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COVER PHOTO
Matt Taylor and Joe Jacobi compete in the Mens C-2 Class during the U.S. Olympic Whitewater Slalom Canoe/Kayak Team Trials on April 4, 2004 at the East Race Waterway in South Bend, Indiana. They finished first in their division and made the Olympic Team. *(Photo by Andy Lyons/Getty Images)*

Message from the USOC's DIRECTOR OF COACHING and SPORT SCIENCES

by **PETER DAVIS, Ph.D.**

This issue of Olympic Coach magazine was a challenging one. We took one topic—Periodization. We gave that topic to three experts and let them tell us what coaches needed to know. The first article is by Tudor Bompa. For those coaches familiar with Periodization, this is one of the most recognized voices in the field in the United States. He took a subject that he is intimate with and brought it down to a very simple and concise article. I am sure this was a difficult task for a person with his knowledge base, but his article will be one that any coach will enjoy reading.

Vern Gambetta has been a conditioning coach for Major League Soccer and is now serving as the Director of Athletic Development for the NY Mets. Vern also has an immense background in track and field. He provides a different twist on our topic. His concern, about the lack of physical education and its effect on the lack of coaches with physical education background, is another voice of alarm and concern for those of us involved in Coaches Education.

Our third expert is Steven Plisk. Steven is a former strength coach at Yale, University of Memphis, James Madison University and the USOC. He has written extensively about Periodization and is heavily involved in the National Strength and Conditioning Association. He is now involved in the Velocity Sports Performance group. He provides us with a nice blend of research and practical usage of Periodization.

Fitting with the theme is a review of an excellent article by Inigo Mujika and Sabino Padilla, entitled "Scientific Bases for Precompetition Tapering Strategies". You will find the information invaluable to developing your own tapering strategies. The breadth of references reviewed in the writing of the article makes it well worth finding a copy.

Kirsten Peterson has an excellent article based on the book "First, Break all the Rules". She has taken the valued lessons that can be used by coaches to help their athletes and themselves. I think you will find this article provocative.

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.

As 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 neuro-muscular 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

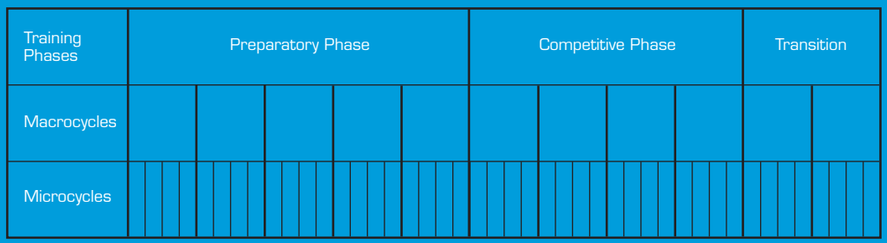


FIGURE 2. An example of bi-cycle, or double peaking periodized plan

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	Comp-etitive	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 = maintencance 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; whish 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.

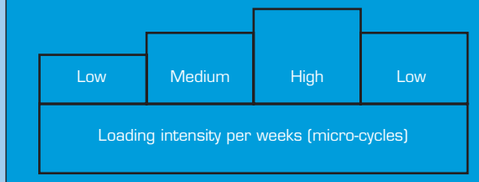
3. After each competitive phase, make sure the athletes have at least two weeks of transition, so that they can replenish the energy stores, remove fatigue, relax mentally, and regenerate from exhaustion.

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.

PERIODIZATION and the SYSTEMATIC SPORT DEVELOPMENT PROCESS

by VERN GAMBETTA, Gambetta Sports Training Systems

Of all the tools available to coaches, periodization might be the most misunderstood and misapplied. My gut feeling is that many coaches are put off by the jargon and terminology. I thought that looking at it from a slightly different perspective would make it more user-friendly and applicable. In order to avoid confusing the issue we must recognize it for what it is. It is simply planning. That is something that effective coaches have done forever. Planning gives direction and purpose to the training without a plan—there is chaos and inconsistent results. It also provides a context to evaluate performance aside from wins and losses or personal records.

Periodization is a concept, not a model. It is a systematic attempt to gain control of the adaptive response to training in preparation for competition. There is very little "hard science" to substantiate periodization. It is mostly based on scientific inferences rather than hard scientific evidence. On the other hand there is an immense body of coaching evidence going back into the early twentieth century that underscores the key elements of what eventually became known as periodization. These key elements are:

- Systematic approach
- A strategy to distribute training loads in relation to competition goals
- A defined structure for progression
- A sequential building block approach
- A set time frame for execution of the plan
- All components of training are addressed
- In pursuit of specific competition goals
- Reflects the undulatory nature of the adaptive process
- Systematic manipulation of the variables of volume, intensity and density
- A method for monitoring training and evaluating competition results

The concept of periodization works the best when the majority of the variables can be controlled. The most important variable is that of competition. Control of the competitive schedule is essential to the success of any plan. One of the stated goals of periodization is optimum performance at the desired time, whether an individual competition or a series of competitive efforts. The undefined nature of the competitive calendar presents the biggest change, from when the concept was formalized in the 1950's and 60's. There is a plethora of high level competitions demanded at the elite level and also for that matter at the developmental level that mitigates against long developmental periods of training.

In an attempt to clarify some of the confusion surrounding periodization, it is important to frame periodization within the concept of the sport development system. The diversity of our nation has always been an overwhelming strength in the development of our elite athletes for international competition. This diversity resulted in a "non-system" sport development system. Teaching coaches to use and adapt the concepts of periodization would be a major step toward producing consistent reproducible results. This would add an element of structure to our "non-system." To do this we cannot blindly copy the traditional eastern European periodization models. That will not work for the reasons I detail in this article. We must take the principles and concepts and apply them to our athletes who live and train in a vastly different society than the society that existed in the former eastern bloc nations.

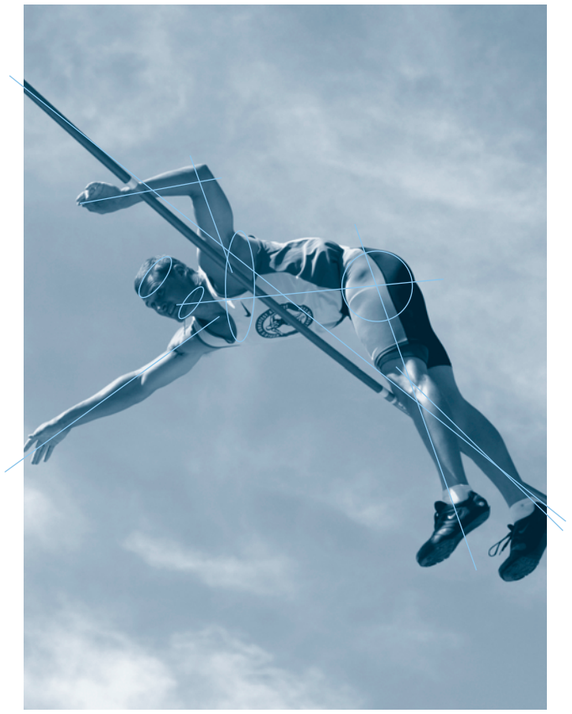
Periodization as a concept is certainly not new, or particularly contemporary. The name may be new to many, but it first appeared in coaching literature in the fifties and sixties. Periodization as we know it today was articulated by L.P. Matveyev who studied specific sports and looked at the periodic nature of training necessary to achieve peak performance at the time of major competitions. The nature of periodization as it has evolved represents a reflection of the socio- cultural milieu of the countries where the concept was first articulated rather than any science of the cyclic nature of performance. The science came later in order to better quantify and verify the concept.

