
Original Article

Pedagogical conditions necessary for effective speed-strength training of young football players (15-17 years old)

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ABSTRACT

This study substantiates pedagogical conditions necessary for effective speed-strength training of young football players, such as careful selection of children and their retention throughout the whole period of football education; differentiation and individualization of speed-strength training of young football players; selection of the most effective means of developing speed and strength in young football players; balance of means of developing speed and strength of young football players. Less important conditions include efficient use of time allotted for speed-strength training; maintenance of high team morale; efficient use of fitness equipment, kettlebells, barbells, and other means of speed-strength training of young football players. **Key words:** PEDAGOGICAL CONDITIONS, YOUNG FOOTBALL PLAYERS, SPEED-STRENGTH TRAINING, PERFORMANCE, MEANS OF TRAINING

Cite this article as:

Bolotin, A., & Bakayev, V. (2017). Pedagogical conditions necessary for effective speed-strength training of young football players (15-17 years old). *Journal of Human Sport and Exercise*, 12(2), 405-413. doi:10.14198/jhse.2017.122.17

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Submitted for publication April 2016
Accepted for publication June 2017
JOURNAL OF HUMAN SPORT & EXERCISE ISSN 1988-5202
© Faculty of Education. University of Alicante
doi:10.14198/jhse.2017.122.17

INTRODUCTION

In modern football, achieving top results is impossible without quality training of young players. The success of any team, including youth teams, is defined by three major factors: player technique, tactics, and the overall condition of each player (physical, moral, psychological, etc.).

A skilled player who understands tactics will never be able to show what he's capable of when he rarely gets the ball due to bad physical condition, moves slowly across the pitch, and strikes the ball poorly. Muscle strength and speed allow the player to use his entire technical and tactical arsenal in a game.

Examination of literary sources and common practices of athletic training of young football players at the age from 15 to 17 shows that the problem of speed-strength training has not been solved yet. Modern scientific literature provides a more detailed methodology for the development of speed and strength in adult football players, but the existing research results and methodological recommendations are too general and don't distinguish between young and adult organism.

Meanwhile, young players are weaker than adults, and their speed and strength develop in a different way. Many experienced football experts believe the age between 15 and 17 years to be perfect for the development of speed and strength in football players (Ibriyev, 2008). This explains why solving the problem of quality development of speed and strength in young football players is crucial.

Over the last few years, the research conducted by Russian and foreign experts in the field of football training show that appropriate exercises applied in speed and strength training of young football players at the age from 15 to 17 significantly lower the risk of injuries and improve future performance (Ibriyev, 2008).

There are currently two opinions on the means that should be used in speed-strength training of young football players. Some experts believe that speed-strength training of young football players should only include ball activities, others claim that players should train without the ball for some part of the training. We support the latter opinion, based on the assumption that during speed-strength training, particularly during speed and mobility exercises, most young players focus solely on the ball and therefore fail to unlock their physical potential.

However, we haven't found any papers that would determine pedagogical conditions necessary for effective speed-strength training of young football players at the age from 15 to 17, taking into account the balance between exercises with and without the ball.

Aim – this study aims to determine pedagogical conditions necessary for effective speed-strength training of young football players.

MATERIAL AND METHODS

Training regime of young football players, distinctive features of their speed-strength training, performance dynamics, and the structure of speed-strength training management were examined using a questionnaire surveys, interviews, and polls. Both football players and coaches took part in questionnaire surveys and interviews. Interviews with athletes provided valuable information on their subjective attitude to certain speed-strength exercises, revealed specific causes of players' injuries, and helped us find actual ways to personalize

self-training. Interviews and polls with football experts clarified various organizational issues and elements of comprehensive support of training sessions.

The physical condition and performance of young football players were assessed through special tests, observation, stopwatch study, pairwise comparison, and analysis of current ratings at the Russian youth championship.

Physical condition was assessed with the purpose of evaluating the level of physical abilities, speed, and strength, as well as to analyze the effects of the means and methods of training on the increase in football players' performance.

In order to assess the state of higher nervous activity of football players, the WAM method was used, which registers individual well-being, activity, and mood (Bolotin, & Bochkovskaya, 2010). These indicators were determined before and two hours after the game using the fill-in-the-blank method. Self-assessment values were obtained by finding the average of ten answers. The WAM test takes into account absolute values of well-being, activity, and mood, and their correlation. We paid particular attention to the fact that in the context of intense play activity, mood does not deteriorate as much as condition and activity.

However, previous research shows that if the difference between the parameters goes beyond 0.6 points compared to the initial data, it may indicate performance degradation of young football players.

The materials of the study received mathematical treatment. The results of mathematical treatment of the obtained scientific data were interpreted according to guidelines provided by A. E. Bolotin (2010). During the analysis, mathematical parameters were considered significant when $p = 0.05$.

