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Overtraining Syndrome by Mark Jenkins

It is no secret among athletes that in order to improve performance you've got to work hard. However, hard training breaks you down and makes you weaker. It is rest that makes you stronger. Physiologic improvement in sports only occurs during the rest period following hard training. This adaptation is in response to maximal loading of the cardiovascular and muscular systems and is accomplished by improving efficiency of the heart, increasing capillaries in the muscles, and increasing glycogen stores and mitochondrial enzyme systems within the muscle cells. During recovery periods these systems build to greater levels to compensate for the stress that you have applied. The result is that you are now at a higher level of performance.

If sufficient rest is not included in a training program then regeneration cannot occur and performance plateaus. If this imbalance between excess training and inadequate rest persists then performance will decline.

Overtraining can best be defined as the state where the athlete has been repeatedly stressed by training to the point where rest is no longer adequate to allow for recovery. The "overtraining syndrome" is the name given to the collection of emotional, behavioral, and physical symptoms due to overtraining that has persisted for weeks to months. Athletes and coaches also know it as "burnout" or "staleness." This is different from the day to day variation in performance and post exercise tiredness that is common in conditioned athletes. Overtraining is marked by cumulative exhaustion that persists even after recovery periods.

The most common symptom is fatigue. This may limit workouts and may be present at rest. The athlete may also become moody, easily irritated, have altered sleep patterns, become depressed, or lose the competitive desire and enthusiasm for the sport. Some will report decreased appetite and weight loss. Physical symptoms include persistent muscular soreness, increased frequency of viral illnesses, and increased incidence of injuries.

There have been several clinical studies done on athletes with the overtraining syndrome. Exercise physiologic, psychological, and

biochemical laboratory testing have been done. Findings in these studies have shown decreased performance in exercise testing, decreased mood state, and, in some, increased cortisol levels -- the body's "stress" hormone. A decrease in testosterone, altered immune status, and an increase in muscular break down products have also been identified. Medically, the overtraining syndrome is classified as a neuro-endocrine disorder. The normal fine balance in the interaction between the autonomic nervous system and the hormonal system is disturbed and athletic "jet lag" results. The body now has a decreased ability to repair itself during rest. Heaping more workouts onto this unbalanced system only worsens the situation. Additional stress in the form of difficulties at work or personal life also contributes.

It appears that there are two forms of the syndrome. The sympathetic form is more common in sprint type sports and the parasympathetic form is more common in endurance sports. The results from various measurements taken during exercise physiologic testing differ between the two forms, but decreased overall performance and increased perceived fatigue are similar. In the parasympathetic form there may be a

lower heart rate for a given workload. Athletes training with a heart rate monitor may notice that they cannot sustain the workout at their usual "set point." Fatigue takes over and prematurely terminates the workout. Regulation of glucose can become altered and the athlete may experience symptoms of hypoglycemia during exercise.

I won't comment on all of the differences between the two forms, but one example is resting heart rate. In the sympathetic form, the resting heart rate is elevated. In the parasympathetic form, however, the resting heart rate is decreased. If this sounds confusing, then you are not alone. There is very little agreement in the literature about abnormal laboratory findings. Additionally, it is possible to have the overtraining syndrome, but have completely normal physical findings and biochemical tests. At this point, there is no single test that will confirm the presence of overtraining. The overtraining syndrome should be considered in any athlete who manifests symptoms of prolonged fatigue and performance that has leveled off or decreased. It is important to exclude any underlying illness that may be responsible for the fatigue.

The treatment for the overtraining syndrome

is rest. The longer the overtraining has occurred, the more rest required. Therefore, early detection is very important. If the overtraining has only occurred for a short period of time (e.g., 3 - 4 weeks) then interrupting training for 3 - 5 days is usually sufficient rest. After this, workouts can be resumed on an alternate day basis. The intensity of the training can be maintained but the total volume must be lower. It is important that the factors that lead to overtraining be identified and corrected. Otherwise, the overtraining syndrome is likely to recur. The alternate day recovery period is continued for a few weeks and then an increase in volume is permitted. In more severe cases, the training program may have to be interrupted for weeks, and it may take months to recover. An alternate form of exercise can be substituted to help prevent the exercise withdrawal syndrome.

All of the medical studies and advice on overtraining have involved single sport athletes. For triathletes and other multi-sport athletes the recovery process may be different depending on the circumstances. If it can be identified that the overtraining has occurred in only one discipline, then resting that discipline along with significant decreases in the other sports can bring about

full recovery. It is vitally important not to suddenly substitute more workouts in one sport in an attempt to compensate for rest in another. The athlete that does this will not heal the overtraining, but will drive him or herself deeper into a hole. Overtraining affects both peripheral and central mechanisms in the body. Resting from overtraining on the bicycle by swimming more will help a pair of fatigued quadriceps, but to the heart, pituitary, and adrenals, stress is stress.

As with almost everything else health related, prevention is the key. Well-balanced gradual increases in training are recommended. A training schedule design called periodisation varies the training load in cycles with built in mandatory rest phases. During the high workload phase, the athlete alternates between high intensity interval work and low intensity endurance work . This approach is used by a number of elite athletes in many sports.

A training log is the best method to monitor progress. In addition to keeping track of distance and intensity, the athlete can record the resting morning heart rate, weight, general health, how the workout felt, and levels of muscular soreness and fatigue. The

latter two can be scored on a 10 point scale. Significant, progressive changes in any of these parameters may signal overtraining. Avoiding monotonous training and maintaining adequate nutrition are other recommendations for prevention. Vigorous exercise during the incubation period of a viral illness may increase the duration and severity of that illness. Athletes who feel as if they are developing a cold should rest or reduce the training schedule for a few days.

In conclusion, the prevailing wisdom is that it is better to be undertrained than overtrained. Rest is a vital part of any athlete's training. There is considerable evidence that reduced training (same intensity, lower volume) for up to 21 days will not decrease performance. A well-planned training program involves as much art as science and should allow for flexibility. Early warning signs of overtraining should be heeded and schedule adjustments made accordingly. Smart training is the path to faster times and good health.