After the Russian Revolution, the Soviet Union organized virtually everything in society into five-year plans. Specific measurable production goals were articulated and all effort was directed toward the achievement of those goals whether it was agriculture, industry, or education. It was only logical that this approach would eventually be applied to the sport development process. Therefore, when they decided to pursue sport internationally as a glorification of the communist system, the same systematic long term planning that was used in the rest of society was applied to sport. Rather than five or ten year plans, the time period in sport development was the quadrennial cycle culminating every four years in the Olympic Games. They recognized that success in international sport, especially as the stature of the Olympic Games gained more international prestige in the sixties and the seventies, would result in a validation and glorification of the communist system.

It is also important to consider the impact of two world wars fought on the European continent. World War Two devastated the male populations of what was to become the eastern bloc nations after the war, as well as Germany, England and France. There was no talent to waste!

Systematic development of the limited human resources for sport development was a necessity if they wanted to compete. Periodization was a tool to enable those countries to optimize their human resources. It is important to consider was that movement and physical culture was an inherent part of the communist ideology. A healthy, physically fit populace was needed for a strong military.

Matveyev was one of many who formalized the concept. Because he was Russian, and the Soviet Union was the dominant geopolitical force in the communist bloc, Soviet ideology tended to prevail even in sport. This explains the dominant influence of the Soviets in the literature of training methodology. Certainly, there were others like Harre in the GDR who made significant contributions. Still, most of what we see in the literature today, including



the work of Tudor Bompa, who has done much to popularize the concept in North America, is basically a rehash of the Soviet literature. Not much has been done to modify, study, change or adapt the concept to the contemporary challenges that exist today. Over the years most of the science underlying periodization has been in the form of studies of overtraining. Although today there does seem to be more sports science research directed to studying training adaptation which certainly has the potential to add science to the art of planning. (Rowbottom, 2000)

The international sport environment is very different today than it was even twenty years ago. Where previously the focus was the Olympic Games as a culmination of the quadrennial plan, now there are more frequent world championships in many sports. Competition schedules are not as clearly defined. In most sports, especially at the elite level, there is no defined off-season. None of the literature on periodization has ever effectively addressed team sports. In addition, one would be naïve not to recognize the huge impact systematic doping had on the development of the former eastern bloc sport development systems. In fact, much of the cyclic nature of classical periodization was based on sophisticated manipulation of drug cycles. (Franke & Berendonk, 1997)

We should also be aware that the strict control of the athlete's lives inherent in the socialist system was a key factor in the success of the classic periodization model. Competition schedules were carefully planned and strictly adhered to. Once the athlete was identified their lives were strictly controlled. This control certainly did not exist in the west nor does it exist today. Even though it may be a value judgment, we certainly recognize the limitations and the human cost of such an approach. Nevertheless we must consider that factor when we look at the training literature on periodization from the former eastern bloc nations and attempt to adapt those principles to our society. This control allowed the system to limit competition and control many variables that we are unable to control in our society. There was an emphasis on volume loading and long periods of general preparation leading up to a few major competitions that is unrealistic in our system. To apply the concepts of periodization to our reality we must challenge these notions, they must be framed in the context of our "non-system."

The United States is no different than any other country in that sport is a reflection of the socio-cultural milieu in which it exists. For many years up to 1976, the United States was able to dominate the world in athletic competition. The basis of our "non system" was a well-defined comprehensive physical education program. Physical education was mandatory in the schools from K-12. The physical education programs provided a cadre of trained coaches well founded in the principles of pedagogy. Planning is inherent in good pedagogy in the form of a "lesson plan."

We also did not suffer the ravages of war in our country. This gave us a large healthy pool of talent to choose from. We had a well-defined competitive sport structure based on interscholastic competition culminating in collegiate competition for the more talented. This encompassed all sports, but did not include significant female participation because of antiquated beliefs on the limitations of the female to train and compete. These factors all contributed to our dominance in international sport.

In the U.S., periodization was not formalized and articulated as such. There certainly was not an overall national plan. Our training year was loosely divided into off-season, pre-season and in season. The top coaches certainly had command of the concept of planning. Bill Bowerman, the track and field coach at the University of Oregon, organized all his training in fourteen and twenty-one day cycles. In his system, the training year was divided into three-month periods with specific objectives for each period. A cornerstone of his system was the hard easy principle, which took into account the unity of work and rest. (Walsh, 1983) In swimming, Doc Counsilman at the University of Indiana, certainly had command of an overall annual plan based on physiological concepts. The number of workouts per week, dry-land exercises, total time and distance per week, the type of training and time of sets was planned for each month. (Councilman, 1977) Dean Smith, former basketball coach at the University of North Carolina, had detailed daily practice plans, which were the basis of his program. These were derived from a master plan for the year as well as a weekly plan. (Smith, 1999) All these coaches are icons in the American "non-system" who used the principles of what came to be called periodization. The common thread among these coaches is that they had formal training as teachers. That was the norm for coaches. Planning was an essential part of their pedagogical training. They also recognized that planning was essential for success.

The bottom line is that for a long time our "non-system" served us quite well. What happened? The first thing that changed was the erosion of mandatory physical education to the point where today there is only one state that has mandatory physical education K-12. The most obvious impact is that youngsters are no longer exposed to systematic physical activity. They are no longer taught basic movement or sport skills as part of an organized curriculum. What we failed to notice is that because physical education was no longer mandatory that less physical education teachers were being hired. The physical education teacher made up the pool of trained coaches. Then there came an increased emphasis on academic achievement to the exclusion of physical education. In addition, there were budget and tax cuts due to declining enrollment; therefore, less qualified coaches were hired in the schools. Club sports began to take the place of school sports. These coaches had no educational requirement. Teacher training colleges changed their mission from teaching to research. Title IX put an increased burden on the schools because in many sports it was now necessary to field two teams instead of one. This served to further deplete the pool of trained coaches creating an obvious staffing problem. These problems are a reality in the United States in 2004. Understanding and adapting the principles of periodization is imperative to reverse these trends.

