

Periodization Part 2 – Divisions of the Training Cycle

Researched and Composed by Jacob Wilson, BSc. (Hons), MSc. CSCS. and Gabriel "Venom" Wilson, M.S., CSCS.

Abstract

Periodization is a division of a training season, typically 1 year long, into smaller more manageable intervals with the ultimate goal of reaching the best performance during the primary competition(s) of the season and that ultimately periodization is a trade off between conflicting demands. The purpose of this paper was to analyze the cycles within periodization and how they achieve the variation, rest, and management of conflicting demands necessary to optimize adaptive processes. Cycles discussed include: (1) Long Term (career), (2) Olympic or Quadrennial Cycle (3) Macrocycle (4) Mesocycle (5) Microcycle (6) Training Day (7) Training Session.

Introduction

Letunow (1950) suggested that periodization was not simply a plan, but an objective set of laws that govern the training process. These laws dictate the need for variation to bring about adaptation and rest to avoid overtraining and accommodation. In this context, Plisk (2004) defined periodization as programmed 'variation in training means (content) and methods (load) on a cyclic basis.' Kraemer (2004, b) added that along with variation periodization includes planned rest periods to augment recovery and restoration of an athletes potential. Zatsiorsky (1995) furthers this concept by suggesting that periodization is a division of a training season, typically 1 year long, into smaller more manageable intervals with the ultimate goal of reaching the best performance during the primary competition(s) of the season and that ultimately periodization is a trade off between conflicting demands. The purpose of this paper was to analyze the cycles within periodization and how they achieve the stated goals of variation, rest, and management of conflicting demands. Cycles discussed include: (1) Long Term (career), (2) Olympic or Quadrennial Cycle (3) Macrocycle (4) Mesocycle (5) Microcycle (6) Training Day (7) Training Session.

Long Term (Career) Period

A Long Term (Career) period comprises the entire career of an athlete. Often you hear bodybuilders discuss the hypothesis that their body does not peak until mid 30s, while they are still in their 20s. This type of thinking is career oriented in nature. Another example in long term training pertains to the European methodologies to training their athletes. Gymnasts begin training at very early ages. One of the concepts which they must manipulate is relative and absolute strength. Absolute strength refers to the total amount of weight an athlete can lift in a criterion task, while relative strength refers to absolute strength divided by bodyweight. Absolute strength is positively correlated to bodyweight, while relative strength actually lowers as body weight increases (Zatsiorsky, 1995). Therefore an

Olympic weight lifter in the heavy weight class will have a lower relative strength, than a lifter in the light weight division, even though his or her absolute strength is greater.

Development affects this process. As height and weight increase with age, relative strength may decline if not countered. According to Zatsiorsky (1995), Russian gymnasts learn most of their technical skills before the age of 13, while focusing on specific strength in the criterion tasks, conditioning, and stability thereafter so as to counter the negative influence of an increase in weight.

Quadrennial Cycle

A Quadrennial Cycle is a four year period, and often is utilized to prepare athletes for such events as the Olympics. However, it could also refer to the four year period which comprises a high school, or collegiate career. In college football, a coach would assess their athletes and according to this assessment lay out specific goals for them. These goals may include understanding the system which the team plays under, increasing body weight to a certain size to be able to withstand the torques and forces found at this level, playing supportive backup, and finally starting. These goals may progress through four different macrocycles (see below) which culminate to a peaking of the ultimate goal, at a realistic time frame.

Macrocycle

The majority of focus in periodization begins here and works its way down. A macrocycle typically lasts a year. However it can be structured to last the exact length of a preseason to season, and can therefore be as short as three to four months. A macrocycle is comprised of several mesocycles (see below). In traditional periodization, the macrocycle begins with relatively high volume work to train the peripheral factors of participants, such as increased cross sectional area. As the macrocycle progresses, volume decreases and intensity and focus on specific exercises increases to peak for competition (Wilson and Wilson, 2005).

Mesocycle

A mesocycle defines the general variation of a macrocycle. The mesocycles origin can be found in European History (Zatsiorsky, 1995). Due to the fact that athletes could not have access to proper food, and training resources at home, they would train in camps year round. However, due to excessive time without family, as well as continually training with rivals, the stress reached a point which degraded training. To combat this, training camp locations were changed with greater frequency. Further, questioners revealed that athletes preferred periods of 4 weeks of training, with 1-2 week periods at home. Therefore traditionally a mesocycle lasts 4 weeks. However authors vary in the length prescribed to this phase. The range seen in the literature is between 1-4 months (Haff, 2004).

Traditionally a mesocycle is directed toward a small number of motor abilities. The issue centers around conflicting demands. For example, many sports require power, endurance, strength, muscular size, and game playing skill(note, the current authors do not refer to these as general attributes, but rather as attributes specific to the task, such as bench press strength or power). However, because each

demand drains the organism of resources, it is thought to be difficult to train each at the same time. Therefore the traditional rationale is to dedicate mesocycles to only a few or even one motor ability. However, new techniques in periodization have sought to actually train several motor abilities in a more contiguous fashion. This process is manifested in non traditional periodization techniques, both of which will be discussed in part three of this series.

There are numerous examples of mesocycles. For example, in traditional periodization, the first cycle used is typically a Hypertrophy Cycle. This consists of high volume, and relatively low intensity training, and is meant to increase peripheral factors such as cross sectional area, as well as work capacity.

