Over Training + fatigue

Read if you are prone to fatigue or you train hard regularly;

I remember discussing whether I was going to train one morning with Graham Rowntree, England front row legend and now coach with Georgia Rugby who I'm helping prepare for the RWC down in Japan. I said I don't think I'm going to train today, why? He asked. Too sore, I said. His face twisted into a grimace then a sneer. "You're not training cause you got DOMS"?… he was soooo disgusted (for the right reasons) I manned up and trained on and hard that same day.

Thinking back on it though all the books, articles, conversations I've had about over training, fatigue and so on. They all boil back down to one route cause. Train too hard on systems which have not yet fully recovered, for too long and you will induce either temporary or prolonged fatigue state. So simple – why do so many people get it wrong?

Summary for the busy reader;

- Balance training with recovery – monitor progression and nervous system using devices and logging systems
- Look after your protein synthesis – eat to repair and rebuild
- Support immune function and digestion where necessary use additional supplements to support intensive blocks of training
- Support normal inflammation – this is important especially at any age but also as we get older
- Support adrenal and CNS function with appropriate herbs and nutrients
- Ensure you are not deficient in any nutrients e.g. omega 3, B12, folate or Vitamin D deficiencies create poor function which can exacerbate fatigue
- Support brain and neural drive
- Eat the rainbow to support antioxidant systems
- Increase glutathione through foods and supplements
- If you are dropping fat watch for excessive calorie restriction for too long – shorter bursts are better
- Think about hermetic doses of everything you do – more on this below and in future posts – just enough, not too much

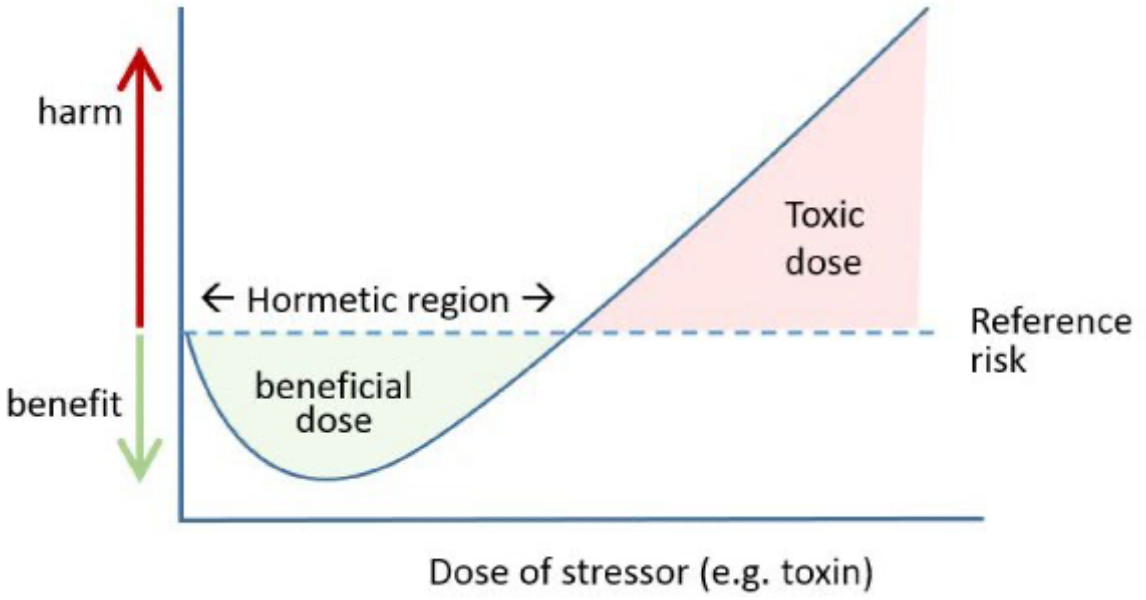
As we go through this aspect of health we can see how the systems all relate and cross paths as they do with most things in life. Oxidation increases inflammation, tissue damage also, the gut can become compromised during high heat and higher intensities of exercise – our neural drive has a finite capacity as does local or peripheral fatigue the loss of fuel. Keeping self-awareness makes sure we can regulate things properly cycling training types, recovery modalities and 'me time'. To ensure maximum health, performance and wellness.

STRESS

In order to improve you have to induce stress. The super compensation model is well understood. Pushing hard is what makes people stronger and better athletes, humans, people. We all need stress to survive, adapt and respond to our environment.

