

## Case Study: Aquatics, Intensity, and Bone Health

JM was a 25 year old male with cerebral palsy, classified as GMFCS Level 1 (hemiplegia). His height is 175.4 cm and his weight is 61.4 kg. His BMI is 20. JM works at a local restaurant, rolling silverware. He lives in a group home. He has diagnosed with attention deficit disorder, depression and seizures. He has a leg length discrepancy of 1 inch and has slight kyphoscoliosis. JM is independent for all activities of daily living (ADLs) but requires verbal cues to complete tasks. JM participated in a 12 -week aquatic resistive exercise program, 3 times per week for 45 minute sessions. JM's aquatic exercise program is outlined in the Table. Exercise dosing was gauged on 70% of maximum aquatic heartrate (AHR), which for JM was 120 bpm. JM had a one-on-one trainer and had 94% compliance in the aquatic resistive exercise program. His average AHR during exercise sessions increased from 73bpm at baseline, to 77 bpm toward the end of the study. He did reach his target AHR of 120 bpm inconsistently throughout the program and more frequently by the last 4 weeks of the program

Aquatic Exercise	Equipment	Time
Stretching hamstring (standing , using pool stairs) and quadriceps muscles(standing in waist deep water)	trainer	5 min.
Hamstring curl in standing	2 lb. ankle weight	5 min.
Flutter kicking in prone	Kickboard + flippers	5 min.
Hip Abd/Add in standing	2 lb ankle weights progressing to HydroTone Boots	5 min.
Hip extension in standing	2 lb ankle weights progressing to HydroTone Boots	5 min.
Walking forward, backward, sideways as fast as possible	2 lb. ankle wts progressing to HydroTone Boots	10 min.
Walking while pushing an upright kickboard in front	HydroTone Boots	3 min.
Running in deep end	Waist float + HydroTone Boots	7 min.

\*Program fluctuated with some “fun” activities built in such as shooting basketball while treading water in deep well; balancing in kneeling on kickboard; tossing ball back and forth with trainer; race running with trainer in shallow end and sculling in prone with snorkel, mask and flippers.

Over the course of the 12-week aquatic exercise program, his average recovery HR increased from 36 bpm at baseline, to 53 bpm by the last 4 weeks of the program. By the end of the 12-week aquatic exercise program: JM's baseline total body BMD increased by 3%; percent fat decreased by 18%, lean muscle mass increased by 4%, and strength in knee extensors, hip abductors, plantar flexors and DF increased by 21%, 29%, 45% , and 13% respectively; and VO2 Max increased by 36%.