

Introduction to Modern Tennis Periodisation

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The focus of this issue of ITF Coaching & Sport Science Review is to investigate the concept of periodisation training as it relates to the sport of tennis. Specifically, we have asked some of the top experts from a variety of different countries to not only provide the theory but also, and more importantly, to focus on the practical aspects of periodisation as it relates to different ages and levels of players. Since periodised programs should be designed specifically for the individual, it is difficult to generalise, however the authors have for the purpose of these articles grouped tennis players into 14-under, 18-under and professional players.

WHAT IS PERIODISATION?

Although relatively new to the sport of tennis, the concept of periodised training was first used by the Greeks during the Olympic Games of the Ancient Era. The foundations of modern periodisation however, were laid in the former Soviet Union during the first two decades of the XX century. Since then, interest in periodisation has gradually grown and discussions between Russian and "Eastern" experts and "Western" specialists have filled books, articles and presentations.

Simply put, periodisation can be considered a process of structuring training into phases to maximise athletes' chances of achieving peak performance, and therefore their competitive goals (Bompa, 1999). Each phase contains different training contents largely reflecting that phase's generic goal: preparation, competition, peaking, and transition. They are also organised into, or to comprise three types of cycles: microcycle, mesocycle, and macrocycle. A microcycle is generally up to 7 days, and tends to assume a very specific function: ordinary, introductory, restorative, competitive or shock (Matveyev, 1981). A mesocycle may be anywhere from 2 weeks to a few months, while a macrocycle refers to the overall training period, usually representing a year.

The General Adaptation Syndrome developed by Hans Selye in the 50's remains central to modern day periodisation (Fleck, 1999). The models however, through which this adaptation is achieved have evolved significantly over the last 20 years. Nevertheless, many coaching resources continue to refer to periodisation almost solely in terms of Matveyev's early linear or traditional model (Matveyev, 1964).

Summarised as the combination of low intensity/high volume training progressing to high intensity/low volume training so as to coincide with one or more competitive peaks during every macrocycle, the model has been widely used across sports. Generally, from a physical perspective, it consists of a hypertrophy phase, a strength phase, a power phase, and a restorative phase. The model however is not without its limitations. For example:

- It does not consider the influence of different exercises on each other in a training program, and unrealistically assumes that any one component of a program can be measured independent of the others.
- It fails to account for the player's subjective perception of the intensity and overall effects of the loading, while also paying minimal attention to player's different individual performance needs.
- The model's smooth merging of training sessions and stages may be suitable for novices but not for more advanced players. For example, an increase in intensity while maintaining the same volume has been shown to enhance performance once a player has reached a certain level.

While suitable for athletes of certain sports and certain levels of mastery, it is neither the only periodisation scheme nor the most applicable in all situations, and obviously not in high performance tennis. For this reason, coaches and trainers have started to employ alternative means of periodising training.

PERIODISATION IN TENNIS

Periodisation in tennis can be quite complicated due to a number of factors. First and foremost, tennis does not have an official off-season like many other sports. Tennis players don't have the luxury of just one major event every four years (the Olympics) or even one or two major events per year. In fact, tennis with its many different ranking systems and different levels of tournaments offers many different opportunities for all levels of players to compete each and every week of the year. As an example top professionals and juniors try to "peak" for the Grand Slam tournaments

(the juniors obviously for the junior Grand Slams), but at the same time are cognisant of the need to play well at other tournaments to improve or "protect" their rankings. To make things even more complicated, it makes a big difference if tennis players: 1. lose in the first round of a tournament or make it all the way to the finals, 2. have a long or short match (or series of matches), 3. have to travel a long way to reach the tournament, 4. play in a very hot and humid environment (or switch environments regularly), and 5. compete on different court surfaces.

All of these variables have a major impact on the type and quality of training, and in many ways accentuate the problems associated with the traditional linear model of periodisation proposed by Matveyev. With this in mind, coaches should consider the merits of applying the following periodisation models to tennis training (Table 1, Siff and Verkhoshansky, 1996). More globally, they should also evaluate how these different models can fit as part of an overall player development plan. That is, if as research suggests it takes 8-12 years or 10,000 hours of training for a talented player to reach the game's elite (Bloom, 1985; Ericsson and Charness, 1994; Salmela, Young and Kallio, 1998), periodisation should most certainly become increasingly non-linear as players mature.



