

MAIN FEATURES OF A MODERN SCIENTIFIC SPORTS TRAINING THEORY

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The aim of this article is to outline the main concepts of a modern scientific theory of sports training which takes into account both the recent findings in biological sciences and the requirements of elite sports. Before dealing with sports training theory the essence of the training process in sports is established; the causative factors, the mechanisms and the rules governing the acquisition of sports skills during training are explained, and the main requirements regarding the content and organization of the training process are determined. The continuous development of an athlete's motor potential and of his or her efficiency in exploiting this potential is identified as the main constant in the training process, while the athlete's ability to utilize this potential is regarded as a measure of training effectiveness. The question as to the content and the organization of all the training means and methods which are necessary to guarantee the required "real" work power for a given sports activity is dealt with. It turns out that a modern sports training theory depends on a thorough knowledge of the following aspects: (1) Rules governing the trend of the organism's adaptation to an intense muscle workload under the conditions specific to a given sports discipline. (2) Specific rules governing the acquisition of sports skills for each sports discipline. (3) Rules governing the body's morphological and functional specialization when training according to a plan covering several years. (4) Rules governing the acquisition of technical skills which are the basis for the acquisition of the movement pattern specific to the chosen discipline and for the acquisition of the skill that will allow the athlete to perfectly execute a certain movement pattern during training and during competition. (5) Rules governing the relations between the athlete's functional condition during the longer phases of the training plan and stable workloads. These rules help to understand the trend of the adaptation process during a training cycle lasting one or several years. They are also very useful for the elaboration of the criteria for the organization of the training process.

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1 Introduction

The main methodological concepts of the modern sports training system were established in the early fifties by Russian coaches, who were faced with the problem of preparing Soviet athletes for the XV Olympic Games (Helsinki 1952) and for other major international competitions. Subsequently, L. MATVEYEV, professor of Theory of Physical Education at Moscow's Institute for Physical Education, generalized the principles drawn from years of practical experience and conceived the theory known as "periodization of sports training" (PST, 7). MATVEYEV was not involved in high level sport, but, at the time, the more qualified experts were not interested in the theory of training and, since Soviet athletes obtained good results in international competitions, foreign experts focused their attention on the periodization of training. For quite some time MATVEYEV was highly considered as a theorist of sports training.

Gradually, "periodization of training" became synonymous with "training plan". Many experts and coaches still use PST's artificial and theoretical structure and try to adapt its concepts to their own ideas on the organization of the training process, although their ideas are usually much more advanced. It is now obvious that the concept of periodization has long since lost its theoretical and practical value and must be replaced by a more up-dated theory (1, 5, 8, 14, 16, 18).

The aim of this article is to outline the main concepts of a modern scientific theory of sports training that takes into account the more recent findings in biological sciences and the requirements of high level sports. The concepts are derived from personal experience as a coach in track and field athletics and as consultant for the preparation of Soviet National Teams for various international events. They are also based on the results of several years of research centered on the biomechanics of sports exercises, on special strength training and on the theory of sports training. The theoretical and methodological concepts and their expression are probably not, as yet, definitely established, but they are already sufficient to help sports specialists and coaches to systematize and increase their knowledge and to provide further elements that will develop the theory and practical methodology of training in track and field athletics.

2 The essence of the training process in sports

Before dealing with sports training theory (STT) it is necessary to establish clearly the essence of the training process in sports, to understand the causative factors, the mechanisms and the rules governing the acquisition of sports skills during several years training, and to determine the main requisites as regards content and organization of the training process. In other words one must have a clear idea as to how STT can be useful, how it can effectively help the coach.

On the basis of various years of research, we can say that improvement in sports skills (S) depends mainly on two factors:

1. an increase in motor potential (P), i.e. in the athletes functional capacities;
2. an increase in the athletes ability to exploit this potential during training and competition (T) — see Figure 1.

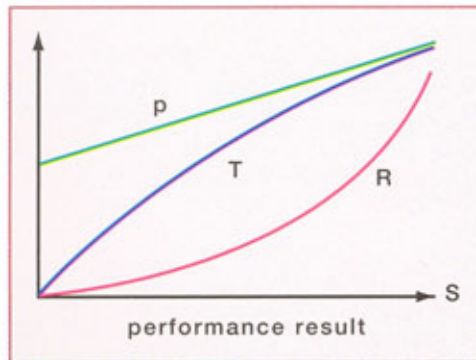


Figure 1: Trend of the increase of the body's motor potential (P) and of the athlete's ability to exploit it (T) as the skill level (S) improves
R is the increase in the intensity of the training stimuli.

As the level of sports skill progresses, the athlete makes better use of his motor potential, which is also improving (curve T comes closer to curve P). It follows that an improvement in performance (S) is determined by a further development of the functional capacities (19).

Therefore, the *main constant in the training process* is the continuous development of an athletes motor potential and of his efficiency in exploiting this potential, while the *effectiveness of the training process* can be evaluated by measuring how much of this potential is in fact put to use (19).

All the other goals and components of the training process, which are certainly important, must be seen as conditions or factors favoring the achievement of this main constant. One of these factors is the intensity of the training stimulus on the athlete's organism: curve R in Figure 1 shows an exponential increase. This indicates that, as performance improves (S), an increase of the motor potential (P) requires a greater intensity of the training stimulus (R).