Periodization is a viable concept that certainly will help improve our sport development system, but we also need trained coaches to plan and then implement the plan. A productive sport development system is coach driven and athlete centered. The solution lies in educating our coaching in the principles of planning in order to optimize resources and time. To achieve athletic success in any kind of systematic manner, certain principles must be observed. The principles are the same regardless of the sport. The plan is the means to execute the principles. The principles are:

Principle of Progression—This is the most often violated principle. Progression in its simplest form moves from simple to complex, easy to hard and general work to specific work. These simple steps give way to complex interactions. All training variables do not progress at the same rate nor do all individuals progress at the same rate.

To insure proper progression, we must clearly define each step. Begin by articulating specific goals and objectives for each step. Then develop evaluative criteria to assess the achievement of each of the goals and objectives of each step. I would go so far as to say that at certain levels of development it should be necessary to show mastery before moving on to the next step. This is especially true in refinement of technical development.

Progression is not linear. We need to begin with a clear picture of what we want the athlete to achieve or look like at the end of a training program as a goal. But we must remember that progression toward that ultimate

objective will proceed in a staircase like progression. Constant progress should be made toward the goal, but some of the incremental steps along the way will be smaller than others.

Principle of Accumulation—Adaptation to the stress of training is a cumulative process. You do not do a workout and gain an immediate positive training response, unless it is a relatively small technical adjustment. Often times you will see the true results of a significant investment in training up to a year after the initial training stimulus.

The effect of training accumulates over time, provided training has been consistent and the athlete has been able to stay injury free. Adaptation to different training demands occurs at different rates and the ultimate training adaptation is the synergistic accumulation of the collective training responses. Remember one workout cannot make an athlete, but one workout can break an athlete. Be patient, wait for training to take effect.

Principle of Variation—The variables of training volume, intensity, frequency and exercise selection must be constantly manipulated in a systematic manner. Because the body adapts to training stress so quickly it is important to vary training in order to insure continued adaptation. This variation should not be random, but systematically planned in order to measure the effect of the variation. If training is not varied the body will adapt quite quickly and the training effect will be dulled. If no variation is incorporated there is a significant risk of staleness and eventual overtraining.

Principle of Context—Before we incorporate something into training we need to see where it fits into the context of what is already being done and what is planned. The biggest violation of the principle of context is to take one component, for example speed or strength and train those to the exclusion of all other physical qualities. This is fundamentally unsound. It is possible to design a program where a component is emphasized for a phase, but it should be kept in proportion to the other components and put into the context of the whole training plan.

Principle of Overload—In order for the athlete to progress they must be subjected to a load at a level beyond which they have adapted. Overload is achieved through manipulation of the training variables of volume, the amount of work, intensity, the quality of the work, and frequency of application of the training stimulus. Because there is a reciprocal relationship between volume and intensity, it is important to be careful about increasing both at the same time. It is easy to fall into a trap of overload through volume. This happens because it is easier to quantify training in terms of volume, more runs, more jumps or more throws. This quickly becomes a trap because you cannot keep adding volume without quickly reaching the point of diminishing returns. It also happens because at the start of the athletic development process volume loading results in rapid and sometime spectacular gains. Remember that volume is not a bio-motor quality. In essence, the more you do the better you get. As training age advances that paradigm has to shift and the overload has to come more from intensity.

Principle of Recoverability—The ability to recover both short term and long term from a workload is crucial to positive adaptation to the training stimulus. If the athlete is unable to recover from the training stress, then it is not an appropriate load. Different athletes have different abilities to recover. No two athletes are the same in ability, nor are they the same in the ability to recover. Of all the training principles— this is the one that is most easy to overlook because it is so easy to get caught up in the work and ignore the ability
to recover.

Ultimately all of this is an educated attempt at prediction of future performance based on evaluation of previous competition and training results. It is achieved through planning and organization of training into a cyclic structure to develop all bio-motor qualities in a systematic, sequential and progressive manner. The goal is optimum development of the individual's performance capabilities. Traditionally, the focus has been on periodization as a model. In order to be more effectively applied, I believe we should focus more on the process and the concepts.

The traditional emphasis in planning has been on the long-term plan. It has been my experience that the longer the period of time for the plan, the less accurate the plan will be. In order to be more effective, the emphasis on long term planning should be on global themes and training priorities based on competition performance, training results, and testing and evaluation data from previous years performance. A shift in focus to the detailed planning of shorter more immediate time periods is more effective and will better serve to meet the needs of the athletes.

Periodization literature is rife with terminology and jargon. We need to make terminology exact and consistent in order to facilitate understanding and communication. I propose that we use the term Planned Performance Training (PPT) instead of periodization, which is a foreign term left over from the old eastern bloc training schemes. Planned Performance Training is defined as the timing, sequence, and interaction of the training stimuli to allow optimum adaptive response in pursuit of specific competitive goals. It is essentially why you do, what you do, in relation to when you do it. This could serve as a step toward updating and revising the concept to fit current sport demands and more accurately reflect current ongoing sport science research.

RECOMMENDATIONS

- Study the applications of the concepts of Planned Performance Training to team sport training.
- Reconciliation and organization of the competitive calendar to allow more thorough planning.
- Agreement on a unified terminology to facilitate effective communication for improved coaching education in the application of the concepts.
- Educate sport administrators on the necessity and value of planning.
- Research methods of monitoring training to better guide planning of training.
- Apply a multidisciplinary approach to planning that draws on history, sociology, anthropology, psychology, biomechanics, physiology and statistics.
- Study successful training programs from the past to further validate and refine the concept.

Hopefully, this overview will help to create further awareness of the necessity of planning and the various influences and ingredients that go into formulating a viable plan as part the whole sport development process.

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PERIODIZATION:

Fancy Name for a Basic Concept

by Steven Plisk, Sports Performance Director for Velocity Sports Performance

"The right amount of unpredictability should not be left to chance."

—A.K. Dixit & B.J. Nalebuff. *Thinking Strategically.* New York, N.Y.: W.W. Norton & Col, 1991.

Textbook definitions of periodization usually go something like this: the planned distribution or variation in training workload and content on a cyclic (periodic) basis. The bad news is that, while this is a mouthful, it's one of the simpler definitions; most are even more complex. The good news is that the underlying idea really isn't tricky at all; it's just a matter of not getting hung up on details. In fact, periodization is nothing more than basic coaching strategy applied to the training process.

WHY ALL THE COMPLICATED TERMS?

*Macrocycles, mesocycles and microcycles…extensive and intensive workloads…training means and methods…general and special tasks…*no doubt about it, periodization has its share of jargon!

