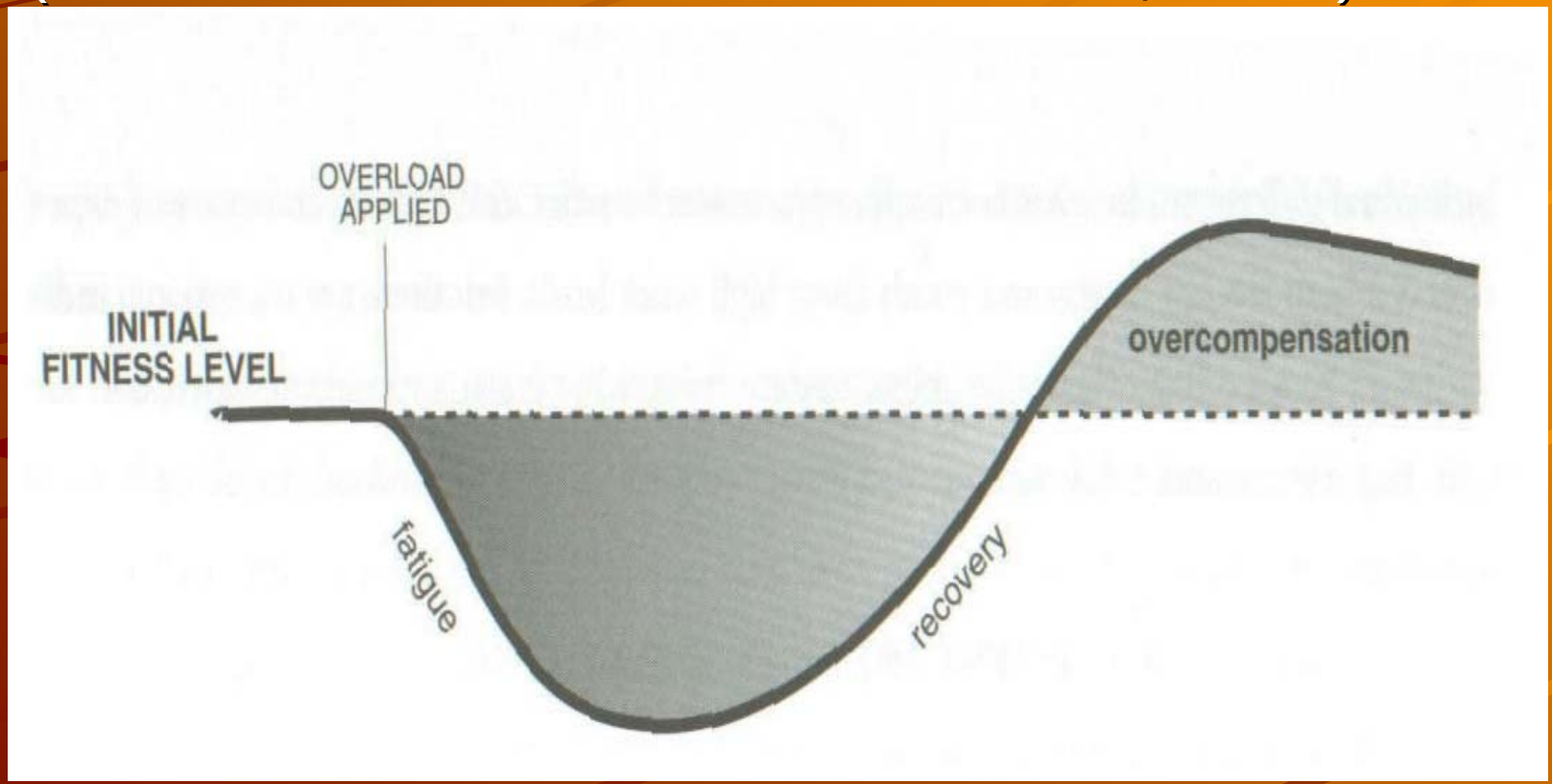
The Importance of Recovery
(and the Perils of Over-training)