Figure 2 shows that the motor potential and the athlete's ability fully to exploit this potential determine, for the most part, what we may refer to as the body's effective work power in the specific conditions of a given motor activity; in other words the performance result. An improvement of this result is a consequence of an increase in the body's effective work power, which is brought about by an improvement of the athlete's performance capacity, and of the degree of technical, tactical, psychological and special physical preparation. Also, as the level of sports skill increases, it requires a greater amount of the body's effective work power. For example, an improvement in triple jump performance (S) is determined by a linear increase of run-up velocity (V) and by the athlete's ability to reduce the velocity lost during the phases of touch down and take-off (Figure 3). But this implies an

increase of the muscle power exerted in each take-off phase (N). For instance, to improve performance from 15 to 16 meters implies a 31% increase in muscle power, and this rises to 42%, if the athlete is to progress from 16 to 17m. In both cases, there must be, at the same time, a 5% increase in the run-up velocity.

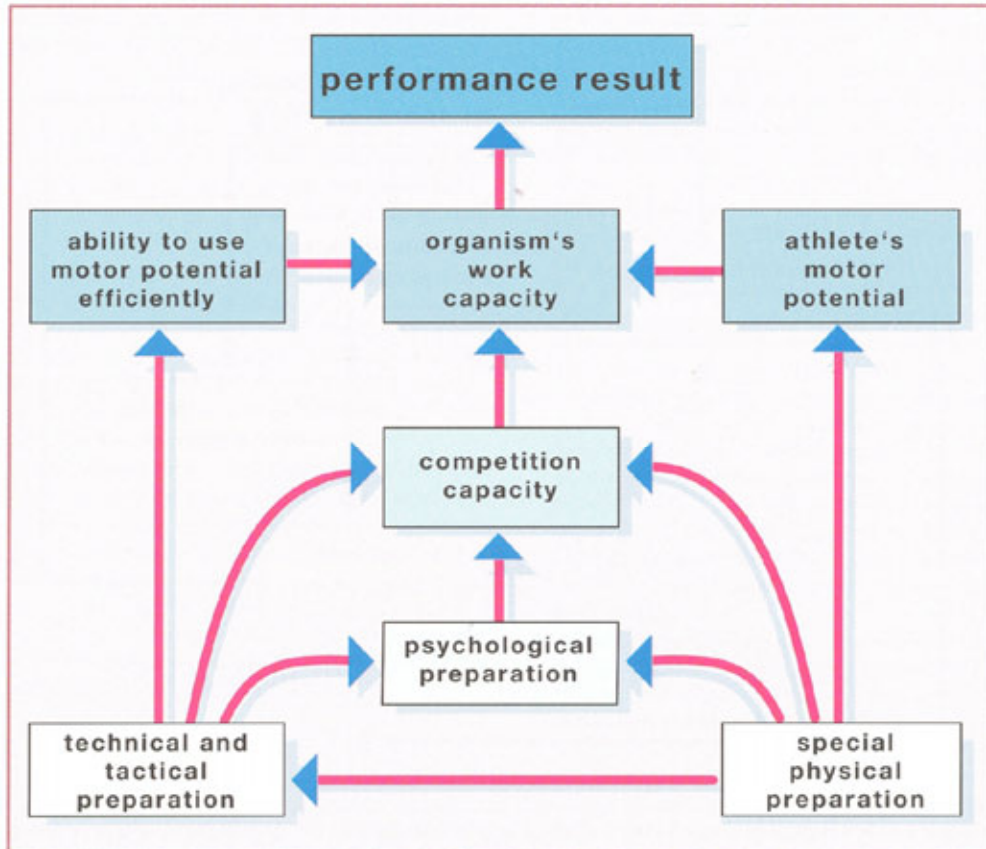


Figure 2: Factors that determine or limit performance result

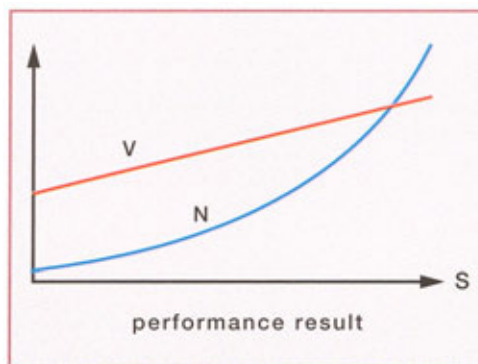


Figure 3: Increase in the work potential of the athlete's structural and motor apparatus (N), such as improvement in the velocity (V) of the run-up and performance (S) in the triple jump

Note that Figure 2 is based on the concept of special physical preparation, which is the main factor influencing an increase in the intensity of the training stimuli

necessary to develop the organism's motor potential, and thus favor the athlete's technical and tactical preparation, which will lead to an improvement in performance.

Figure 4 shows the curve of the athlete's work power (N) as against duration (t). Each sports discipline is characterized by a specific point on this curve. When the discipline requires a significant amount of work power, as for example, in the field events in athletics, this point is found close to the co-ordinates, while it is further away from the co-ordinates for disciplines requiring less work power, as is the case in the long distance running events. We may say that the adaptation of an athlete's organism to the specific work regimen required for a given sports discipline is the main objective of the training process. The knowledge now acquired in sports science allows a relatively easy identification of all the biomechanical and physiological characteristics corresponding to different work regimens.

