

THE DEVELOPMENT OF SPECIAL-STRENGTH IN POWER / SPEED EVENTS

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Improved performance in jumping and throwing events is determined mostly by an athlete's speed-strength levels, and a large amount of special strength work is required to increase these levels. Two comments are relevant:

1. The tendency to increase the training volume, as one of the conditions for improved results, is fully justified in cyclical sports. However, an automatic transfer of this tendency to speed-strength sports is wrong.
2. In speed-strength events, the load volume amount is not as important as its skillful use. What is more important is determination of the effective content of the training load, the proper combinations and continuity of different methods (including technique), the proper distribution of high-volume loads throughout the year, and the alternation of work and active rest.

An enormous amount of practical experience, along with the efforts of scientists, has made it possible to improve significantly the special strength training methods in speed-strength type sports. However, there are still many shortcomings:

- A wholesale, mechanical build-up of the volume of strength work according to the "the more the better" philosophy instead of using an optimal load volume (Ed. Note: "Optimal load volume" means of optimal amount of strength training);
- Parallel use of special strength training and technique training by employing a great amount of corresponding methods, which reduces the effectiveness and quality of technique training;
- The use of nonspecific methods in the special strength training of high-level athletes, and also methods that have lost their training effect but which demand a lot of time and energy;
- Over-saturation with strength workouts during periods of the year in which there is no acute need for them;

- An unoriginal approach to speed-strength training, using the same means and methods year after year.

In this article the author attempts to create a unified, methodical concept of training and to attract the attention of coaches to certain specific aspects and general principles of the process of improving athlete's speed-strength capabilities. At the same time we will examine practical conclusions that result from these general principles.

There is a certain correlation between absolute muscle strength, the ways to develop it, and qualitative movement characteristics. It has been established that a build-up of absolute muscle strength has a negative effect on movement speed and on the ability of a muscle to display explosive efforts.

This does not negate the role of absolute strength, but the amount needed is determined by the sport, i.e., by either the amount of resistance which must be overcome and/or by the speed with which it must be overcome. In this regard, one should analyze the execution of the sports movement in order to determine its precise characteristics.

In principle, a high level of absolute strength is necessary if an athlete must overcome great external resistance and if there is even the briefest isometric contraction along with a significant external load (hammer throwing, triple jump, high jump, shot put). If a movement requires intense explosive muscle contraction in order to overcome a relatively light external resistance, a correspondingly lower level of absolute muscle strength is required (long jump, javelin throw). Finally, if the external resistance is insignificant (sprinting and hurdling), an even lower level of absolute strength is required.

There are certain correlations between the amount of strength work and the amount and tempo of increase in speed-strength qualities. How are these correlations expressed?

An excessive amount of strength work, executed over a prolonged period of time, reduces movement speed and a muscle's ability to display explosive efforts. A cyclic, wave-like increase and decrease in the amount of strength work provides the same wave-like but steady increase in movement speed and explosive muscle strength.

A reduction in the amount of strength work, providing a chance for the body to recover and advance to a higher functional level, is quite important at this stage. A brief period of active rest provides good recovery after intensive high-volume strength work, and speed-strength may rise by 10-15%.

It is important for jumpers and throwers to use high-volume strength work in such a manner that it provides a steady increase in speed-strength throughout the yearly cycle, but yet does not interfere with technique work.

Practical experience and experimental data suggest the need to isolate the magnitude (the total work) and duration (the distribution over time) of strength training volume. Specifically, the “concentrated” and “distributed” variants should be distinguished. The “concentrated” variant involves a concentration of strength work over a limited span of time; the “distributed” variant involves a distribution of the same or slightly greater volume of strength work over a prolonged period of time.

The following principles of speed-strength dynamics are inherent in the indicated variants. In the case of a “distributed” volume (Fig. 1), speed-strength indicators (C) increase at first; then they drop, and after a stoppage of high-volume work they have a tendency to increase slightly. (The illustrations presented in the article are generalized schematics of real-life cases, observed in ordinary training or in specially organized experiments.)

The “distributed” variant of high-volume loads does not provide a substantial increase in the special strength fitness level.



Figure 1. The “distributed” variant.

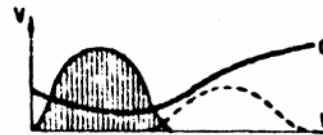


Figure 2. The concentrated variant.

