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Aquatic Interventions for Fibromyalgia

Meeting the challenges of a complex syndrome

Beth Scalone, PT, DPT, OCS, ATRIC
Beth@waterpt.com/ www.waterpt.com

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CONTINUED

Learner Outcomes:

- List the classification criteria for Fibromyalgia as outlined by the American College of Rheumatology.
- Identify at least three common overlapping conditions that influence individual rehabilitation programs.
- Describe at least two examples of current research and at least two examples of expected outcomes on rehabilitation and aquatic therapy programs for individuals diagnosed with Fibromyalgia.
- Outline at least three safe and effective aquatic therapeutic interventions for the therapy treatment plan for individuals with fibromyalgia.

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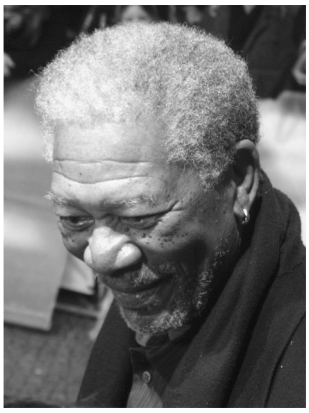
What does fibromyalgia look like?



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Prevalence

According to the National Fibromyalgia Association:

Fibromyalgia is one of the most common chronic pain conditions.

The disorder affects an estimated 10 million people in the U.S. and an estimated 3-6% of the world population.

While it is most prevalent in women 75-90%

Does occur in men and children of all ethnic groups

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Diagnosis

This Photo from Pixabay is free for commercial use

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CONTINUED

Diagnosis Criteria has evolved..

American College of Rheumatology

1990 = Widespread pain, minimum of 3 months with 11 of the 18 designated tender points.

2010 = Widespread pain and accompanied by allied symptoms such as sleep, clarity in thinking and fatigue.

The new criteria allows an improved method to track response to treatment.

6

New Criteria follows 3 conditions

(WPI >7 AND SS >5) or (WPI 3–6 AND SS >9)

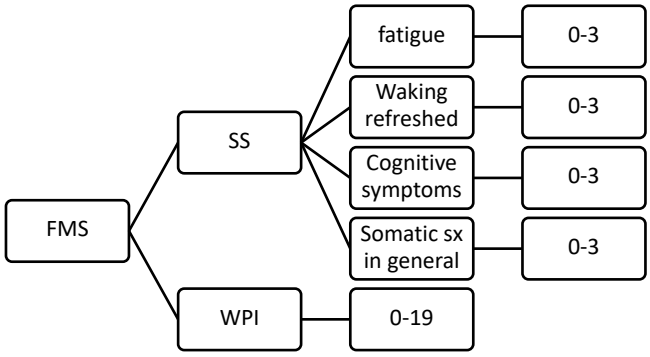
Symptoms have been present at a similar level for at least 3 months

No other disorders to explain symptoms

7

Fibromyalgia Score (0-31)

Wolfe (2010)



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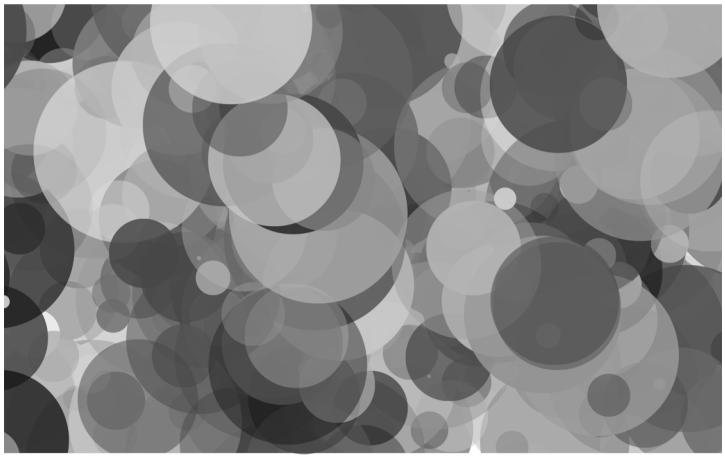
Often not dealing with Fibromyalgia alone…



