

# Physical Therapy CRPS and Chronic Pain

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# Focus on Therapeutic Interventions

## Brain Retraining

- Laterality Training
- Explicit Motor Imagery
- Mirror Therapy

## Aquatic Physical Therapy



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# Where does Pain come from?

## TRUE OR FALSE

- Pain only occurs when you are injured
- The Brain decides when you experience pain
- Chronic Pain means an injury hasn't healed properly
- In chronic pain and CRPS, chemicals associated with increased stress can directly activate nerves sensitivity
- PAIN IS REAL

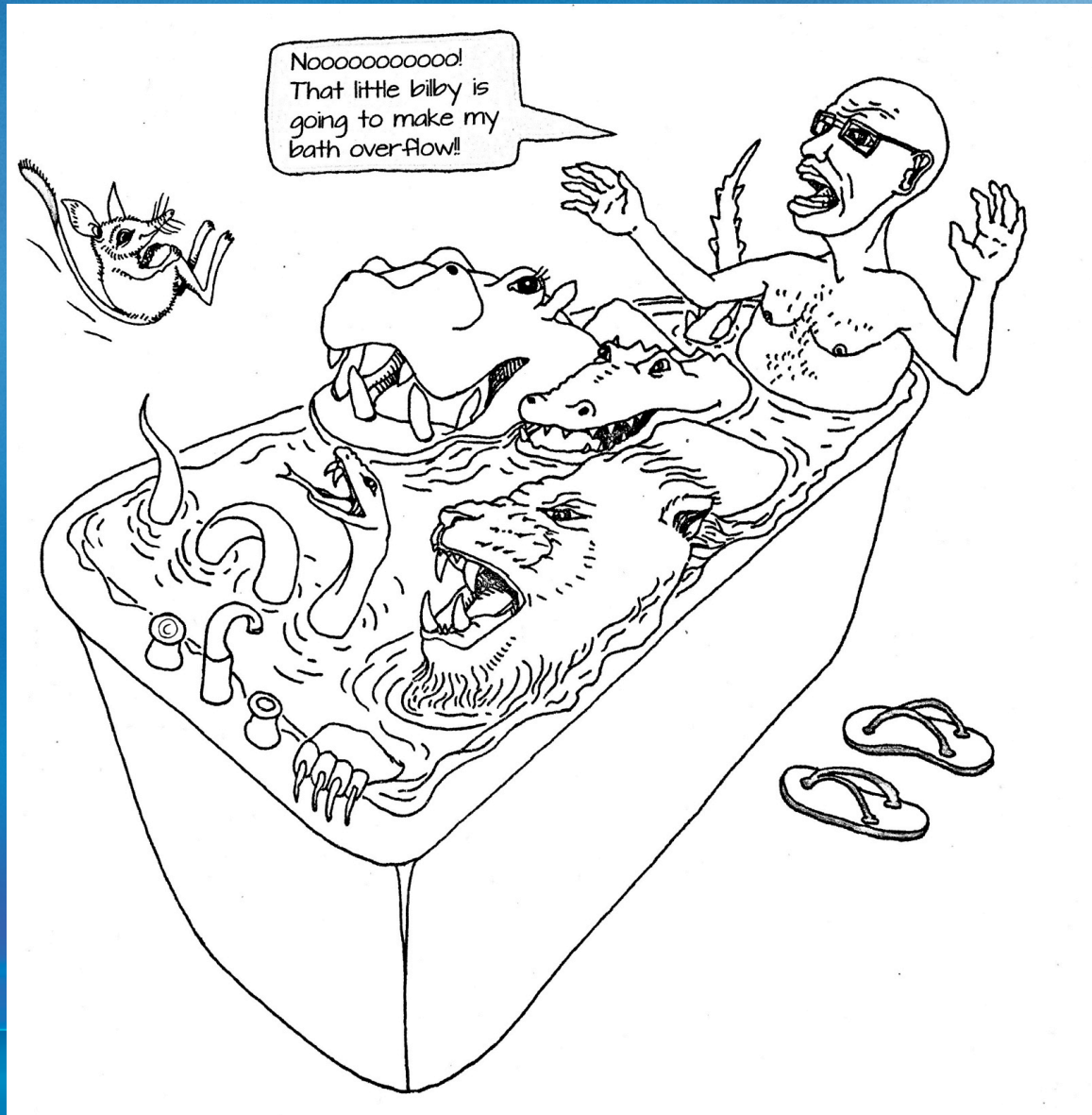


# Brain Creates Pain

- Warning system, protection mechanism
- What is Phantom Limb Pain?
- Context: what you believe, where you are, what you think, what you understand
- Pain may increase with thoughts of pain anticipation: “I know I am going to have pain when...I get out of bed..when I walk...”



