The concept of under-training or training reversibility states that, while physical training results in adaptations that improve athletic performance, stopping or reducing training causes a reversal of these often hard-won adaptations, compromising athletic performance [3].

To get positive results from training, workouts need to create an overload of the athlete's system in order to promote the adaptation process; the training stimulus needs to be adequate. [1], [3]

In situations involving recreational athletes, this overload is not difficult to achieve, and in most cases any training proves to be beneficial.

The management of training load is critical for high-level athletes where performance gains are harder to achieve, and small percentage point improvements (or reductions) in performance are often the difference between winning and losing.

Anaerobic threshold and Training Intensity

The monitoring of training intensity requires the setting of thresholds that are relevant to a particular athlete.

The use of the Anaerobic Threshold as a marker of training intensity is well accepted in training circles.

Accurate methods typically require invasive, costly laboratory equipment, while simple heart rate-based methods have been shown to be unreliable.

The Anaerobic Threshold is also known to be closely related to the Ventilatory Threshold [2]. The Ventilatory Threshold has been shown to be characterized by a rapid increase in breathing rate during incremental exercise tests [3].

Typically, breathing rate measurement has required a mask-based breathing device to measure and monitor it. Some studies have looked at using spectral analysis of the R to R variation post VT; however this method is fraught with errors due to the high level of movement in maximal testing and does not provide live breathing rate data.

The Zephyr PSM System removes these restrictions.

Monitoring training intensity with the Zephyr PSM System

The Zephyr PSM Training (or Responder or Defense) system allows the measurement of breathing rate directly using Zephyr's patented breathing rate sensor in a smart-fabric chest strap. This capability allows coaches, trainers or sports physiologists to:

1. Detect VT, and hence AT during an incremental exercise test without a mask or gas analysis equipment.
2. Monitor AT non-invasively in real-time, during team based field activities using breathing rate, based on an athlete's known thresholds.

By monitoring an athlete in real-time, the Zephyr Team System enables a coach or trainer to monitor the workload of their athletes in relation to the goals of the current training session.

A coach can continually assess whether or not their athletes are working hard enough, based on their real-time physical intensity in relation to their anaerobic threshold.

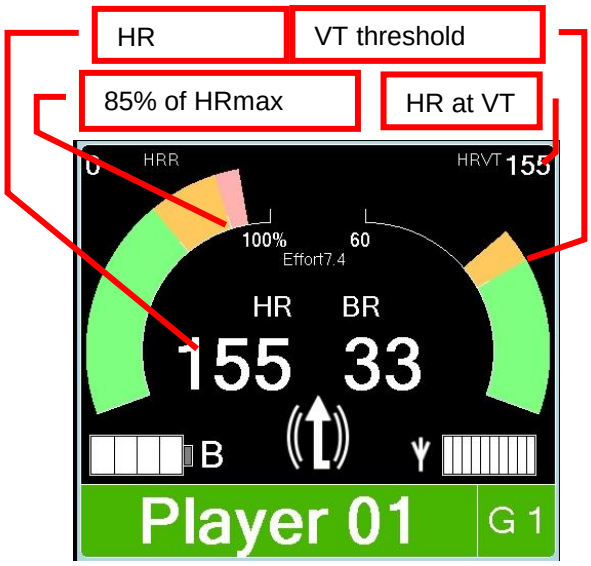

Fig. 1

Figure 1, for example, shows the OmniSense Live BioGauge for an athlete performing a pre-season interval training session.

The coach's goal is to increase his athletes' tolerance to anaerobic workload, as well as improve aspects of their strength and speed. He needs to make sure all of his athletes are working hard enough to achieve this.

Player 01 is clearly working above his anaerobic threshold, as shown by the orange and red segments on the HR and BR dials.

The threshold levels can be customized manually or automatically on request as part of previous VT test work done using the PSM OmniSense software.

Player 02 is working below his threshold. In this situation, the coach or trainer is able to assess the situation immediately, and provide appropriate motivation to Player 02.

This "control" over a player's workout provides value to a coach or trainer during both the pre-season and season-proper where the intensity of specific sessions is critical to achieving and maintaining performance throughout a season.

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