - NGH (nerve growth hormone)
  - Both increase nervous system tissue repair, regeneration

Aquatic Exercise

People with MS may find it difficult to exercise through traditional land-based methods due to increased physical demands on the body and a rise in body temperature, which may cause a temporary worsening of symptoms (Uhtoff's phenomena)

The available literature suggests the beneficial effects of aquatic exercises and support its use as a reasonable treatment option for individuals with multiple sclerosis to improve:

- Flexibility and range of motion
- Cardiovascular endurance
- Fatigue level
- Muscle strength
- Mobility function (including gait and balance)
- Quality of life and psychological well-being

In addition, none of the studies identified any exacerbation or reported adverse change in neurologic status

Aquatic Assessment

Assessment is the first step in designing and beginning an aquatic exercise or therapy program

- Provides information on the current functional status of the individual
- Identifies other health issues a person may present along with precautions and contraindications for exercise in the aquatic environment
- Gives information needed to provide an effective program that is safe and utilizes the person's resources available in their community

Aquatic Assessment Tools

- There are a few templates available to use for aquatic assessment
- These tools utilize a large portion of the information received from the land assessment that are pertinent to the person with MS
- Special attention to the Neuromuscular and Musculoskeletal systems would be recommended in this population
- A person living with MS can have issues in any of the system areas. It is prudent to screen for other health issues.

Commonly Used Tools

- The Aquatic Exercise Review Systems (AERS)
- ICF checklist
- Water Orientation Test (WOTA)
- Aquatic Berg Balance Test
- Aquatic Exercise Association (AEA) Health Risk Appraisal Template

Water is a unique environment

- The topic of aquatic exercise is as broad and varied as the individuals with MS that may want to participate in this exercise option
- There are a large number of treatment and exercise options
- This is only really limited by the knowledge and creativity of the aquatic therapist or exercise professional.
- It is important, therefore, that the aquatic professional has a solid foundation in Aquatic Physics and hydrodynamics

Physical Properties of Water

Aquatic Physics and
Hydrodynamics

Buoyancy

- The uplift force that is experienced when a body is submerged in water.
- It is the sensation that movements towards the water’s surface are easier than on land
- Buoyancy can assist, support or resist motion
- Often a person can move more independently in water than on land due to this force
- This can increase the ease of assisting a person with MS with exercise or activities

Relative Density

- This is the ratio of the density of the object or person to the density of the water
- This determines whether an object will sink or float
- A person with a limb that has spasticity will tend to sink
- Conversely a person with a flaccid limb or an osteoporotic limb will tend to float

Relative Density, Con't.

- This becomes important in treatment planning because it influences:
  - Activity/Exercise choice
  - Participant position
  - Participant posture
  - Depth of water to work in
  - Equipment choices

Hydrostatic Pressure

- Fluids exert pressure in all directions
- The deeper a body is immersed in water the greater the pressure it experiences
- This causes a centralization of blood volume from the limbs to the chest
- This can make the work of breathing more difficult
- This is a concern for a person with significant respiratory or cardiovascular compromise

Hydrostatic Pressure, Con't.

- There are also significant changes in kidney regulation and function with immersion
- An aquatic professional needs to be aware of these physiologic changes to appropriately address these issues if needed
- Positive aspects of hydrostatic pressure include increased ability to stand, ambulate and balance
- There may also be improvements in edema, pain and hypersensitivity
- Water environment activities could also be used to improve respiratory muscle function

Viscosity

- A measure of a fluid’s resistance to flow
- There is an attraction between all the molecules in a fluid. This is greatest at the water-air interface
- Different fluids have differing amounts of friction between molecules
- This is the sensation that water is thicker and heavier to move through than air

Viscosity, Con't.