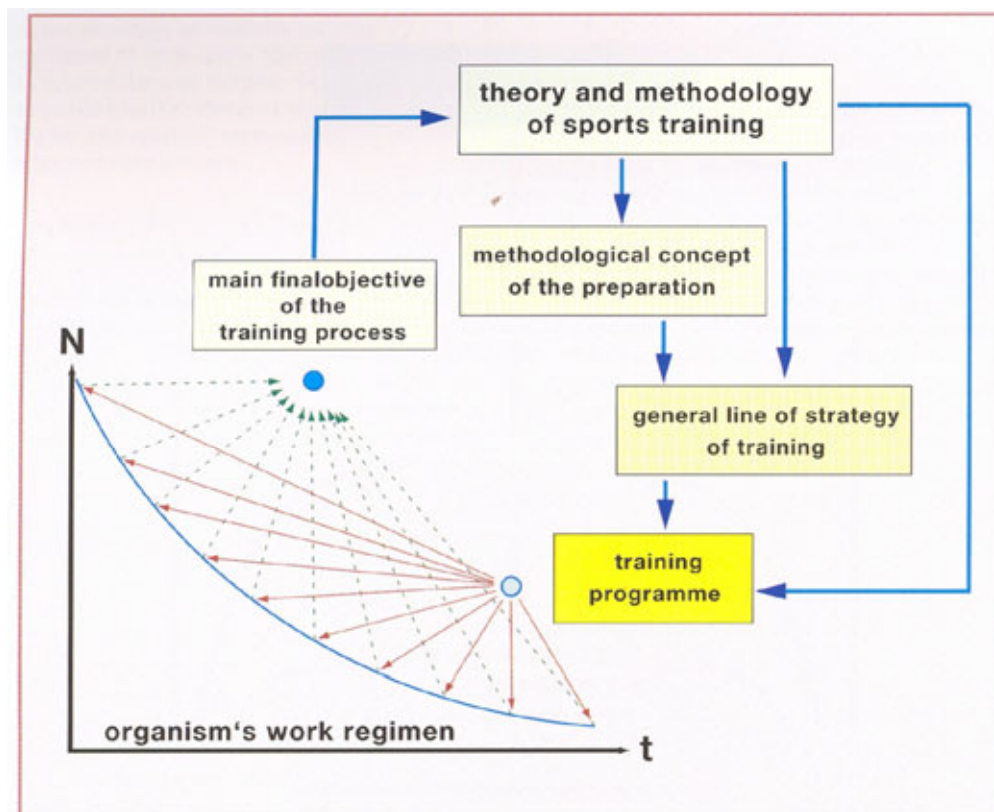


Figure 4: Relationship between the theory of sports training and the organization of the athlete's preparation

3 What should a theory of sports training represent?

This question may be put as follows: what should be the content and the organization of all the training means and methods of each component of the sports training process, in order to guarantee the required "actual" work power for a given sports activity? This is the measure of both the scientific and the practical value of a sports training theory. If the training theory is adequate, the coach will

find in it the basis of an answer to all the more important issues, in particular, the methodological concept of the athlete's preparation, the principal strategy and the training programme corresponding to the work regimen (Figure 4) specific to a given track and field discipline, and, in greater detail, the one corresponding to the level of sports skill achieved by the individual athlete. These concepts will be examined in detail further on.

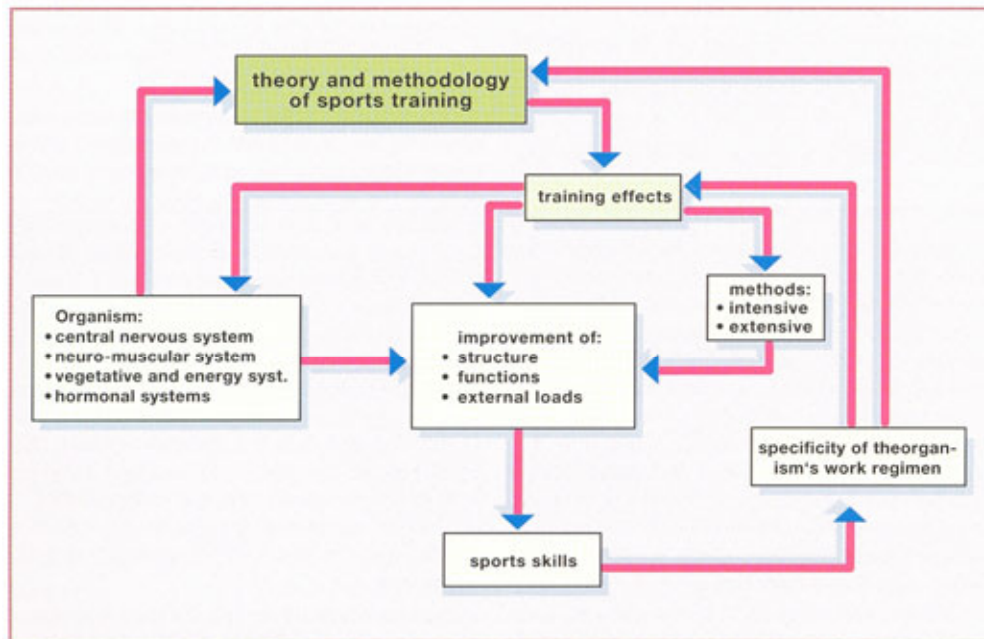


Figure 5: Diagram illustrating how sports training theory and the methodology of training are influenced by an understanding of biology

Figure 5 is a development of Figure 4, in that it elucidates the requisites of an STT based on a discerning knowledge of the physiology of muscles. The diagram shows how an STT can provide objective criteria for the selection of the appropriate training stimuli, only if it is based on:

1. an awareness of the specificity of the motor activity of a given sports discipline;
2. a thorough knowledge of the functional capacities of the human body and of the possible degree of adaptation of the functional systems, as well as of the organism as a whole.

It is only when both these conditions are fulfilled that an Sf1 will effectively provide the elements for an improvement of the function and structure of the physiological systems (and of the athlete's skill), necessary to the adaptive changes of the body's external loads in the conditions that characterize a given sports discipline.¹

¹ The term external loads in this context is meant to indicate the organization and interdependence of all the different motor actions employed by the athlete (15, 19). These loads determine the work regimen required for a given sports discipline.

Also, taking into account the typical development trend of a training process, a STT must first of all distinguish all the known training means and methods and then classify them into one of two main groups: intensive — i.e. aimed at intensifying the organism's functions; and extensive — i.e. aimed at morphological changes. The STT must also make use of each of these within the framework of the training process.

