Overreaching vs. Overtraining
Understanding the Difference

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Coaching Observation
“More performances are spoiled by slight overtraining than by slight lack of fitness.”

“An athlete who is 50% conditioned for an event will do better than an athlete who is 0.5% overtrained.”
-Bobby McGee

Understanding the difference between overreaching and overtraining are important considerations for the coach in the development and planning for their athletes. One can lead to optimal training advances, the other can lead to disaster.

Overtraining is the worst case scenario for the athlete, but it is the more easily defined of the two. Overtraining is a long-term effect that goes for weeks and possibly months and doesn’t seem to be reversible with normally scheduled recovery periods. Performance suffers chronically, which means the athlete may have to end the season because they are not able to recover from the effects of overtraining.

In contrast, overreaching is a smaller, less serious version of overtraining. It is a period where performance suffers, but typically only for a couple of days. The effect is expected because it is the result of several days of hard training. Overreaching is reversible after a normal, planned recovery ranging from a few days up to a week. The impact of overreaching is that it is a very necessary, positive aspect of training—particularly at the elite level. When working with elite athletes, one should remember that the body must be stressed in order for it to adapt, get stronger and ultimately perform better. The line between overreaching and overtraining becomes finer as the athlete advances along the developmental continuum. It is important to note that the amount of stress before adaptation that can occur is lessened for the beginning and recreational athlete.

OVERREACHING
-Short term (days)
-Reversible with recovery
-Positive training adaptation - necessary to improve performance especially at elite level.

OVERTRAINING
-Long term (weeks, months)
Characteristics of Normal Recovery

Recovery is essential in the overreaching process and overtraining avoidance. The recovery process is a highly individualized situation. This is especially true for the recreational or beginning level athlete who works 40-50 hours a week and the sport participation is not their job. This is where the coach plays a key role. Knowing the athlete’s recovery rates and how hard the athlete works on a given day helps the coach determine how much recovery to give the athlete before the next hard workout. The coach should be on the lookout for signs in the lack of both physical and psychological recovery. It might be the fact that the athlete is not able to successfully complete the initial stages of a hard work out. This is a good sign that the athlete is not recovered and not ready to complete the scheduled hard workout. If this early difficulty is observed, the coach can either end the workout or choose alternative activities that would be less stressful on the athlete. This will hopefully facilitate recovery so that the athlete can come back the next day and have a successful hard training session.

There are things that a coach can monitor, such as sleep, which can also give some insight to recovery or the quality of recovery that does not require blood work. These topics will be addressed in a future article. A lot of gauging recovery is intuitive by the coach. This stems from knowing their athlete well from a training/recovery perspective and being able to make the “no workout” or “reduced intensity workout” calls quickly. This takes discipline for the coach. If a workout is taken off the board, the coach must have the maturity and confidence to avoid feeling that the athlete has missed a quality workout and that it must be made up. The coach should avoid this thinking and realize that the athlete needs to recovery naturally and in their own time. It is accepting the idea that it is necessary to sometimes take one step backwards to move two steps forward.

Acute Overload and Overreaching

Table 1 illustrates the intensity, volume duration, frequency continuum and the relationship of acute overload and overreaching. The trick is to advance from acute overload (half full bucket) to achieve overreaching (full bucket), but avoid overtraining (tipping the bucket over). This table illustrates that training is a continuum with both positive and negative zones. The athlete should strive to keep their bucket at least half full without tipping it over. I liken the acute overload to today’s workout. The athlete has a structured, challenging workout (acute overload) which is designed on a micro (weekly) cycle to stress the body. If this acute overload is done correctly over several days, you have positive physiology adaptation and minor performance improvements. A track athlete does a workout of 10 x 400 meters at race pace with minimal recovery. That is a hard workout that is an acute overload bringing about positive physiological adaptations. The workout is designed to help the athlete run a faster competitive mile at some point in the future. If you take this further for several workouts that are similar but not back-to-back and with proper recovery, we now get into the part of the continuum that is overreaching. We may have several weeks of the 10 x 400 meters, but other workouts similar to it are designed to push the athlete to the overreach line, from positive adaptations to optimal physiological adaptations and performance. The key word is “optimal,” whether the athlete is at a beginning or elite, Olympic level. Trying to optimize training for optimal competitive results is the center of every coach-athlete relationship. The balance imposes physiological stress through workouts which are designed to allow stress without being overstressed or overtrained.

Seasonal Considerations

The next question or challenge is to apply this acute over- load and overreach model to the different training seasons, pre-off- and in-season. As the seasons change, the nature of training changes. Accomplishing acute overload is an easy task that anyone can write a workout or a week’s worth of workouts can accomplish. The challenge is that a season can last several months. The concepts of periodization and designing the systematic workout properly lead to the ultimate goal—having the athlete give their best performance at the most important competitions. This is more difficult than designing the single-week workouts.

Creating a workable, optimal season plan is difficult under any circumstance. The biggest challenge for the coach and athlete is to do it effectively the first year. This does not mean the first year will be disastrous, but a lot of things can happen as the coach and athlete learn about each other. The first year should serve as a blueprint for the coaches to understand what they can do with the long-range plans. This is in terms of how hard they push an athlete and when to rest an athlete in order to bring them to peak performance. A lot of coaches tell their athletes that the first year is a learning curve and that the athlete should hang in there for the year. But there is an exponential increase in that learning curve from year one to year two. The intuitive coach will look at what areas need improvement and design seasonal strategies. It is a huge challenge to take the athlete from one acute overload to several over a few weeks’ time which overlap with pre- and competitive seasons. It is best for the coach to err on the conservative side so that the results are positive, but not optimal. This leaves the athlete with a positive feeling. That will build trust in what the coach is doing. If 80% of the goals are met within the first year, this will be a great way to improve the blueprint without making drastic changes to the blueprint. That way, 90% of the goals can be achieved the next year. This is a great way to build a long and lasting relationship.

