

## **Aqua HIIT for Obese and Elderly Populations**

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### **INTRODUCTION**

**High intensity interval training** (HIIT) is an organized exercise intervention designed to exhaust the cardiorespiratory system during short spurts of high intensity work followed by timed rest periods. Aquatic-based HIIT allows individuals with limitations, such as the obese and elderly, to reach a higher intensity during exercise with reduced risk of injury compared to exercising on land.

- **OBESITY:** BMI  $\geq 30$  kg/m<sup>2</sup>

Often experience accumulated stress on joints during exercise that increases the risk of musculoskeletal injuries.

*Why Aquatic HIIT?* Obesity is the number one risk factor for cardiovascular disease. HIIT alone challenges the cardiorespiratory system to its maximum limit for small spurts at a time creating a more tolerable training experience. Aquatic HIIT takes away the forces that gravity applies, relieving the joints from the stress that land-based exercise puts on the body.

- **ELDERLY:** 65+ years old

Often experience reductions in physical fitness including aerobic endurance, strength, and balance. Reduced strength is associated with a greater risk of injury and increased fall risk.

*Why Aquatic HIIT?* A key factor in increasing muscular strength is the intensity of effort. The water provides a safety net for this population so that a higher intensity can be reached. Continuous intense exercise creates a less tolerable training experience for an elderly individual. Therefore, interval training is recommended with this population when exercising at higher intensities.

### **EXERCISE RECOMMENDATIONS**

#### **Applications used for Aquatic HIIT**

- **Deep-Water Running:**

Interval Work: Rest Ratios

90s Work: 3min Active Recovery

15s Work: 30s Rest

40s-2min Work: 1-3min Active Recovery

- **Shallow-Water Aerobic Exercise:**

Interval Work: Rest Ratios

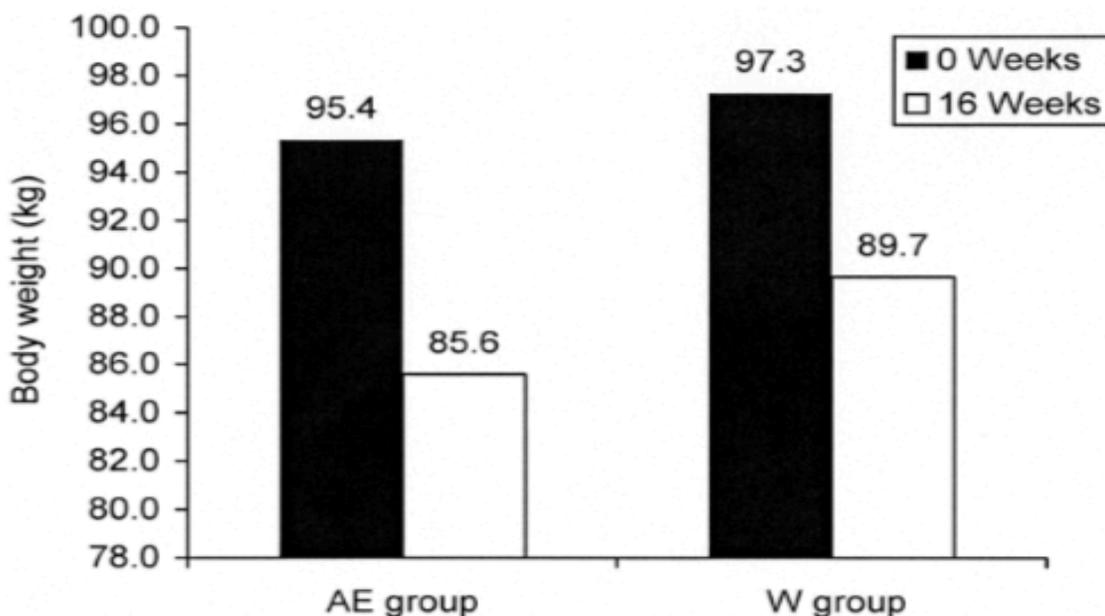
15s Work: 30s Rest

1min Work: 30s Rest

90s - 120s Work: 2min Active Recovery

**Results:**

Following a DWR + Aerobic Exercise Aquatic HIIT intervention, both obese and elderly populations were seen to show improvements in increasing  $VO_{2max}$  values, maximal ventilation, muscular strength and flexibility. In both populations BMI was decreased, but there was a greater decrease in abdominal obesity in the obese population. These improvements were noted regardless of interval scheme. Though when comparing deep- and shallow-water training, deep-water HIIT elicited lower body increases in strength.