4 Scientific bases of a sports training theory

The scientific bases of a modern sports training theory cannot but be a thorough knowledge of the following aspects (16, 19):

1. **Principles governing the trend of the organism's adaptation** to an intense muscle work load in the conditions specific to a given sports discipline. These principles indicate the physiological mechanisms and the parameters of quantity and duration for the achievement of the desired adaptive changes; they also represent the objective criteria for the exact formulation of the ultimate aim, for the definition of content and organization of the training process (5, 17-19).
2. **Specific principles governing the acquisition of sports skills (ASS)** for each sports discipline, in particular for each one of the track and field events. These principles characterize the required condition, the respective relationships between cause and effect, that will ensure an improvement of performance and determine the rational variation of content and organization of the training process over the years (15, 16, 19).
3. **Principles governing the body's morphological and functional specialization (MES)** in a training plan covering several years. These are the external indications of the specific component of a long term process of adaptation to an intense muscle work load and are the objective criteria for the elaboration of a long term training programme. This part of the STT also requires knowledge of the motor abilities of the human body, the respective physiological mechanisms and rules governing their development and improvement (15, 19).
4. **Principles governing the acquisition of technical skills.** These form the basis for the acquisition of the movement pattern specific to the chosen discipline and for the acquisition of the skill that will allow the athlete to perform the movement pattern perfectly — i.e. at maximum speed and using maximum strength — during training and during competition (15, 19).
5. **Principles governing the relationship between the athlete's functional condition during the longer phases of the training plan and stable work loads** (content, volume, intensity duration and organization of the work loads). It is only recently that these principles have attracted specific attention, but their study has immediately provided very significant data. First of all they allow one to understand the trend of the adaptation process

during a training cycle lasting one or several years. They also facilitate the formulation of the criteria for the organization of the training process (15-19). Figure 6 illustrates the trend followed by performance results, by the capacity to express explosive strength and by the variations in the take-off phase as compared with different training work loads employed by women long jumpers. Experimental data gathered in our laboratories was used as an objective basis for the elaboration of a number of principles for the programming of the training process (15, 19). A more detailed study of the principles governing the relationships between the athlete's functional condition and the established work load is essential for a further development of a STT.

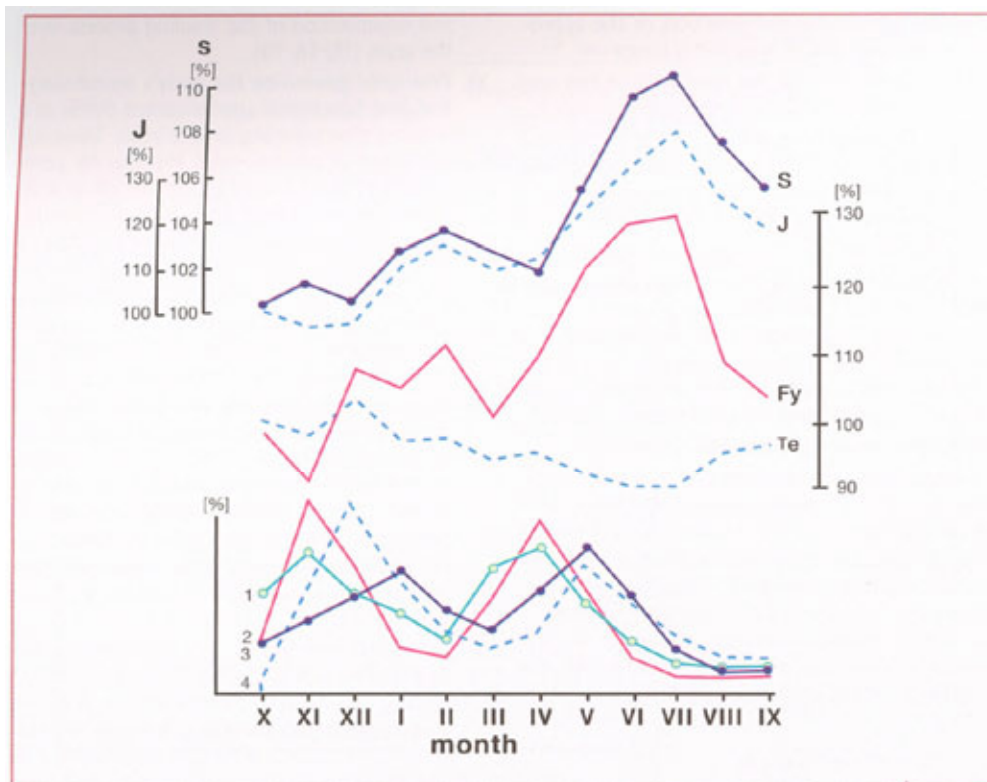


Figure 6: Trend of speed strength and technical skills in women long jumpers and distribution of the training means in an annual cycle

S – performance result; J – explosive strength of the take-off leg; Fy – vertical component of strength effort at take-off; TE – take-off time

1 – jumping exercises; 2 – exercises with overloads; 3 – long jumps; 4 – run-ups

5 Modern approach to the elaboration of a sports training theory

Thanks to an extensive use of the more advanced findings in biology, STT can be continuously enriched with new and sometimes revolutionary concepts of the organization of the training process. Among these we may mention the following (15, 19):

- the concept of the organisms actual adaptation potential;

- the concept of a main adaptation cycle;
- the concept of the specificity of the organism's reactions to training stimuli;
- the concept of an organization of the whole training process programmed on the basis of a specific aim.