There are probably two reasons for that: First, periodization theory originated in Eastern Europe, and many of the original terms don't translate well. Second, we try to impress our peers with our ability to speak "coacheze" . This has enhanced periodization's mystique, but also alienated people in the process. At the very least, many coaches in the West still perceive it as a foreign idea. This is unfortunate because the central idea couldn't be much more straightforward.

DEMYSTIFYING THE CONCEPT

Training periodization is the equivalent of game planning. In much the same way that coaches use certain plays or tactics to set up others during competition—and do so much advance planning and preparation in general—certain training tactics can be used to set up the effect of others. It's basic game theory, or strategic thinking, applied to one's training program. But, as is the case when designing a game plan, it's easy to miss the overall strategy if you're focusing only on the X's and O's.

So here's an alternative definition of periodization*: *the use of planned unpredictability to manipulate or outmaneuver another player—which in this case is the body's adaptive mechanism.* The goal is to influence your counterpart to adjust or redirect its actions in probable ways and prevent it from accommodating your tendencies. This is no easy task considering that our adversary is very "smart", having the collective wisdom of millions of years of evolution (and all the accompanying stressors it is prepared for). We need a principle-based approach to the game because there's no reason to expect simplistic methods to be effective.

This brings us to a critical distinction: In contrast to athletics, where a competitive strategy is used to achieve a "win-lose" outcome, the key in training is a cooperative strategy aimed at a "win-win" result. Although the basic principle of game theory applies in either case, complementing rather than defeating another player is the strategy of choice in this situation. In this sense, periodization is a form of "coopetition."

Coaching is often described as the science of total preparation. In some respects (e.g. game planning, play calling), it can also be described as the art of systematic unpredictability. The trick is to mix your plays with no demonstrable pattern in order to prevent your adversary from effectively countering your tactics. This involves a randomized plan intended to thwart an opponent's ability to anticipate your next move or concentrate its resources at a single point of attack.

* A game is any situation of strategic interdependence where one player's decisions and/or actions interact with another's. Such "games" can be very real, the players need not be persons, and their interactions need not be adversarial. Indeed, a recurring concept in game theory is that convergence (not conflict) of interest is the rule rather than the exception in many circumstances.

The essence of a periodized program design is to skillfully combine different training methods in order to yield better results than can be achieved through exclusive or disproportionate use of any single tactic—even a dominant one. A "mixed methods" strategy can exploit certain physiological responses and achieve specific objectives. The first step in the planning process is to classify training tactics into a rational system. Tables 1-2 outline two reasonable schemes of strength and endurance development methods, respectively, that can be used as a sort of "playbook". These reflect general agreement in the literature, making them useful examples.

APPLIED COACHING STRATEGY

Having clarified what periodization is, let's discuss the goal of one's training strategy. Typically it's threefold:

- exploit complementary training effects at optimal times
- manage fatigue, thereby preventing stagnation or overtraining
- optimize training time and effort

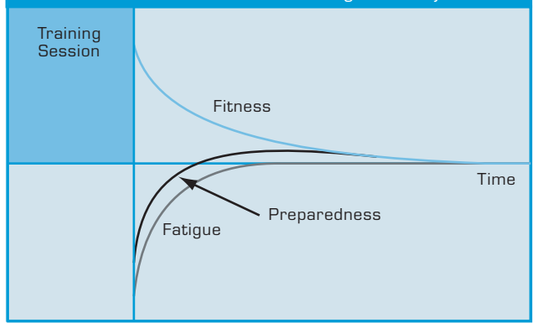
Achievement of these objectives involves long-term, intermediate and short-term planning, usually expressed in terms of macro-, meso- and microcycles. These cycles, in turn, should progress on two fronts—i.e. workloads (extensive to intensive) and tasks (general to special). Corresponding decisions should be made with respect to several factors including the biological responses to training stimuli, athlete's developmental status, and specific demands of the sport.

All of this seems simple enough on the surface. In practice, however, some challenging trade-offs need to be resolved.

DECISION-MAKING

When designing a training program, strategy would be unnecessary if the pieces of the puzzle fell together automatically. Following are some paradoxes that influence the decision making process:

FIGURE 1. Fitness-Fatigue Theory



An athlete's preparedness is determined by the summation of positive (fitness) and negative (fatigue) responses. In contrast to the "supercompensation" theory based on a cause-and-effect relationship between these two processes, this model proposes that immediate training effects are characterized by their opposing action. Reprinted from V.M. Zatsiorsky. *Science & Practice of Strength Training*. Champaign IL: Human Kinetics, 1995; p. 16.

Fitness vs. Fatigue. The prevailing theory of training adaptation is the *fitness-fatigue* paradigm (Figure 1). According to this theory, an athlete's preparedness is defined as the summation of two after-effects of training: fatigue and fitness. In contrast to the "supercompensation" theory based on a cause-and-effect relationship between these factors, the fitness-fatigue model proposes that they have opposing effects.

This has a simple but profound implication for program design and implementation: Preparedness can be optimized with strategies that maximize the fitness responses to training stimuli while minimizing fatigue.

Since fatigue is a natural consequence of training stress (especially with high volume-loads)—and adaptations are manifested during subsequent unloading periods—fatigue management tactics are integral to a sound program.** These can be implemented at different levels:

- Macrocycle—active rest/transition periods after competitive periods
- Mesocycle—restitution microcycles after overreaching microcycles, concentrated blocks or stressful competitions
- Microcycle—maintenance/restitution workloads or recovery days; daily training routines distributed into modules separated by recovery breaks; and additional intra-session relief breaks

Intensity vs. Volume. The idea of a trade-off between intensity and volume seems pretty basic, but has important ramifications because the interaction of these variables drives many of the decisions made when designing training programs. Periodization involves fluctuating emphasis between intensity and volume such that adaptation is steered toward specific objectives, but it is rather meaningless to consider one variable independently of the other; hence the practical value of the *volume-load* concept as an indicator of training stress.

Volume-load prescription should be viewed in the context of productive workload ranges. At the lower end is the stimulus threshold required to trigger desired effects; whereas at the upper end is a point of diminishing returns, beyond which further application yields no beneficial—or perhaps even detrimental—effects. These tend to be moving targets as an athlete's fitness and adaptivity improve with long-term development.

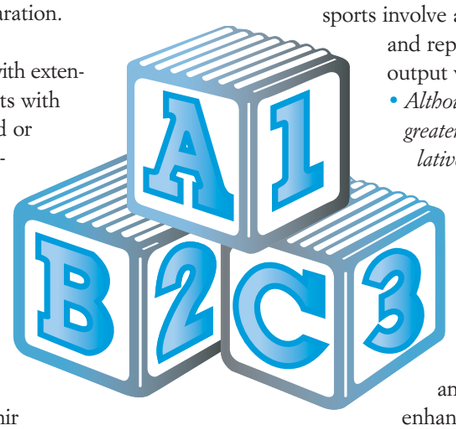
** Rational program design is one prong of a restoration plan that should also address regenerative/therapeutic techniques, nutrition and sleep.

