

# Cross-Training for Runners

Adding an alternative mode of exercise training can be a great way to increase aerobic capacity and running performance. Cross training is a concept that allows for higher volumes of training without overtraining specific tissues of the body. Repeatedly performing the same movement increases one's risk for overtraining and developing muscular imbalances. Cross training can assist in significantly boosting running performance by reducing running injuries, increasing running efficiency, increasing caloric expenditure, and even improving the body's ability to regulate temperature during training and racing. In contrast, if cross training is not executed properly, it may hurt performance or the runner themselves by increasing their vulnerability to injury or infection.

It has been shown that endurance activities, such as swimming or cycling, can increase training volume without increasing the recovery (duration) requirements of the muscles involved in running mechanics. These activities will strengthen the heart and improve endurance while the specific leg muscles used in running can rest and preserve glycogen stores (energy stores) for bouts of running. The cardiovascular exercise, regardless of the mode (e.g. cycling, swimming, aerobic class) will continue to train the heart and make beneficial adaptations without the increased risk of musculoskeletal injuries commonly seen with increased mileage.

Adaptations to the heart in response to endurance training cause an increase in the left ventricular chamber size

allowing the heart to pump more blood per beat (increased stroke volume). This increases the runner's capacity to deliver oxygen to all the body's cells including those cells involved with running. It will also lower the runner's resting and training heart rates. Changes in 5k running performance have been observed in (n = 10) runners who added intense interval cycling workouts three times per week to their running regiments. The results of the study revealed significant running improvements in just six weeks, with the average 5k time for the group improving from 18:16 to 17:48.



The greater volume of endurance training also results in a larger volume of plasma retained in the blood. This increased blood volume further enhances the capacity to deliver oxygen to working muscles. Additionally, the increased extracellular fluid associated with larger plasma volume can be used to help regulate body temperature during intense training by increasing the body's



evaporative cooling potential. The increased blood volume will also help preserve hydration during training and racing.

In addition to a runners' existing program, an extra couple workouts each week will burn additional calories if body fat is a consideration. When a runner lowers their body weight, running times will improve as long as the body fat levels are still within healthy levels. For example, a female runner who trims her body fat from 17.5% to 16% can reduce her 5k time by as much as one minute without any cardiovascular or biomechanical improvements as the total weight being moved is a factor of work.

An alternative form of cross training is weight training. When performed properly, lifting weights can improve muscle strength in the tissues used in running. This can make the runner more economic because they will be able to produce more force with reduced fiber

recruitment. Additionally, higher power output capabilities translate into faster paces for individuals with similar  $\text{VO}_2$  capacities.

Proper strength training can also reduce the risk of injury by focusing on muscles that are at risk of becoming imbalanced. For example, some runners have strong plantar flexors (gastrocnemius) and weak dorsi flexor muscles, which can lead to shin splints or an overuse-induced stress fracture. Strengthening the tibialis anterior by doing toe raises (dorsi-flexion) may counteract this strength imbalance, improve range of motion and reduce the risk of shin-splints. Similarly, weak quadricep muscles can lead to runners-knee due to a misalignment of the knee cap on the femur causing irritation and pain while running. Other common weaknesses in runners can be found in the abductor muscles (e.g. tensor fascia lata, and gluteals) which may cause iliotibial band syndrome (ITBS); a

syndrome which is associated with severe knee or hip pain along the lateral thigh. Strength training and stretching these muscles can be useful to prevent these common running injuries.

In contrast to the benefits of cross training, deleterious effects can also occur if not applied appropriately. It is interesting that the nature of cross training is a contradiction to one of the principles of exercise training – specificity. The Principle of Specificity simply states that for the body to improve in managing a particular stress it must be exposed to the specific stress (above what it is accustomed to). This suggests that one must perform exercise using the same mode, energy system (intensity), and movement pattern (muscles, joints, and velocity) as their sport. In this regard, cross training has proven detrimental in the past among some specialized athletes. For example, after winning the Tour De France, American cyclist Greg LeMond took up cross-country skiing in the off-season to rest his cycling muscles. Ultimately, he blamed this training on his lack of success on the next tour because he felt that the cross-country skiing made his upper body too large, less aerodynamic, and the excess muscular weight affected his hill climbing. This suggests that cross training is used as a complement to one's primary training mode, but should not dominate or replace it.

Other adverse events from cross training, particularly in runners, have been observed when added to a high-mileage or intense running program. The additional training reduces energy stores (glycogen) and recovery time leading to overtraining. Additionally, if a runner applies the same intensity and duration

as they are accustomed to with running to their cross training exercise without appropriate acclimation an injury may result due to overuse. For example, runners who perform their run training on the road during the winter months and switch to beach running in the summer run the risk of injury if they use the same distances and intensity without an acclimation process. This is analogous to any change in training mode where the runner attempts to cross over their running fitness into the new form of exercise.

Anyone who adds cross training or any alternative forms of training to their running program should be aware of the signs of overtraining listed below:

- Leg muscle or joint pain, soreness and aches
- Inability to maintain mileage or running pace
- Weight loss
- Loss of appetite
- Insomnia
- Headaches
- Restlessness
- Frequent thirst
- Increased susceptibility to colds and infections
- Rise in resting heart rate

If any of these symptoms exist, the athlete should decrease training volume and intensity and be sure to assist the body in recovery by: 1) getting sufficient sleep or taking naps, 2) eating frequent meals with higher amount of complex carbohydrates, 3) maintaining appropriate hydration status with water or glucose-electrolyte solutions, and 4) selecting foods that are nutrient dense, for example fruits and vegetables bright in color which contain antioxidants

which assist with tissue repair and boosting the immune system.

Exercise prescriptions should be analyzed for areas that may cause problems. This is particularly true when similar muscle groups are employed on a routine basis. Cross training, although designed to manage increased training volume may inadvertently cause overuse injuries. This is most common when similar muscles are used and similar intensities are employed without recovery balance. Likewise, new stimulus to already trained tissue may still cause overuse due to a poor acclimation process. Generally 7-12 doses of stress are required for the body to better manage the new stimulus. It does not necessarily have to be a new exercise as acclimation is important

whether that stress is a new force requirement, altitude, heat, cold or other.

In summary, cross training can be both effective and detrimental for runners. Keeping in mind the described precautions can help the runner avoid overtraining and injury while reaping the reported benefits associated with cross training. In addition to preventative strength training, cycling, basketball, soccer, swimming, stair climbing, and deep water running have all been shown as effective modes of cross training. If a runner selects one of these activities, starts slow, and progresses in the sport while maintaining or tapering their running mileage, they should see improvements in running and enjoy the change from their traditional routine.