

## Heart Rate Variability - A vanity metric or the key to recovery

The balance and relationship between adaptation and recovery is a constant tug-of-war for any sports practitioner. In general, pre-season and the initial phase of competition provide the greatest windows to maximise physiological adaptation. Conversely, during periods of high load/competition seeking opportunities to enhance recovery and minimise fatigue/injury risk appears logical. The caveat to this latter approach is that during the season/pre-season this perspective may diminish positive physiological adaptations.

Navigating this push-pull relationship is highly individualistic, complex and necessitates an understanding of recovery status. The advent of wearable technology has enabled metrics such as HRV, and sleep performance to become accessible and a feasible surveillance method for establishing an individual's "response fingerprint". Knowledge of how to practically apply HRV can assist the prescription of adaptation/stress, and/or aid recovery guiding a cascade of events in order to maximise the training-performance process.

### What is HRV?

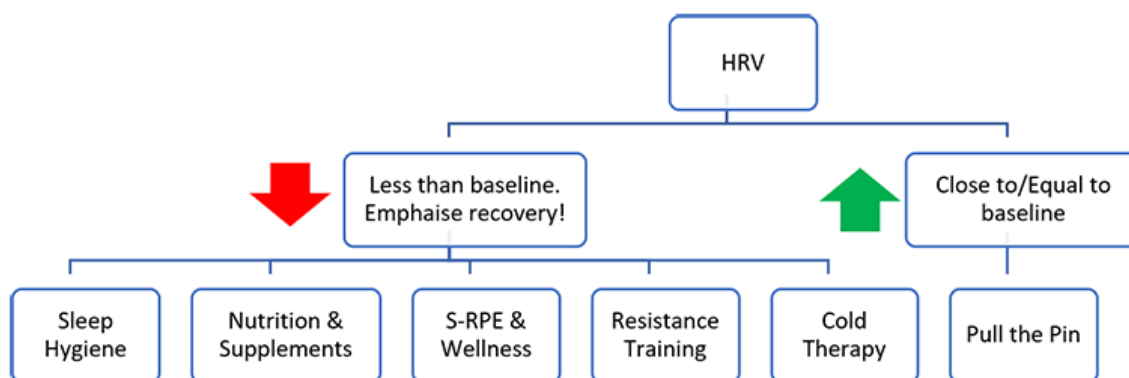
The heart has a natural rhythm that changes according to how the body is regulating itself and distributing energy. HRV is a measure of this rhythm mediated by an intricate balancing act between the parasympathetic (PNS) and sympathetic (SNS) nervous systems.

The PNS and SNS sit across a spectrum, whereby the PNS is dominant at rest and the SNS is active under periods of stress. Understanding how the body biases either the PNS or SNS are reflected by this association with either a more restorative (rest/digest/rebuild) or "fight or flight" state.

The HRV value itself is a measure of the PNS, a key marker of longevity and indicative of the body being in an anabolic, anti-inflammatory and resilient condition. Wearable technology (Polar, Apple, Whoop, Garmin etc.) has made accessing data and tracking HRV the 'cool kid' in the playground when it comes to pursuing performance/lifestyle wins. Greater variation in the heart rate pattern is characteristic of an improved HRV, and synonymous with structural and functional changes that occur as a result of improved aerobic capacity.

### Controlling the Controllable(s)

Competition and key stakeholders will undoubtedly mediate the decision-making processes when it comes to applying HRV data. Harnessing the controllable(s) therefore becomes crucial in the implementation of HRV data.



Low/lower than baseline HRV suggests methods should be utilised to enhance the recovery. The following areas can be considered:

1. Sleep hygiene – see article on “how to ensure a good night’s kip.”
2. Nutrition & Supplements - antioxidant intake is recommended to improve recovery and can be easily consumed through products such as CherryActive. Research has shown CherryActive to improve sleep patterns, decrease uric acid levels and reduce inflammation.
3. S-RPE & Wellness – ratings of perceived exertion have been used extensively and provide a standard measure for quantifying the extent of fatigue. Similarly, wellness questionnaires provide a valid and sensitive measure of mental and physical fatigue.
4. Resistance Training – evidence suggests enhancing the testosterone-cortisol ratio can promote a more favourable endocrinological environment enhancing recovery. A global increase in blood flow may improve metabolic clearance and as a result recovery. Generally, the tissues of the lower limbs experience the most neuromuscular fatigue and mechanical damage. The use of upper body resistance exercises during recovery-themed can bring together an amalgamation of both performance and recovery processes.
5. Cold therapy – the physiological response to cold therapies (cold water immersion, cryotherapy, localised cooling) vary according to the states of matter and laws of temperature transfer and thermodynamics. However, the consensus on the utilisation of cold therapy to facilitate recovery through the reduction of peripheral and deep tissue temperature and reducing blood flow.

High/Baseline HRV = pull the pin, indicative of being recovered, increase intensity chase adaptation.

BUT...

As with all measure’s, consistency is king. Using the same system is one variable that can be controlled, but with HRV being measured at random intervals (in most cases) standardising for a comparison with baseline state becomes difficult. In addition, HRV is a volatile metric sensitive to body position, breathing rate, stress etc.

Don’t neglect other more universal measures

1. Resting Heart Rate
2. Heart Rate Recovery – How quickly can we return to baseline following exertion?  
(use intra-exercise e.g., between intervals)

HRV has a place, understand it and remember it doesn't tell you WHY it gives you an indication of WHAT is happening. Find the WHY and stop shooting in the dark.