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Overlapping Conditions

- Fatigue/ Sleep disorders
- Secondary Renaud's syndrome (30%)
- Restless leg syndrome
- Memory issues
- Migraine/ tension HA
- Back pain/ TMJ other musculoskeletal complaints
- Irritable bowel syndrome
- Chronic fatigue syndrome
- Major depression and panic disorder
- Thyroid
- SICCA (18%)

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Photo by Alison Burrell from Pexels

Sleep Disturbance and Pain

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Education on Sleep Hygiene

- Limit screen time before bed (turn off 1 hour before bed) and leave phone in other room
- Consistent bed times
- Cool, dark and quiet
- Use the bed for sex and sleep only
- Exercise and get sunlight during the day
- Limit your daytime naps
- Watch what you eat and drink
- Stay calm when you can't sleep

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CONTINUED

Raynaud's syndrome

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CONTINUED

What does this mean?

- Warmer pool temps
- Staying warm in colder climates
- Smoking Cessation Education
- If patient also has carpal tunnel caution with gripping equipment

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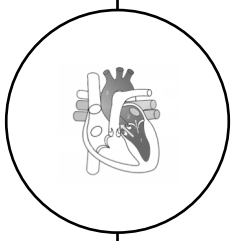
FM and Mitral Valve Prolapse and Joint hypermobility

50 patients (Pellegrino 1989)

- Mitral valve prolapse was detected in 75%

75 females with FM (Kozanoglu 2016)

- 68% dx with BJHS
- 20% with MVP
- MVP higher in patients with BJHS (9 x more prone)
  - BJHS= Benign Joint Hypermobility Syndrome



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What does this mean?

- Moderate exercise is usually recommended for individuals with MVP especially when asymptomatic
- Some medications such as beta blockers can aggravate Raynaud's syndrome
- Those with a-fib maybe on blood thinners
- With symptoms and limited tolerances to activity therapist should work with cardiologist to demine cardiovascular exercise intensity levels during therapy.

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This photo is by FRANKYDEE from Pexels

EDS and Fibromyalgia

- Ehlers-Danlos Syndrome = defect in the synthesis of collagen
- Pain associated with EDS is a serious complication and might be misdiagnosed as FM
- There are other overlapping symptoms
- Think about testing for EDS if there is joint hypermobility

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CONTINUED

Deep stabilizers & Postural Control

- You can have tight muscles over loose joints
- Aggressive stretching without inherent stability at the joint will exacerbate the problem
- Facilitate joint stability and control with correct movement patterns before adding aggressive strengthen.
- Educate the hypermobile client on reducing stress to the joints in daily lives: example avoiding hyperextension of the knee in standing

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Brain Fog!

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Psychological issues: 30-40%

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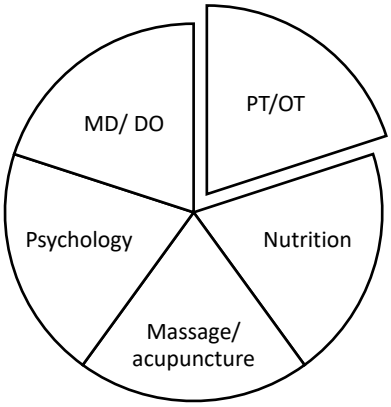
Multidisciplinary Team Approach!



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Research Review
Treatment Guidelines

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CONTINUED

Clinical Guidelines Recommend Aerobic Exercise

- American Pain Society and the Association of Scientific Medical Societies in Germany provide a high rating in recommending for aerobic exercise
- APS recommends moderate intensity 60-70% age adjusted predicted maximal heart rate 2-3 times per week.

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CONTINUED

EULAR evidence-based recommendations for the management of fibromyalgia syndrome(2007)

- Understanding of fibromyalgia requires comprehensive assessment of pain, function and psychosocial context.
- **Optimal treatment requires a multidisciplinary approach** with a combination of non-pharmacological and pharmacological treatment modalities tailored according to pain intensity, function, associated features such as depression, fatigue and sleep disturbance in discussion with the patient

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CONTINUED

Non-pharmacological management (EULAR cont.)

