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LIFESTYLE

GETTING THE BALANCE RIGHT

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"If you do not consciously form good habits, you will unconsciously form bad ones."
- Anonymous

The life of a successful athlete revolves around structured training sessions, and coaches spend a lot of time planning the intricate details of every session.

The time between these sessions is also important; the ability to train again quickly, as well as to achieve improvements in performance, relies on getting the most recovery out of an athlete's down time.

The role that an athlete's lifestyle can have on their performance should never be underestimated, and a more structured approach to lifestyle factors may often be required. Sleep, rest, recovery and nutrition are obvious factors to be considered, but attention should also be paid to potential life stressors such as relationships with friends and family, as well as work and school.

Every athlete has natural ability; the ones at the top are blessed with a combination of ability and a strong work ethic. These men and women make constant lifestyle choices, with either positive or negative effects on their performance. Figure 1 outlines a number of factors that will influence an athlete's performance environment. The relationship between training and performance is well understood. However, other factors within the athlete's environment can have a significant impact on the athlete's ability to both train and perform.

This fact sheet will describe a number of these additional factors, such as exercise and health, sleep, rest and recovery, and self-monitoring. This doesn't mean this is all there is; part of the art of being a successful athlete is to balance and manage all of the various lifestyle issues to release your full potential (Egan, 2002).

EXERCISE AND HEALTH

The effect that exercise has on the immune system is generally positive. Moderate exercise results in a temporary boost in the body's production of macrophages (the cells that attack bacteria), while regular, consistent exercise can lead to substantial benefits in the health of the immune system over the long term. However, a heavy schedule of training and competition can lead to immune impairment in athletes. This is associated with an increased susceptibility to infections, particularly upper respiratory tract infections (URTI) such as colds (Gleeson, 2004).

If athletes are not careful, they may contract more illnesses than usual as a result of the effects of hard physical training on their immune systems. This is important, as even medically insignificant illnesses can have an effect on athletic performance.

During intense physical exertion, the body produces certain hormones that temporarily lower immunity (Venkatraman & Prendergast, 2002). The levels of these hormones (cortisol, adrenaline and noradrenaline) are increased acutely both during and after exercise, which causes temporary immunosuppression. This is characterised by a reduced function of the immune system and is a state in which the immune system defences have been suppressed, damaged, or weakened.

In an intense training regime, where exercise is repeated within a short period of time, the immune system may not have enough time to recover properly between sessions. Poor diet and psychological stress can also serve to make this hormonal response more severe. As a result sore throats and flu-like illnesses can be more common in athletes than in less active individuals (Nieman, 1997).

Cold or Flu?

While the common cold and influenza (flu) are both viral infections, flu is caused by a much more serious virus.

While a cold targets the nose and the upper part of the respiratory track, flu infects both the upper and/or lower

respiratory passages. This, of course, carries with it a greater risk of complication.

The principle difference between the symptoms of the cold and flu viruses is that a cold will rarely cause a fever, muscular pain or body aches. Cold symptoms are more likely to be confined to above the neck and are less likely to appear suddenly (Olympic Medical Institute, 2006).

Should I Exercise with a Cold?

An adult suffers, on average, two to three upper respiratory infections each year. Many athletes wonder if they should continue their training routine when they experience cold like symptoms, such as a stuffy/runny nose, or a sore throat.

While research is limited, most experts recommend that if your symptoms are from the neck up (e.g. nasal congestion from the common cold) and you don't have a fever, moderate exercise would be acceptable. Be sure to decrease the intensity of training, keep it comfortable and monitor how you feel during and after exercise. As your immune system is already taxed fighting an infection, additional stress could undermine recovery. Intensive exercise should be postponed until a few days after the symptoms have disappeared.

If symptoms point to the flu (e.g. fever, extreme tiredness or muscle aches) it is advisable to consult your doctor. It may be necessary to take a break from training for a few days, or possibly up to two weeks in extreme cases. When you are returning to exercise, gradually increase your workload to pre-illness levels.

