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DEEP WATER RUNNING

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Deep water running is one alternative to maintaining cardiovascular endurance, mobility, strength, and flexibility while "resting" an injury. A 4-6 week period of inactivity will lead to a 14-16% reduction in VO2 Max. Literature has shown that deep water running can duplicate the sport specific of running and limit the reduction in VO2 Max to 5-7% during the same 4-6 week lay off while recovering from an injury. Deep water running (DWR), allows runners to put in miles without incurring the impact of land based training as the water's buoyancy virtually eliminates the effects of gravity. The depth of the water directly affects the amount of impact transferred through the musculoskeletal system. Moving deeper in the water decreases the impact for a given exercise while moving to the shallower end of the pool increases the load on the body.

DWR consists of simulated running in the deep end of the pool aided by a flotation device (vest or belt) that maintains the head above the water. Aquajogger belts may be obtained from many local sporting good stores or at www.aquajogger.com. The key to effective DWR is correct body alignment. Initially, as you adjust to the buoyancy, you may find yourself hunching over in the water. Use the following checklist to prevent poor alignment:

- Head up
- Chest lifted
- Shoulders positioned directly above hips
- Abdominals tight
- Buttocks squeezed together and slightly tucked under

Once proper body alignment is obtained, working on correct form is the next objective. The desired running form in water is almost identical to running form on land. Maintain vertical posture with your head tall and your chest lifted. Coordinate arm and leg movements as in running and:

- Push down with a flat foot as if you are stomping on grapes then lift your heel toward your buttocks as you cycle through
- Cup your hands and swing your arm from the shoulder in a relaxed, pendulum like action with the elbow about 3 inches out from your side
- Avoid hunching your shoulders, bending at the hips, or reaching out too far in front of the body with your lower leg

Exercise intensity is another important part in any DWR program and may be determined by heart rate and/or cadence. Because of the physiologic changes incurred while immersed in water, it is recommended that training be performed at heart rates 15-20 bpm lower than on land. In deep water running, the Brennan scale is used to determine proper intensity:

Rating of Perceived Exertion	Cycles Per Minute	Land Based Equivalent
1 Very Light	60	Light jog or recovery run
2 Light	60-70	Long steady run
3 Somewhat hard	70-80	10K road race pace
4 Hard	80-90	400-800m track speed
5 Very Hard	90+	100-200m track speed

In determining cadence, count the number of times the right knee comes forward and up in 30 seconds and double to determine the cycles per minute or cadence. In general, it is best to use heart rate during long runs and prolonged periods of exercise in the pool and cadence for interval sessions. Exercise sessions can gradually be progressed from deep water to chest level, which allows about 25% loading. Next, the sessions are moved to waist level which is about 50% loading. Finally, the belt is removed in waist level before returning to land based running.

A sample training week for a runner training for a marathon might be:

- Monday: Off
- Tuesday: Interval training of 6-8(3-5 min. at RPE of 4) with 1-2 min. rest
- Wednesday: Easy run of 30-60 min. at RPE of 1-2
- Thursday: Tempo run of 20-40 min. at RPE of 3 or 2X20 min. with 1-2 min. rest between intervals
- Friday: Off
- Saturday: Easy run of 30-60 min. at RPE of 1-2
- Sunday: Long run of 1-2 hours at RPE of 2-3