The Importance of Recovery
(and the Perils of Over-training)
Overload

a planned systematic and progressive increase in training with the goal of improving performance.

(USOC/ACSM Consensus Statement, 1998)
Different Methods of Training

- No training adaptation and no change in performance

- No training adaptation and decreased performance

- Training adaptation and improved performance
Training

overload and optimal training zone
rest/recovery
over-training
Adaptation to Training

- Nutritional
- Physiological
- Neurological
- Psychological
Monitoring Training Load

- training volume
  - distance
  - time
- training intensity
  - heart rate
  - blood lactate
  - RPE

the athlete’s body
Training Load - Other Factors

- exercise capacity
- recovery potential
- nutritional status
- non-training stress
- stress tolerance
Training and the importance of recovery

- Recovery during training
- Pre-workout/race recovery
- Post-workout/race recovery
Recovery Strategy

**System**
- Nutritional
  - Principle: restore fluid & cell supplies
  - Technique: hydration w/ CHO after exercise
- Physiological
  - Principle: increase blood supply to cells
  - Technique: active recovery, stretching
- Neurological
  - Principle: promote muscle relaxation
  - Technique: active recovery, stretching, rest
- Psychological
  - Principle: promote psychological recovery
  - Technique: visualization, meditation, positive self-talk
Over-reaching

an accumulation of training and non-training stress resulting in short-term decrement in performance capacity with or without related physiological and psychological signs and symptoms in which restoration of performance capacity may take several days to several weeks. (Kreider, Fry, & O’Toole, 1998)
Over-reaching

Performance

undertraining

optimal training

short-term overtraining [over-reaching]

long-term overtraining (overtraining syndrome)

Training load
Over-training

An imbalance between training and recovery, exercise and exercise capacity, stress and stress tolerance. (Lehmann, Foster, & Keul, 1993)

Overstress that results in premature fatigue during exercise, decline in performance, mood changes, emotional instability, and decreased motivation. (Kuipers, 1996)

An accumulation of training and non-training stress resulting in long-term decrement in performance capacity with or without related physiological and psychological signs and symptoms in which restoration of performance capacity may take several weeks to several months. (Kreider, Fry, & O’Toole, 1998)
Over-reaching v. Over-training

“Over-reaching” is “short-term over-training.”

“Over-training” is the “long-term” form of overloading.
Symptoms associated with over-training

Categories of symptoms

- physical performance
- psychological / information processing
- immunological
- biochemical
Types of Over-training (Kuipers, 1996)

1. Mechanical
2. Metabolic
3. Sympathetic
4. Parasympathetic
Symptoms of Over-training

**Sympathetic Over-training**

- ↑ resting heart rate
- ↓ delayed post-exercise heart rate recovery
- ↑ resting blood pressure
- ↓ performance
easily fatigued
weight loss
poor (loss of) appetite, mental irritability, restlessness
disturbed sleep

**Parasympathetic Over-training**

- ↓ resting heart rate
- ↓ submaximal heart rate
- normal post-exercise heart rate recovery
- ↓ resting blood pressure
- ↓ plasma lactate
- ↓ performance
easily fatigued, lethargy
hypoglycemic after exercise
good appetite
depression,
normal sleep

Disturbed sleep
Treatment of Over-training

treatment depends on the type of overtraining
treatment depends on the cause of overtraining
decrease training volume
decrease training intensity
treatment includes
- sufficient rest and recovery
- high carbohydrate diet

*most significant thing is to*

*prevent over-training*
Prevention of Over-training

- develop well-balanced but flexible (individualized) training programs
- use field or lab performance tests at regular intervals
- emphasize appropriate dietary habits
- track athlete’s resting heart rate and body weight
- screening of athlete’s mood state (POMS)
- screening of athlete’s muscle complaints
- consider non-training stressors
Discussion?
Comments?
Q & A

Thank You