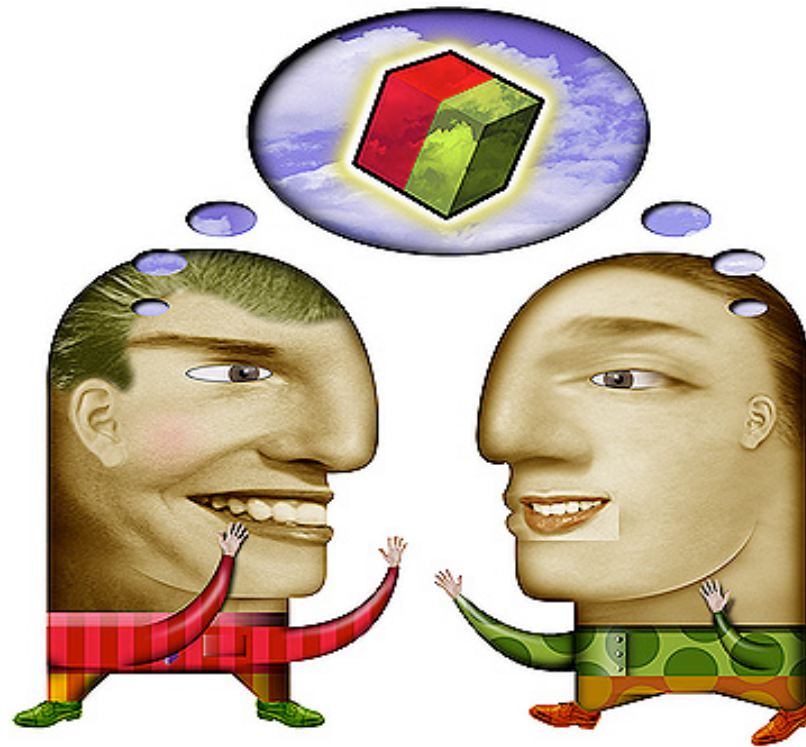


# What is the BEST Way to Train The Anaerobic Energy Systems?



● **Anaerobic Metabolic Conditioning:  
● A Brief Review of Theory, Strategy  
● and Practical Application**

● Steven Scott Plisk

● *Dartmouth College, Alumni Gymnasium, HB 6083, Hanover, New Hampshire 03755*

● Journal of Applied Sport Science  
● Research, 5(1), 22-34, 1991

● **Program Design**  
●



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● Intensity of exercise is  
● the primary stimulus for  
● anaerobic conditioning.



# Intensity



- ◆ Moderate to Near maximal to Maximal
- ◆ Always balance quality of exercise with sufficient intensity

Plisk, S.S. (1991). Anaerobic metabolic conditioning: A brief review of theory, strategy, and practical application. *Journal of Applied Sport Science Research*, 5(1), 22-34.

# Intensity



## ◆ SPECIAL NOTE

- ★ Heart Rate (HR) is a poor predictor of exercise intensity during anaerobic training
- ★ Activation of sympathetic nervous system disproportionately elevates HR

Plisk, S.S. (1991). Anaerobic metabolic conditioning: A brief review of theory, strategy, and practical application. *Journal of Applied Sport Science Research*, 5(1), 22-34.

# Exercise Bout Options

- ◆ In sets of repetitions
- ◆ Intervals or sprints performed intermittently (active or passive rest)
- ◆ Multiple-sequence exercises (circuits), particularly for health/fitness

Plisk, S.S. (1991). Anaerobic metabolic conditioning: A brief review of theory, strategy, and practical application. *Journal of Applied Sport Science Research*, 5(1), 22-34.

# Sets and Recovery

- ◆ Usually 15 to 90-second bouts
- ◆ Can last as long as 120 seconds
- ◆ Relief of 2 to 3 minutes (**active recovery is best**) between repeated sets
- ◆ **Phosphocreatine resynthesis takes up to 3 minutes post exercise**
- ◆ **Plisk suggests a minimum of 2 min recovery**

Plisk, S.S. (1991). Anaerobic metabolic conditioning: A brief review of theory, strategy, and practical application. *Journal of Applied Sport Science Research*, 5(1), 22-34.