The athlete must realize that it is important to be mature and disciplined in the decision-making process. There should be that understanding between coach and athlete that this is a commitment. It will take some time. The analogy can be made that a husband and wife date a few years before the relationship is optimized. The same is true of an athlete.

Symptoms of Overtraining

Identifying overtraining is not a simple, quick fix where one thing will serve as a bull’s-eye to identify the condition. Overtraining is a complex picture that is changing by the year because of research with many gray areas. The more information for a coach, the more characteristics can be evaluated, determined and checked off. The coach will also be better able to make judgments as to whether an athlete has overreached or overtrained.

Performance Symptoms

-Consistent decrease in performance compared with:
  +earlier in the current season
  +at the same point in the previous season
-Prolonged recovery after WOs & competition
-Reduced toleration of training load - inability to complete WOs
-Decreased muscular strength
-Loss of coordination
-Deterioration of technical skills

This is an area where a coach can observe of great deal without the reliance of medical/laboratory testing and data. This is an area where the coach of the beginning athlete should focus on both the training and competitions as to how the athlete is responding. One can hope that the training is telltale enough to indicate problems before the athlete gets into the competitive environment. If a beginning-level athlete enters a competition in an overtrained state, their result may be poor and this novice will be dealt a psychological blow that will be difficult to get over. This creates doubts
with the coach, the program and whether the sport is for them. Watching the early performance of a workout can immediately tell the coach that the athlete is not ready for the work to come and can be adjusted accordingly. The coach can cut the workout short, change the intensity or send the athlete home. If this continues, it is a good indication that the athlete may be on the road to overtraining. If the coach acts with maturity and discipline, many overtraining situations can be avoided before they become serious. Performance symptoms are the first line of intervention indicators.

These early indicators occur even at the elite level. I have seen coaches here at the training center send athletes who have been ranked number one in the world home right after warm-up. If the athlete is not ready for the scheduled stress, the stress applied will do more harm than good. The coach can make the mature, disciplined decision to send the athlete home to let the body get the additional rest it needs. The stress will then be applied at a later date.

**Physiological Symptoms**
- Increased HR at rest, during submaximal exercise & recovery
- Increased O2 consumption during submaximal exercise
- Reduced maximal exercise capacity
- Decreased blood [HLA] during submaximal & maximal exercise
- Decrease in total body weight and body fat
- Poor sleep and chronic fatigue
- Loss of appetite and GI disturbances
- Muscle soreness
- Increased muscle & joint injury

One of the areas that a coach can explore rather easily is sleep. The athlete can be asked to chronicle not only how much sleep they get, but also the quality of that sleep. This can be easily done with a diary. Another area that can be evaluated rather simply is appetite and diet. All the other areas require a laboratory set-up to measure.

**Immunological Symptoms**
- Increased susceptibility to colds/flu/allergies
- Swelling of lymph glands
- Bacterial infection
- Abnormal WBC differential
  - (- lymphocytes, - eosinophils)
- Minor cuts heal slowly

These too require a laboratory set-up, and some are rather sophisticated. From my experience as a coach, the one area here that always pops up at the time of major competitions is illnesses such as colds and the flu. This is a time when athletes seem to be the most susceptible to these types of illnesses. Lifestyle changes such as contact with people during this delicate time can help reduce the chances of illness.

**Biochemical Symptoms**
- Reduced muscle glycogen concentration
- Elevated serum cortisol
- Decreased serum ferritin (Fe depletion)
- Mineral depletion
- Menstrual dysfunction (oligomenorrhea, amenorrhea)
- Decreased bone mineral density

These symptoms are based on objective blood tests or other fairly sophisticated tests. The menstrual dysfunction is one that a coach can monitor as long as the athletes are honest and candid. Blood chemistry can be a good investment for some intermediate and beginning-advanced athletes that is not overly expensive for the objective information that is obtained.

**Psychological Symptoms**
- General apathy and lethargy
- Lack of concentration
- Mood changes
- Decreased self-esteem
- Fear of competition
- Gives up when the going gets tough

A good sensitive and intuitive coach can pick on most of the items in this list. If the coach checks off five or six items on this list and three or four items on the performance list, then the coach should be aware that overtraining may be occurring. Adjustment must be made quickly. If the coach sees an athlete who is normally very competitive complaining and/or lethargic during warm up, this can be a huge red flag.

There is a distinction between fear of competition and anxiety that the coach should have a handle on. This is another intuitive scenario. Competition anxiety is something I would equate to putting on a game face. The athlete is serious, focused and anxious to get started. There is a challenge ahead, but the athlete is confident that s/he is ready to meet that challenge. The competition is tough, but the athlete is up for the competition because that is why they are an athlete—to compete and give it their best. The fear of competition is the “what-am-I-doing-here?” look or the “I-don’t-want-to-be-here” look. Body language is lethargic and the face is fearful—not the game face. Another indicator of fear is expressed verbally. The athlete makes excuses for poor results in advance of competition. The words “I can’t” come up frequently. This is an especially good indicator for athlete who otherwise is very positive.

More Information Please! Contact Randy at randy.wilber@usoc.org

Table 1 adapted from: Armstrong, LE, and JL VanHeest. The unknown mechanism of the overtraining syndrome: clues from depression and psychoneuroimmunology. Sports Medicine, 32: 185-209, 2002.