



# PRIMER ON PERIODIZATION

by Tudor O. Bompa, Ph.D., Professor Emeritus

Tudor Bompa is THE person who stimulated Western interest in Periodization. As the author of 14 books on topics of periodization, planning, peaking and strength training, he is one of the strongest influences on the topic in the United States. Tudor Bompa competed as a rower in the 1956 Olympic Games in Melbourne, Australia and won a silver medal at the 1958 European Championships, which were held in Poland.

Source: Bompa, T.O. "Primer on periodization." *Olympic coach* 16:2(2004): 4-7.

**A**s a very important training concept, Periodization is not, as many people may believe, a new discovery. As exemplified by Flavius Philostratus (AD 170-245), a Greek philosopher and sporting enthusiast, a simple form of periodization has been used since the ancient Olympic Games. In his six manuals on training, Phylostratus wrote extensively about the methods used by the Greek Olympians.

The roots of periodization can be found in the term "period" as in a period of time. In fact, the term periodization has been borrowed from history, where it refers to the specific periods of time of human development. In sports training, this term, periodization, refers to dividing the yearly training plan into smaller and, therefore, easier to manage training phases. Basically, the periodization of an annual plan has three major phases: preparatory or pre-season, competitive or season, and transition or off-season. This is what Philostratus mentioned about the way the ancient Olympians organized their own periodization, except that they used slightly different terms: preparation, Olympic Games, and relaxation. Is this training organization method so drastically different than what the US track and field athletes, the winners of most medals in the first modern Olympic games (Athens, 1896), have used? Not at all! This first group of American Olympians has used exactly the same periodization plan: preparatory, competitive, culminating with the Olympic Games, and off-season (transition).

## WHY IS IT NECESSARY TO USE PERIODIZATION?

The use of periodization is dictated by several training elements, such as:

**Physiological adaptation to training.** The scope of training, especially during the preparatory phase, is to create a training program that will result in the highest

adaptation, or athlete's best adjustments of the neuromuscular and cardio-respiratory systems to your training program. Higher adaptation, increased athlete's physical potential, is the determinant factor in reaching peak performance during the competitive phase. The program you organize during the preparatory phase, the development of the motor abilities necessary in your sport (strength, speed and endurance) to the highest level possible, is a fundamental requirement to improvement of the athlete's working potential, their physical abilities, and as a result, their improvement of performance from year to year.

**Peak performance.** Normally, a peak performance is planned to be reached during the competitive phase and cannot be maintained forever. This is why during the preparatory phase; the scope of training is to improve the athlete's working capabilities, to accumulate the highest physical potential possible, to cope with the fatigue of training and competitions, but not necessarily to reach highest performances of the year. This is normally achieved during the competitive phase by progressively planning more specific training programs—specific speed, power, and endurance. However, your athlete's highest adaptation to training, continuous improvements of physical potential, represent the foundation on which peak performance depends on. Without a continuous increase of your athlete's physical potential from year to year, you cannot expect to improve performance on yearly basis.

**Skill development.** The rate of improving and perfecting your athlete's technical and tactical skills, are directly dependent on how you periodize your training program. During the preparatory phase, where the stress of competitions is almost nonexistent, skill acquisition is maximal. Now is the time to teach your athletes new skills and to perfect the ones acquired in the past year. Your athlete's skill improvement during the preparatory phase will be most beneficial during the league games



and/or official competitions. The longer the preparatory phase, the better your athlete's chances to improve skills' effectiveness. In team sports, martial arts / contact sports and racquet sports, any technical improvements will directly assist your athlete's tactical proficiency. In other words, the better the technique, the easier the athlete will apply the skills into your tactical plan.

**Psychological qualities.** Athlete's psychological behavior, his/her degree of motivation and focusing capabilities are directly dependent of their physical potential acquired during the preparatory phase. High level of physical potential usually translates into better abilities to cope with fatigue. The athlete's psychological well-being is directly dependent on the level of fatigue. When an athlete is physically exhausted it directly affects his/her visualization, concentration capabilities, focusing, and motivation. An exhausted athlete is not a highly motivated athlete. But athlete's psychological behavior is also negatively affected by the volume (quantity) and intensity used in training (high loads in weight training, the abuse of maximum speed, the daily employment of just high intensity drills in team sports/ racquet sports/martial arts, etc.). The higher the intensity of training the higher the stress, and the more it taxes the central nervous system (CNS). The consequence of constant high intensity training is a high psychological fatigue.

