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Question: Discuss how six principles of Sports physiology training can be applied to improve athletes performance during international competition.

ANSWERS

THE SIX PRINCIPLES OF SPORT PHYSIOLOGY

Training means engaging in activity to improve performance and/or fitness; this is best accomplished by understanding general sports training principles: overload, reversibility, progression, individualization, periodization, and specificity.

**Overload**

Description: The exposure of tissues to greater than accustomed-to training stress.

Concept: Challenging current fitness/performance levels induces compensatory improvements. However, excessive overload and/or inadequate rest can result in overtraining, injury, and performance decrements.

Example: A jogger runs faster than her normal pace with hopes of improving endurance.

**Reversibility**

Description: The observation that withdrawal of tissue loading results in loss of beneficial fitness/performance adaptations.

Concept: The body adapts to cessation of a specific activity and inadequate training load with atrophy and fitness/performance decrements.

Example: A body builder laments his loss of muscular gains after taking a 2-wk vacation.

**Progression**

Description: The gradual and systematic increases in training stress to maintain tissue overload and, thus, provoke continued training adaptation.

Concept: As fitness/performance improves with training, training variables (i.e., frequency, intensity, volume) must be increased to induce further adaptation. Rate of progression is important; progressing too rapidly can result in injury while progressing too slowly will delay goal attainment (2).

Example: A weight lifter can comfortably lift a weight that used to be a challenge, so she must now lift heavier weights to continue gaining strength.

**Individualization**

Description: The modification of training to account for an athlete’s unique capacity for and response to training.

Concept: A training program should acknowledge differences in an athlete’s capacity for adaptation from that of their teammates, in order to ensure adherence to training principles for that individual; this capacity is affected by physiological factors (e.g., age, current fitness, training history), psychological factors(e.g., effort, confidence), environmental (e.g., nutrition, lifestyle habits), and genetic factors.

Example: The workout program for a freshman quarterback differs necessarily from that of a senior lineman on his football team, based on individual differences.

**Periodization**

Description: The planned systematic and structural variation of a training program over time.

Concept: Constant cycling of training variables (activity, rest, frequency, intensity, duration) within a training program each day, week, and month aims to maintain optimal training stimulus, address changing goals and individual variability, and avoid overtraining, injury, and burnout; this is often implemented using microcycles, mesocycles, and macrocycles (training cycles within training cycles of increasing duration) as a framework.

Example: A lacrosse team’s training program is altered across macrocycles to keep adaptations aligned with the varying goals of the preseason, in-season, and off-season.

**Specificity**

Description: The observation that fitness/performance improves through training movement patterns and intensities of a specific task and fitness type (strength, power, endurance, or flexibility).

Concept: Incorporating specific tasks of a sport will induce neuromuscular and metabolic adaptations to improve specific structure, fitness, and exercise economy of the overloaded muscle groups. Training should be directed at improving the fitness/performance of a sport’s distinct key components.

Example: While power athletes should train power and endurance athletes should train endurance (e.g., swimmers should swim), team sports athletes require training with a combination of these two types of fitness, as well as sport-specific movements/skills.