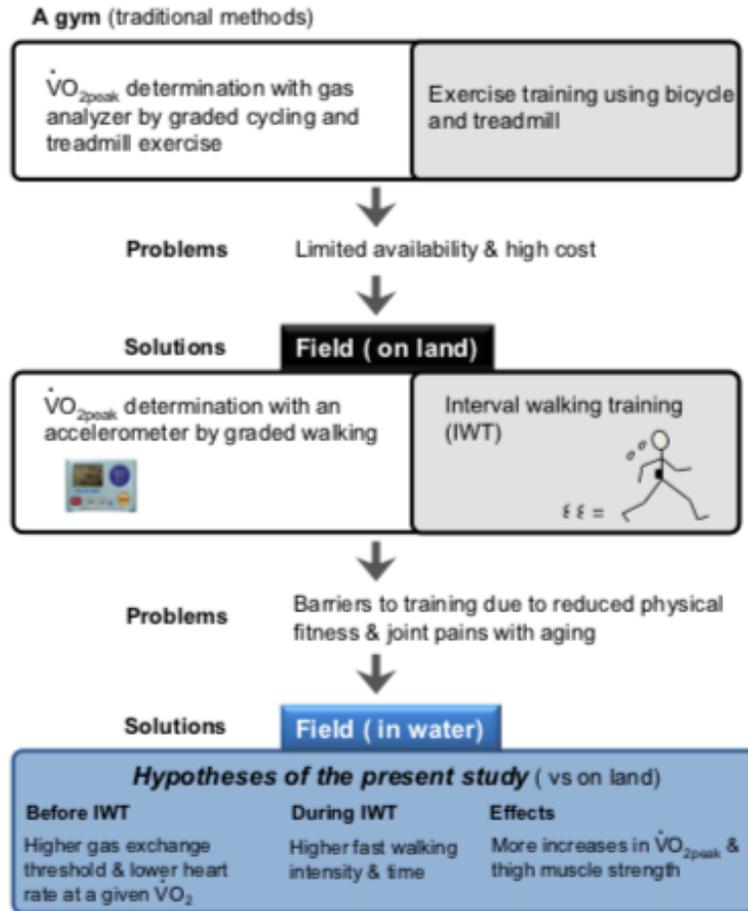
**Figure 1** — Changes in body weight from 0 to 16 weeks. AE = aquatic and walking exercise; W = walking only.

**CONCLUSION**

Exercising at higher intensities challenges the cardiorespiratory system, slowing aging and improving weight management. High intensity interval training (HIIT) allows obese individuals and the elderly to reach maximal effort for a short period, allowing for recovery during the rest periods while still receiving the benefits of high intensity exercise.

While exercising at a high intensity on land may be unsafe for some populations, such as the obese and elderly, Aquatic HIIT provides the same benefits of HIIT in a safer environment. These benefits, including positive health outcomes such as improved weight loss, cardiorespiratory fitness levels, and quality of life, were seen regardless of the interval scheme.

## Experimental strategy



## REFERENCES

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**SAMPLE WORKOUT**

High intensity interval training (HIIT) is an organized exercise intervention designed to stress the cardiorespiratory system during short spurts of high intensity work interspersed with timed rest periods. Aqua HIIT allows individuals with limitations, such as the obese and elderly populations, to reach a higher intensity of exercise with a reduced risk of injury.

**Warm-Up** (~ 8 minutes)

Aerobic exercises, increasing intensity from 50-85%, progressing 5% every minute.

- Jogging
- Jumping Jack
- Cross-Country Ski
- Rocking Horse
- Knees High
- Heels High
- Frog Jump
- Speed Skate

**Exercise Segment** (~ 45 minutes)

**\*WORK:REST\***

**8 Rounds (15s:30s) at 100% maximal effort**

|                      |
|----------------------|
| Cross-Country Ski x4 |
| Jumping Jack x4      |

**8 Rounds (15s:30s) at 100% maximal effort**

|               |
|---------------|
| Sprints x4    |
| Tuck Jumps x4 |

**8 Rounds (15s:30s) at 100% maximal effort**

|                           |
|---------------------------|
| Flutter Kick (level 3) x4 |
| Speed Skate x4            |

\*Exercises are alternated and rest periods are passive.  
\*Exercises are chosen to make the participants alternate through different planes of movement.

**3 Rounds (90s:2min) at 85-90% maximal effort**

|               |                                 |
|---------------|---------------------------------|
| Rocking Horse | Lateral Leg Raise (alternating) |
|---------------|---------------------------------|

**3 Rounds (90s:2min) at 85-90% maximal effort**

|          |                               |
|----------|-------------------------------|
| Pendulum | Front Leg Raise (alternating) |
|----------|-------------------------------|

**3 Rounds (90s:2min) at 85-90% maximal effort**

|                       |                |
|-----------------------|----------------|
| Tire Run (high knees) | Hamstring Curl |
|-----------------------|----------------|

Rest periods are active and performed at a reduced effort

**Cool-Down** Ai Chi (~ 8 minutes)

1. Contemplating
2. Floating
3. Uplifting
4. Enclosing
5. Folding
6. Soothing
7. Gathering
8. Freeing