The best cure for a negative psychological fatigue that affects the level of psychological qualities and reactions is a well-planned periodized training. Organize longer preparatory phases, if you can, with the lowest psychological stress. Accumulate best physical adaptation to training so that your athletes are well equipped to cope with fatigue, and as such, decrease the level of psychological fatigue.

**Climatic conditions.** The duration of the seasons in a given geographical region, also dictates the way you'll organize your periodization plans. Often the duration of a given training phase, such as the duration of outdoors season, clearly dictates how long the league games for outdoors team sports can be. Climatic conditions, therefore, directly dictates the periodization of all the outdoors sporting activities, seasonal sports such as skiing, rowing, kayaking/canoeing, running, cycling of any type, triathlon, sailing, golfing, etc.



## VARIATIONS OF PERIODIZATION/ ANNUAL PLANS

The time since the ancient Olympic Games has long passed, and along with many other improvements in the human society, periodization of training has evolved as well. In addition to the basic periodization plan of three main phases (see figure 1), typical plan for most team sports, there are other variations of periodizations as well. The needs of certain sports had made us to depart from the ancient periodization plan with one peak only, known as mono-cycle in the technical nomenclature, or peaking only for one major competition (i.e. National Championships). Consequently, different sports with specific domestic and international calendar of competitions employ other types of periodization plans. As such, track and field has two major competitions per year: indoors and outdoors competitions, or short and long course championships in swimming. This type of plan is called a bi-cycle, or double peaking. Other sports, such as wrestling, boxing, or martial arts, use either triple peaking, also called tri-cycle, or multi-peaking plans, where the athletes have to peak several times per year.

As illustrated by Figure 1, each training phase is subdivided into smaller phases, such as macro-cycle (macro = bigger, and cycle = a phase which repeats itself several times throughout the annual plan). A macro-cycle is usually 3-5(6) weeks, or micro-cycles (micro = small). The only smaller training phase than the micro-cycle is the training

**FIGURE 1.** The periodization of an annual plan

Training Phases	Preparatory Phase				Competitive Phase				Transition
Macrocycles									
Microcycles									



**FIGURE 2.** An example of bi-cycle, or double peaking periodized plan

Month	1	2	3	4	5	6	7	8	9	10	11	12	
Periodization (phases)	Preparatory 1			Competitive 1			T1	Preparatory 2			Competitive 2		T2
	General Prep.	Specific Preparatory	PC	Competitive	U	M	Gen. Prep.	Specific Preparatory	PC	Competitive	U		

**Legend:** T = transition phase: the first one of only two weeks, while the second one (Transition 2) is 4-5 weeks long  
 PC = pre-competitive, or exhibition competitions/games/matches  
 U = unloading/tapering for the major competition of the year  
 M = maintenance of a 40-50% of the previous training load

**FIGURE 3.** A tri-cycle, or a periodized annual plan with three main competition seasons, or three major peaks

Month	1	2	3	4	5	6	7	8	9	10	11	12
Periodization (phases)	Prep. 1	Competitive 1		T1	Prep. 2	Competitive 2		T2	Prep. 3	Competitive 3		T3
	GP	SP			GP	SP			GP	SP		

**Legend:** Prep. 1 = preparatory for the first competitive phase  
 T = transition of two weeks duration, following the first competitive phase  
 GP = general preparatory-type of training  
 SP = Sport-specific training

session, or workout. Therefore, looking from the top of Figure 1 to the bottom, you realize that a periodized annual plan progressively becomes shorter. The shorter the phase, the easier is to manage a training program. However, an overall guideline of training is necessary: a periodized annual plan.