Training stress like other stressors induces similar effects on the nervous system. In addition to these effects, other systems can become disrupted and require rest and restoration to normalise and become more robust.

We need what's called a hormetic dose. Just enough, not too much. To allow benefits without destruction;



As with general fatigue states – which also apply to the over training model, many systems can become disrupted at once. Obviously, there's wear and tear involved in using the body, the drive to produce force and effort is central from the brain and nervous system. Stress hormones are released primarily from the adrenals and pituitary. The immune and digestive systems can become dysregulated from intensive training leading to suppressed function, leaky gut and IBS type symptoms.

Depression, listlessness and lack of drive often prevent with of course the tell tail signs of failure for sufficient adaptation. The thyroid will also generally slow as a secondary affect to adrenal insufficiency. All the while inflammation can become dysregulated and chronic. Of course, sleep patterns become disrupted – furthering a downward spiral.

Training too hard for too long without adequate replenishment and repair can also deplete essential nutrients, which then add to the total burden and symptom patterns listed above.

In general, unexplained fatigue states, occasionally a toxicity presents itself such as zinc toxicity which has all the same symptoms as adrenal insufficiency and OTS. All other factors which can present in CFS and fibromyalgia must also be considered. Mitochondrial function, particularly in the older athlete needs to be considered. Environmental contaminants and heavy metal toxicity, molds, plastics and toxin exposure also need to be checked for and ruled out.

Food intolerances can develop or are worsened and can increase or be the root cause of an energy depletion and afterward contribute to an over training situation. Lyme's disease cannot be forgotten about.

Mastering both the art of relaxation and the general optimum replenishment factors outlined above are essential items for both recreational and elite performers. Having read extensively on this subject, frequently borderline and occasionally gone in OTS myself and helped 100's of individuals and athletes recover from this state – I'm confident you will find ways to improve your recovery and prevent this happening to yourself or your clients, friends and loved ones.

Always remembering if you train too hard, too frequently without sufficient recovery you too could begin to present with the symptoms outlined above.

ROAD TO RECOVERY

Plan Training and Recovery Properly
Improve quality of dietary intake (see a nutritionist)
Fix Sleep
Monitor Recovery status and adaptive capacity
Maintain optimum energy balance, nutrient balance and protein balance for your goals
Support digestive function
Support brain function
Support inflammatory processes
Rule out ancillary cofactors
Monitor your stress load pay into your replenishment processes frequently
Practice techniques to maintain a positive emotional state

Want to know more? Read on for a more detailed breakdown into the theories of over training.

What is OTS? Or over training syndrome?

What are the risks? Theories of OTS and how to support these with diet, supplements and training plans.

This is an area I'm interested in as creating resilient athletes and individuals is a corner stone to creating success in life and in sports. Clearly there's a fine line between pushing yourself hard enough and knowing when to back off and rest and recover. Treading this line is really part of the secret of being a good coach, and part of what makes good teams and individuals into great teams.

Overtraining, staleness or burnout occurs when continuous training is carried out without sufficient recovery to the point where sporting performance decreases.

Typically, overtraining is associated with immune suppression, glycogen depletion, performance incompetence and negative impacts on mood. There is no specific physiological definite cause for overtraining, it may be associated with a multitude of factors.

OVEREACHING is a short-term problem and may be alleviated after a couple of days rest. It's sometimes called functional overreaching or FO for short.

CHRONIC OVERTRAINING SYNDROME is likely to take the sportsman/woman longer than a few days rest to recover. Sometimes referred to as non-functioning over reaching NFO

OVERTRAINING SYNDROME can affect a sportsman/woman for a long period of time and could take them months to correct (OTS for short).

There are a few theories of how OTS syndrome manifests itself and whilst one particular system might be out of balance and lead the way in terms of affecting the host, it's always a cause where all the systems will overlap in terms of contributing to symptoms. Let me give you some examples now of the systems which can become imbalanced;

ENERGY IMBALANCE

Glycogen 'system' this theory suggests in a glycogen depleted state we have an increase in oxidation, an increased breakdown of BCAAs from muscle tissue, increased production of stress hormones like cortisol and higher levels of 5HT (a pre cursor to serotonin which then makes us tired).

There's no doubt in my mind that prolonged training in a depleted state will lead to this type of OTS. Energy balance is a corner stone to remaining robust, competitive and well recovered. The solution here is to keep an eye on intake and expenditure making sure if you are running a deficit don't run it too hard for too long!