The organism's actual adaptation potential (AAP) is the energy reserve that allows a temporary, but relatively stable, adaptation to work loads and conditions requiring maximum intensity (15-19). The existence of an AAP underlines the fact that the adaptive process is not indefinite; there is a limit — influenced by genetic factors — to the organisms possibility to respond adequately to continuous training stimuli. It may be assumed that the AAP's limit is determined both by the hormonal systems functional reserve and by the level of adaptive changes (morphological and functional), achieved (17). Entity, intensity, volume and duration of the training stimuli, and their respective variations in time must be carefully measured, because the values necessary fully to exploit the organism's AAP are quantitatively determined (i_1 in Figure 7). If the values are too low (i_3), the organism's potential will not be realized in full, while if they are too high, (i_2), the organism's reserves will be excessively depleted. In both cases, the training process will be scarcely effective. We can say that the organization of the training process is adequate when, thanks to the correct intensity, volume and variation in time of the training stimuli, the correct combination of intensive and extensive training means and the ideal energy expenditure on the part of the athlete, the organism's AAP will be fully put to use.

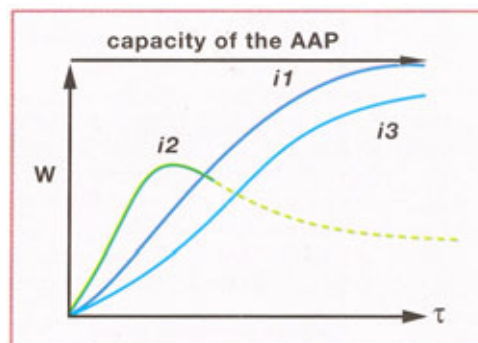


Figure 7: Realization of the organism's actual adaptation potential (AAP) in relation to the duration of the training process (τ), to the work volume (W) and to the increase of intensity (i)

The main adaptation cycle (MAC) is a structural, but relatively independent, component of the training process. Its content, organization and duration are associated with the realization of the organisms AAP. The MAC is a phase in the adaptive process that is complete in itself and is characterized by the appearance of relatively stable morphological changes and by the athlete's progression to a higher level of specific work capacity (15-17, 19). The MAC is the main organization structure and must be precisely defined within the framework of the

training process. It should also be adequately planned and be repeated at regular intervals, always at a higher level of intensity. The objectives must be consistent with the general strategy of the training plan, which is aimed at the full exploitation of the athlete's AAP and, most importantly, which must be based on morphological and functional changes. Observations carried out in the field indicate that, with the work loads now customary among high level athletes, the complete realization of an athlete's AAP can be achieved in 40-45 weeks in the case of a single competition season, in 18-24 weeks in the case of two competition seasons, and in 14-16 weeks when there are three competition seasons (16). Therefore, depending on the specific requirements of the chosen discipline, the duration of the MAC should be close to one year or to six months (16). Two essential conditions must be fulfilled in an adequately organized MAC:

- the training loads must have specific aims, i.e. must involve specific physiological or energy systems, or specific functional capacities;
- the objective must be clearly established.

Therefore, the correct choice and organization of the work loads depends on a thorough knowledge of:

- the functional capacities and physiological and energy systems that determine an athlete's specific work capacity;
- their respective resistance to adaptation;
- the heretochronia of the adaptive reactions of the organism's physiological systems.

The specificity of the organism's reactions to training stimuli is a well-known biological phenomenon which can be observed through the "metabolic trace", i.e. the accumulation of the by-products of metabolism (metabolites) that induce protein synthesis immediately after a muscle effort. Metabolites determine exactly which proteins will be synthesized as a result of the increased muscle activity. Protein synthesis prevalently involves the proteins required to create active cell structures and enzymes, which will catalyze biochemical reactions that determine specific cell functions (18). This ensures a consistency between the athlete's motor activity and the body's morphological and functional improvement. For this reason, it is extremely important not only to ensure that the work load has a high training potential but also that it induces the required, specific, protein synthesis (15-17, 19). On a practical level, this means that it is necessary:

- to forecast the physiological effect (metabolic trace) of a given work load;
- to ensure that its organization will produce the desired training effect;

- to determine the duration of the training effect, so that the protein synthesis that immediately follows the work load can be fully developed and completed.

The organization of the whole training process programmed on the basis of a specific aim. A greater knowledge of sports physiology has resulted in a new approach to the organization of the training process. In particular, the organization based on an analytic-synthetic approach, which, in past years, dominated sports training theory, has now been replaced by an organization programmed on the basis of a specific aim.

In accordance with the periodization theory (based on the analytic-synthetic approach), the training process was subdivided into single modules, the microcycles (MC), considered as the basic organization structure of the training process (7), which was seen as the sum of a chain of microcycles. The sequence of these modules in the chain was determined by pure speculation, without considering the ultimate aim of the whole process, and without having a clear idea as to whether the effects of any given chain of micro-cycles would, in fact, favor its realization. The chain of microcycles would be built-up, much like a child's construction game, to form larger structures, mesocycles, phases, macrocycles (Figure 8). The unifying factor was provided by the so-called "rules governing the dynamics of physical condition"; no more than abstract concepts having no objective bases. According to the periodization theory, physical condition would be induced by undulating variations of total volume and intensity of the work load. This was organized following the traditional "complex" principle, so that all training tasks were carried out simultaneously (in the single training unit and in the microcycle) and in parallel (in the single training phase and in the annual cycle) (7). This concept no longer corresponds to the requirements of modern sports. (1, 2, 4, 10, 11, 14, 16, 20).