# Frequency

- ◆ Two to three times per week for fit persons
  - ★ Based on timeline for glycogen repletion

Plisk, S.S. (1991). Anaerobic metabolic conditioning: A brief review of theory, strategy, and practical application. *Journal of Applied Sport Science Research*, 5(1), 22-34.



# Anaerobic Progressive Overload

- ◆ Anaerobic-type conditioning is best trained by increasing **intensity or speed (not duration)**
  - ★ Extending duration of bouts leads to poor exercise technique and longer recovery



Plisk, S.S. (1991). Anaerobic metabolic conditioning: A brief review of theory, strategy, and practical application. *Journal of Applied Sport Science Research*, 5(1), 22-34.

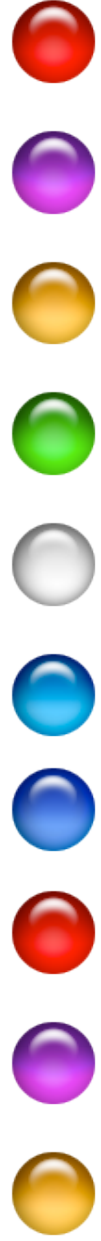
# Anaerobic Conditioning Recovery Idea



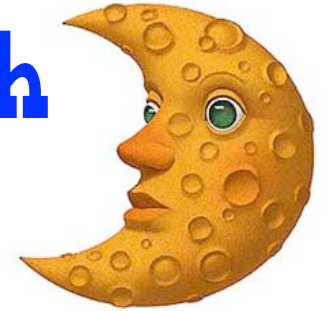
## ◆ SPECIAL NOTE

★ Exercise recovery by heart rate (HR): allow HR to recover to 120 to 140 bpm (before next bout)

Plisk, S.S. (1991). Anaerobic metabolic conditioning: A brief review of theory, strategy, and practical application. *Journal of Applied Sport Science Research*, 5(1), 22-34.



**2nd Special Note: Athletes with  
higher aerobic capacity  
resynthesize phosphocreatine more  
effectively,**



Bishop, et al. (2011). Repeated-sprint ability-part II: Recommendations for training, Sports Medicine, 41(9) 741-756.



**2nd Special Note: Athletes with higher aerobic capacity resynthesize phosphocreatine more effectively, thus emphasizing a unique benefit of aerobic exercise to improve anaerobic performance!**



Bishop, et al. (2011). Repeated-sprint ability-part II: Recommendations for training, Sports Medicine, 41(9) 741-756.

# Value of Resistance Training

- ★ Improvements in muscular strength and power often elicit increased anaerobic performance

Plisk, S.S. (1991). Anaerobic metabolic conditioning: A brief review of theory, strategy, and practical application. *Journal of Applied Sport Science Research*, 5(1), 22-34.

# Value of Eccentric Training

- ★ Many explosive competition sports involve a lot of ballistic stretch-shortening contractions

Plisk, S.S. (1991). Anaerobic metabolic conditioning: A brief review of theory, strategy, and practical application. *Journal of Applied Sport Science Research*, 5(1), 22-34.

# Anaerobic Conditioning Program Design

- ◆ Total exercise volume (repetitions, sets, circuits)
  - ★ At this time there is no evidence-based guideline
  - ★ Plisk suggests that trainers need to focus on exercise quality (with a sufficient intensity) to elicit targeted responses and adaptations for each athlete/client

Plisk, S.S. (1991). Anaerobic metabolic conditioning: A brief review of theory, strategy, and practical application. *Journal of Applied Sport Science Research*, 5(1), 22-34.

# ● Assignment: Apply the Research

● ◆ Design an anaerobic  
● training **WORKOUT**  
● based on current evidence










● ◆ Work with a partner

● ◆ Write out on your quiz





# **Assignment: Apply the Research**

-  1. Choose an anerobic activity or sport
-  2. Design ONE workout session for ONE person
-  3. What is the training status of the person?
-  4. What is the goal of the training session?
-  5. What exercises will you use?
-  6. What intensity will you employ?
-  7. How long will each set be in time?
-  8. How long will you recover between sets (if doing repeated sets)?
-  9. How would you progressively overload this workout for a subsequent workout?