OXIDATIVE STRESS

The oxidative stress theory of OTS suggests that through excessive training an increase in reactive oxygen species overwhelms the bodies antioxidant defense mechanisms.
This increased oxidation increases inflammation which in turn increases muscle fatigue and slower recovery.

The solution of course is to increase compounds which support antioxidant enzyme systems whilst cycling training to avoid repeated stress on under-recovered areas.
Also training smart with shorter higher intensity sessions would seem sensible rather than plodding along for hours and hours or training the same muscles before they are fully recovered.

ADRENAL OR CNS DEPLETION

Of course, the central system can also become depleted which leads us to the CNS theory of OTS involving the ANS (autonomic nervous system) in this theory we become centrally fatigued and lose our ability to produce stress hormones in response to training or other stressors.

In the short term this involves displacement of BCAAs increasing 5HT uptake into the brain. Although this theory has been criticked.

In the longer term his involves adrenal hypofunction and dysregulation of the HPA (hypothalamus pituitary adrenal axis) which is how the brain talks to the adrenals. There's some contention around different types of nervous system OTS but some people suggest endurance leading to sympathetic burnout and weights / power leading to parasympathetic burnout. In both situations the answer is pretty simple and symptoms can cross over too, reduce volume whilst keeping intensity, increase rest days and use adaptogens. Plant based compounds which reboot the CNS.

INFLAMMATION

All types of training will increase inflammation. The cytokine theory of OTS focuses on this system imbalance as causing many of the problems associated with OTS. The Cytokine Theory of OT.

Adaptation through tissue healing and strengthening occurs via activation of local inflammatory response and recruitment of cytokines (part of the immune system which are usually pro-inflammatory). Overreaching and OT causes inflammation and stress. Stress increases cytokine levels.

Resting elevations in pro inflammatory cytokines (IL1b, IL-6) are a common symptom in overtraining, you can test these with blood tests. An increased pro inflammatory environment causes muscle wasting and is also associated with catabolic hormonal environments.

Increased cytokine levels may impact the brain negatively; crossing the blood brain barrier they have been associated with depression like symptoms, lethargy, sickness behaviour and withdrawal from social situations. This is sometimes called cytokine sickness.

HOWEVER, some Cytokines (like IL-10) are anti-inflammatory and may switch off the inflammatory response.

In summary;

- Inflammation becomes chronic with insufficient rest
- Lower glycogen maybe due to TNFa (a pro-inflammatory cytokine) reduction of Glut 4 receptors (which let glycogen into cells)
- Low glycogen = heavy legs & fatigue
- Tryptophan used for synthesis of inflammatory proteins
- Lower tryptophan = lower serotonin = depression
- Cytokine sickness; IL – 1b and TNFa act on brain, appetite, sleep and depression = cytokine sickness
- Cytokines increase ACTH which increases cortisol this leads to a reduction of testosterone levels

- OTS favours activation of cytokines which activate TH2 immune system response…….this can increase allergy based reactions and autoimmune disease

What can we do to combat inflammation and for over training in general

- Guard against deficiencies with a good quality multi vitamin
- Increase Fish oils and improve omega 3/6 ratio
- Increase all Herbs and spices
- Use ZMA, curcumin, boswellia for example R5's + Metabolic optimiser
- Use Resveratrol, quercetin
- Correct Vitamin D and Ca deficiency
- Boost Immune system with reishi and other medicinal mushrooms e.g. immune power
- Use AMPK supportive nutrients (see previous article)
- Use Adaptogens

Sleeping and chilling out should be part of who you are. The athletes and individuals who learn the art of relaxation are the ones who succeed.

Of course, the immune system will be impacted and suffer through OTS and FOT. A reduction and normalizing the oxidative stress and inflammatory pathways will help immune function, specific nutrients such as colostrum and probiotics may further support digestive health and immune system functioning during periods of high stress and higher intensity training.

How will you know if any of the things above are happening well there's a few cool little ways you can monitor and reflect on whether you've let the balance between training and recovery become compromised. Remember sometimes your set up with training and recovery it may be perfect, but a new stressor may arrive which you don't factor in and something will have to give to allow you sufficient time to shift into the parasympathetic recovery mode enough to you regenerate and repair properly.

I hope you found this useful – please do share with anyone you know with a fatigue state or an athlete or trainer prone to overreaching or over training.

Matt Lovell
www.mattlovellstrengthforlife.com