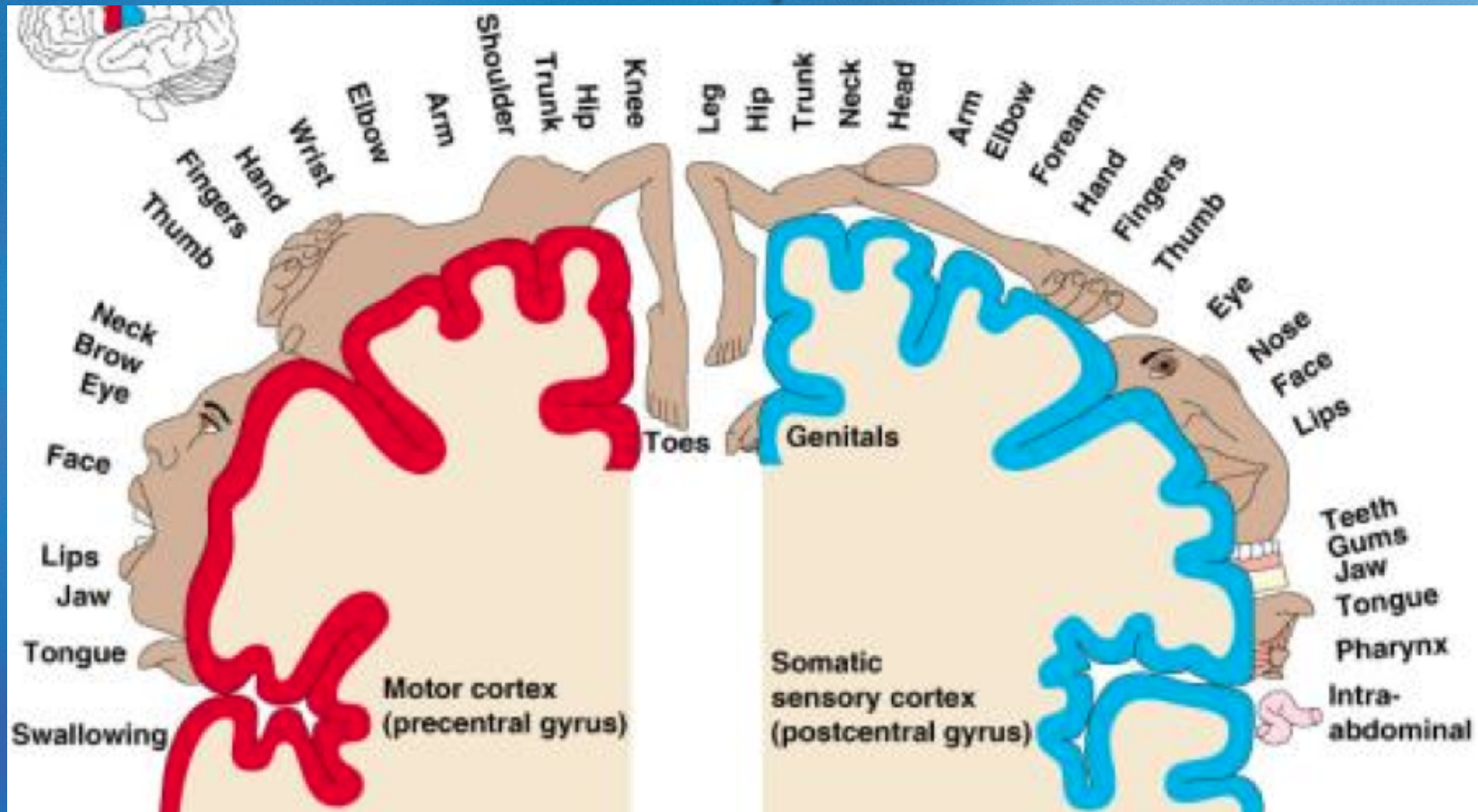
## Explain Pain Handbook Protectometer GL Moseley & David Butler