FURMAN INSTITUTE OF RUNNING & SCIENTIFIC TRAINING FIRST

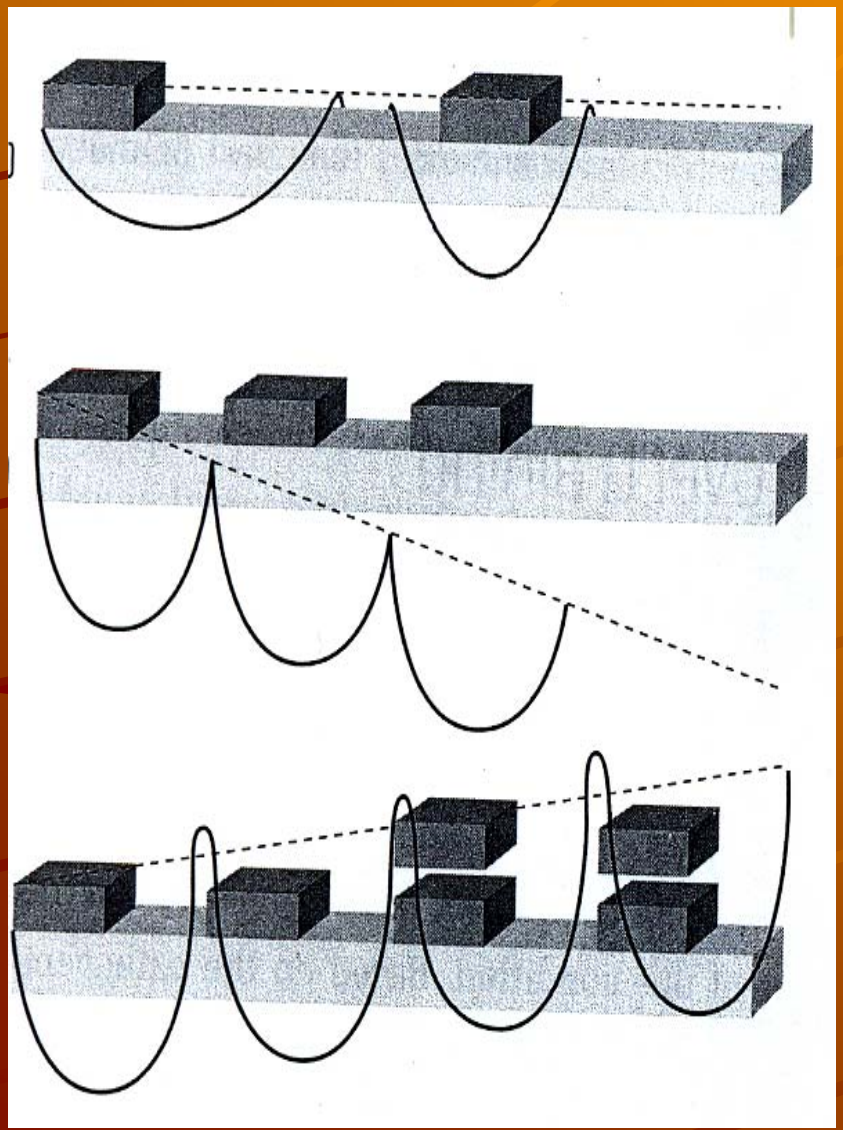
Overload

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

(USOC/ACSM Consensus Statement, 1998)



