

the unexplained under performance syndrome

could an 'off day' actually be an indication of something more serious? This article takes a look at overtraining syndrome (OTS)

We've all heard of overtraining, also known as overtraining syndrome (OTS), staleness, chronic fatigue in athletes, sports fatigue syndrome and burnout.^{1,2}

OTS should not be confused with over-reaching which reflects a temporary deterioration in athletic performance or short-term fatigue.³ With sufficient rest, the over-reached athlete should recover and show improvement.² However if the intensity and duration of training are not reduced, this could lead to OTS. One of the main differences between over-reaching and OTS is in their recovery times. Recovery from over-reaching should take 2-3 weeks whilst OTS recovery could take several months.⁴

The exact aetiology of OTS is not fully understood and there is no universal tool to predict its occurrence before it is clinically diagnosed.⁴ A number of hypotheses have been proposed in an attempt to explain the condition of overtraining syndrome (OTS), however the underlying mechanism(s) remains unclear. Many researchers agree that it is related to a dramatic increase of, or sustained periods of, high volume and/or intensity of training/competition with insufficient time for recovery.² Yet, some would argue that looking at factors outside the specific training environment, such as relationships between the athlete and the coach, or personal relationships, are important as these could be a significant variable in OTS.^{1,5}

prevalence of OTS

The prevalence of OTS is difficult to estimate,⁵ hindered by unsystematic research with large variances in protocols from study to study.^{5,6} This has resulted in the very existence of overtraining being questioned.⁷ A round table discussion was held in 1999 at St. Catherine's College, Oxford, in an attempt to clarify the diagnostic criteria to be used in the future.¹ It was decided to redefine the syndrome as unexplained underperformance syndrome (UPS), defined as 'a persistent unexplained performance deficit (recognised and agreed by coach and athlete) despite two weeks of relative rest'. This was said to be a broad and all-inclusive definition which does not include over-reaching.

It is postulated that UPS is associated with suppressed immune function. This is associated with increased incidence and severity

of upper respiratory tract infections (URTIs). There have also been reports of intestinal upsets, slow wound healing and increased sensitivity to environmental and food allergens. Alteration in immune cell function has also been recorded, which includes suppressed neutrophil function, suppressed lymphocyte count and proliferation, suppressed natural killer cell count and activity and decreased serum, nasal and salivary immunoglobulins.^{8,2}

early markers of UPS

Impaired mood state and subjective complaints are consistently described as sensitive and early markers of UPS and these usually start well before a definitive drop in performance.³ Other signs and symptoms include the following:

physiological performance:

- decreased performance
- prolonged recovery
- decreased muscular strength
- loss of coordination
- chronic fatigue
- insomnia
- muscle soreness
- loss of appetite

psychological:

- depression
- general apathy
- emotional instability
- difficulty in concentrating
- fear of competition

immunological:

- increased susceptibility to illnesses
- allergies
- minor scratches heal slowly
- bacterial infection

biochemical:

- negative nitrogen balance
- depressed muscle glycogen concentration
- mineral depletion i.e. zinc, cobalt, aluminium, selenium, copper
- elevated cortisol
- low free testosterone

case study

A 41-year-old female professional dressage rider and trainer presented with the following:

Lethargy, apathy, loss of appetite as well as an intolerance to numerous foods, tiredness all day and especially after light exercise, anxiety, an inability to concentrate or make decisions, poor memory, palpitations, mood swings and a need to be left alone.

This was affecting her riding and as a result, she was unable to perform the simplest task with her horse, from maintaining her posture to signalling to her horse for him to perform a particular exercise.

She slept whenever she could and kept away from people, feeling unable and unwilling to socialise.

Her blood test showed nothing out of the ordinary and a past history of her training regime did not show any change in training volume with ample recovery time. Her diet history showed that she normally had an excellent appetite and ate a varied diet.

However, in the last 18 months she moved to a new property which needed to be completely renovated and also sold several of her horses and moved to a new stable. All three incidences were highly stressful, each was laden with problems and it appeared she may not have been adapting to the stress.

An Adrenal Stress Index (ASI) test was recommended to ascertain her levels of cortisol (see box). The results showed low noon cortisol levels whilst her afternoon levels dropped below the reference range. This is known as pre-exhaustion or pre-adrenal fatigue. This pattern indicates long-term stress which depletes the adrenal glands caused by an excess cortisol response⁽¹¹⁾.

After a six-week period, following a protocol of supplements to support the adrenal glands and help balance blood sugar levels, the subject regained her energy, appetite, mental concentration and memory. Her dressage training improved above her own expectations as she was able to multi-task and keep her concentration.

Athletes display different combinations of these symptoms with varying degrees of severity.^{9, 10, 4, 2}

Several factors contribute to UPS, including a sudden increase in training volume and/or intensity, heavy competition schedule, lack of periodisation, monotonous training programme, lack of programmed recovery and high self-reported stress levels regardless of whether they are directly related to training.⁵

Despite the fact that high cortisol has been recorded in some athletes with UPS, very little research is available on how to lower cortisol levels besides rest periods of several months.

Chronic secretions of cortisol need to be addressed as they can lead to the following:

1. A weakening of the immune system, making the athlete more prone to bacterial and viral infections.
2. A depletion of zinc and B6, which are needed to make hydrochloric acid (HCl) in the stomach.
3. An increase of fat in the abdominal area.
4. An increase in protein breakdown, leading to a loss of muscle tone.
5. An inability to heal wounds due to a depletion of zinc.
6. Increased sleep problems.

7. An inability to focus mentally as memory is impaired.

8. An increased possibility of insulin resistance which can lead to diabetes.

Although not all athletes with UPS will present with chronically high levels of cortisol, for those who do, a simple non-invasive saliva test can accurately reflect levels of cortisol. Clinical evidence shows a return to normal function in as little as six weeks or as long as nine months. Certainly more research is needed in this area but for the time being, for athletes showing signs of UPS and after excluding any form of disease or psychological problems, a simple saliva test may be worth considering. ^{fn}

the adrenal stress test

The adrenal stress test is quick, simple and highly reliable. Four saliva samples are collected at four specific times of the day. The vials are sent directly to the laboratory for analysis and results are ready within 5-7 days.

It is important for athletes, coaches and trainers to realise that although adrenal stress is a growing problem, it is not irreversible. Recognising the problem in its early stages will speed up the recovery process, allowing the athlete to resume normal training.

Interestingly, body workers such as massage therapists, osteopaths and physiotherapists may be the first to notice one of the signs of adrenal stress: loss of muscle tone. Assuming there hasn't been a change in training or any overt signs of any other medical condition or problem, it is hugely important for the nutritionist to get involved at this stage. Dealing with this problem correctly is the difference between the end of an athletic career or simply a learning lesson on the road to peak performance.

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