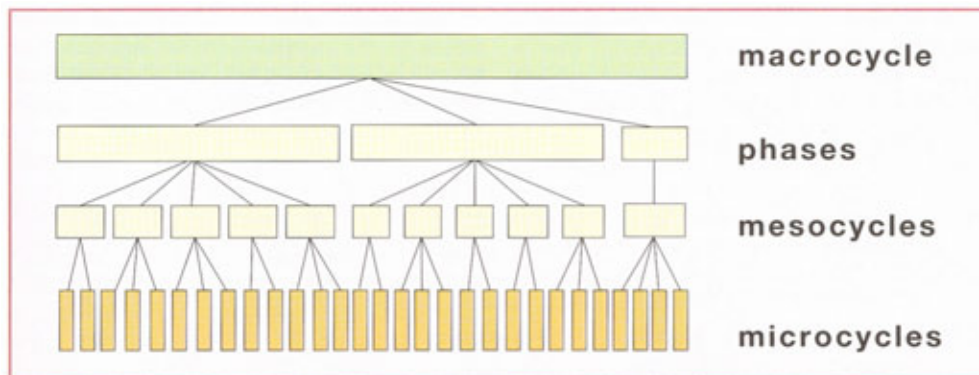


Figure 8: General concept of the "periodization of training" according to L. MATVEYEV (7)

If the training programme is to be organized on the basis of a specific aim, the training process can no longer be considered as the sum of single modules (microcycles) arranged in any given sequence. It must be seen as a monolithic ensemble containing various levels and different parts (phases and microcycles). In this context, the microcycle is no longer to be viewed as the basic organization

structure (7), but, and this is very important, as the most efficient structure for the organization of particular elements of the total training load, consistent with the specific aim and with the general strategy of the training plan. In this case, the decisive factor of the whole system is not the so-called “physical condition” but the specific, concrete goal that is taken into consideration in all the phases and determines their content and organization (15, 19).

In this type of organization, the ultimate aim of the training process must be established first. It will then be possible to select content, volume and type of organization of the training load that will ensure the realization of this goal. Since this is by no means a new concept, it is here necessary to emphasize that its novelty and its great practical value are due to (15, 16, 19):

- the possibility to express the ultimate aim in terms of quantity;
- the existence of objective criteria that determine both the selection of the training means and methods, and their respective dosage;
- the possibility to monitor the results in terms of quantity, so that any correction of the process will be more accurate.

As far back as the third century BC the Greek philosopher Aristotle said that, in all things, good outcome depends on the fulfillment of two conditions: a correct formulation of the final aim and the choice of means with which it is to be achieved. It is therefore not difficult to see that an organization of the training process programmed on the basis of a specific aim not only radically changes the principles and the methodology of organization, but also establishes the significance of decisions regarding quantity, determined by current scientific findings.

6 The structure of the main concepts of the sports training theory

The content and structure of the concepts of the sports training theory (Figure 9) are based on the scientific findings detailed above. They take into account the requirements of the professional coach and show how these findings can be put into practice.

Note that the organization of the training process requires the coach to make decisions regarding a number of issues. Thus his professional skill depends mainly on his ability to distinguish the more important issues, whose solution is essential to the success of the whole training process, and will also favor the solution of other more marginal issues.

The basic concepts of the STT are the following (Figure 9):

- a hierarchy of the final objectives;

- a concept of the general methodology for the preparation of an athlete;
- a general line of strategy for the training process.