RESULTS AND DISCUSSION

The development of speed and strength of young football players is one of the most crucial problems of the modern sport science. Strong performance during the training of young football players is one of the major criteria of effectiveness and correctness of the training process. It is therefore vital to examine the problem of speed-strength training organization and selection of the most effective means and their balance.

Special speed-strength training of young football players is viewed as a specialized function of the entire training process that focuses on achieving the expected result. The level of athletes' fitness at different training periods undergoes complex structural changes. Therefore, the assessment of speed and strength of young football players at each particular stage must focus on the training complex specific for this period. Such complex is basically a minimized set of the most effective means of speed and strength development and the balance between them (Bolotin & Skripachyov, 2014; Bolotin & Bakayev, 2015).

Selection of such means, according to which informative indicators are chosen, is an important task that would define the effectiveness of the test box. One of the requirements for a complex assessment of athletes' speed and strength is to identify information criteria that have high correlation with the markers of football players' play activity. Facts that can be found in scientific literature and sport practices allow us to pick a minimum of speed-strength exercises that address particular aspects of young football players' fitness.

Management of the training process involves the transition of football players from the initial physical condition to the new, expected one. For that to happen, the following basic conditions should be met:

- one must understand the current condition of the player and have a description of the required condition;
- the most informative means for the effective development of speed and strength in football players must be determined, and any changes to them must be controlled.

Our data suggests that the first condition has been partly experimentally justified. The second condition, on the other hand, hasn't been properly studied. Therefore, the problem of identifying the most effective means of speed-strength training that determine the efficiency of young football players' training management requires particular attention. Effective management of young players' fitness means careful planning of the training process and its continuous adjustment based on the obtained data.

Quality is the cornerstone of exercises that emulate basic elements of play activity. At the same time, it is desirable to register such parameters as coordination complexity and speed and length of the distance covered during training or game.

Objective assessment of young players' fitness and dynamics of its changes is one of the key conditions of effective management of the training process. Complex control procedures provide objective assessment of young players' fitness that considers all aspects of speed-strength fitness at a particular time period.

Data obtained through complex educational control in football allows objective assessment of the level of players' fitness at various stages of training. Comparing this data with model values creates the conditions required for effective management of the training process. In order to get a better understanding of the means that determine the effectiveness of speed-strength training of young football players, a questionnaire survey of football coaches was conducted. There was no consensus as to the duration of special exercises aimed at the development of speed and strength: 15% believe it has to be two to three weeks, another 15% claim it should last 90 days. Finally, 70% opine that such exercises should be used all year (on a regular basis). For the results of the survey of football coaches, see Table 1.

According to the survey, there is no consensus as to the structure and content of speed-strength training of young football players. It is common knowledge that the play activity of young football players requires high endurance. Research data over the last few years shows that modern football demands strong dynamic efforts from the players. This leads to the degradation of joints and ligaments in the lower limbs of football players. Thus, particular attention should be paid to a correctly organized training process aimed at increasing the endurance of joints and ligaments that suffer the most during intense play activity. The health and sports longevity of athletes hinges on that. The fewer injuries a football player has, the better his performance in tournaments will be. Considering how superficially this problem has been studied, we decided to focus on analyzing the injuries of young football players. In order to improve the development of speed and strength of young football players and lower the risk of injuries, it is essential to understand the structure and nature of the injuries sustained during the play activity of the players.

Table 2 shows a breakdown of injuries sustained in the youth teams of St. Petersburg. According to the analysis of the obtained data, ankle joint injuries are the most common. We believe it to be so because the load on this joint during a football game is considerable, and the joint and ligaments are not properly prepared for a competitive effort.

Table 1. The most effective means of speed-strength training of young football players according to football coaches (n = 37)

Importance (rating position)	Classification of exercises	Rating indicator (%)
1	Wind sprints from different positions	21.2
2	Wind sprints combined with exercises to improve reaction time with the ball	17.8
3	Short-distance wind sprints	15.3
4	Fast run along the midfield line	13.1
5	Winders with the ball	11.9
6	Wind sprints combined with exercises to improve reaction time	9.7
7	Maximum speed run from different positions	7.2
8	Exercises involving the use of fitness equipment, barbells, and kettlebells	3.8

Table 2. Breakdown of injuries in young football players (n = 237)

Rating position	Injuries	Number (%)
1	Knee joint	32.2
2	Ankle joint	28.2
3	Lumbar spine	16.4
4	Groin	12.2
5	Other injuries	11.0

According to the study, young players with a lower level of overall and special physical fitness are more susceptible to injuries. Dynamic (jumping) activity damages areas where ligaments are attached to the bones.