Never attempt to "sweat out" a feverish illness with intense exercise. In some cases, exercising when sick can lead to a severely debilitating condition known as post-viral fatigue syndrome; also known as chronic fatigue syndrome (CFS).

This syndrome affects the central nervous system, immune system, and many other systems and organs. While difficult to diagnose, it is associated with severe mental and physical exhaustion which can be "unrelieved by rest", and is often worsened by even trivial exertion. Symptoms include weakness, increased fatigue, frequent infections and depression, and can persist for several months or even years.

Practical Guidelines to Lower Infection Risk

In order to lower the risk of immune suppression and sickness, athletes can follow these practical recommendations:

- Eat a well-balanced diet. Your immune system needs a wide variety of vitamins and minerals to work properly. Research has shown that athletes who exercise without sufficient carbohydrates experience a larger increase in the circulation of stress hormones than those who are well fuelled (Gleeson, 2004)
- Avoid rapid weight loss. Immune function is impaired by low calorie diets, fasting and other methods of achieving rapid loss of weight
- Always hydrate properly. Saliva contains components that protect against URTI. Saliva production falls during exercise, but can be maintained by a regular intake of fluids. Drinking at regular intervals and self-monitoring of urine colour is recommended
- Get plenty of sleep. Major disruption of sleeping habits (e.g. three hours less than normal) has been linked to suppression of the immune system
- Maintain good oral hygiene
- Try to keep life stress to a minimum
- Wear flip-flops in communal showers in order to avoid picking up infections
- Wash your hands often. This is often the best protection. Don't forget to wash under your fingernails
- Avoid putting your hands near your eyes, nose or mouth. Most bacteria and germs are spread from a surface to your hands, and then to your face, rather than by air as is commonly thought
- Never share drinking bottles with your teammates.

Finally, listen to your body. If you are less than 100% you will feel better and recover faster if you let yourself rest.

Summary

Based on current knowledge, there are a number of ways to maintain a healthy immune system. Eating a well-balanced diet, drinking plenty of fluids, keeping life stresses to a minimum, getting adequate sleep, training at the appropriate intensity levels and allowing enough time for recovery from exercise are all essential to a healthy training regime.

While some athletes have robust immune systems that can handle substantial training workloads, others may break down at much lower levels. Therefore, avoidance of illness requires striking an individual balance between all of the influencing factors we have mentioned.

REST/RECOVERY

Successful training must strike the right balance between physical exercise and recovery. It has been said that winning athletes are not those that train the hardest, but those who recover most effectively. An athlete's recovery programme is just as important as their training programme.

Recovery is defined as the process the athlete goes through to return the body to normal physiological function, the reduction of muscle soreness, the removal of psychological symptoms and reduction in fatigue (Madigan, 2005). A recovery strategy aim should be to reduce an athlete's lingering training fatigue and stress. Rest, or passive rest, refers to sleep and other activities such as relaxation techniques, listening to music, and generally switching off from the day's exertions and stress.

The Importance of Recovery

Elite athletes can be expected to engage in very demanding training twice or even three times a day. A structured recovery programme is essential, as each training session causes damage to the body, which must be repaired. Rest periods between training sessions allow the body's muscles to rebuild themselves, and without proper recovery the body will eventually break down. As athletes look for the leading edge, rest is frequently over looked in favour of increases in load, intensity and volume, doing serious damage to the athlete's body.

To maximise the potential for athletes to learn, adapt, and improve, it is important for them to begin any training session or event from a non-fatigued state. Without the necessary recovery it is very difficult for an athlete to maintain a high level of performance. A well designed recovery strategy can decrease fatigue, accelerate physiological regeneration and enhance the athlete's adaptation to the stress of exercise.

So what is the best Recovery Strategy?