As already mentioned in several sports, coaches have to use a bi-cycle (double periodization), a triple-cycle, and very few sports employ a multi-peaking plan. Figure 2 shows a bi-cycle annual plan with its training phases, and the



specific objectives for each training phase. Not mentioned at all are the macro-, and micro-cycles, now relatively clear in readers' mind that they subdivide each training phase into smaller units of training. Please also observe that each preparatory phase has two training objectives:

- In the first one third of the phase, the scope of the plan is to train the athletes with non-specific, but also with some specific type of training.
- The rest of the preparatory phase is dedicated to sport-specific types of training, from specific flexibility to specific speed, strength and endurance.

### SOME CHALLENGES OF PERIODIZATION

#### Number of Peaks per Season

The more peaks you are planning for a year or a competitive phase, as often is the case with individual sports/martial arts/contact sports/racquet sports, the more difficult is to peak for each important competition. Usually, a competition means a very stressful environment. Therefore, the more competitions and the more you push your athletes to peak for each one of them, the more stress the athletes are exposed to. The higher the stress without rest and regeneration prior to a new competition, the closer your athlete is to a state of staleness, or even overtraining. To avoid such an unpleasant conditions, you have to prioritize competitions, meaning to treat some of them as very important and others the second,



or even third priority competitions. Obviously, the intent should be a full peak only for the first priority competition; which usually should be the championships competition of that cycle.

### Avoid Overtraining

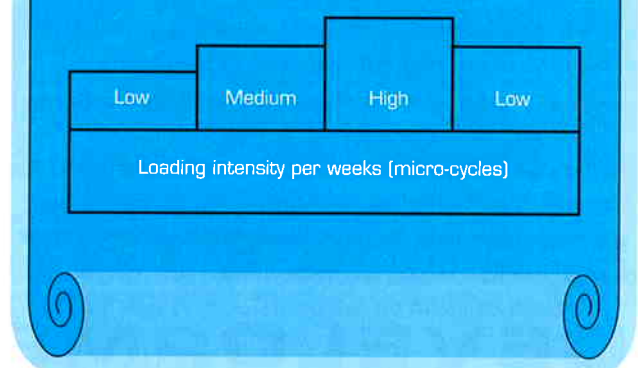
As you plan for competitions, you should you plan to avoid their strain, staleness, and the undesirable state of overtraining. There are certain methods to accomplish that, such as:

1. Never plan a challenging workout immediately following a stressful competition! Give your athletes time to remove the fatigue, relax mentally, rest and recover before your athletes will train hard again.
2. Throughout a week of training constantly alternate high with medium and low intensity workouts. This is a build-in strategy to avoid critical levels of fatigue.
3. After each competitive phase, make sure the athletes have at least two weeks of transition, so that they can replenish the energy stores, remove fatigue, relax mentally, and regenerate from exhaustion.
4. Use the step loading method (Figure 4), as the best progression training adaptation: one week of low intensity, followed by a medium, and then by a high intensity week. Every time you'll start again with low intensity week, this will be an opportunity for your athletes to replenish energy stores, recover and regenerate physically and mentally before they'll be exposed to more difficult weeks.

### Short-Duration Preparatory Phases

Influenced by professional sports, some coaches attempt to imitate their heavy competitive schedule, and as such accept the notion; the more games/competitions, the better

**FIGURE 4.** The step loading method; the progression of increasing the intensity and volume of training per week



my athletes will improve. In reality the opposite is true: the more you compete the less time you have for training. As demonstrated by sports science, well designed training programs and not high number of competitions led to higher adaptation, and as a result, to higher performance improvement. To play/compete more means in reality to have a longer competitive phase, a situation which is possible only by reducing the duration of the preparatory phase, with all its negative repercussions: less time to acquire/perfect skills, reduced time to improve general conditioning (such as during the general preparatory phase), and shorter time to work on improving the sport-specific speed, power and endurance. Reduced time to train but increased time to compete means in reality to train and over train just the same exercises, same specific parts of the body, joints and muscles, and as a result, increase the incidents of injuries. On a long-term basis, shorter duration preparatory phases will reduce training time, lower the rate of adaptation, and ultimately result in a stagnation of performance improvement. 