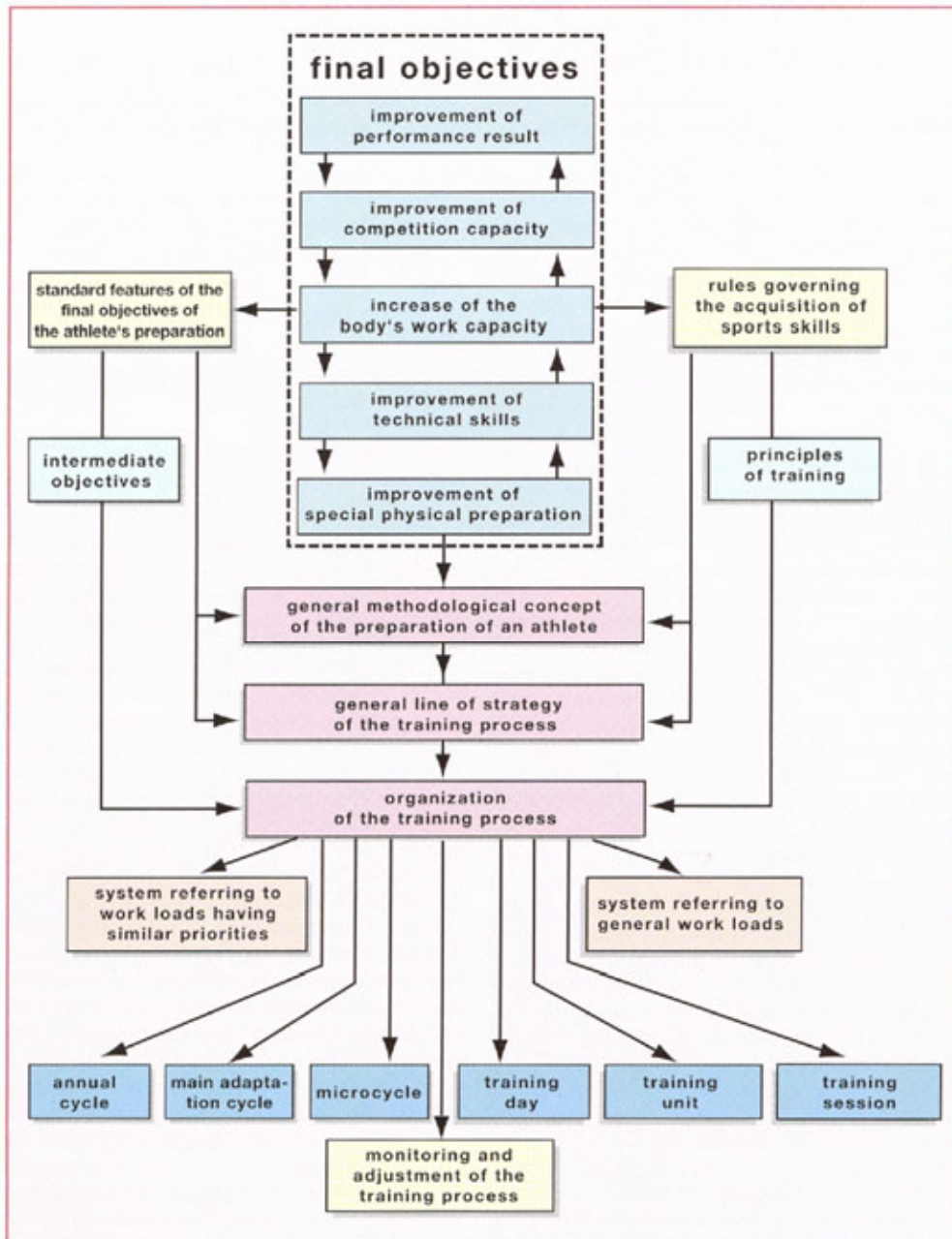


Figure 9: Structure of the main concepts of the theory and methodology of sports training

These concepts are significant on a theoretical level; they are also meant to be thought-provoking and help the coach to systematize his theoretical and methodological knowledge, so as to obtain a rational organization of the training process.

Figure 9 shows that both the general methodological concept and the general line of strategy are based on the rules governing the improvement of sports skills. These express the specific features of the adaptation to the requirements of a given track and field discipline. The organization of the training process follows definite methodological principles extrapolated from these rules (19).

“Hierarchy of the final objectives” here signifies a classification by order of importance of all the parameters that must be achieved in succession (Figure 9). For instance, having established the entity of the desired improvement in performance (the most important final aim), the coach will identify all the conditions required to achieve this improvement, i.e. the corresponding improvement in technical, tactical and competition skill, the corresponding increase in the athlete’s specific work capacity at that given work regimen, and the variations in the athlete’s special physical preparation that become necessary. When monitoring the athlete’s progress, the coach will proceed the other way around. If the athlete’s special physical preparation has not shown sufficient improvement, it will not be possible to improve his technical and tactical skill or the organism’s specific work capacity. It will, therefore, not be possible to ensure the required stability of the competition skill. So, if one of the intermediate aims is not achieved, or is only partly achieved, an improvement in performance will be highly unlikely.

The “standard” features of the final objectives are the more important elements of the level of the athlete’s special preparation that need to be perfected by means of the training process; they are also the criteria for an evaluation the efficiency of the training. Thanks to current scientific knowledge and to practical experience, these standards may be precisely defined as to quantity, and this allows an accurate monitoring of the progress and trend of the training.

For example, if the coach of an international level high jumper plans to improve the athlete’s performance by 5-8cm, he will classify the training objectives as follows:

- for an increased stability of competition skill:
 - a) 5 successful jumps in a row at a height that is 15cm (or 10 or 20cm) lower than the athlete’s personal record: or
 - b) a sequence of successful jumps, with the height of the jump gradually increased until it is 10, 15 or 20cm below the athlete’s personal record;
- for an increased work capacity:
 - a) an increase of 0.2m/s in the run-up speed;
 - b) an improvement of 0.2” in a 20m run from a standing start;
 - c) an improvement of 0.3m in a long-jump with a 10-12 stride run-up;

- for an increase in sports skill:
 - a) the improvement of specific details in the movement pattern (must be suited to the individual athlete)
- for an increase in the special physical preparation level:
 - a) a 15kg increase of the load in the squat with a barbell;
 - b) a 0.4m improvement in a series of 5 bounds from a standing start;
 - c) a 0.4m improvement in a series of 5 bounds on the take-off leg with a standing start.

The term “methodological concept” signifies the manner in which the training process is organized and reflects the coach’s general plan for the preparation of the athlete. Methodological concepts are usually associated with the name of a celebrated coach; in track and field athletics, for instance the concepts of coaches such as V. GERSCHLER, P. CERRUTTY, A. LYDIARD, V. DJACKOV, I. NIKIFOROV, V. ALEKSEEV, had a considerable following.

A number of theoretical-scientific concepts are also well-known (3, 6, 13); such as:

- the complex organization of training, in accordance with which the required tasks are carried out in parallel, using means and methods aimed at a restricted range of objectives. In a subsequent phase, the so-called integration training, the results achieved are brought together in an efficient and harmonious combination;
- the analytical-synthetic concept of the periodization of training (7), which has already been dealt with;
- the organization of training on an annual basis with relatively uniform work loads (13);
- the “block” system, which includes a phase in which all the work loads for SPP are concentrated, so that their long term effect can be used in the competition phase (15, 19).

The general line of strategy of the training process represents the central methodological concept, which determines the main objective affecting every phase of the training process. It is elaborated on the basis of the main objective and must first of all establish a rational progress in the athlete’s preparation. This should be achieved through the planned improvement of the body’s specific work capacity, based on the coordinated development of the athlete’s special physical preparation and of his technical and tactical skill. This concept determines all the coach’s decisions regarding the organization of each phase of the training process.

The general line of strategy that leads to the achievement of the main objective — a given performance at the desired time — could be represented in an annual cycle, for instance, as the tendency to an increase in running speed, or an increase in the intensity of the strength effort in the competition-specific exercise (Figure 10 A). The main objective, which reflects the general methodology, influences each one of the phases of the annual cycle (1-4 in Figure 10) and acts as the guideline for the organization of their content. Furthermore, in each phase, the planned result (speed or intensity) determines the content and organization of that phase and is its final objective, which is termed an intermediate result, as against the main objective of the training process.