Primary emphasis is generally placed on training quality (i.e. intensity), which can be expressed in quantitative terms such as impulse or power output during task execution. In practice, such parameters are useful indicators of stimulus intensity and corresponding training effect. The central issue regarding programming strategy is the method by which increased intensity is achieved. Variable rather than linear workload progressions tend to yield superior results and can be accomplished through different tactics.

By definition, high work volumes are associated with the development of endurance qualities (Tables 1-2, pg. 18). But work volume also fulfills several other important functions when rationally applied with respect to intensity. In terms of general preparation, extensive volume-loads:

- establish a functional base of work capacity;
- influence the duration and stability of corresponding training effects; and
- are an important prerequisite for intensive efforts involved in special/technical preparation.

Two basic tactics are often associated with extensive work volumes: high-repetition sets with corresponding reductions in workload or increased number of sets and/or exercises. Other tactics, however, should also be considered. For example, volume-loads can be adjusted by periodically manipulating density variables (e.g. training session distribution and frequency) in order to achieve certain objectives.



Specificity vs. Variation. Vladimir Zatsiorsky (*Science & Practice of Strength Training*. Champaign IL: Human Kinetics, 1995; pp. 108-135) points out that a sound periodization plan is a trade-off between the conflicting demands for fluctuation (according to the law of variability) vs. stability (to satisfy the demand for specificity). Optimal effects are achieved through systematic variation in training content and/or workload, whereas monotonous loads or tasks—e.g. entirely activity-specific movements—can predispose an athlete to accommodation or stagnation problems. This is the rationale for regular application of novel stressors. In practice, the challenge is to structure these into appropriate variation "bandwidths".

A basic principle of training is that adaptation becomes increasingly specific to the demands imposed on an athlete as his/her preparation level improves. Specificity exists on several fronts including biomechanical, coordinative and energetic, all of which are useful criteria for selecting and prioritizing training tasks. After completing a needs analysis, the relative emphasis placed on different means and methods should be influenced by the athlete's developmental status, especially with regard to critical or sensitive periods. Pre-adolescence seems to be the optimal window for enhancing the "coordinative abilities" upon which motor skills are based. Although these are still trainable to an extent during and after adolescence, training should shift toward a greater emphasis on strength/power improvement upon reaching puberty. This issue has intriguing implications in all aspects of program planning, but receives little attention in the West.

Strength vs. Endurance. Certain types of endurance training can hinder strength and power development when performed concurrently, at least in previously untrained subjects. This creates a dual problem:

- *High levels of these qualities must be developed in specific combinations in order to optimize athletic performance.* Even brief, explosive "power sports" require special endurance qualities in order to achieve the prescribed volume-loads in training; whereas prolonged "endurance sports" often involve a series of brief, explosive spikes in power output. And, of course, most transitional sports involve a blend of sub-maximal activity and repetitive, intense bursts of power output with limited relief allowance.
- *Although advanced athletes can tolerate greater training stress than novices, cumulative fatigue can be problematic when developing multiple fitness qualities simultaneously.* Unfortunately, such compatibility studies on trained subjects are lacking.

The challenge in practice is to integrate strength and endurance training effects such that they enhance (rather than interfere with) one another. In basic applications, this may be achievable with fairly simple training and recovery tactics. For qualified athletes, however, advanced strategies are valuable in minimizing cumulative fatigue and compatibility problems.

Periodization vs. "Programming". If there is one self-limiting tendency among coaches, it is that we often focus on numerical models rather than underlying strategy when designing programs. This may be an artifact of the rep/set counting mentality that was prevalent before periodization became popular in the West. In any case, it poses an interesting problem: A given training stimulus (input) results in a response (output) that is not entirely predictable.

According to Mel Siff (*Supertraining* [5th Edition]. Denver CO: Supertraining Institute, 2000; p. 326): "The use of numerical computations as the sole descriptor of loading often overlooks the fact that apparently objective measures like this do not take into account the athlete's *subjective perception of the intensity and overall effects of the loading*." He recommended a combined objective-subjective approach referred to as "cybernetic periodization" where zones of workload intensity are planned in advance, but tactics are adjusted as necessary based on technique evaluation by the coach as well as performance feedback from the athlete (e.g. regarding perceived effort/fatigue).

This is not meant to dissuade coaches from calculating a thoughtful game plan. The salient point is that volume-load parameters, rep/set schemes, and so on are secondary to training goals and objectives. Furthermore, rather than applying them rigidly, intuitive factors can be used to make prudent adjustments during implementation.

CYCLIC PROGRAM STRUCTURE

Early periodization models were usually based on the competitive calendar more so than on adaptive processes because information regarding the latter was limited. As our knowledge base has expanded, it has become apparent that there are opportunities to augment training effects by exploiting certain biological phenomena. For example, by using appropriate sequencing or timing strategies, the after-effect of one training stimulus can modulate the response to another. This is a fundamental objective of contemporary periodization: to systematically converge the cumulative or interactive effects of different means and methods—i.e. to set up one play with another.

Rate of involution (decay) of various training effects is a central consideration in cyclic program design. Acutely, involution is a function of the half-life of structures synthesized during adaptive tissue remodeling. As might be expected, their time courses vary (e.g. the half-life of glycolytic enzymes is relatively brief, ranging from ~1½ hours to a few days; whereas oxidative enzymes turn over less rapidly, and myofibrillar proteins have a comparatively greater life span). Chronically, involution is modulated by the length of the preparation period. In general, the greater the duration of a training program, the more stable its residual training effect. This allows fitness qualities acquired during one phase to be maintained with relatively small volume-loads during the next, such that emphasis can be redirected and cumulative fatigue problems can be minimized.

The consensus arising from the literature is to organize training programs into 4-week periods, which seem to be an optimal biological window for integrating responses:

- Leo Matveyev (*Fundamentals of Sports Training*. Moscow: Fizkultura i Sport, 1977; Moscow: Progress, 1981 [translated by A.P. Zdornykh]; pp. 245-259) cites natural monthly bio-cycles as a rationale for constructing training cycles that are approximately 1 month in duration, each consisting of 3-6 subcycles of approximately 1 week duration, in order to exploit cumulative training effects.
- Atko Viru (*Adaptation In Sports Training*. Boca Raton FL: CRC Press, 1995; pp. 241-299) cites the half-time of training effect involution as the rationale for a 24–28 day cyclic training structure consisting of 4–6 subcycles, each 4–7 days in duration, in order to summate their training effects.
- Vladimir Zatsiorsky (*Science & Practice of Strength Training*. Champaign IL: Human Kinetics, 1995; pp. 344–421) cites the need to structure training cycles around a 4 ±2 week window in order to superimpose the delayed training effects of distinct targets distributed over that time.