- **Heated pool treatment with or without exercise is effective in fibromyalgia**
- **Individually tailored exercise programs,** including aerobic exercise and strength training can be beneficial to some patients with fibromyalgia
- Cognitive behavioral therapy may be of benefit to some patients with fibromyalgia
- Other therapies such as relaxation, rehabilitation, physiotherapy and psychological support may be used depending on the needs of the individual patient

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CONTINUED

Aerobic Exercise: Review of RCT

Hauser (2010)

- AE program should consist of land-based or water-based ex with slight to moderate intensity 2-3 times per week at least 4 weeks and patient should be motivated to continue exercise after participating.
- Initial intensity should be adapted to individual level of fitness and start just below capacity and gradually progress. Type should be patient preference and comorbidities
- Heart rate assessment not the focus, patient should exercise at the intensity they were able to speak fluently with another person

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CONTINUED

Cochrane review 2008

- There is 'gold' level evidence (www.cochranemsk.org) that supervised aerobic exercise training has beneficial effects on physical capacity and FM symptoms. Strength training may also have benefits on some FM symptoms. Further studies on muscle strengthening and flexibility are needed. Research on the long-term benefit of exercise for FM is needed.

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CONTINUED

Are aquatic aerobic exercise programs effective in decreasing pain levels in patients with fibromyalgia? (Danner and Freeman 2018)

Aquatic aerobic exercise programs reduce pain scores by up to 33% compared with no exercise for patients with fibromyalgia; however, aquatic programs are no more effective at reducing pain than land-based therapy (SOR: A, meta-analysis of RCTs and 2 RCTs).

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The effectiveness of aquatic physical therapy in the treatment of fibromyalgia: a systematic review with meta-analysis (Lima 2013)

- Three meta-analyses showed statistically significant results in favor of the aquatic physical therapy (Fibromyalgia Impact Questionnaire, stiffness and the 6-minute walk test) during a period of longer than 20 weeks. Due to the low methodological rigor, the results were insufficient to demonstrate statistical and clinical differences in most of the outcomes.

29

Therapeutic benefit of balneotherapy and hydrotherapy in the management of fibromyalgia syndrome: a qualitative systematic review and meta-analysis of randomized controlled trials. Naumann (2014)

- Hydrotherapy with exercise we found moderate-to-strong evidence(consistent findings among ≥3 RCTs with low risk of bias)for a small improvement in pain (eight studies, 462 participants; including three low-risk studies, 223 participants) , no group difference was found when comparing water-based exercise to land-based exercise.
- No evidence was found for improvement of depressive symptoms

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RCT: Deep Water Running: Clinical Effectiveness of Aquatic Exercise to Treat Fibromyalgia

Clinical outcomes

- Pain decreased and function improved in both groups
- DWR had greater improvements in the FIQ at the 8 week mark compared to LBE and continued to improve
- Only the DWR group showed improvements in the SF-36 role emotional
- DWR was shown to be safe and effective

Assis et. al. (2006)

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DWR technique used in the study

- Upright posture/ neutral pelvis
- Running in place (tether cord)
- Water line shoulder level
- Reciprocal arm/ leg
- Hands clenched (light)
- LE bicycle motion
- Ankle DF and eversion with hip and knee flexion and plantar flexion and inversion with extension of the LE

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CONTINUED

The effects of aquatic, isometric strength-stretching and aerobic exercise on physical and psychological parameters of female patients with fibromyalgia Syndrome Sevimli (2015)

Looked at

Tender points, VAS, FIQ, 6 min walk test, SF-36 and Beck depression inventory

3 groups x 3 months (n=25 in each group, females age18-50)

- HEP (isometric and stretch 15 min/ day)
- Gym aerobic (40 min 1st month, 45 2nd and 50 in the 3rd)
- Pool aerobic (40 min 1st month, 45 2nd and 50 in the 3rd)
  - Karvonen Method for 60-80% MHR for both aerobic groups
  - Intensity increased from month 1 to 2 and rest period reduced in month 3

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CONTINUED

Results

- Revealed that Aquatic Aerobic Exercise was the most effective treatment of the three. All of the groups showed significant improvements in all variables between pre-and post-test, except the mean values of VAS and BDI in the land program.
- Authors concluded: The results suggest that aquatic aerobic exercise program is more effective than AEP and ISSEP in the treatment of FMS.