The “concentrated” variant (Fig. 2) is more effective. It is characterized by a drop and then a significant rise in speed-strength. This is a manifestation of the so-called “delayed training effect” of strength work. Its magnitude will be greater if the concentrated strength work is followed by specialized work of moderate volume (the dash line in the illustration), but with a higher power output of the muscular contractions (technique work, competitions, controlled starts).

It is to be emphasized that technique work includes throwing with maximal and sub-maximal efforts, jumps with a full approach run or for a determined height, which are executed in high volume. This is maximally specialized speed-strength work. Actual data show that a 2-month concentrated volume of strength work (with subsequent specialized work) provides an increase in speed-strength for a period of 2-3 more months.

Considering the need for a continuous increase in specialized strength, the following plan for using concentrated amounts of strength work can be recommended for jumpers and throwers (Fig. 3). The point is obvious and doesn't require explanation. It should only be emphasized that the second wave of concentrated volume should include methods that produce a greater training effect.

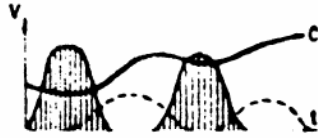


Figure 3.



Figure 4.

The training effect of a concentrated volume of strength work depends partially on its content and structure. Special studies have shown the merit of the so-called "sequentially-coupled" combination of speed-strength modes (Fig. 4).

Within the limits of the time allotted for a concentrated volume, methods with a greater training effect are introduced, successively into training. For example:

1. Jumping exercises,
2. Barbell exercises,
3. Jumps (leaps) after depth jumps.

They are not separated by time intervals but are continuously substituted one for another. During the second wave of the concentrated volume (Fig. 3) either the methods can be changed or the intensity of their execution can be increased.

In using the above-examined concepts and general principles for a specific period of time (for example, for a 12-month cycle) it is possible to see the contours of the methodical training system for jumpers and throwers. In this system:

- a. The effect of high-volume strength work in providing a steady increase in an athlete's speed-strength is effectively utilized;
- b. The total volume of strength work is optimized;
- c. The proper correlation and succession of special strength and technique training is determined, providing execution of technique work when the body's motor apparatus is in optimal functional condition (not fatigued by strength work);

- d. The main competitive movement is used as a method of special strength training.

The correlation and dynamics of strength and technique work (as the main components of the training process) for a 12-month cycle can be expressed in the following graph (Fig. 5). Its idea takes into account the fundamental incompatibility of large amounts of strength and technique work and provides for them to be distributed over time such that technique work is executed during the delayed training effect of a high-volume load of strength work.

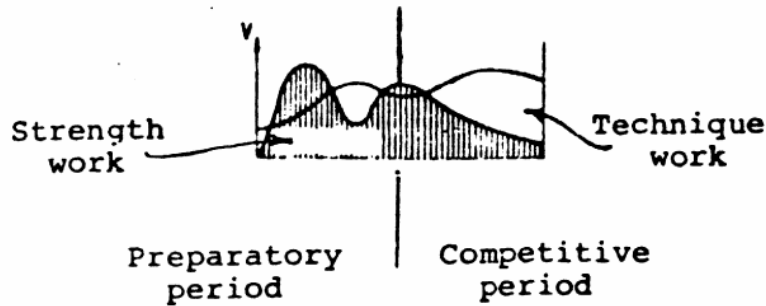


Figure 5

The following model of strength training in a two-cycle system of yearly training can be recommended (Fig. 6). The idea of "blocks" of special strength training is presented in the mode. Proceeding from the competition schedule and the given athlete's special fitness level, the dynamics of the composite indicator of speed-strength fitness (C) and its planned values at points A and B are set. Then one determines the content and volume of the concentrated special strength work for blocks 1, 2, and 3, necessary to achieve the intended level with optimal expenditure of the athlete's time and energy. The between-"block" intervals are used for technique work (T) while the delayed training effect of the concentrated strength load is being realized. The amount of strength work is thereby minimized within allowable limits, "diluted" in time by technique work, and favorable conditions are provided for competition in winter and summer events and for control over one's competitive form.

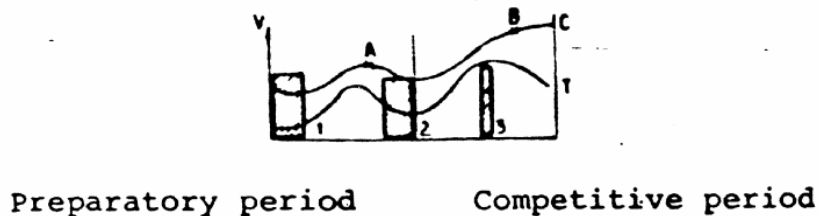


Figure 6