Different Methods of Training



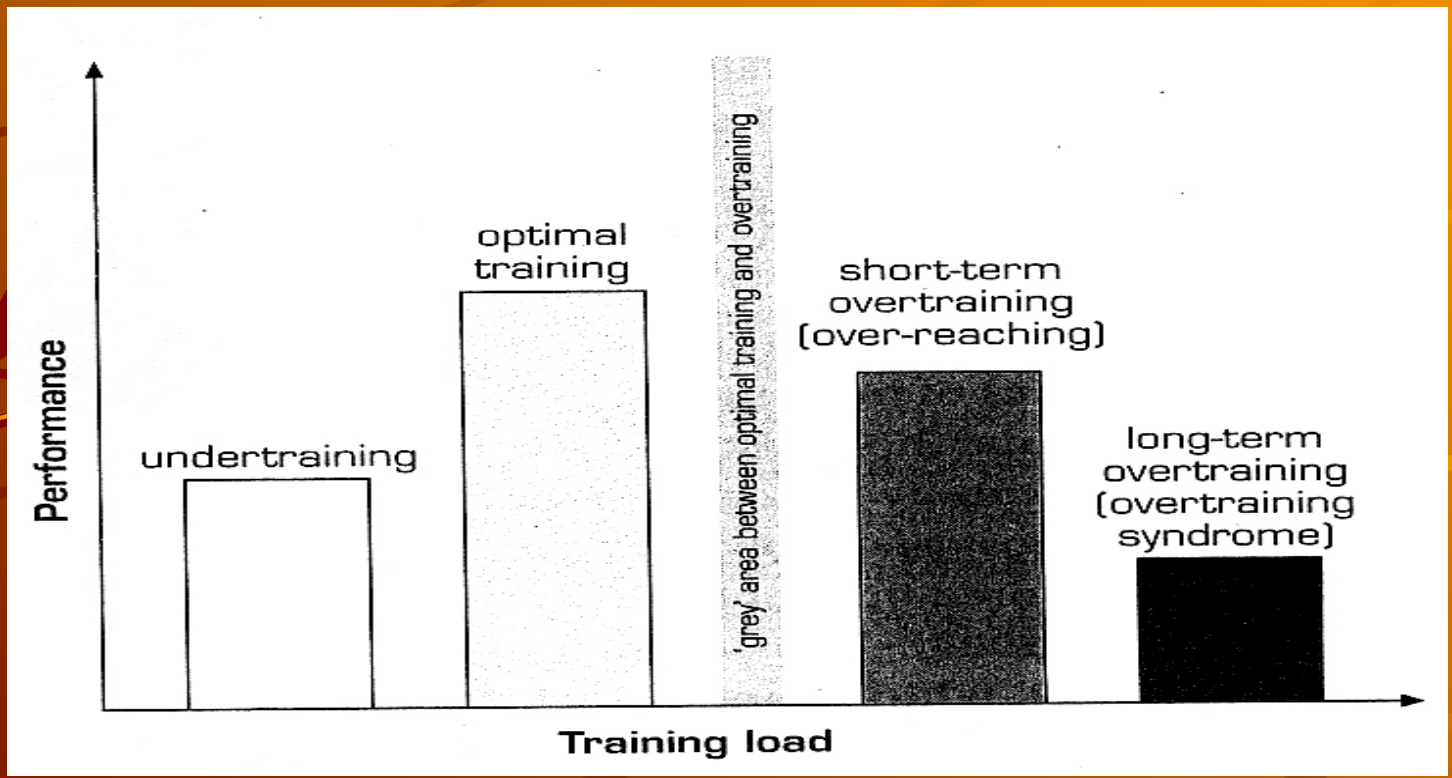
- No training adaptation and no change in performance
- No training adaptation and decreased performance
- Training adaptation and improved performance

Training

overload and optimal training zone

rest/recovery

over-training

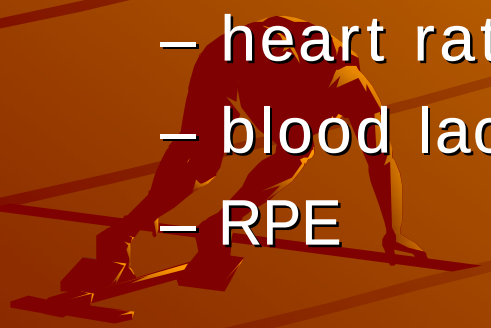


Adaptation to Training

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

Basic Law of Training

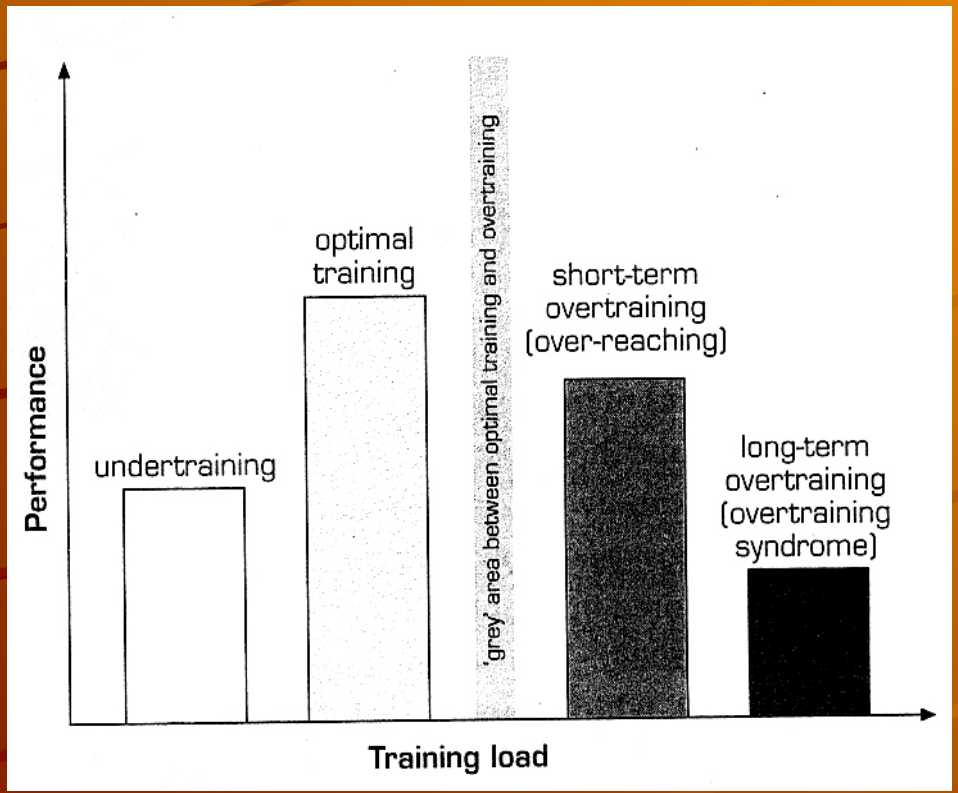
Optimal Training **STRESS** + Optimal Training **REST** + Optimal **NUTRITION**