Microcycle

The microcycle is a division of the mesocycle and typically lasts a week in length. According to Kraemer (2004 b) the microcycle is perhaps the most important aspect of periodization, as changes in acute training variables within the cycle are made to define a mesocycle.

The microcyclic structure is based on the specificity of fatigue produced in a given workout. Overall more work within a given week can be performed with proper sequencing of workouts. Sequencing takes into account the body parts trained, as well as the general population of motor units utilized (Wilson and Wilson, 2005). Typically exercises in consecutive sessions should only involve the same muscle groups to a minimal level. For example, training biceps on Tuesday, and back on Wednesday would have a degrading effect on the back workout. In terms of motor unit activation, a microcycle may consist of separating light, and heavy workouts as the motor unit population trained will vary within this continuum (Kramer, 2004 b). The amount that a muscle group can be trained depends on the size of the musculature trained, as well as the magnitude of stress (training impulse) applied to it (Wilson, 2003).

Training Day

The training day is defined as a 24 hour period comprised of all training sessions performed in that period. This unit of periodization is concerned with the number of training sessions, the order of training sessions, and the recovery between sessions. Evidence suggests that performing two or more workouts in a day is more beneficial to developing motor abilities than one time a day (Wilson, and Wilson 2005). Typically sessions which require more motor abilities are trained fresh (Zatsiorsky, 1995). For example exercises with extreme coordination requirements like cleans would be performed in the AM, with auxiliary exercises performed at night. Sleep periods, proper meal sequencing, and therapeutical treatments such as sauna would occur between sessions.

Training Session

The training session is primarily concerned with acute training variables. Wilson and Wilson (2005) explain:

Perhaps the most thorough description of training stimuli was provided by Kraemer (1983 a, b, 1984 a, b, c, d, e, f, 1988, 2004). Utilizing statistical analyses Kraemer (1983) developed an approach to operationally describe any workout protocol through identification of five specific acute training variables. These variables consist of the (1) choice of exercise, (2) order of exercise, (3) number of sets performed (4) rest period lengths and (5) resistance used or intensity of exercise. Given the above combinations, a virtually endless quantity of training sessions can be developed, each yielding somewhat differing adaptations.

An entire series of articles dedicated to acute training variables will be released shortly, and will cover in depth what the current scientific evidence suggests the result of various manipulations of these variables will be.

Summary

Periodization is concerned with meeting the requirements of variation, and programmed rest required to elicit peak performance in the human organism. It does so through dividing these demands into manageable time periods which include (1) Long Term (Career) periods, (2) Quadrennial Cycles (3) Macrocycles (4) Mesocycles (5) Microcycles (6) Training Days (7) and Training Sessions. The Long term cycle attempts to outlay an entire career of an athlete. The Quadrennial cycle deals in four year periods and is often associated with time frames covering high school, collegiate, and Olympic careers. Macrocycles are typically a year in length with the ultimate goal of achieving peak performance for the most important competition of a season. Mesocycles are 1-4 month periods which define the variation within a macrocycle. Microcycles are generally 7 days in length and are concerned with proper sequencing of workouts. The training day, and training session are concerned with acute training variables, as well as recovery between workouts.

References and Sources Cited

- Plisk, (2004) Roundtable Discussion: Periodization of Training Part I. *National Strength and Conditioning Association Journal*, 26, 50-69
- Kraemer (2004 b) Roundtable Discussion: Periodization of Training Part I. *National Strength and Conditioning Association Journal*, 26, 50-69
- Zatsiorsky, V.M. Science and Practice of Strength Training. Champaign, IL: Human Kinetics, 1995.
- Wilson, J., and Wilson, G., (2005) Periodization Part II: Comparison of Traditional and Non Traditional Periodization *Journal of Hyperplasia Research*.
- Haff, G (2004) Roundtable Discussion: Periodization of Training Part I. *National Strength and Conditioning Association Journal*, 26, 50-69
- Wilson, J. (2003) Cliff Hanger Part I and II: *Journal of Hyperplasia Research*.

Kraemer (1983) Exercise Prescription in Weight Training: Manipulating Program Variables. *National Strength and Conditioning Association Journal*, 5, 58-61

Kraemer (1983) Exercise Prescription in Weight Training: A Needs Analysis. *National Strength and Conditioning Association Journal*, 5, 64-65

Kraemer (1984, a) Program Design: Manipulating Program Variables: Exercise Prescription: Number of Sets *National Strength and Conditioning Association Journal*, 6, 47-47

Kraemer (1984, b), Program Design: Manipulating Program Variables: Exercise Prescription: Needs Analysis *National Strength and Conditioning Association Journal*, 6, 47-47

Kraemer (1984, c) Program Design: Manipulating Program Variables: Exercise Prescription: Order of Exercise *National Strength and Conditioning Association Journal*, 6, 47-47

Kraemer (1984, d) Program Design: Manipulating Program Variables: Exercise Prescription: Choice of Exercise *National Strength and Conditioning Association Journal*, 6, 47-47

Kraemer (1984, e) Program Design: Manipulating Program Variables: Exercise Prescription: Rest Periods *National Strength and Conditioning Association Journal*, 6, 47-47

Kraemer (1984, f) Program Design: Programming: Variables in Successful program design. *National Strength and Conditioning Association Journal*, 6, 54-55

Kraemer (1988) Exercise Physiology Corner: Factors in exercise prescription of resistance training *National Strength and Conditioning Association Journal*, 10, 36-42

Kraemer (2004 a) The use of Science In Exercise Prescription Development *National Strength and Conditioning Association Journal*, 26, 56-70