Even the most advanced training strategies generally agree with this monthly cycle guideline. This period can be structured in at least two different ways: as a mesocycle to be subdivided into multiple microcycles and objectives (for basic and intermediate applications); or as a "block" with essentially one objective arranged as part of a series (for advanced applications).

SUMMARY

Perhaps the most important take-home message regarding periodized training is to use cooperative program design strategies. Clearly we want to influence, but not defeat, our athletes' adaptive processes. Mix your plays and think win-win!

Periodization is the use of planned unpredictability to manipulate or outmaneuver another player—in this case, the body's adaptive mechanism. Influence your counterpart to adjust or redirect its actions in probable ways while preventing it from accommodating your tendencies. This is a simple extension of coaching strategy: Mix your plays with no demonstrable pattern so your adversary can't effectively counter your tactics.

Training effects can be optimized—and adaptation directed toward specific goals—by prescribing a bandwidth of appropriate stimuli such that the response to one amplifies another. Organize training programs into 4-week periods. This seems to be an optimal biological window for integrating responses.

Finally, periodization is just one example of game theory applied to sports training. For example, consider the possibilities in skill instruction and acquisition: The "contextual interference" effect is a well-established motor behavior/learning phenomenon, where random and variable practice methods result in short-term performance decrements but improved long-term retention. This has important teaching ramifications for skill-based training programs.

SUGGESTED READING

Haff G. (chair), Kraemer W., O'Bryant H., Pendlay G., Plisk S., Stone M. Roundtable discussion: periodization of training [part 1-2]. *Strength & Conditioning Journal* 26(1): 50-69, 2004; 26(2): in press, 2004.

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NOTE: Part II of this article is available on www.usolympicteam.com/sportscience

TABLE 1: Continuum of Classic Methods for Specialized Strength Development

[objectives are indicated in brackets]

MAXIMUM STRENGTH

- Brief maximal efforts [intra/intermuscular coordination; rate of force development]
  - relative intensity ... 75–100%
  - action speed ... slow to explosive
  - volume ... 15–25 reps/session @ 95–100%; 20–40 reps/session @ 90–95%; 35–85 reps/session @ 80–90%; 70–110 reps/session @ 75–80% (8 reps/set for low skill movements; 3 reps/set for high skill movements)
  - density…full (up to 8 min) recovery between sets
- Repeated submaximal efforts [hypertrophy]
  - relative intensity…80-90%
  - action speed…slow to explosive
  - volume…5–10 sets per exercise
  - density…1–4 min recovery between sets; 24–48 hours between sessions
- Combination methods

SPEED-STRENGTH

- Submaximal accelerative efforts [power; rate of force development]
  - relative intensity…30–85%
  - action speed…explosive/maximal
  - volume…3–7 sets per exercise; 1–3 reps/set @ 85%; 3–5 reps/set @ 80–85%; 5-8 reps/set @ 70–80%; 8–15 reps/set @ <70%
  - density…2–8 min recovery between sets; daily sessions
- Reactive-ballistic efforts [stretch-shortening cycle; stiffness regulation]
- Contrast methods [acute after-effects; potentiation]

STRENGTH-ENDURANCE

- Extensive interval [low/moderate intensity endurance capacity; recoverability]
  - relative intensity…30–40%
  - action speed…brisk/continuous
  - volume…3–6 sets per exercise; 20–30 reps per set
  - density…<5 min recovery between sets
- Intensive interval [high intensity endurance capacity; recoverability]
  - relative intensity…50–60%
  - action speed…explosive
  - volume…3–6 sets per exercise; 20–45 second duration per set (rep count is irrelevant)
  - density…1–3 min recovery between sets

Reprinted from S.S. Plisk. Muscular strength and stamina. In: B. Foran (Editor), *High-Performance Sports Conditioning*. Champaign IL: Human Kinetics, 2000; pp. 63-82.

TABLE 2: Continuum of Classic Methods for Specialized Strength Development

[objectives are indicated in brackets]

COMPETITIVE-TRIAL [Special Endurance]

- Supramaximal training
  - intensity…greater than competition
  - duration/distance…less than competition
- Maximal training
  - intensity…equal to or less than competition
  - duration/distance…equal to competition
- Submaximal training
  - intensity…less than competition
  - duration/distance…greater than competition

DISTANCE-DURATION [Submaximal Endurance]

- Continuous training…70–95% competitive speed/power
- Fartlek training…unstructured changes in intensity, duration, volume and density
- Variable training…structured changes in intensity, duration, volume and density

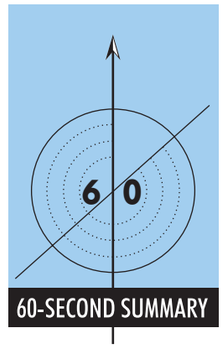
INTERVAL [Speed-Endurance]

- Extensive training
  - relative intensity…low-medium (60–80% competitive speed/power)
  - duration/distance…short-medium (e.g. 14–180 sec over 100–1,000 m running distance for advanced athletes; 17–100 sec over 100–400 m running distance for novices)
  - volume…large (e.g. 8–40 reps for advanced athletes; 5–12 reps for novices)
  - density…high; short incomplete relief interval allowing HR to recover to 125–130 bpm for advanced athletes or 110–120 bpm for novices (i.e. <_ time needed for complete recovery; e.g. 45–90 sec or 60–120 sec for advanced or novice athletes, respectively)
- Intensive training
  - relative intensity…high (80–90% competitive speed/power)
  - duration/distance…short (e.g. 13–180 sec over 100–1,000 m running distance for advanced athletes; 14–95 sec over 100–400 m running distance for novices)
  - volume…small (e.g. 4–12 reps for advanced athletes; or 4–8 reps for novices)
  - density…medium; longer but still incomplete relief interval allowing HR to recover to 110–120 bpm (e.g. 90–180 sec for advanced athletes; 120–240 sec for novices)

REPETITION [Speed/Agility]

- relative intensity…very high (90–100% competitive speed/power)
- duration/distance…very short/medium (e.g. 2–3 sec up to several min)
- volume…very small (e.g. 3–6 reps)
- density…low; long near-complete rest interval allowing HR to recover to 100 bpm (e.g. 3–45 min)

Reprinted from S.S. Plisk. Speed, agility, and speed-endurance development. In: T.R. Baechle & R.W. Earle (Editors)/National Strength & Conditioning Association, *Essentials of Strength Training & Conditioning* (2nd Edition). Champaign IL: Human Kinetics, 2000; pp. 471-491.



