

Practical Handout IATF: forced practice in an enriched environment constrained induced in behaviorally relevant tasks.

3 goals:

- intensity: level of exertion is 50 - 60% MHF
- multi-tasking with problem-solving (focus, attention taking)
- social elements (social contact)

Other sub-goals:

- mirroring
- positive arousal gives activity in CNS
- negative arousal is OK! Awareness on error making also stimulates CNS
- repetitive but variabel

Typical diseases in ageing are mostly based on a chronic low grade inflammation, driven by the hypothalamus (Zhang 2013). Purkayastha (2013) related hypothalamic inflammation to metabolic syndrome, including Diabetes Mellitus type 2 (T2DM). Research systematically relates T2DM to lifestyle; lack of physical activity is an important element (Hu 2001). Especially those that are limited by gravity because of e.g. obesity, pain, weakness are limited in achieving metabolic and endocrine changes secondary to movement.

Activity is not the only way to influence neuro-inflammatory – metabolic – processes. The hypothalamus, as coordinator of metabolic homeostasis, is also very sensitive for environmental enrichment, which has shown to increase the production of Brain Derived Neurotrophic Factors (Nithianantharajah 2006) with a concomitant decrease of serum leptin (one of the pro-inflammatory cytokines) and an increase of adiponectin (one of the anti-inflammatory cytokines) (Cao 2010). Meijer (2015) expects that: “the object of movement therapeutic treatment of DM2 and related diseases is the inflammation of the hypothalamus. Treatment is most effective when patients combine exercise, new sensory experience, cognitive challenge and social stimulation in an enriched environment (Sale 2014). Only exercise will be less effective”

The effects of aquatic exercise on the cardiovascular system in T2DM and related problems such as overweight and obesity are well established. This is also the case for body composition, metabolic – and inflammatory markers. Aerobic movement in water at levels between 40% and 70% of the Heart Rate Reserve decreases post-exercise glucose in T2DM by 21-34%, women reacting with a higher decrease (Deleon, 2005, Katsura 2010)

Overweight and obesity are related to T2DM. Aquatic research has dealt with body mass indexes (BMI) from 25-42. Body composition can be positively effected in water and modest to even statistical significant decreases in the waist-to-hip ratio, waist girth, body weight, skinfold thickness, BMI or % fat have been shown (Takeshima 2002, Gappmaier 2006, Nagle 2007, Green 2009, Jones 2009, Meredith-Jones 2009, Katsura 2010, Cox (2010), Lim 2010, Wouters 2010, Kaddissy 2011, Conners 2012).

Takeshima (2002), Bageri (2010), Cox (2010), Katsura (2012) and Nuttamonwarakul (2012) have shown that water exercises and swimming elicit a decrease in cholesterol, trichlycerids, low density lipids or glycosylated hemoglobin. Bageri (2010) also showed an increase of high density lipids.

Effects of aquatic exercise on BDNF has been shown only for multiple sclerosis (Bansi 2013), but can lead to the hypothesis that the use of aerobic activity with the elements of environmental enrichment also might be beneficial in metabolic lifestyle diseases.

The approach in this workshop will be based on an aquatic fitness programme, with the inclusion of kinetic, sensory cognitive and social challenges. We want to give the freedom to move in order to obtain the adaptations we need!

Exercise One:

STACKSET: building series of exercises (memory & execution): each exercise is 30 seconds of aerobic exercise, using the add on method to get the full sequence:

Exercise 1: jogging with high knees

Exercise 2: jumping jack

Repeat exercise 1 & 2, add

Exercise 3: cross country ski

Repeat exercise 1, 2 & 3, add

Exercise 4: walking with triceps pulls

Repeat exercise 1, 2, 3 & 4, add

Exercise 5: tuck jumps (jump with high knees up)

Repeat exercise 1, 2, 3, 4 & 5

If possible: when the execution of the move is done in proper alignment, add factor to increase the intensity (change work position, travel, work with longer levers...)

Exercise Two:

Jumping Jacks in different shapes: make an X shape, change the position of the feet, jump on one leg and try to find different options for that X shape. (problem solving) (add arms for higher intensity, add them also for higher concentration) (one leg: add hipflexion or extension, endo- exorotation hip, knee extended – flexed...)

Add travel and jump 5 times to the side; then stay in balance: the smaller you are, the higher is the rotation speed, so work against that to stay balanced. (different options) (add closing the eyes, look up to the sky, extend the posture to eg a tree pose from yoga...)

Arm patterns: from assisting to resisting arms: increase the intensity of travel! Also stay on the spot and go from combined moves (front back – side to side) to the start-stop principle (action reaction, Newton's law) push back and stay (water pushes you further! Inertia!)

Extra: cross country ski with different foot-positioning: only heels, only toes, inversion and eversion: rooting (awareness) on hard and soft landing, 'warm pools floor' ...

Exercise Three:

1 jumping jack, 9 tuck jumps → 2 jacks 8 jump → 3 jacks 7 jumps ... (competition!) (Can be done with different exercises)

Also possible: 1 kick right, 2 left, 3 right, 4 left, 5 right, 4 left, 3 right, 2 left, 1 right (and then repeat other side)

Write numbers (like a telephone number) with your good hand in the water, also do it with the wrong hand! The do it backwards, standing on one leg...

Perform cross country ski while spelling 'MEXICO'... then repeat, but switch one letter: M becomes N, E becomes F ... what do you feel? Slower move, bigger ROM (Range of Motion)

Exercise Four:

Two groups against each other: (form 2 lines) Participants have to walk on 'a imaginary cord', keep the balance (with or without using arms) (also possible: walk 3 in front, 2 back, 3 in front, 2 back...) (add two cords to adjust more stability moves) add arm patterns while working, walk with the kickboards and use them differently (on the head, one arm swinging...)

Extra turbulence is added with kick boards.

Partner work: use the kickboard as a seat, go toe ach other ands switch boards, or go around each other before going back in line...

EXTRA (not done) competition: pass the kick boards (or any other equipment) in one group tot he back of the group, run forward and repeat until everybody is done... (only pass it tot he right, or swithc passing right and left, under the legs...)

Exercise Five:

Secret handshake: run towards each other, give the secret handshake and then run backwards tot he line. Now repeat and add one move. Repeat and add a move that has to be legs... then repeat sequence and add a 'breathing' exercise... repeat several times!

No find another partner and exchange (show and tell) your handshake, find another one to siwthc (repeat 3 times) No go back to your original partner and do your original secret handshake (do you remember?) (aslo possible: do it backwards without talking!)

Exercise Five:

Circle: add running in circle and balance, holds hands and one has to go over and under the arms, add relaxation (any other person is supine), jump and have fun, open & close...

HERE IS THE TRICK: remember the 5 exercises done in part one? AIIIIII WE FORGOT! If not, switch them... what was number 3? And so on... THANK TO ALL PARTICIPANTS!