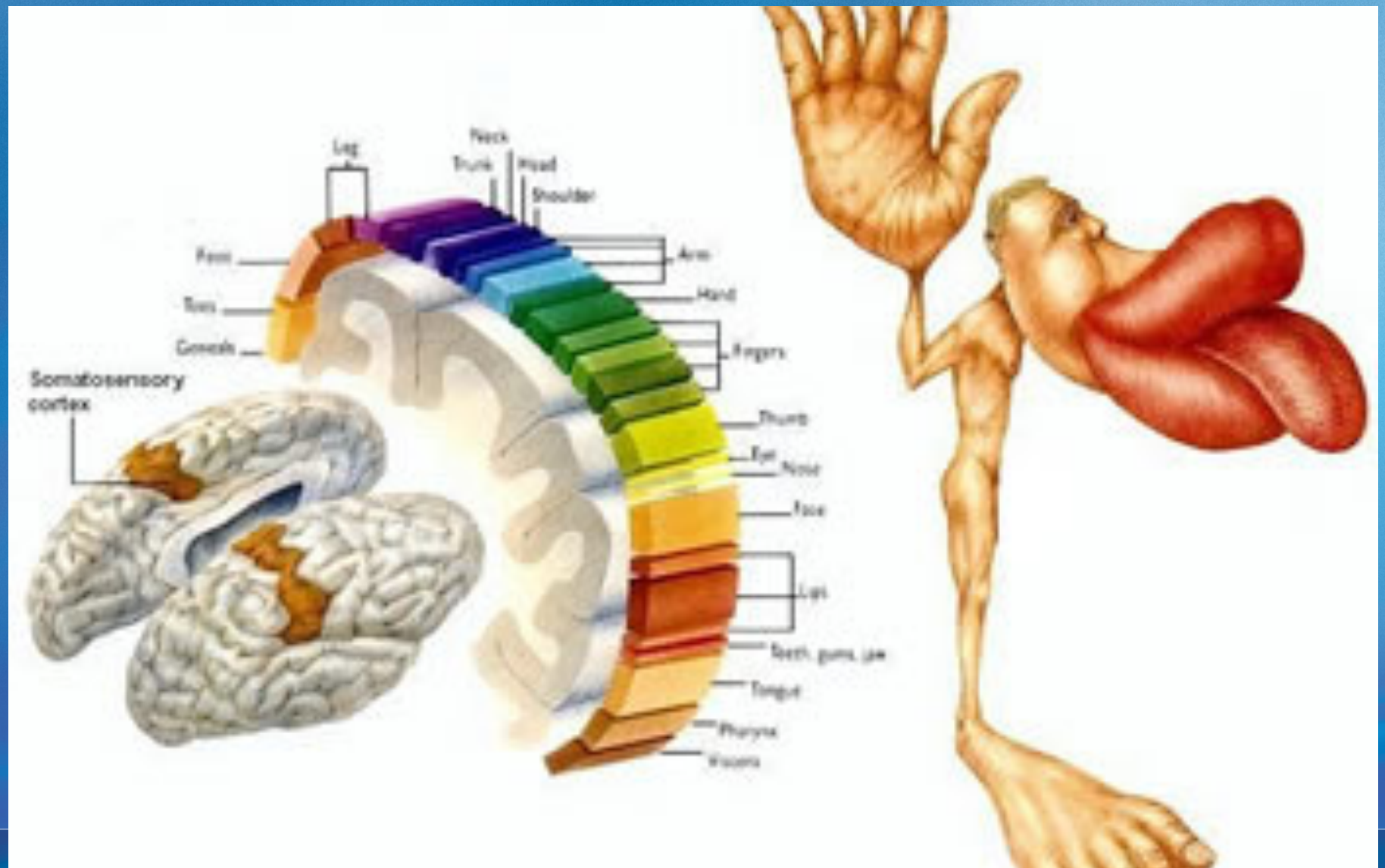
# Homunculus “Little Man”

## Motor and Sensory Cortex: Brain Map





# Brain Map





# The Brain's Image of Painful Body Part

- Smudging: image of your affected limb is not as defined in the sensory or motor area of brain, can lead to spreading of CRPS
- “The hand”, “the foot”, giving body part a name separate from own







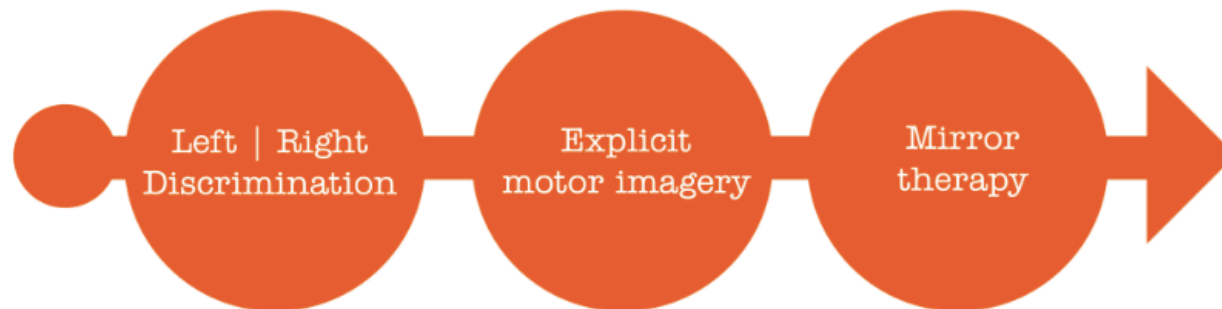
# Brain Retraining for CRPS

- Treatment focused on training the brain to reconnect to the body part affected by pain
- Goal is to activate your brain to RECONSTRUCT the body part without increasing activation of severe pain state
- BRAIN IS PLASTIC



## What is graded motor imagery?

Graded Motor Imagery is the most up to date rehabilitation program – based on the latest science and clinical trials to treat many complex pain, and movement problems.



## The three stages of G.M.I

Graded motor imagery is broken down into three unique stages of treatment techniques, each exercising your brain in different ways.

