MONITORING TRAINING LOADS

– perspectives on illness risk

(Part 2)

TEXT BY **DR SIMON SOSTARIC** | PHOTOGRAPHY BY **SHUTTERSTOCK.COM**

To recap Part 1 in the previous edition, injury risk perspectives were highlighted, which included - the management of athlete loads; fundamental training and competition monitoring metrics; and internal/external objective measures that are relative to an athlete's specific biological capacity. The second part of this series presented here, highlights the key points associated with the characteristics of common illnesses affecting endurance athletes, and considerations for reducing the risk of developing training and competition induced illness. As with Part 1, the information provided here is in reference to recent consensus guidelines on training load effects on injury and illness, facilitated by the International Olympic Committee (Schwellnus et al, 2016).

CHARACTERISTICS OF ILLNESS AMONGST ATHLETES

Extended periods of either high intensity or high volume (or both) training and competition contribute to disturbances in immune function, which ultimately increase the risk of illness. Furthermore, incidental aspects associated with travel and daily life stressors also contribute to the risk of acquiring illnesses. Similar to the efficacy of injury surveys discussed in Part 1 of this series, athlete illness surveys provide insight into the characteristics and trends of illness incidence, severity and impact on health and performance outcomes. During the past 20 years, researchers and medical personnel have capitalised on the opportunity to survey a large number of world-class athletes at major events, such as the summer and winter Olympic Games; and numerous world championship events across multiple sports. For events or tournaments less than four weeks in duration (e.g. the Olympic Games), data suggests that 6-17% of competing athletes are likely to become ill, with a higher proportion of female athletes affected. Furthermore, 50% of reported illnesses during competition affect the upper respiratory tract (URT), followed by illness effects on the digestive system, skin, and other biological tissues. Athletes may also develop URT symptoms via exposure to allergens or less tolerable air conditions.

EFFECTS OF ILLNESS ON PERFORMANCE

The power of numbers is such, that most athletes will be affected by illness at some stage. Those who have been toiling away at their training for some years will typically develop a sensitivity to feeling the effects of something brewing inside - before the classic signs of illness fully materialise. Viruses, in particular, interact with multiple organ systems, therefore athletes may first feel the effects of training and competition performance impairment. Disturbances to immune function via propagating illness will then typically provoke a domino effect on decreased muscle strength, muscle wasting, impaired motor control, reduced oxygen uptake at submaximal and maximal exertion, altered metabolic function, and thermoregulatory impairment (further exacerbated in the presence of illness-induced fever and fluid loss). The investment of an athlete's time, effort, money and emotion to their sporting aspirations may also blur the boundaries of common sense when making decisions about what to do when illness affects an athlete just before or during competition. Therefore, athletes need to be aware of managing signs and symptoms with logic and best practice in mind, given that persevering with high physical demands with perturbations will increase the risk of developing more sinister outcomes.

SICK: Data found 50% of reported illnesses during competition affect the upper respiratory tract (URT).

MEASURING AND MONITORING IMMUNE FUNCTION

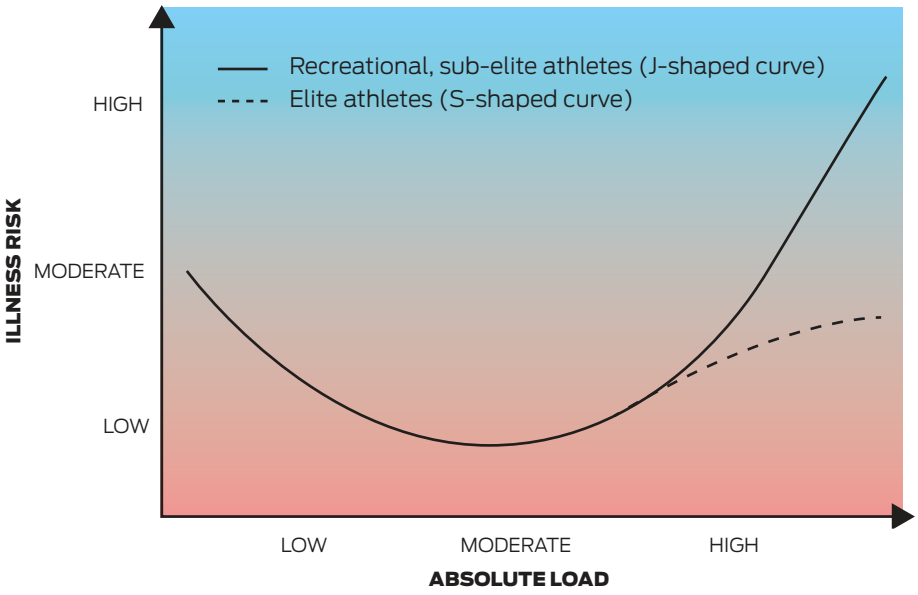
Athletes competing at an elite level often have access to monitoring programs facilitated by their sport's national high-performance organisation. Fortunately, there are also many private practitioners (sport and exercise physicians, exercise physiologists, sports scientists, sports psychologists and more) who provide performance-monitoring expertise to anyone who chooses to engage such services. Regular monitoring encompasses precision measurements to understand the effects of illness on performance, and instigate effective action plans. Moreover, regular monitoring provides important feedback on the nature of load-induced fatigue, and the subsequent necessity to make informed decisions about modifying training and competition loads; and managing the right balance of recovery or therapeutic intervention, while minimising the risk of physiological maladaptation.

