Potential Benefits of Water Exercise for Muscular Dystrophy (MD) Participants

Vertical water exercise is different than swimming. Swimming requires specific propulsion skills performed in a horizontal position. Some participants may find the skills difficult and may never be able to swim well enough to feel comfortable, and have fun.

Vertical water exercise requires simpler skills and can mimic functional activities on land, which are familiar. Buoyancy provides support and multidimensional resistance offers neuromuscular challenges through movements that are simple to complex, functional patterns of movement or games that could transfer to land (9).

# Buoyancy & Resistance Tools

* Buoyancy supports active and passive range of motion of the limbs and minimizes fear of falling.
* Participants control their intensity on-demand, by changing speed. The harder participants push, the harder the water pushes back. Stop moving and participants can float for complete rest, as needed.
* Muscle contractions in water are primarily concentric, minimizing the discomfort and muscle damage attributed to eccentric contractions required for land activity.
* Resistance is multidimensional so participants can develop neuromuscular patterns of movement that mimic activities of daily living.
* Water reduces lower body impact, based on depth, for comfort, safety. For example, Masumoto *et al.* (2,3) measured muscle activation during land walking and compared it to shallow water walking. Muscle activation for water walking was lower for quadriceps, hamstrings, tibialis anterior, and gastocnemius when cardio intensity was matched (land and water). MD participants can train their cardiorespiratory system using lower muscular intensities than required during land-based walking.

# General Water Exercise Program Design

1- 5 months

Frequency: 3 days per week

Intensity: light enough to avoid muscle fatigue

Time: 15 to 20 minutes

Type: Cardio and muscular endurance, range of motion, and functional activities of daily living (ADL), including exercises for balance, coordination

6 months – 1 year and current

Frequency: 3 days per week

Intensity Light to moderate, at a level that avoids muscle fatigue

Time: 25 to 30 minutes\*

Type: Cardio and muscular endurance, range of motion, and functional ADL, including exercises for balance, coordination

\* 30-minute session began after 7 months and has continued over the past 3 years. More time may be spent in the pool when relaxation exercises are added after training.

# Range of Motion Land-Based Exercises

Since her childhood, a physiotherapist has treated Laura with the following exercises, which continued during her water fitness program and is currently part of her program today.

* Assisted active mobilization of the 4 limbs
* Passive mobilization of the 4 limbs
* Maintenance of the range of movement of the joints
* Movements to enhance abdominal respiration
* Exercises to stabilize the spine
* Stretching