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


**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:


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

End