# Phase 1 Left/Right Discrimination Laterality Training

- Ability to identify a body part as right or left
- Goal: Reconstruct a clear representation of left and right body part affected



# Recognise

Help

## Choose your test



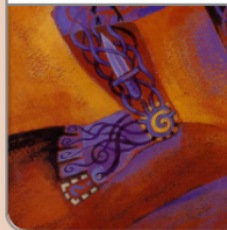
Feet

**Vanilla Feet**



Feet

**Context Feet**



Feet

**Abstract Feet**



Neuro Orthopaedic Institute



[www.noigroup.com](http://www.noigroup.com)

Other apps from noigroup



Left

Right





Left

Right



Left

Right





Abstract Feet



Left

Right



Left

Right



# Laterality Recognise NOI Group

- Frequency: 3-5 times per day
- Duration: 20-50 images per session for minimum two weeks
- Goal: 85% accuracy both right/left <2 seconds
- APP: Apple and Android, many different body type images
- If Pain – decrease images/frequency/challenge



## Phase 2 Motor Imagery

- Watching or imagining a body part in a certain position or motion
- Watch another person's body part in a magazine or out in public
- Imagine yourself moving doing a certain movement, sport, walking
- Look at pictures of the body in magazines, differentiate right from left















# Motor Imagery

- Frequency: 3-5 times per day
- Begin with 3 minutes, increase to 10 minutes
- Minimum two weeks
- Pain increase – decrease time/frequency or go back to Laterality training



# Phase 3 Mirror Therapy

- Use of a mirror to present a reverse image to the brain
- Goal is to Reconstruct a more clear representation of body part in the brain
- No jewelry, limb should be the same as the other side
- TRICK YOUR BRAIN!







# Mirror Therapy

- Look at an image of the body part in the mirror first – start with picture
- Look at mirrored body part – no movement
- Look at mirrored body part moving
- Introduce tools, pens, objects like lifting cups that affected limb used to be able to do
- Can use the mirror in different places to provide the brain with different contexts, with music on, add different smells and noises



# Mirror Box Therapy





# Mirror Therapy









# Mirror Therapy

- Frequency: 3-5 times per day
- Duration: 1-10 minutes
- Minimum two weeks
- If Pain: decrease frequency/duration or go back to Phase 1 or 2