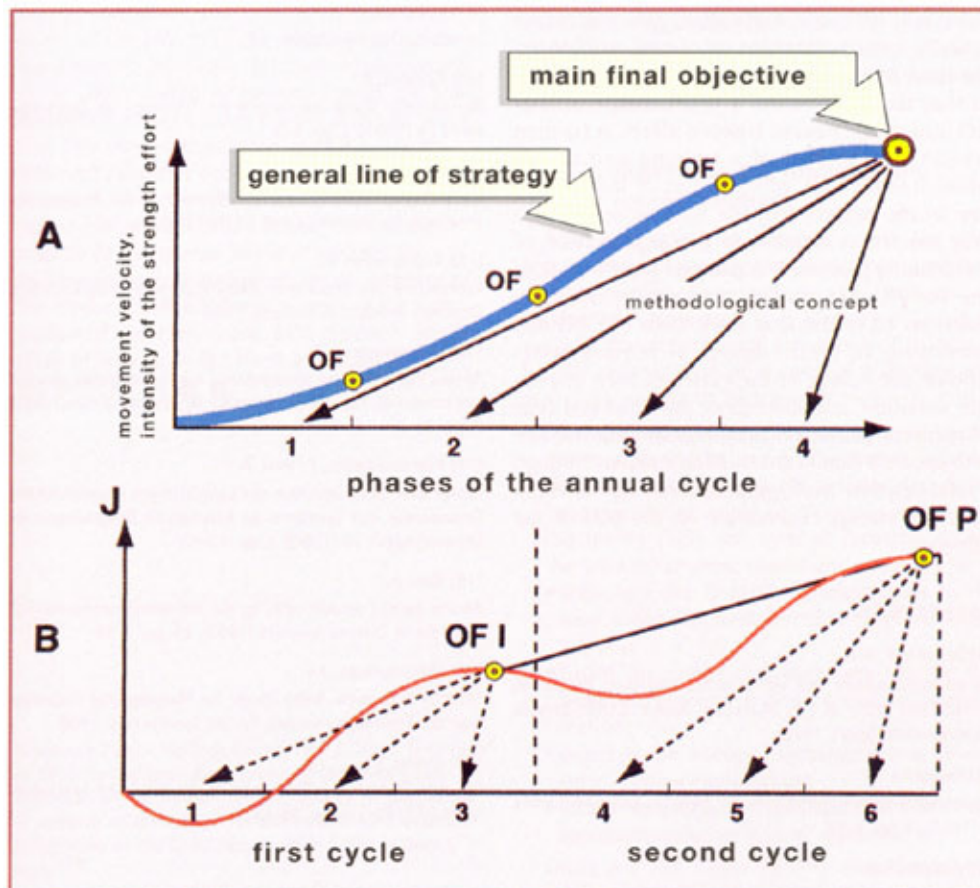


Figure 10: Examples of the general line of strategy in an annual training cycle

The general line of strategy can also be represented as the course of the athlete's functional state during the annual cycle, i.e. as the ideal trend in the variation of the more important functional parameters of the specific work capacity. Figure 10 shows the model trend of explosive strength capacity (J) in the track and field disciplines requiring speed-strength. The highest point on the co-ordinate J denotes the competition phase in the second cycle. It is the main objective of the preparation (OFP) and has an influence on all the phases of the second cycle and on the intermediate objective (OF1) of the first cycle. It, therefore determines the content and organization of all the phases of the annual cycle.

The organization of the training process incorporates all that we know about it. It is based on the principles of training and on the chosen final objective. It involves the rational, systematic use of work loads, so combined as to ensure the optimum training effect and the ideal energy expenditure on the part of the athlete. The organization of the training process has two objectives:

- the systematic use of the chosen means;
- the optimization of the contents of the work load.

Training means and methods may be used simultaneously or in any given order. The term “systematic use” means that which will ensure maximum training effect and ideal time and energy expenditure on the part of the athlete. “Systematic use” concerns both work loads with similar priorities (for instance, the improvement of endurance, explosive strength, technical skill or speed of execution) and work loads with different priorities (this will be analyzed in detail in a separate article).

As regards the optimization of the contents of the work load, it is important to emphasize that a given work load must refer to a specific time span and be organized accordingly. Time is the best instrument to monitor the efficiency of the training stimuli; it determines their duration and their cyclic repetition. On the one hand, a certain time is necessary to carry out the volume of work required to achieve the desired result; on the other hand, it is necessary to take into account the competition calendar. Time, therefore, becomes a limiting factor in the training process and thus influences its organization. A coach’s professional skill resides in his capacity to elaborate and implement a rational organization suited to a real situation.

As regards the time factor, there are six main structures (Figure 9): the annual cycle, the main adaptation cycle (MAC), the microcycle, the training day, the training unit and the training session (15, 16, 19). Two of these structures need a more detailed explanation.

The training day; this structure has already been in use for quite some time but it has not been sufficiently studied. It usually includes 2 or 3 training units. The content and organization are determined according to the priorities of the work load carried out the day before and of that planned for the following day.

The training session is the time necessary to carry out, without interruption, training means (usually having the same priorities), chosen on the basis of the organisms short term reactions, so that the repetition of a given muscle activity will lead to the desired training effect. A training session may be part of a training unit or the whole training unit, which is part of the training day. In the modern SSTM, the training session is a very important element in the organization of the training process. It is planned on the basis of the body’s physiological short term, adaptive reactions to continuous work loads (18, 19) and according to methodological requirements (choice and dosage of the exercises, their respective variation and

succession, duration and type of recovery pauses between repetitions). The aim is to ensure a significant training stimulus through a relatively low work volume, involving minimum time and energy expenditure on the part of the athlete.

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