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FMS and Aquatic Exercise

- Research reviews: positive with decreased pain and improved functional scores
  - Gangaway 2006
  - McVeigh et. al 2008
  - Langhorst et. al 2009
  - Baranowsky et. al 2009
- Study in Spain concluded an 8 month aquatic training program to be a cost effective addition to the usual care provided by the public health system
  - Gusi & Thomas-Carus, 2008

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CONTINUED

All had warm up and cool down/ relaxation
Strengthening or stretching component
30-60 minutes sessions
2-4 times per week (most 3x/week)
Aerobic intensity 60-80% HR
Only 3 progressed difficulty of exercise
Supervised group therapy

Perraton, Machotka, Kumar (Journal of Pain Research, 2009)

Components of Effective RCT of Hydrotherapy programs for FMS

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Aquatic Therapy Outcome Measures

- Both Land & water exercise groups improved
- Mental Health related outcomes: improved anxiety and depression related outcomes
- Pain reduction, functional tolerance improved, improved QOL
- Exercise appears to be the most important factor related to hydrotherapy programs

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Improved Sleep (Vitotino, Carvaiho &Prado 2006)

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CONTINUED

Future research

Neria (2018)

Will be looking at land and aquatic exercise with each group components

- Warm up 15 min
- Proprioceptive exercises 25 min
- Stretching 8 min
- Relaxation 12 min (pool – ai chi and land Jacobson progressive relaxation)

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5244527/

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CONTINUED

Aquatic Therapy Interventions

- Based on the research cited: aerobic component essential
- Clinically needs to be individualized based on current complaints, patient presentation and comorbidities
- Warmer water: 90-92° recommended
  - Side-note the Assis DWR research done 28-31°C = 82.4-87.8° F
- Progression is slower
- Relaxation component
- Education

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Aquatic Aerobic Therapy Interventions First determine intensity

Determining HR (examples are for 60% intensity and 40 year old)

- Simple formula based on % of max HR
  - 220-age = max HR
  - Training HR = .6 (max HR)
  - .6 (220-40) = 108
- Karvonen formula
  - Target Heart Rate = ((max HR – resting HR) × %Intensity) + resting HR example
  - (110 x .06) x 70 = 136
- College of sports medicine
  - Max HR = 211-(.64x age)
  - Target HR = 111

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But if in cooler water HR decreases!

Due to increased central blood volume and Stark's law there is increased cardiac output when submersed in water therefore the Heart Rate is 10-15 BPM slower in water at same Rate of Perceived Exertion (RPE) on land.

RPE:

Borg and Modified/ Revised Borg (13/ 4 = somewhat hard)
Individualized

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RPE Scale (Rate of Perceived Exertion)	
1	**Very Light Activity** (anything other than complete rest)
2-3	**Light activity** (feels like you can maintain for hours, easy to breath and carry on a conversation)
4-5	**Moderate Activity** (feel like you can exercise for long periods of time, able to talk and hold short conversations)
6-7	**Vigorous Activity** (on the verge of becoming uncomfortable, short of breath, can speak a sentence)
8-9	**Very Hard Activity** (difficult to maintain exercise intensity, hard to speak more than a single word)
10	**Max Effort** (feels impossible to continue, completely out of breath, unable to talk)

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Diaphragmatic Breathing

Decreases

- Blood Pressure
- Tone and contractures
- Spasticity (spasticity increases with stress, breath-holding and thoracic breathing)
- Stress
- Heart Rate
- Pain and pain awareness
- Sympathetic response
- Breathing cadence
- Use of accessory muscles

Increases

- Circulation
- Blood flow to the muscles
- Parasympathetic response (calms the reticular system)
- Relaxation and comfort in the water
- Digestion
- Focus
- Restorative rest
- Deep tissue abdominal muscle activation
- Rib cage mobility and lung expansion for gas exchange

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Inhale→ Exhale

Increase rib cage expansion by increasing trunk and rib cage mobility
Encourage complete and full exhale

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Breathing/ Relaxation

Use snaking/ Bad Ragaz passive stretching techniques and watsu with deep breathing.

Inhale facilitates spine extension and increases buoyancy .

Exhale facilitates flexion and creates greater relative density.