# Brain Retraining takes constant effort!



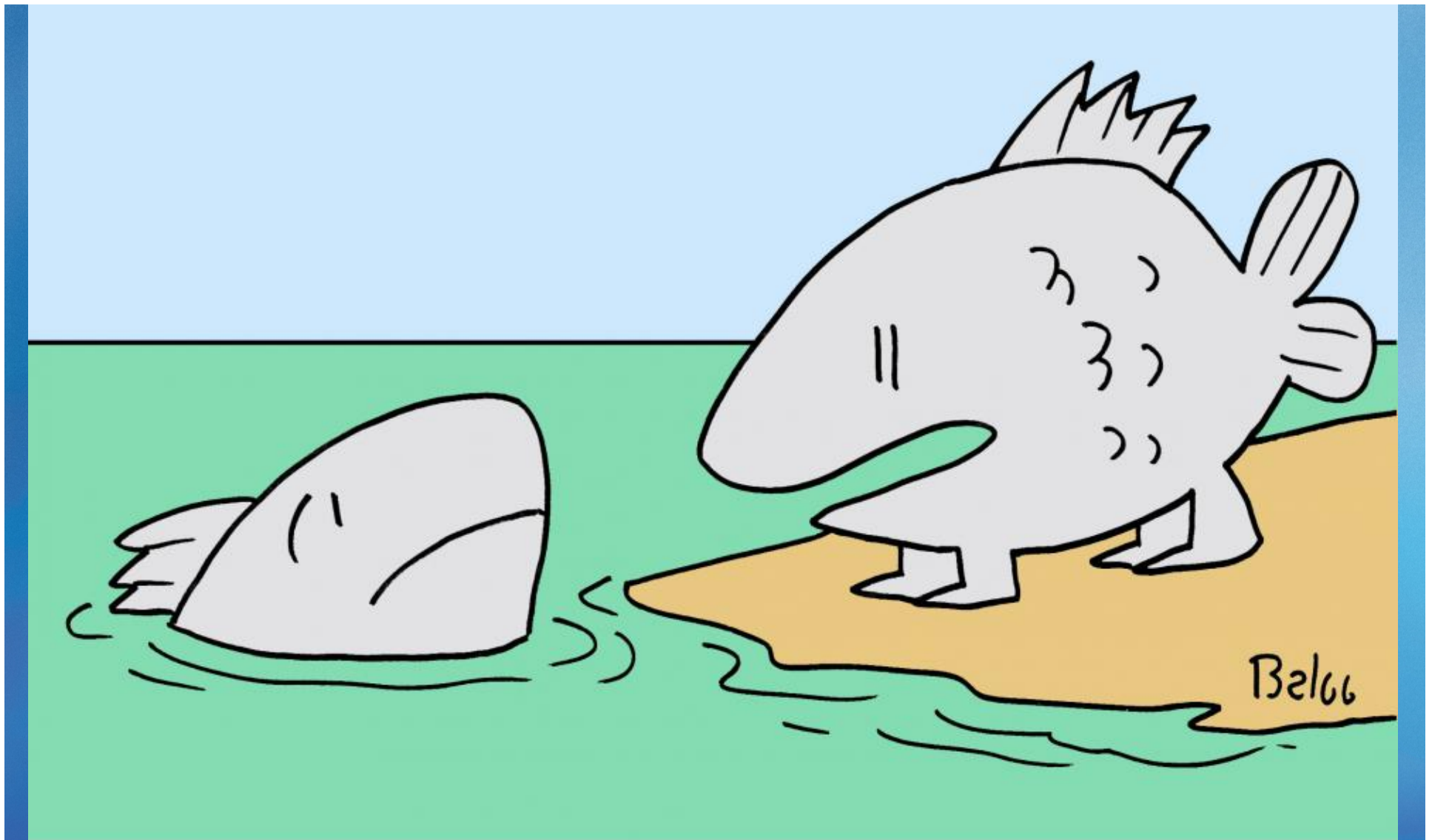


# Aquatic Therapy

## The Bridge to Land







"Believe me, it's  
overrated up here."

# What is the difference between Aquatic Physical Therapy and Aquatic Exercise?

- Aquatic Physical Therapy requires the “skilled service of a PT and/or PTA” ([aquaticpt.org](http://aquaticpt.org))

Covered by insurance: check your plan!

CPT Code 97113

- Aquatic Exercise is the utilization of water for the implementation of quality of life, fitness-related or general health-related goals.  
([aquaticpt.org](http://aquaticpt.org))



# Does Water Temperature Matter?

- Therapeutic Temperature: 88-94 degrees
- Benefit: decreased muscle guarding, relaxation, less pain
- Commercial Pools: 78-85, moderate to high activity level
- Spa Temperature: Typically 100-104 degrees



The background is a solid blue gradient, transitioning from a lighter blue at the top to a darker blue at the bottom. A bright, white, diagonal light streak or lens flare effect is visible in the lower half of the image, adding a dynamic visual element.

# *What are the Benefits of Aquatic Physical Therapy?*



# Buoyancy

- Supports body, reduces stress, promotes flexibility and range of motion, joint decompression
- Promotes relaxation, greater ease of movement
- Reduces stress on entire nervous system





# Graded Weight Bearing

- Begin walking and weight bearing when unable to on land, recovery is faster
- Balance activities, functional activities, weight shifting





# Gentle Graded Resistance

- Able to progress at individual challenge level
- Core Stabilization, Proprioception, Posture
- Able to progress slowly without increasing pain





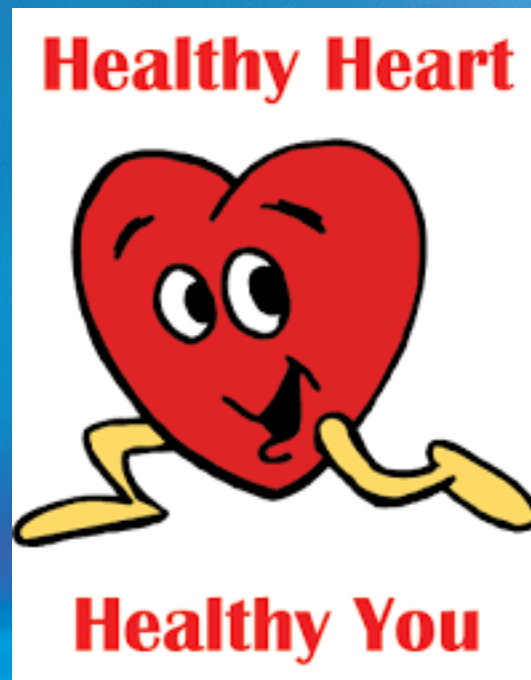
# Graded Resistance





# Body Conditioning

- Improved heart, lung function and circulation – assists with decreasing swelling from hydrostatic pressure
- More oxygen to the body promotes healing
- More oxygen to the brain helps with stress and brain retraining





