

Periodization Training Update: New Insights in Ultra Training Design

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- I. Periodization: a method of planned progression to maximize performance and minimize overtraining and injury
 - A. Strategic implementation of specific training phases
 - B. Do you want to be successful in training? Then plan for it
 - C. Volume in periodization is sets x reps; intensity is the %1RM or a Rep zone
 - D. Balancing training variables: choice, order, load, sets, reps, action, tempo, speed, recovery, lifestyle (nutrition and sleep)
- II. EXTRA Information: Benefits for athlete/client: achievement of goals, motivation to achieve, prevention of overtraining, prevention of boredom in training, goal-directed approach to training, injury prevention, plateau buster, progression built into system
- III. Background and foundation of periodization
 - A. Selye's General Adaptation Syndrome (GAS)
 1. Shock (workout stimulus)
 2. Adaptation (muscular fitness adaptation)
 3. Avoid exhaustion (plateau and overtraining) by CHANGING the workout stimulus regularly; Physiological explanation of GAS
 - B. Overview of how periodization was originally presented
 - C. Inverse association of volume and intensity (technique matches intensity)
 - D. The balance challenge to the fitness professional and personal trainer
 1. Intensity leads to greater motor unit activation & greater force production
 2. Volume leads to greater time under tension and hypertrophy (size and mass)
 3. The key is finding the balance for each individual client
- IV. Where do we start with our periodization planning?

Overview: Current training status/needs assessment; individualize goals; accessible resources; time and schedule of client; strategically plan phases; Ongoing evaluation; systematic progression; creativity prevails

 - A. Basic terms of periodization
 1. Microcycle: number of training sessions that form a recurrent unit (i.e., hard day, easy day, combination day, rest day, repeat); typically 1 week to 10 days
 2. Mesocycle: a block of microcycles that represent the attainment of some goal phase (i.e., strength, power, hypertrophy, etc); typically 4 to 12 weeks
 3. Macrocycle: the combined phase of microcycles and mesocycles to accomplish the overall goal (i.e., compete in a marathon or triathlon); ~10 to 12 months

- B. Individualizing the training begins with a thorough needs assessment
 - 1. Health/injury concerns, is the individual training for a sport or recreational activity or weight management, time constraints for training, training frequency/week, preferred type of equipment to use, determine muscular strengths/weakness, client's proposed strengths/weakness, how much aerobic training: Goal Setting and Strategy Planning
 - 2. Emphasizing the importance of RECOVERY to your clients is quite meaningful
- C. Disclaimer time for your clients: there is no one best periodization plan; the challenge is to find what works best for each client

V. Phases of periodization training in Training (Recreational) Athletes: Theoretical Overview

- A. Preparatory (pre-habilitation) phase: technique, posture, function, stabilization
- B. Hypertrophy phase: basic physical training, high volume and low intensity, non-specific to any sport or activity
- C. Strength phase: increase in intensity with decrease in volume; overload and begin specificity training
- D. Power and peaking phase: near maximum intensity, speed, force and performance technique emphasis
- E. Maintenance phase: slightly lower intensity with increase in volume; for long competitive seasons alternate with peaking phase
- F. Transition phase or Active Rest: physical and mental recovery cycle, minimize deconditioning, light training, improvement of basic physical skills and techniques
- G. Comparison of linear vs. non-linear periodization
- H. Extra Information: Great programs have variety and creativity: be "consistently inconsistent" in CHANGING the exercise stimulus
- I. Special note: specificity of training for athletes is much more complex (involves cardiorespiratory function, muscle energy production, musculoskeletal integrity, body composition, neuroendocrine responses, muscle hypertrophy, neuromuscular recruitment patterns, and thermoregulation)

Periodization models: linear vs. nonlinear! What can we learn from the research?

Periodization: Linear vs. reverse linear vs. daily undulating for Endurance

Study: 60 males & females, trained lower body 2x a week (3 sets) in 15 wk study; knee extension tested

Linear (SPECIAL Note: reverse linear is simply in the reverse order of linear by weeks)

Weeks 1-5 25RM Rep zone

Weeks 6-10, 20RM Rep zone

Weeks 11-15, 15RM Rep zone

Daily undulating periodization (non-linear)

Wk1: Day 1 is 25RM Rep zone, Day 2 is 20RM Rep zone

Wk2: Day 3 is 15RM Rep zone, Day 4 is 25RM Rep zone

Wk3: Day 5 is 20RM Rep zone, Day 6 is 15RM Rep zone

Program continues in this undulating sequence for 15 weeks. **Study results: No difference!**