- A person submerged in water will experience resistance while moving. This increases as the speed and surface area of the object increases
- This can be used to increase or decrease exercise or activity difficulty
- Viscosity slows down movement and may allow for higher level skill and balance training opportunities
- The increased resistance at the water's surface needs to be considered with any motion breaking the water's surface as might be experienced with a participant who experiences a weak or painful shoulder

Refraction and Reflection

- Refraction is the bending of light rays from a denser medium such as water to a thinner medium such as air
- This can make accurate determination or measurement of movements and positions difficult for the aquatic professional
- Reflection is the change of direction of a wave at the interface between two surfaces
- Reflection may trigger symptoms of dizziness and could cause problems for a person prone to seizure activity
- May need to lower the lighting in a facility or use sunglasses

Thermal Transfer of Heat

- Water is able to retain heat and transfer heat very efficiently
- This makes it a very useful medium for therapeutic effects
- It can help a person stay cooler even during activity or exercise
- Recommendations for people with MS are generally to have the water temperature 86 degrees or below

Water in Motion

- Streamlined or laminar flow of water is a steady continuous flow of water molecules in one direction
- Turbulence occurs when the velocity of flow of the water increases and the water molecules move irregularly
  - This can be utilized to increase resistance
  - This can provide training opportunities for balance, core stabilization or coordination activities

Water in Motion, Con't.

- Movement of a body in water causes turbulent flow of water around and behind the body
- Pressure in front is greater and less behind the body or object
- The low pressure area behind the body is known as a wake and the water that flows in this area is an eddy

Water in Motion, Con't.

- This principle can be used to maximize the ability of people to stand, balance and walk
- If the aquatic professional walks in front of the person with MS, this creates an area of lower pressure and may decrease the work of walking
- If the aquatic professional walks beside the person it will increase the work of walking

Aquatic Exercise Programs

- There are a great variety of aquatic exercise programs to choose from a community based exercise group to individualized treatment
- Participation in a group exercise class may help increase motivation, support as well as compliance for long term participation in exercise
- There are numerous techniques and exercise options for all ability levels in the aquatic environment

Halliwick Technique and Water Specific Therapy

- Originated in England in the 1950s
- Initially intended to help disabled children learn to swim and have a swim club for them
- Since the therapists involved noted improvements in balance, postural control and functional activity participation, it has evolved into water specific therapy techniques
- Based on a 10 point program with 3 stages of learning

Halliwick Technique and Water Specific Therapy, Con't.

- Mental adjustment is the ability to independently respond to different environments, situation or tasks in the water
- Balance
  - Sagittal rotation
  - Transverse rotation
  - Longitudinal rotation
  - Combined rotation

Halliwick Technique and Water Specific Therapy, Con't.

- Movement
  - Swimming
  - Balance
  - Transfers
  - Walking
  - Reaching

Halliwick Technique and Water Specific Therapy, Con't.

Halliwick Technique and Water Specific Therapy, Con't.

Bad Ragaz Ring Method (BRRM)

- Developed in Switzerland in the 1960s
- Utilizes Proprioceptive Neuromuscular Facilitation (PNF) techniques
- Utilization of diagonal patterns for the trunk, arms and legs
- Improves strength, core stability and proximal control
- The patterns are very specific in the handholds and positions

Bad Ragaz Ring Method (BRRM), Con't.

Watsu and Jahara Techniques

- Aquatic bodywork developed by Harold Dull in CA in the 1980s
- Combines stretching and soft tissue mobilization with the principles of Zen Shiatsu
- Effective in stretching tight muscles and restricted soft tissue, decreasing pain and promotes profound relaxation

Watsu and Jahara Techniques

- Mario Jahara studied with Harold Dull and then developed his own style of aquatic bodywork utilizing a short noodle to improve body alignment
- In a clinical setting a session may begin 10 - 15 minutes of stretching and relaxation before engaging in exercise or functional activities

Watsu and Jahara Techniques, Con’t.

Watsu and Jahara Techniques, Con’t.

Ai Chi

- A modified format of Tai Chi adapted for the aquatic environment
- Developed by Jun Konno in Japan in the 1990s
- It is a combination of slow, fluid motions with breath patterns
- The benefits include improvements in balance, weight shifting, body awareness, postural control and stress management

Ai Chi, Con’t.

Task Oriented Approach

- Draws from motor learning and control theories
- This became more utilized in the 1980s
- Emphasis is on practicing functional tasks and complete skills instead of movement patterns
- Focus is on quick and reciprocal movement patterns and quick progression of the level of difficulty
- Any functional task or recreational task may be practiced such as walking, stepping over obstacle to balance, reaching, lifting, household tasks, golfing or tennis swing

Task Oriented Approach, Con't.