Periodisation is important for both junior and senior players.

Model	Characteristics
Wave	Smooth wave-like variations of the load over definite phases, with volume during the competitive phase ~10-15% lower than the maximum that is reached during the preparatory phase (Matveyev, 1981).
Step	Endorsed by researchers such as Yakolev and Ermakov, it involves abrupt step-like alternation of loads of different intensity (light, medium, heavy) over the short-term and long-term. At the short-term level, the training load is varied sharply from session to session, and in the weekly and monthly cycles. Its success has been corroborated by the research of several workers (Vorobyev, 1978).
Combination	Equal distribution of training loads comprising of strength and technical skills work. Increase in strength without concurrent improvement in sport-specific skills training is considered inefficient.
Undulating	Wave-like concentration of loading with a given primary emphasis for about 5-10 weeks at a time. Each concentrated load with one emphasis acts as the foundation for the next load with a different primary emphasis, so that pronounced adaptation occurs in time for major competitions. This method is intended for more highly qualified players and must be prescribed intelligently to avoid overtraining during any given phase. It actually adjusts the sets, reps, speed of movement (tempo), and rest period every single workout, and has been proven to be more effective in inducing maximum strength gains than traditional linear or alternating models.
Pendulum	Smooth, uniform, rhythmical alternation of the different components of training.
Overreaching	Volume or intensity is increased for a short period of time (one to two weeks), followed by a return to "normal" training. This method is used primarily with advanced strength trained athletes.
Other	Long-term training can be organised according to perceived daily maximum loading, intuitive or ad hoc prescription on a short-term basis, fairly random use of supplementary training methods, up and down pyramiding, etc.

Table 1. Periodisation models for tennis training.

TRAINING PRINCIPLES

Regardless of the age or level of the player, the success of any periodised program requires that some key training principles are followed.

1. Planning: Planning for the year should be methodical and based on scientific methods and knowledge. This will help players achieve the highest level of training and performance. Long term as well as short term plans should be developed. There should be enough flexibility in these plans to allow for variation depending on successes and failures as well as injuries and other unplanned for factors. Plans should be made for the different phases of periodisation, training weeks, tournament weeks, longer training sessions (no match or short match days) and short training sessions (long match days).

2. Volume: This is also known as the duration or the amount of work players perform or how long they train. This concept is often misunderstood, especially by junior players. It is not the quantity of time spent in training that makes a player better, rather it is the quality of time spent in training both on and off the court that helps a player improve.

3. Intensity: Intensity indicates how hard a player trains. This concept clearly ties in to the idea of quality vs. quantity. It is much better for example to have a very intense two-hour training session, than a lackluster four-hour training session.

4. Frequency: This concept deals with how often a player trains. Also closely related to

volume and intensity, the frequency of training has to be closely monitored by coaches. Rest and recovery are as important to a proper training program as all the other variables, both from a physiological and a psychological perspective.

5. Specificity: This concept relates to how similar the training is to the actual demands of tennis. It doesn't necessarily mean that the movement patterns used during training have to mimic the sport. In fact, in many cases the opposite is true. Antagonist muscles may actually have to be trained concentrically to provide much needed muscular balance for tennis players.

6. Variation: How often do players vary their training? Players can get stale if coaches do not apply enough variation in the day-to-day training programs. Again, this principle applies to both on and off-court training. In addition to preventing burnout, players will also train muscle groups in a variety of ways which will add to the overall enjoyment of their training program.

SUMMARY

Coaches and players have long been aware of the benefit of changing the training stimulus at regular or even irregular intervals. Tapering training volume prior to competition, planned periods of active rest, and interspersing power and strength workouts to challenge different energy systems are all attempts to elicit adaptation, and improve performance, in tennis players. To do this consistently and with planned intent, coaches should look to make use of the emerging models of periodisation that

are likely to better accommodate the game's unique matchplay, training and travel demands.

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