Periodization: Linear vs. daily undulating for Strength

Study: 20 males trained for 3 sets of bench, 3 sets of leg press in a 12-week study (3 days/wk)

Linear

Weeks 1-4 8RM Rep zone

Weeks 5-8, 6RM Rep zone

Weeks 9-12, 4RM Rep zone

Daily undulating

Each week progressed in the following sequence for the 12-week study

Mon (8RM for all exercises), Wed (6RM for all exercises), Fri (4RM for all exercises)

Results: Daily undulating elicits superior results. Why?...Unknown at this time.

New Periodization Study: Linear vs. Reverse Linear for Strength (12-week mesocycle)

20 females in 12-week total body training workout 3 days/week

Tests for 1RM of bench press, lat pull-down, arm curl, and leg extension

Weeks 1-3 Rep zones: 10-12 reps, 8-10 reps, 6-8 reps

Week 4: High Volume Training Week; 12 RM for all exercises

Weeks 5-7 Rep zones: 8-10 reps, 6-8 reps, 4-6 reps

Week 8: High Volume Training Week; 12 RM for all exercises

Weeks 9-11 Rep zones: 6-8 reps, 4-6 reps, 2-4 reps

Week 12: High Volume Training Week; 12 RM for all exercises

Training Exercises: Alternate 'A' & 'B' Workouts: 'A' (bench press, incline fly, dumbbell shoulder press, lateral raise, standing arm curl, biceps preacher curl, triceps extension, close-grip bench press); 'B' (back squat, leg extension, leg curl, gluteal kickbacks, hip abduction, hip adduction, standing heel raise, lat pull-down, seated row). Example of training: On one week the subjects did Training 'A' on Mon. & Fri. and Training 'B' on Wed. The next week subjects did Training 'A' on Wed. and Training 'B' on Mon. & Fri.

Rest Intervals between sets: 60 seconds between 10-12 repetitions; 80 seconds between 8-10 repetitions; 100 seconds between 6 to 8 repetitions; 120 seconds between 4-6 reps

Results: Linear periodization superior for strength development

What is the Newest Undulating Periodization Model: Random Order Undulating

Periodization: (Daily) Undulating: day to day variation of intensity/volume program

Rep Zones: 3-5 reps, 8-10 reps, 12-15 reps: weekly random order changes in sequence

Options {12-15 RM, 3-5 RM, 8-10 RM}, {8-10 RM, 12-15 RM, 3-5 RM}, {8-10 RM, 3-5 RM, 12-15 RM}, {3-5 RM, 8-10 RM, 12-15 RM}, {12-15 RM, 8-10 RM, 3-5 RM}

Total body workout: change exercises daily working all major muscle groups

VI. Repetition zone characteristics

1-5 Reps (100-85% 1RM) Strength emphasis

6-8 Reps (84-77% 1RM) Strength and hypertrophy emphasis

9-12 Reps (76-70% 1RM) Hypertrophy emphasis

13-20 Reps (69%-60%) Endurance emphasis (less hypertrophy and less strength)

NOTE: Several Periodization Articles with all references on Dr. Kravitz's WEB Page:

Prestes et al. (2009). Comparison of linear and reverse linear periodization effects on maximal strength and body composition. *Journal of Strength and Conditioning Research*. 23(1), 266-274.

Rhea, M.R. et al. (2003). A comparison of linear and daily undulating periodized programs with equated volume and intensity for local muscular endurance. *Journal of Strength and Conditioning Research*. Vol. 17(1), 82-87.

Rhea, M.R. et al. (2002). A comparison of linear and daily undulating periodized programs with equated volume and intensity for strength. *Journal of Strength and Conditioning Research*. Vol. 16(2), 250-255.

Extra Information: Special Topic: Should you always train to failure?

- A. Muscular fatigue: point during exercise when the neuromuscular system can no longer produce adequate force to overcome workload
- B. What is the theoretical basis for training to failure? Activate the greatest # of motor units. Mixed and inconclusive research on this topic
- C. Precautions to always training to failure: may lead to overtraining and overuse injuries; has been shown to lead to a decrease in IGF-1 (a growth promoting hormone)
- D. Practical applications: alternate going to failure in sets or workouts; training failure should be varied, as all other acute variables of resistance exercise; stop a set when technique is being compromised; for special populations, function and stabilization may be more important than training to failure

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