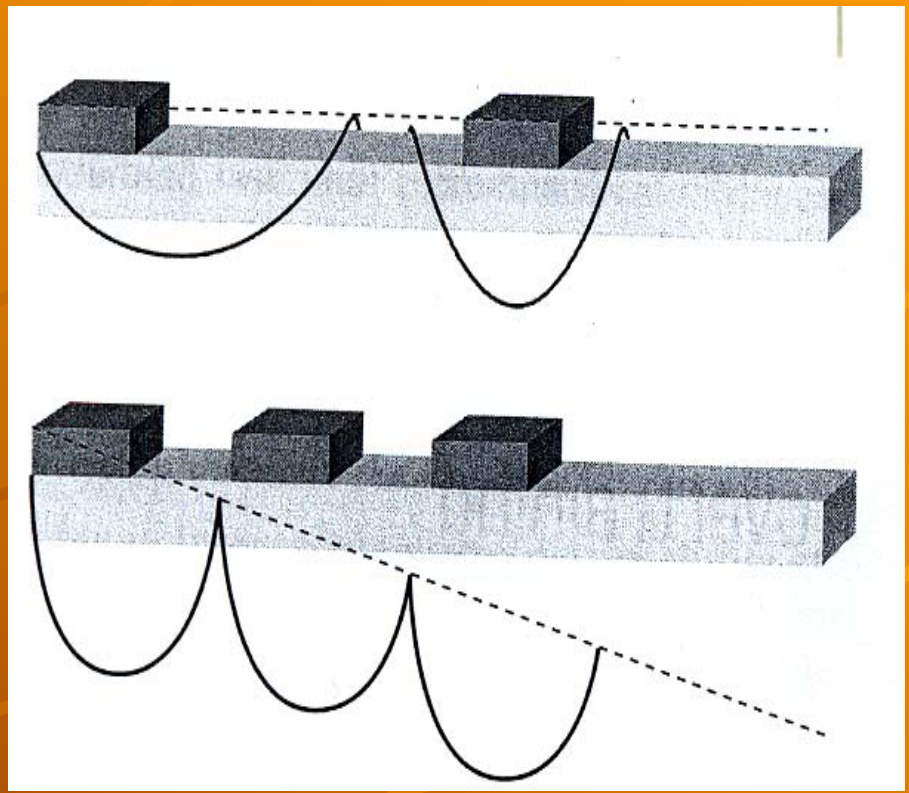
= Optimal Training **PROGRESS**

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





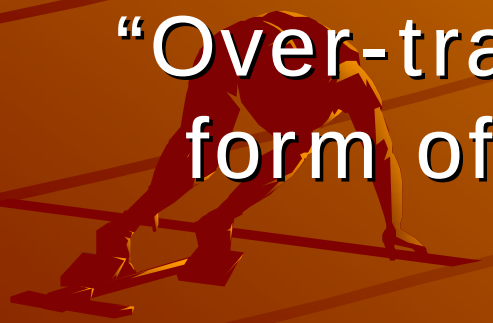
Over-training

- 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

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

FIRST

Discussion ?

Comments ?

Q & A

Thank You