Muscle ruptures are most common in areas where the muscle tissue pass into ligaments.

This data allowed us to put together a comprehensive classification of young players' injuries. These materials indicate a need for a rationalized training process involving special speed-strength exercises. There is currently a wide array of means that have a positive effect on the structure of muscles and ligaments through speed-strength training of young football players. We believe that inclusion of special exercises in the system of overall and special training could improve the effectiveness of speed-strength training management. This is why it is vital not only to select the most effective means of speed-strength training, but also maintain their balance in the training process.

In order to determine the most suitable combination of means of speed-strength training for young football players, 37 football coaches were surveyed. For the results of the survey, see Table 3.

Table 3. Correlation between different means of speed-strength training of young football players according to a survey of football coaches (%)

Means of speed-strength training	Football players		
	15 years	16 years	17 years
Wind sprints, maximum speed run	40	35	30
Jumps and jumping exercises	25	20	15
Wind sprints, run with the ball, ball exercises on the move	15	20	25
Exercises to improve reaction time with the ball on the move	15	15	20
<i>Exercises involving fitness equipment, barbells, and kettlebells</i>	5	10	10

Analysis of the survey of football coaches shows that the training of the 15-year-olds should focus on wind sprints and maximum speed runs without the ball, while older players should train with the ball at maximum speed. In this case, exercises involving fitness equipment, barbells, and kettlebells become more important.

This study allowed us to determine the most effective means of speed-strength training of young football players and their balance in the training process.

Results of the experimental study show that the realization of personal managerial capabilities of a coach largely depends on the conditions of their professional activity. Coaches work with a group, which requires a differentiated and individual approach to the education and training of young football players. Differentiation involves not only determining players' positions, but also taking into account their temper, fitness, mental processes (attention, memory, way of thinking, etc.), natural skills, etc. Individualization means selecting the most talented players, who require a different approach to become 'one-of-a-kind' players. Working with such player, the coach must consider the peculiarities of the talent and cultivate hard work, perseverance, discipline, responsibility, commitment, and other essential ethical qualities.

As can be seen from the experience, speed-strength training of young football players can be improved only under certain pedagogical conditions. To find a solution to this problem, we surveyed 37 football coaches. Table 4 shows the rating of the basic conditions required to improve the effectiveness of speed-strength training of young football players.

Table 4. Rating structure of pedagogical conditions required to improve the effectiveness of speed-strength training of young football players.

Importance (rating position)	Conditions required to improve the effectiveness of speed-strength training	Rating Indicator (%)
1	Careful selection of children and their retention throughout the whole period of football education	19.7
2	Differentiation and individualization of speed-strength training of young football players	17.8
3	Implementation of measures to improve the knowledge of coaches in speed-strength training of young football players	16.3
4	Selection of the most effective means of speed-strength training of young football players	14.9
5	Balance of means of speed-strength training of young football players	10.1
6	Rational use of time allotted for speed-strength training	8.7
7	Maintaining high morale within a football team	7.2

8	Appropriate use of fitness equipment, kettlebells, barbells, and other means of speed-strength training of young football players	5.3
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Experts rightfully placed the selection of children in football schools at the top of the ranking. We believe this condition to be vital to the emergence of talented players in 'adult' football. Significant attention should also be paid to the differentiation and individualization of speed-strength training of young football players.

Another important condition is the coach's ability to use the most effective means of speed-strength training of young football players. As can be seen from the experience, the existing system of coach selection and appointment meets the requirements and allows them to make the training process effective. Therefore, heads of football schools should take into consideration individual capabilities of coaches as well as their other personal qualities.

The study shows that rational use of time allotted for the training has a strong effect on the development of speed and strength of young football players. In this regard, special effort should be paid into finding ways to rationalize the use of time budget in speed-strength training of young football players. One way to save time is to optimize individual planning of the football coaches' work.

Maintaining high morale in a football team is another important condition, allowing to make speed-strength training of young football players more effective. Public opinion, interpersonal relations, management style, and other factors have significant effect on the quality of speed-strength training. In order to create a positive public opinion on speed-strength training, it is advisable to debrief coaches. During the debriefings, heads of the football schools must unequivocally support ideas that facilitate the positive psychological climate in a football team. Material and moral stimulation of coaches is important for the effective training process management.

It can be concluded that the determined pedagogical conditions must be taken into account when validating the content of speed-strength training of young football players.

CONCLUSIONS

The study revealed the most important pedagogical conditions that determine the effectiveness of speed-strength development in young players are careful selection of children and their retention throughout the whole period of football education, and differentiation and individualization of speed-strength training of young football players. Another important condition is selecting the most effective means of speed-strength training of young football players and finding perfect balance between them.

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