# Types of Aquatic Exercise Equipment

## Buoyant/Supportive      Resistive



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# Psychological Benefit

## Freedom to Move Without Fear





# Aquatic Therapy Promotes Better Sleep!





# Aquatic Physical Therapy Program Components



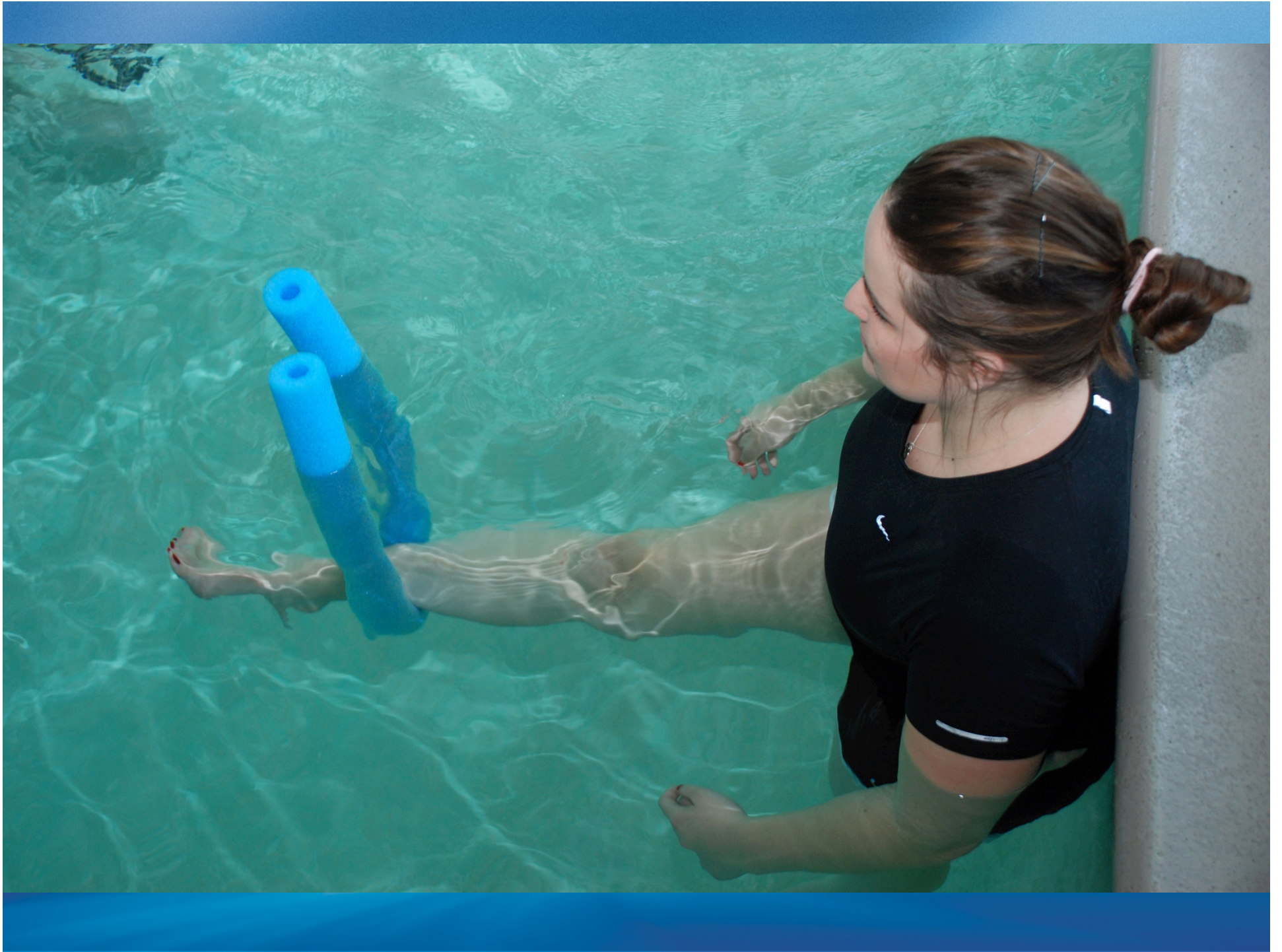
# Gentle Stretching

- Hold 20-30 seconds
- Repeat 3-5 times
- Practice Relaxation Breathing during hold
- No PAIN
- Can use equipment to assist