Research overwhelmingly supports the benefits of an active cool-down, involving low intensity exercise, over passive (resting) recovery for the removal of lactic acid, a by-product of strenuous exercise (Coffey et al, 2004, Dodd et al, 1984). The relationship between active cool-down and subsequent performance, however, remains unclear.

Every athlete, from the once a week 5-a-side soccer player to the Olympic gold medallist, will be familiar with the feeling of discomfort associated with an acute bout of exercise. However, the myth that the pain and discomfort experienced in the days immediately after a tough training session, particularly at the beginning of the season, is as a result of a build-up in lactic acid is unfounded. An active cool-down will help with the elimination of lactate acid from the muscle within 1 to 2 hours following the end of exercise.

The reason for the discomfort experienced in the days following these training sessions is a phenomenon known as delayed onset muscle soreness (DOMS). Symptoms, which become progressively lessened from 24 to 48 hours after exercise may include tenderness to touch as well as a loss of range of motion, flexibility, force production, and mobility (Cheung et al, 2003). DOMS is caused by microscopic changes in the muscle and the body's response to this damage following unaccustomed exercise.

DOMS is most common at the beginning of the sporting season, or during the season when athletes are first introduced to certain activities. Eccentric exercise (lengthening of the muscle while maintaining contractile tension) increases the severity of DOMS.

There are a wide variety of activities and therapies used to help with recovery from training fatigue. As scientists have not researched many popular recovery techniques, coaches and athletes tend to rely on anecdotal information. Here we present two commonly used methods of recovery from exercise, along with the positive physiological effects they can have on recovery.

Contrast Temperature Water Immersion (CTW) - Ice Baths

Hot-and-cold (contrast temperature) water immersion is a method of recovery developed from the application of heat and cold in the treatment of acute injuries. It is widely used by many athletes and coaches, although there has been very little research into its effectiveness.

CTW immersion is thought to speed recovery through increasing the peripheral circulation. It does this by removing metabolic wastes and stimulating the nervous system, reducing post exercise oedema (swelling) and increasing blood flow to the muscle (Cochrane, 2004).

Immersion in cold water decreases skin and muscle temperature, resulting in a narrowing of the blood vessels (vasoconstriction), while immersion in hot water has the opposite effect (vasodilation). Alternating between short periods of hot and cold baths results in rapid alternation between vasoconstriction and vasodilation, resulting in a "pumping" action within the peripheral limbs. This "pumping" action is thought to increase muscle recovery, allowing an ever-increasing supply of nutrients into the working muscles and aiding in the elimination of metabolic by-products of exercise.

The protocols for CTW immersion have not been firmly established, but the following guidelines may help:

Temp'	Cold (12-15^{0}C)	Hot (37-43^{0}C)
Shower	10-30 seconds	1-2 minutes
Bath	30-60 seconds	2-3 minutes

Note: Alternate between hot and cold 3 times, always beginning with cold water immersion and finishing with hot water immersion.

The timing will depend on the method of application, with total immersion (bath) requiring a slightly longer application.

Temperatures either above or below these ranges will not provide any further benefit and should not be used. Athletes are advised not to spend longer than the prescribed time in the warm water, as it may offset the recovery benefits.

An interesting point that consistently emerges within the research on CTW is that the method provides the athlete with an enhanced psychological perception of recovery after exercise. This psychological benefit alone provides a considerable boost to the athlete's recovery.

Note: do not use CTW if you have a cold or flu, or have experienced a recent soft tissue injury within the last 48 to 72 hours.

Massage

Massage has been in use as a therapeutic method in most cultures since early civilisation. It has a long tradition of use in sport (Hemmings et al, 2000) both as an aid to physical performance and as a method of facilitating recovery (Cafarelli & Flint, 1992).