Scientific Bases for Precompetition Tapering Strategies

by Inigo Mujika and Sabino Padilla

Medicine and Science in Sports and Exercise, Vol. 35, No. 7, pp.1182–1187, 2003

REVIEW

This is a must-read article for any coach. Mujika and Padilla have extensively reviewed 50 scientific articles that focus on the topic of tapering. The authors state that this "paper intends to establish the scientific bases for the precompetition tapering strategies."

The definition of a taper by the authors is "a progressive nonlinear reduction of the training load during a variable period of time, in an attempt to reduce the physiological and psychological stress of daily training and optimize sports performance."

A mathematical model was used to analyze national and international swimmers response to three tapering models: 1) Reduction of training intensity 2) Reduction in training volume 3) Reduction in training frequency.

The results showed that a high level of training intensity was one of the keys to an effective taper. "Total blood volume, red cell volume, citrate synthase activity, muscle glycogen concentration, muscle strength and running time to fatigue were optimized only with the high-intensity, low volume taper."

In regards to volume, a "better physiological performance results with a low-volume taper than with a moderate volume taper." The authors reviewed the effects of a progressive taper with a 50–75% reduction of volume over 6 days and concluded that a "75% reduction was a more appropriate strategy to optimize adaptations." "The beneficial consequences of significant progressive 50–90% reductions in training volume during the taper have repeatedly been underpinned by several researchers" in a variety of sports.

Johns research with competitive swimmers shows that a 50% reduction in frequency during a 10 and 14 day taper increased power and performance in swimmers. However, after reviewing other studies and factors the authors state "that whereas training adaptations can be readily maintained with quite low training frequencies in moderately trained individuals (30–50% of pretaper values), much higher training frequencies should be recommended for the highly trained, especially in the more "technique-dependent" sports such as swimming (>80%).

"Positive physiological, psychological and performance adaptations have been reported as a result of taper programs lasting 4–14 days in cyclists and triathletes, 6–7 days in middle and long-distance runners, 10 days in strength trained athletes and 10–35 days in swimmers. Kenitzer and Kubukely, et al. recommended that two weeks is an optimum taper duration. "Taper duration must be individually determined for each athlete, in accordance with their specific profiles of adaptation to training on the one hand, and loss of training-induced adaptations on the other hand."

In analysis of Linear, slow Exponential, fast Exponential or a Step taper, it was noted that the fast Exponential taper had the greatest improvement in performance.

SUMMARY OF OPTIMAL TAPERING STRATEGIES

- Minimize fatigue without compromising fitness
- Maintain training intensity
- Reduce training volume by 60–90%
- Maintain training frequency at >80%
- Individualize taper duration between 4 and 28 days
- Use progressive, nonlinear tapering designs
- Expect performance improvement of ≈3% (range 0.5–6.0%)

MIND GAMES

What Coaches Can Learn from Great Managers:

"Breaking All the Rules" in Selecting and Coaching Your Athletes

by Kirsten Peterson, Ph.D.,
USOC Sport Psychologist

[Athletes] don't change all that much.
Don't waste time trying to put in what was left out.
Try to draw out what was left in.
That is hard enough.

This paraphrase is at the heart of a 1999 best-selling management book entitled *First, Break All the Rules*. Through numerous in-depth interviews of the best versus average managers, the authors of this book question the conventional wisdom about how to select for and develop productive employees. The main findings of this book have some interesting implications for coaches interested in maximizing the performance of their athletes.

UNDERSTANDING SKILLS, KNOWLEDGE, AND TALENT

Central to this book's message is that skills, knowledge and talents are distinct and different concepts. The authors argue that understanding these distinctions are critical for coaches eager to tap their athletes' potential in its entirety. One such distinction that great coaches already know but that managers are just beginning to realize, is that while skills and knowledge can be taught, talent cannot. What is interesting for coaches is what falls under the heading of "talent" and is therefore considered unchangeable. For the sake of clarity, here is how each of these terms is defined.

Skills are the "how-to's" of a role—capabilities that can be transferred from one person to another. Knowledge, on the other hand, comprises what you're aware of factually as well as what you have learned from experience. Experiential knowledge is what you pick up over time as you reflect back on your experiences and draw connections and patterns and includes, among other things, your unique perspective, your biases, and your values. The athlete who is able to analyze her competitive experiences to determine what works best for her during competition is developing her experiential knowledge.

Talent, the authors contend, is distinct from knowledge and skill and is the product of how your brain's pathways developed in response to your unique upbringing and which kinds of thinking and behaving were rewarded or punished along the way. In short, your talents are your recurring thoughts, feelings, or behaviors. The authors have identified three types of talents:

1. Striving. This talent explains the "why" of an athlete. What motivates her? Is she competitive, achievement oriented, afraid to fail?"

2. Thinking. This talent explicates the "how" of an athlete. How he thinks. Is he disciplined? Organized? Spontaneous?

3. Relating. This talent explains the "who" of an athlete—who he is drawn to or repelled by, is he introverted or extroverted?

Great coaches, therefore, should find their players roles that play to those players' talents and can do so in two ways. They create the environment that allows each athlete's talent to flourish. Second, they define the right outcomes and allow each athlete to find his own route to those outcomes.

Some coaches might question the idea that qualities like "drive" and "motivation" are unchangeable. There is little that is as frustrating as the highly skilled athlete who is not motivated to train or compete her perceived potential. Few sport psychologists escape the question from coaches wanting to know how to better motivate those one or two gifted, but seemingly uncoachable athletes. Great coaches, like great managers, have learned something from this kind of frustration, and have learned to redefine the issue. Accepting that an athlete's source of motivation is unchangeable does not necessarily mean that you cannot succeed with him. It may just mean that you have not yet individualized your approach enough to help his particular striving talent emerge.

LESSON #1: Individualize Your Approach to Cultivate and Maximize the Talents of Your Athletes.

Great managers will tell you to focus on each person's strengths and manage around his weaknesses. Don't try to fix the weaknesses. The lesson for coaches? Don't try to perfect each of your athletes. Instead do everything you can to help each athlete to cultivate his talents. Help each athlete to become more of who he already is. Keep in mind that this does not mean that athletes cannot learn to do things differently. Skills and knowledge are malleable. Talent, however, is not.

Great managers can describe in detail the unique talents of each of their people: what drives each one, how each thinks, and how each builds relationships. Great coaches do the same. Ask your athletes about their goals, about where they see their career heading, and how they want to interact with you. Other great questions for your athletes:

- Do you want public recognition or private? Written or verbal?
- Tell me about the most meaningful recognition you ever received. Why was it memorable?
- How do you learn best?
- Who was the best coach you had? How did he or she help you?

Great managers consistently reject the Golden Rule: Don't treat your people as you would like to be treated… treat them how each of then would like to be treated.