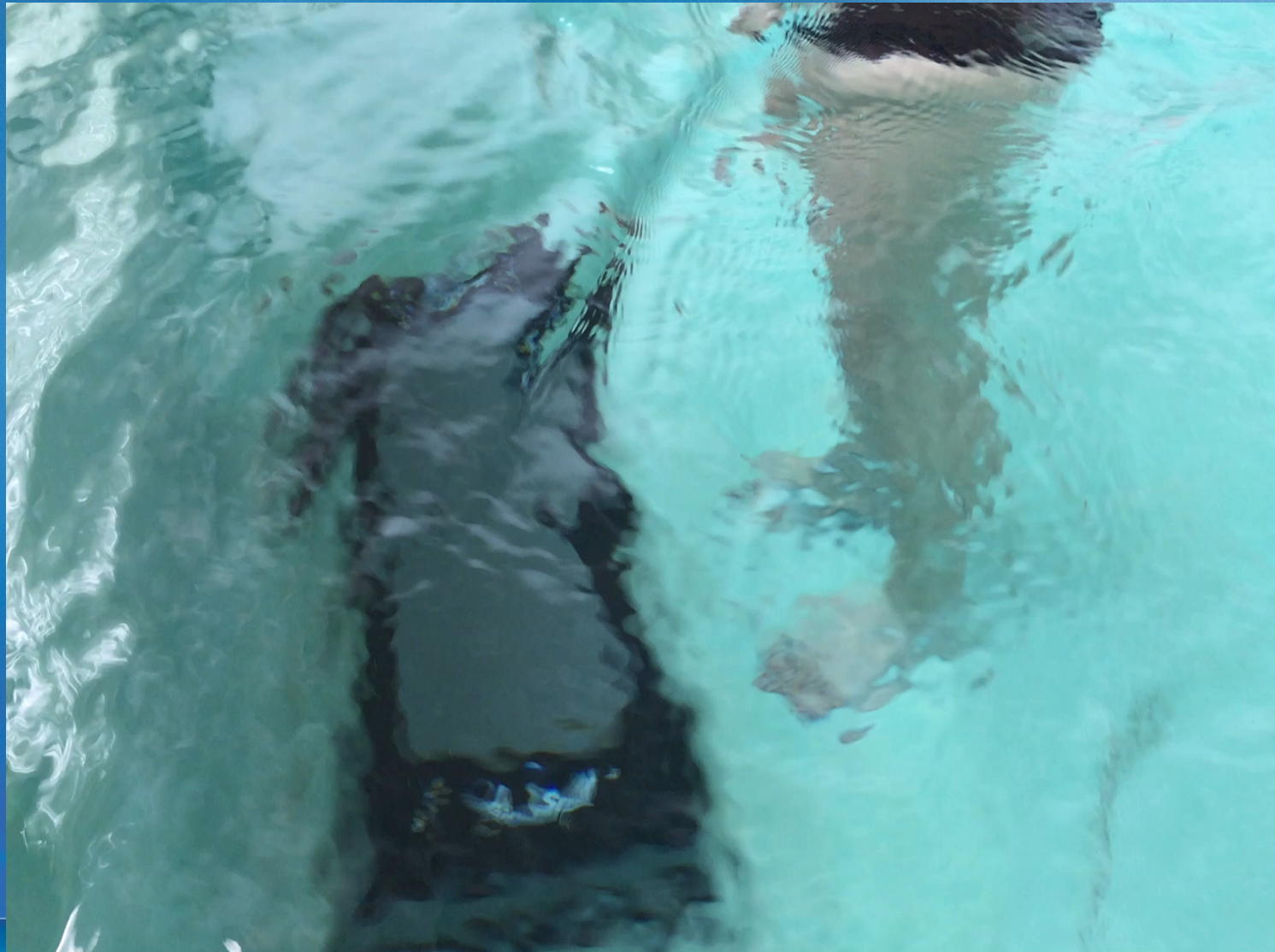


# Shallow Water 3-5 feet

- Walking, forwards, backwards, side to side
- Balance/Proprioception Activities
- Core Stabilization
- Functional Training



# Functional Activities: Steps





# Functional Squat





# Functional Squat with Theraband





# Balance Activities





# Core Stabilization and Balance





# Deep Water: Weightless!

- Hanging/Decompression of Body/Relaxation
- Conditioning, Running, Cross Country, Biking
- Simulate land activities: brain retraining
- Strengthening, Stretching
- Use buoyancy equipment
- Use resistive equipment with buoyancy equipment