It is important to note that there is no single measure or marker of athlete loading that can predict the onset of illness or overtraining syndrome. However, measuring and monitoring a cluster of internal (biological, physiological, psychological responses) and external (volume and intensity of training and competition, life events) loads, provides the practitioner with an understanding of an athlete's load capacity, and stimulus required to optimise adaptation and sustainability. Naturally, athletes have differing capacities to absorb training loads, therefore should be monitored individually rather than as a collective group.

One of the challenges with reliance on previous publications reporting illness trends is that data represents the time point when the athlete is affected by clinical signs and symptoms. Whereas it is always helpful for athletes and their support practitioners to predict the likelihood of an illness materialising, via less specific symptoms experienced during the prodromal period, which may typically include general fatigue; muscle and joint soreness; a headache and fever. Some or all of these symptoms may also be a sign of incomplete recovery or overtraining syndrome – in which case an illness may not materialise. The main point is that training modification is required in order to mitigate symptoms and prevent exacerbating either the magnitude of forthcoming illness or the extent of an overtraining period.

> *"Incidental aspects associated with travel and daily life stressors also contribute to the risk of acquiring illnesses."*
>
> — Simon Sostaric

PERFORMANCE



ABOVE: The relationship between load and risk of illness in recreational and sub-elite athletes (J-shaped curve) versus elite athletes (S-shaped curve).

OVER-REACHING AND OVERTRAINING

In the quest to understand boundaries of tolerable workloads, most athletes will be affected by a period of over-reaching at some. That is, a reasonably short (1-2 weeks) period of mild fatigue and performance decline, which is reversible with adequate rest and attention to detail in nutrition and sleep patterns. Without adequate consideration for training loads and recovery practices, those affected by an over-reaching period can quite easily develop an over-training syndrome (OTS), which presents as a more significant, chronic period of fatigue, biological disturbances, and maladaptation/ performance decline. Useful monitoring tools in order to prevent and/or better manage OTS include the regular recording of training loads, using questionnaires, psychological screening and direct observational methods. Practitioners who specialise in OTS also utilise specific diagnostic algorithms, which factor in internal and external measurables.

COMPETITION & TRAINING LOADS LINK WITH ILLNESS RISK

For the majority of athletes, absolute training loads and illness risk typically follow a "J" shaped curve. That is, low or no training is associated with increased illness risk, compared to moderate levels of training, whereas very high training loads increase illness risk. However, elite athletes tend to buck this trend and tolerate high training loads for extended periods, therefore not fitting to the classic "J" curve analogy.

There are very few studies that have examined the association between changes to training loads and illness risk. Increased volume in training increases illness risk in runners and swimmers, and a 10% increase in elite swimmer training load is associated with a 10% increased risk of developing URT symptoms. Furthermore, prolonged and strenuous efforts (such as ultra-distance events) quite often lead to a higher frequency of URT symptoms in the proceeding 1-2 weeks. Prevalence of non-training stressors, such as sleep deprivation or significant stress, also contribute to increased illness risk.

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CONSIDERATIONS FOR ATHLETES

- Long-term monitoring of training loads, including reliable external and internal metrics
- Seek establishment of baseline monitoring data when healthy
- Implement illness prevention strategy guidelines with your coach and practitioner/s
- Avoid significant increments (>10%) in training loads
- Minimise contact with virally infected people
- Hygiene mindfulness and practices (washing hands, sneezing into an elbow, use of insect replants, consistent sleep patterns, etc.)
- Minimise psychological stress
- Plan for adequate recovery during training blocks and following competition
- Listen and act upon early warnings to prevailing illness (sleep disturbances, persisting fatigue, aching muscles/ joints, diminishing performance) AT

References:

Schwellnus, M., et al (Br J Sports Med, 2016). How much is too much? (Part 2). International Olympic Committee consensus statement on load in sport and risk of illness.

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