The hardest thing about being a manager is realizing that your people will not do things the way you would. But get used to it. Because if you try to force them to, two things happen. They become resentful—they don't want to do it. They become dependent—they can't do it. And neither is productive over the long haul. (*First, Break All the Rules*, page 151.)

LESSON #2: Spend Most of Your Time With Your Best Athletes

"The harder he works, the better he performs, and the more leeway he gets from me."—*Jimmy Johnson, NFL Coach*

Great coaches such as Jimmy Johnson break conventional wisdom management rules by refusing to apply one-size-fits-all approach to the athletes in their charge. They reject the traditional approach that suggests the best use of time is to bring up the lowest performers, and to assume that their best athletes are doing fine without them. Great managers agree, for the following reasons:

1. It's fair. The only way to treat someone fairly is to treat them as they deserve to be treated (not treating everyone the same) bearing in mind what they have accomplished.

2. It's the best way to learn. You as a coach can't learn about excellence by only spending time with those athletes who need more work. Ask questions and spend time with your best athletes. Listen to what they do, watch how they do it. Replay it, dissect it, and understand what happened and why it worked.

3. It's the only way to reach excellence. The best managers don't use "average" but "excellent" as the standard to judge performance. Those who are already performing above average are the ones most likely to reach excellence.

LESSON #3: Be a Catalyst

Great managers refuse to limit their role to controller or instructor. Instead, they spend their time trying to figure out better ways to unleash their best performers' distinct talents. Certainly all coaches would consider teaching to be central to their role, since sport skill acquisition is obviously critical to athletic success. Taken on its own, however, skill is often not enough. Consider Michael Jordan and the Chicago Bulls, who languished as play-off non-contenders for several seasons before Michael was persuaded to redirect his considerable skills to put the interest of the team's success over his own. Here are some ways that you become more of a catalyst with your athletes:

- Strive to cut out a unique set of expectations for your athletes that stretch and focus them.
- Highlight each athlete's unique style. Draw his attention to it; help him understand how it works for him and how to perfect it.
- No news is not good news for athletes—it kills behavior. Great coaches don't forget to continue to reinforce the talents of their best performers. If you see your stars acting up, it is a sure sign that you have been paying attention to the wrong behaviors and the wrong people.

As the authors of "First, Break all the Rules" rightly point out in their introduction, there are more differences than similarities between the world's best, be it coaches or managers. Beyond these differences in style, however, there do appear to be some universal truths in how best to help your athletes achieve their best. Don't be afraid to break some rules along the way.

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OLYMPIC COACH E-MAGAZINE

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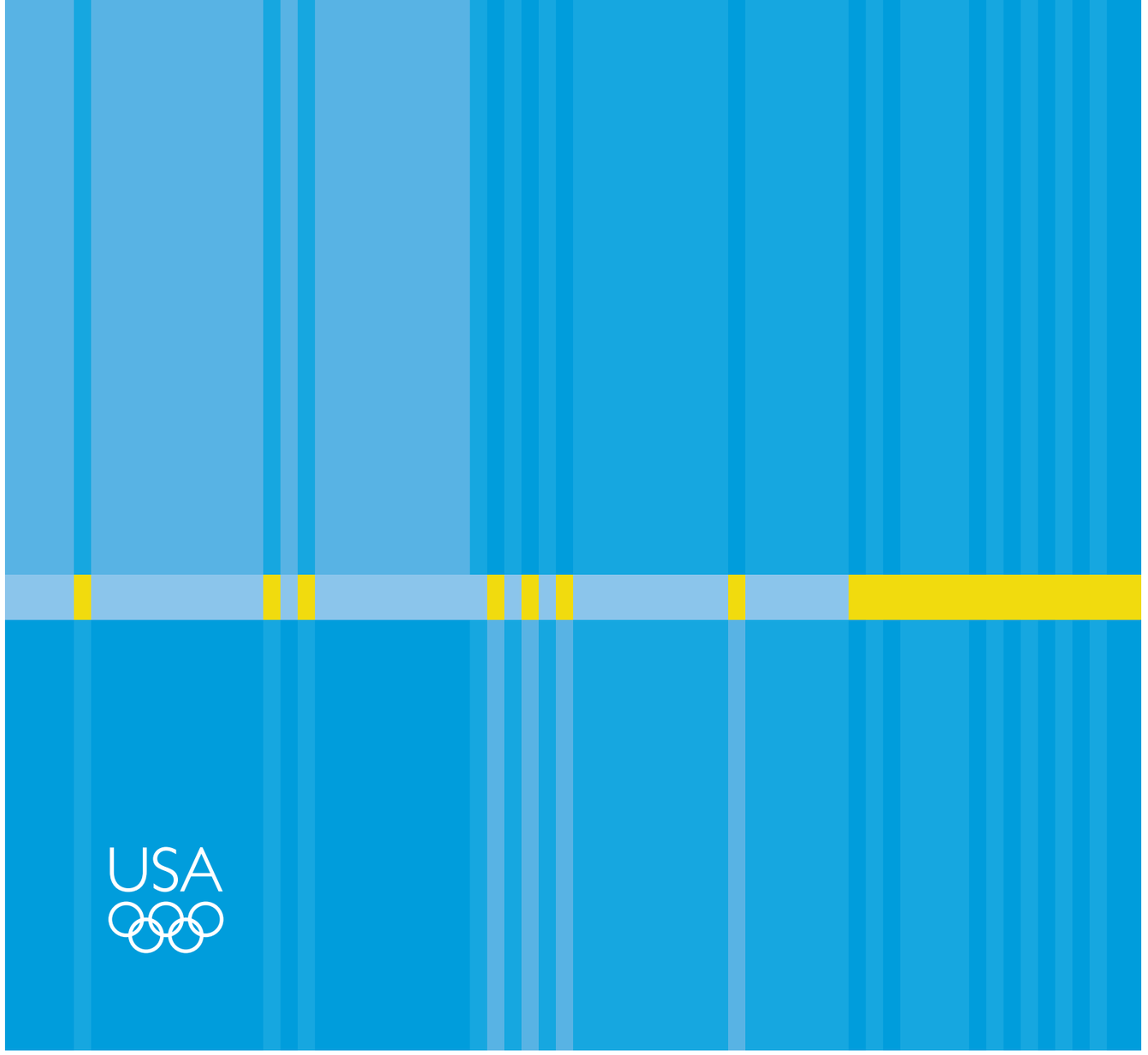
SARAH LEITH

Sarah Leith of Hulets Landing, New York competes in the Womens K-1 Class during the U.S. Olympic Whitewater Slalom Canoe/Kayak Team Trials on April 4, 2004 at the East Race Waterway in South Bend, Indiana. She finished second in her division and made the Olympic Team. **PHOTO BY ANDY LYONS/GETTY IMAGES**



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