# Deep Water Hanging/Decompression



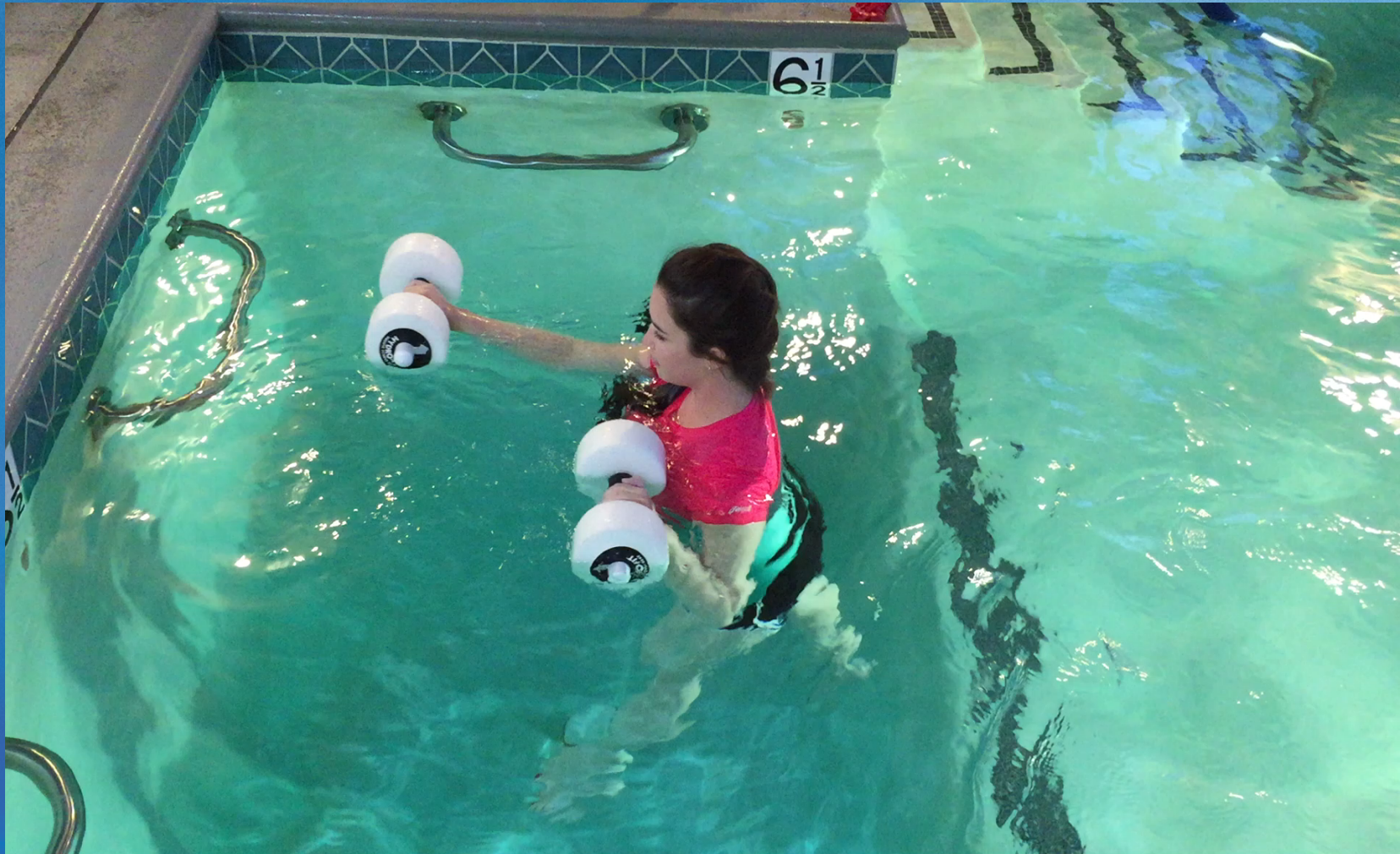


# Deep Water Conditioning/RDM





# Deep Water Conditioning





# Aquatic Exercise Guidelines

- Pacing Exercise: Less is More
- Take frequent breaks between exercises: rest and breathe deeply, visualization
- Progress exercise time slowly over several weeks
- Drink plenty of water
- Rest when you get home
- Practice good nutrition and sleep habits



# General Activity Monitoring

- Borg Scale: Rate of Perceived Exertion: Scale 0-10/10, rate how hard you are working during activity
- Track Exertion Level to find proper exercise intensity to not aggravate nervous system



# Perceived Exertion Chart

<b>10</b>	<b>Very Very Hard Activity</b> Completely out of breath, unable to talk
<b>9</b>	<b>Very Hard Activity</b> Can speak only one word at a time
<b>7-8</b>	<b>Hard Activity</b> Out of breath, can speak a sentence or two
<b>4-6</b>	<b>Moderate Activity</b> Can still carry a conversation
<b>2-3</b>	<b>Light Activity</b> Breathing is easy
<b>1</b>	<b>No Activity</b>



# General Activity Monitoring

- Fitness Monitor/APP, daily step monitoring
- Monitor HR, check exercise intensity
- Diary of fatigue level, comfort level 0-10/10
- Problem solving around your environment
- GOAL: Decrease sensitivity of the nervous system, create healthier body and mind



# How to Succeed with Your Rehabilitation

- Be a part of your solution
- Ask questions
- Give information to your PT
- Must be compliant with the whole program
- Ask support system for help, find an advocate



# Brain Retraining/Education Resources

- Recognise APP, GMI, Mirror Therapy:NOI Group
- Protectometer, GL Mosely, David Butler
- Explain Pain, GL Mosely, David Butler
- The Brain That Changes Itself, Norman Doidge, MD
- Phantoms in the Brain, VS Ramachandran, MD
- Why Does Everything Hurt?, Adriaan Louw  
ISPI, International Spine and Pain Institute



# Aquatic Resources

- Aquatic Section American Physical Therapy Association: [aquaticpt.org](http://aquaticpt.org)
- Aquatic Exercise Association: [aeawave.org](http://aeawave.org)
- Aquatic Therapy and Rehab Institute: [atri.org](http://atri.org)
- Wet Wrap: DK Douglas Company  
[dkdouglas.com](http://dkdouglas.com)
- Sprint Aquatics Equipment: [sprintaquatics.com](http://sprintaquatics.com)
- Millennial Pro Crutches: [millennialmedical.com](http://millennialmedical.com)



# Questions?



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