Massage is generally considered to enhance muscle recovery and reduce soreness after intense physical activity. It increases blood flow to the muscle and, in so doing, increases oxygen delivery to the tissue. This enhances healing, metabolite removal, and hastens the return to homeostasis (Hinds et al, 2004). Another perceived benefit is improvement in the stretching of tendons and connective tissue, as well as relief of muscle tension and spasm (Hemmings et al, 2000). This decreases the loss of muscle strength and function seen after intense exercise (Jonhagen et al, 2004).

The majority of this evidence is anecdotal, with laboratory based research being undecided on the physical benefits of massage (Robertson et al, 2004). However, the vast majority of research on the psychological effects of massage (decreased anxiety, increased relaxation) has concluded that massage produces positive effects on exercise recovery

(Weerapong, 2005). Since recovery from intense physical activity involves both physiological and psychological issues, massage is very useful as a method to aid in the athlete's recovery process.

Other Methods

While both CTW and massage are popular recovery therapies, other methods could also be considered, such as cross training, aqua-jogging and flexibility sessions. Cross-training can be viewed as any form of active rest, provided the work intensities are low and the exercises are different from those normally performed in training, while aqua-jogging consists of simulating running in deep water, aided by a floatation device that maintains the head above water. Aqua-jogging's primary advantage within recovery is that it eliminates the impact of body weight on the muscles, bones and joints.

Summary

Every training session should be viewed as an opportunity to maximise an athlete's potential. To give the athlete every chance of improving, it is necessary to start each session in a fatigue free state as much as possible. Recovery strategies help in this by reducing training fatigue and stress (Calder, 2006). Used in conjunction with an active cool-down and well planned nutrition and hydration strategies, these recovery strategies will provide additional benefits.

An important point to remember is that an effective recovery program must be customised to the individual. While certain requirements are common to all athletes, and can be offered in a team situation, most recovery activities are a matter of personal preference and depend on individual circumstances, including home and work life.

SLEEP

Sleep is a complex physiological process that scientists are only beginning to understand. We do know that when we are asleep, there is a clear alteration in the activity of the brain.

Much research has been done on the effect that sleep can have on the repair and regenerative process after exercise (Mougin et al, 1996, Mougin et al, 2001, Souissi, 2003). Despite this, sleep is still considered a very undervalued process within the athletic community. Considering we spend approximately one third of our life sleeping, it is surprising how little attention sleep gets within a conditioning programme.

Stages of Sleep

Sleep is made up of five recurring stages within a sleep cycle. Stages one to four are categorised as non-REM (NREM) sleep stages, with the fifth stage being the Rapid Eye Movement (REM) sleep stage.

Stage 1 (Drowsiness):

We drift in and out of sleep easily for five to ten minutes and can be easily awakened. During this stage the sleeping individual may experience the feeling of falling and jerk suddenly into wakefulness.

Stage 2 (Light Sleep):

This marks the beginning of actual sleep lasting 10 to 20 minutes. Most people are virtually blind and deaf to external stimuli. Heart rate slows and body temperature decreases as we prepare for deep sleep.

Stage 3 & 4 (Deep Sleep):

Sleep advances progressively deeper and the individual becomes difficult to arouse, the stage is characterised by no eye movement or muscle activity. Brain-waves produced during this stage have a slow frequency. Hence, this stage of sleep has also been categorised as slow-wave sleep.

REM sleep:

During REM sleep our breathing becomes more rapid and irregular and our eyes jerk in various directions. It is during this stage that we dream. The body's major voluntary muscle groups are paralysed. This is to prevent the body from acting out our dreams.

The average length of time for a complete sleep cycle is 90 to 110 minutes. The cycle of sleep stages is repeated four to six times a night. As cycles are repeated, the duration of stages three and four decreases while duration in the REM stage increases.