Aquastretch

- A newer technique developed by George Eversaul
- Incorporates dynamic stretching, intuitive movement to decrease restrictions, edema and pain associated with physical functioning
- The person is stabilized at the edge of the pool with weights to the legs or trunk

AquaStretch, Con't.

- The person is told to move the painful or restricted area in anyway they feel they need to
- The person's painful or restricted limb or area is positioned in a hold and then pressure or movement is applied by the aquatic professional
- A sequence of these movements and hold positions are performed until the pain has dissipated or diminished

Aerobic and Endurance Training

- Continuous, rhythmic movements of the larger muscle groups for a period of time to elevate heart rate and produce a cardiovascular training effect
- Benefits include improved endurance for physical exertion, which may decrease complaints of fatigue
- Swimming, water walking, running or shallow or deep water aerobics

Aerobic and Endurance Training, Con't.

- American College of Sports Medicine (ACSM) recommends
  - Warm up/cool down 1 – 5 minutes
  - 3 – 5 times/week
  - 55 – 90 % of the maximal heart rate
  - 15 – 60 minutes duration of workout phase

Aerobic and Endurance Training, Con't.

Aerobic and Endurance Training, Con't.

Resistance Training

- To improve muscular power and endurance
- The aquatic environment lends many options for resistance training
  - Viscosity of the water
  - Adjustment of body surface and levers
  - Equipment
    - Mitts, paddles
    - Fins
    - Buoyant dumbbells
    - Noodles
    - Aquatic theratubing or bands

Resistance Training, Con't.

- ACSM recommendations
  - 2 times/week
  - 8 – 12 repetitions
  - Light to moderate loads
  - Ability to complete the full range of motion
  - A weak and deconditioned person may need to begin with only 3 – 5 repetitions
  - Termination of exercise would be recommended when movement quality and fatigue symptoms begin

Resistance Training, Con’t.

Resistance Training, Con’t.

Flexibility/Stretching

- Recommendations are for stretching at least once a day
- This is to help manage spasticity and loss of range of motion with inactivity
- Consistent stretching often increases a person's ability to participate in functional tasks
- Stretching is often easier in the aquatic environment because of buoyancy, hydrostatic pressure and viscosity
- Stretches can be performed statically at the wall or more dynamically away from the wall

Flexibility/Stretching, Con’t.

Adapted Swimming

- As a person's abilities change so does their ability to safely and independently swim or move in the water
- The aquatic therapist needs to know how to modify strokes to maximize the persons ability to move through the water with the least amount of restriction from their physical abilities
- The choice of stroke depends on the body shape, ability to float and the person's ability to consistently clear the face for breathing
- Supine strokes such as elementary backstroke and backstroke can decrease anxiety about getting the face immersed
- Utilization of goggles, earplugs and snorkels decrease problems with prone immersion
- A person could perform elementary backstroke arms with freestyle kick of the legs if this is easier to coordinate
- A person could alternate between kicking and arm strokes to decrease fatigue

Games

- The use of games is a great way to increase social interaction and add a fun aspect to a group setting
- Aquatic volleyball
- Relay races
- Red light/green light
- Hokey pokey
- Crack the whip

Aquatic Exercise Equipment

- There has been a resurgence in the popularity of aquatic exercise in the 1980s
- The variety of exercise equipment options has also increased
- Equipment can provide support, assistance or resistance of an exercise or activity

Aquatic Exercise Equipment

- Considerations for equipment purchase are:
  - Product durability
  - Variety of activities the equipment can be utilized for
  - Safety
  - Ease of use

Aquatic Exercise Equipment

- Access to the pool may require a wheelchair for entry or transportation to and from the pool
- A pool may have one or all of these entry access styles: a ladder, steps, ramp or a lift
- Pool attire in most facilities requires a bathing suit, not street clothes. Pool shoes may protect feet on the deck and in the pool
- Use of neoprene vests, jackets, shorts, trousers, catsuit or wetsuit may decrease chilling in outdoor or cooler temperature pools

Aquatic Exercise Equipment

Aquatic Exercise Equipment

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Aquatic Exercise Equipment

Thank You

This concludes our webcast:

Advancing Knowledge of Aquatic Exercise and MS

Once again, I would like to thank Michele Harrison for her time and very informative presentation, as well as Genzyme, a Sanofi company, for sponsoring this program and additional Swim for MS projects.

On behalf of MSAA, thank you for joining us.

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