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Incorporate Breathing Oxygenation and Relaxation

Breathing Homework: perform 3 reps 3 times per day

- Inhale through nose for count of 4
- Hold for count of 7
- Exhale through the mouth for count of 8

Must teach correct pattern first

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CONTINUED

Breathe well from different positions

Once you gain improved posture make sure to reinforce breathing patterns in that posture.

Dysfunctional breathing patterns exacerbate upper crossed syndrome

(Clark and Lucett 2010)

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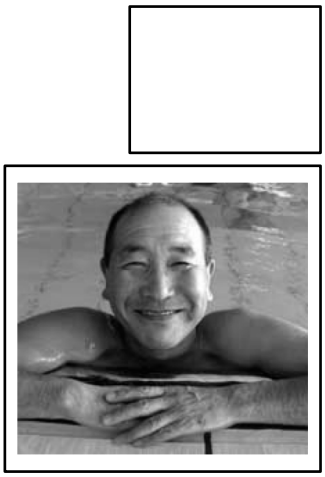

Ai Chi

balance, breathing, weight shift, coordination

Slow, breath centered movement

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CONTINUED

Ai Chi

Ai chi is a technique of active relaxation related to T'ai Chi and Chi Gong performed in the water.

Performing simple and slow movements, progressing to weight shifting with arm movements and narrowing base of support having a positive effect on balance and coordination.

Can be done in a group setting.

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A new approach towards improved quality of life in fibromyalgia: a pilot study on the effects of an aquatic Ai Chi program (Cruz and Lambeck 2018)

- Pilot study was performed with a sample of 20 female subjects diagnosed with FM
- Visual analog scale and the Short Form-36 physical and mental health summary scores. Baseline and post 10 sessions

- Results after 10 sessions
- Significant improvements pain perception, vitality, mental health, as well as perceived overall improvement in quality of life.

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AquaStretch™

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AquaStretch for Fibromyalgia

- Based my observations and clinical experience
- Individuals with Fibromyalgia respond favorably to AquaStretch sessions
- Amount of pressure required is significantly less than the usual 5lbs. (more ½-1lb.)
- Intuitive movement provides control and active participation
- Goes after area of restriction within the tissue vs the entire tissue.
- Whole body approach

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Where do you start?

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Aquatic Exercise Basics

- Often patients presents with inappropriate and excessive muscle recruitment during functional performance.
- Need to educate and increase client's awareness of things like clenching the teeth; shoulder shrugging; upper chest or paradoxical breathing; global muscle activation and guarding
- Use the water to improve movement patterns first before jumping into resistive programs
- Caution with equipment

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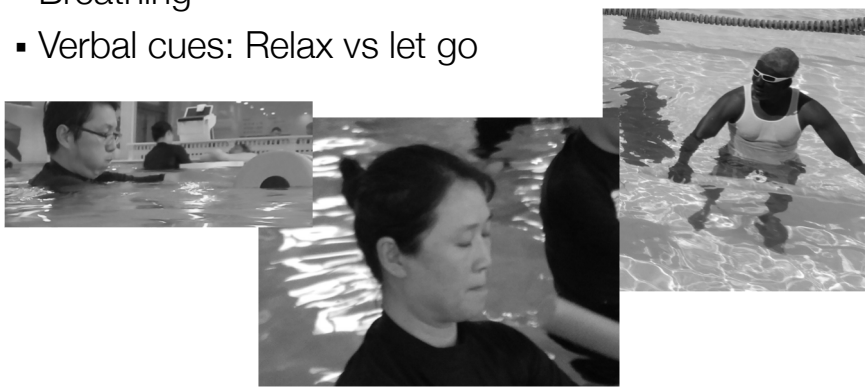
Relaxation

- Exercise vs learning how to move effortlessly
- Breathing
- Verbal cues: Relax vs let go



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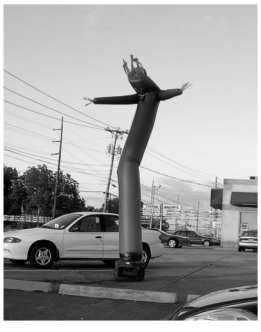

Organized Movement takes place at the base of the upright column!

