

## MONITORING RECOVERY DURING THE HIGH ALTITUDE TRAINING CAMP

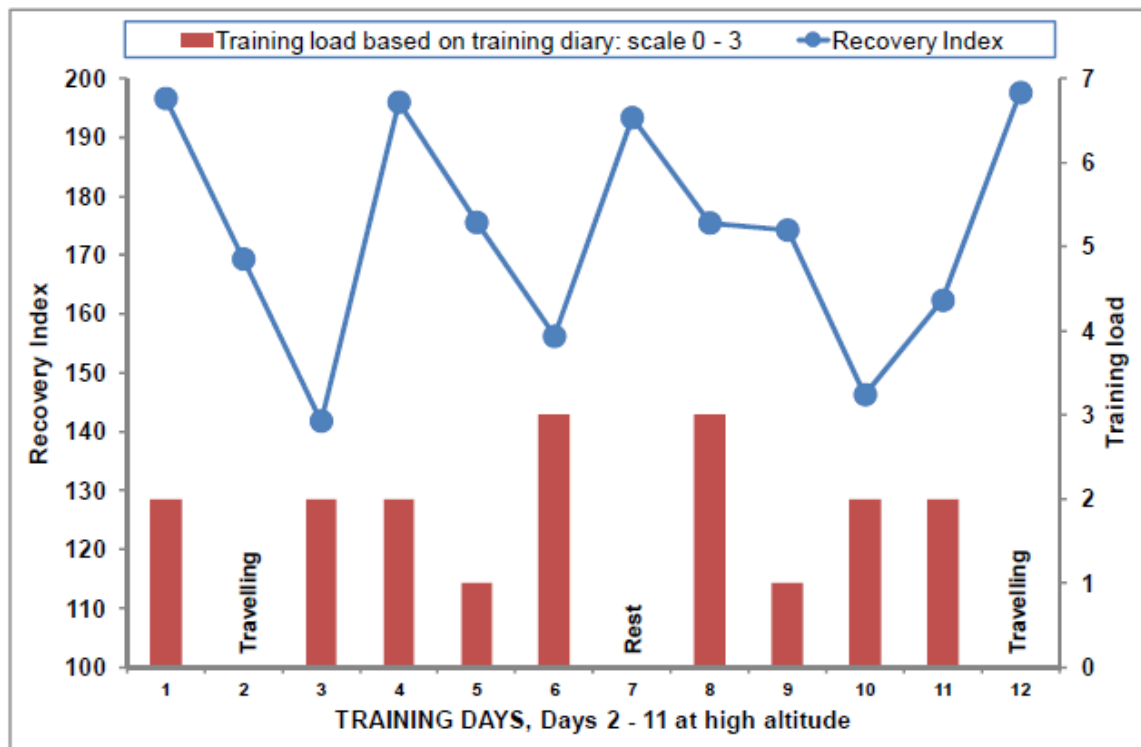
Altitude (hypoxic) training has been widely used in professional sports to improve the athletic performance or to pre-acclimatize to altitude before the key events. Whether it is acute training response in hypoxic chamber or prolonged periods in altitude, the hypoxia is always an additional stress factor to the body. The physiological research has proven the benefits of high altitude training, but there seem to be huge individual differences in responses and patterns that lead to desired improvements in performance. By monitoring the training responses and adaptations (recovery process) to altitude the coaches and athletes can find the individual pattern that provides the desired performance boost.

Firstbeat research partner, KIHU – Research Institute for Olympic Sports has been using the Firstbeat SPORTS software for years in high altitude projects conducted to Finnish national endurance teams. We interviewed the KIHU staff to summarize the key observations detected while working with the athletes in altitude.

**Acclimatization:** When going to high altitude, Recovery index (RI) decreases remarkably during the first 1-3 nights. Altitude and individual responses have effects on changes in RI, but the decrease can be even 50-70 units. The acclimatization normally takes 3-7 days and RI can return back to baseline again depending on the training conducted in high altitude. Athletes with more experience in altitude will adapt to altitude faster.

**Training in Altitude:** The body reacts similarly to the training in altitude as in sea level, but the changes are stronger. Recovery from the hard training takes longer in high altitude which should be kept in mind.

**Recovery from altitude training:** Returning back to sea level can also be considered as a stress factor where the body needs to adapt. Normally during the first week after the training camp RI index remains low due to training load in altitude and due to stress caused from travelling (and jetlag). Recovery after the hard training period is essentially important to monitor as training too early and too hard and will eventually lead for overtraining.



Example chart\* showing changes in recovery index and training during the high altitude training camp.

\* Reference: Mikkola J, & al. NOCTURNAL HEART RATE AND HEART RATE VARIABILITY BASED TRAINING LOAD MONITORING, A CASE STUDY OF AN ELITE JUNIOR XC SKIER DURING A GLACIER TRAINING CAMP. 2nd International Congress on Science and Nordic Skiing, 28 – 31 May, 2012, Vuokatti, Finland.

### Summary for using the recovery test in altitude training

- Measure your recovery baseline level before the camp
- Train easily during the first days in altitude following the principle “one stress factor at a time”. Acclimatization normally takes 3-7 days and recovery index returns close to baseline.
- While training in the altitude, recovery from the workouts takes longer. Pay special attention to recovery enhancing procedures (nutrition, hydration, naps, stretching/massage).
- The recovery index can drop even 100 units during the training camp
- Make sure your recovery returns close to baseline before starting a new training period. This takes normally 1-2 weeks.