Stages three and four of the sleep cycle are critically important for athletes, since it is at this time during the sleep cycle when growth hormone (GH) is released from the anterior pituitary gland at the base of the brain (Mougin et al, 2001). GH stimulates muscle growth and repair, bone formation and fat burning, making it one of the key hormones that helps athletes recover from tough workouts, and ultimately enhances their performance. Studies show that lack of sleep and disturbed sleep patterns diminish GH release (Mougin et al, 2001), which can have a detrimental effect on recovery from exercise.

How Do I Know If I'm Not Getting Enough Sleep?

Some of the signs that indicate you are not getting enough sleep include:

- Inability to concentrate
- Moodiness, irritability or anxiety
- Difficulty waking up in the morning
- Falling asleep during work hours.

If you are not getting enough sleep you may enter into a condition referred to as sleep debt. If this happens you are not getting sufficient deep sleep. Deep sleep is the stage in the sleep cycle in which regeneration and repair occurs.

Sleep debt will cause the body to produce insufficient GH to adequately repair and regenerate the body from the workload imposed in the previous days training session. While it is possible to accumulate a "sleep debt", it is also possible to compensate for this "sleep debt" by sleeping more the following night or at the weekend.

How will this Affect Performance?

Sleep deprivation has been shown to reduce cardiovascular performance by 11% (Martin, 1981). It is possible to accumulate enough sleep debt in 10 to 12 days to significantly reduce athletic performance. For example, if an individual is busy in work or has exams and they only get six hours sleep a night when they require eight.

Smaller amounts of accumulated sleep debt may have a detrimental effect on mental functioning and emotions. When an individual is in a state of sleep deprivation, the rate of perceived exertion (RPE) during exercise is significantly higher, indicating that not only does time to exhaustion decrease after sleep deprivation, but also that exercise is perceived to be more difficult to the individual (Martin, 1981).

How Much Sleep do I Need?

The amount of sleep required will vary between individuals, but it is most likely to be between eight to ten hours. It is possible to calculate individual sleep requirements.

To do so it is necessary to stabilise your sleeping pattern for one week:

- Establish a consistent bedtime at which you feel drowsy and will be able to receive ten hours of uninterrupted sleep, i.e. 10pm to 8am
- Ensure that you go to bed within a half hour of this set time every night, i.e. before 10:30pm
- For the first few mornings, you may need an alarm to wake on time
- After a few nights, once sleep is repaid, you may even find that you wake up early, i.e. 7am
- In this case your required amount of sleep is nine hours, since you slept from 10pm to 7am
- It is possible to make adjustments to the schedule, but once you get eight and a half to nine and a half hours sleep, you should rarely experience sleep debt.

Quality Sleep and Napping

Quality sleep is an integral part of the recovery from intensive training. Quality sleep is determined by the amount of time you spend in the different stages of sleep. Or, in simpler terms, sleep quality refers to the amount of undisturbed sleep throughout the night.

If you have the time, don't be afraid to take a nap during the day. However, ensure that the nap isn't longer than 45 minutes, as anything longer may negatively affect both the night's sleep ahead and the body's natural rhythm of hormone release.

Sleeping Tips

If you experience poor sleep from time to time, some of the following sleeping tips may improve sleep quality:

- Avoid caffeine-containing drinks three to four hours before bedtime
- Don't train too late in the day, and ensure to take time to wind down before bedtime
- Avoid any strenuous activity 90 minutes before bedtime
- Avoid alcohol use in the hours before bedtime as, while it may help you fall asleep, it can lead to disturbed sleep later in the night
- Don't eat a large meal before going to bed as it won't be digested properly during the night, ensure you leave two to three hours after your main meal before bedtime
- Keep the bedroom well ventilated, quiet, dark and cool
- Go to bed when you are tired/sleepy, even if it is before your normal time
- If you are having trouble clearing thoughts from your head as you sleep, write a list of the things that are stressing you, before you go to bed; this may help to forget about them and allow you to "switch off"
- Invest in a good mattress and comfortable pillow; you will shift body position many times during the night so ensure that there is plenty of room to manoeuvre.