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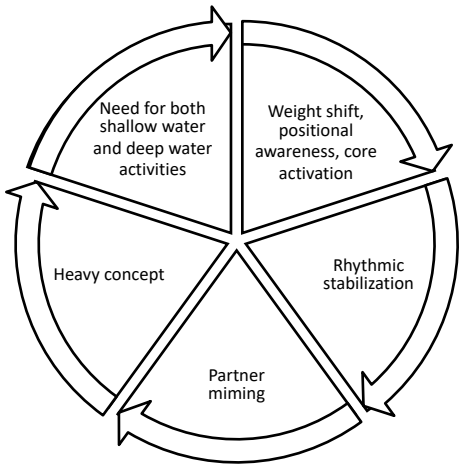
Grounding: Finding Stability in a Buoyant Environment



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Rhythmic stabilization (PNF)

Utilizes alternating isometric contractions of first agonists, then antagonists against resistance; no motion is allowed. Slow build and slow release.

Think of it as a way to 'wake up' muscle you want to fire!

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CONTINUED

Manual & Drag forces

- Manual pressure and holds
- Hold against turbulence
- Isometric Hold against drag

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CONTINUED

Partner Miming

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Partner Miming Progressions

- Seated
- Kneeling
- ½ kneeling
- Standing: various positions
- Staggered stance: add heel and toe lift
- Single leg
- Walking forward

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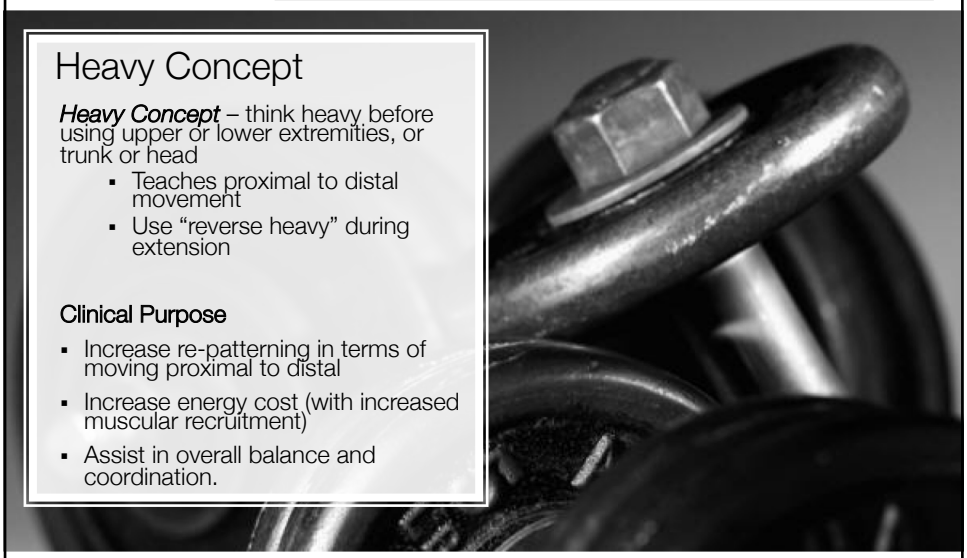
Heavy Concept

Heavy Concept – think heavy before using upper or lower extremities, or trunk or head

- Teaches proximal to distal movement
- Use "reverse heavy" during extension

Clinical Purpose

- Increase re-patterning in terms of moving proximal to distal
- Increase energy cost (with increased muscular recruitment)
- Assist in overall balance and coordination.



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Slow and Hold

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Stability in different positions

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Stability in different stances

- Parallel
- Staggered (various width/ step length)
- Staggered in different planes
- Tandem
- Single leg

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Move from Stability to Stability with Mobility

- Proprioceptive awareness
  - Head and shoulder placement
  - Setting shoulder blades
  - Feeling feet/ weight shift/ tripod
- Pool wall posture with arm movements
- Noodle as foam roller

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Postural awareness

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“Elevator” to build stability

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CONTINUED

Cuing often required!

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CONTINUED

Rules for progression

- Correct movement pattern
- Ask “where do you feel it?”
- Start without equipment
- Once can perform 1 set of 10 without increased symptoms (2 hour rule) perform with the same parameters 2-3 more sessions then increase reps or sets
- Once can perform 3 sets of an exercise for 2-3 sessions in a row without increased symptoms progress challenge (increase speed or add equipment to increase resistance)

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Keep track: outcome measures

- Fibromyalgia Impact Questionnaire Revised (FIQR)
  - https://www.drpodell.org/FIQR.pdf
- Body part specific functional questionnaires
  - Back/ neck index
  - DASH
  - LEFS
  - Patient specific
- Pain levels or trends/ hours of sleep
- Objective measures such as ROM, strength
- Document movement patterns and compensations

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Incorporate Education

- PNE (Pain Neuroscience Education)
- Sleep
- Nutrition
- Pacing and other ADL modifications
- Communication with healthcare team

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CONTINUED

Pain Science:

Science shows pain and loss of function leads to reduced awareness of the position and movement sense. With reduced movement:

- Reduction of 2 point discrimination
- Brain struggles with left vs right
- Harder to identify location
- Altered sense of body part size
  - (more painful = larger)

Consciousness

- Can you have injury without pain?

It is impossible to have pain and not know about it!

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CONTINUED

Threat

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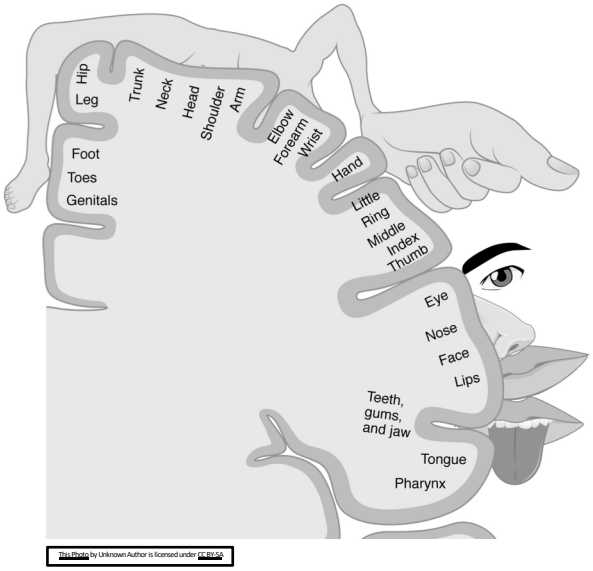
Neglect and Smudging

Neuroplasticity:

If you don't use it you lose it!



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Current treatment approaches:

Pain Neuroscience Education (PNE)
Make the unknown- known

Localization task/ sensory discrimination

1	2	3
4	5	6
7	8	9

Graded Motor Imagery:
- Left / Right Discrimination
- Explicit Motor Imagery
- Mirror Therapy

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How can water help?

- Improve body part awareness
- Stimulate proprioceptors through immersion, movement, drag force, hydrostatic pressure etc.
- Allow for ease of movement to minimize or reverse the neglect
- Health stimulation and mapping of body parts
- Safe place/ good option for cardiovascular
- Still need to progress to land eventually

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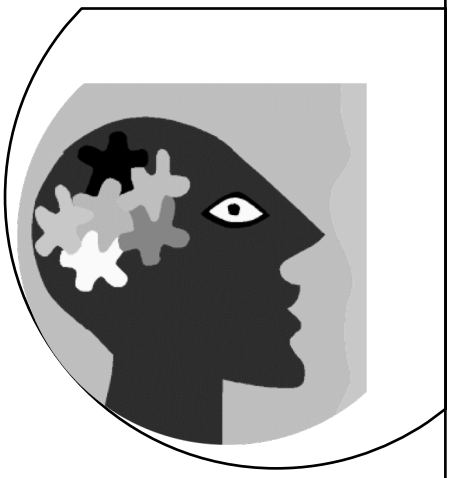
Central Sensitization

Central sensitization is a condition of the nervous system that is associated with the development and maintenance of chronic pain. When **central sensitization** occurs, the nervous system goes through a process called “wind-up” and gets regulated in a persistent state of high reactivity.



Ways to decrease/ dampen down

- Breathing
- Relaxation
- Postural exercise
- Aerobic exercise
- Graded activities
- Sleep hygiene

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Hone your people skills

- Empathetic and honest
- Verbalize expectations including time frames
- Encourage independence through education
- Patience for brain fog and flare ups with non judgmental discussion on self care/ management techniques to improve outcomes
- Remain positive and encourage people to stay off the internet/ provide reputable sites for reference.

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Questions

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