

The Effects of the Training in the Preparation Period on the Repetitive Strength Transformation with Cadet Level Football Players

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ABSTRACT

The main aim of the research was to identify a level of quantitative changes of the repetitive strength with fifteen years old football players under the influence of the programmed football training of a six weeks preparation period. The training programme covered forty-four training units. The research was made on a sample of 120 cadet level football players. To estimate the repetitive strength three tests have been used: Lying-sed for 30 seconds, Push-ups and Lifting upper body while lying on stomach. In the area of comparative statistics, we used discriminant parametric procedure t-test for big paired samples. It can be concluded that there are statistically significant differences in all three variables to estimate the repetitive strength. This confirmed the hypothesis that the expected significant positive quantitative changes of basic-motor abilities influenced by the proposed model of training in preparation period with fifteen years old football players. The authors were guided by the fact that this kind of training program in preparation period is very effective in terms of raising the repetitive strength level with fifteen years old. The obtained results can be directed towards innovation plans and programs in the preparation period, and the adaptation of the same needs of the respective population.

Key words: football, effects preparation period, repetitive strength

Introduction

Football is a sport that is characterized by numerous and varied complex dynamic kinesiology activities that are characterized by a large number of cyclic and acyclic movements (Gardasevic & Bjelica, 2013). It is evident that all four moments of play, possession of the ball, the opponent's possession of it, the transformation after winning the ball and the transformation after losing the ball depends on the ability of players to perform certain movements of varying intensity, in different directions and the different sections of the field (Gardasevic & Bjelica, 2014). They must have developed basic and specific motor abilities (Gardasevic, Bjelica & Popović, 2015). One of the basic motor skills, which should be at a high level, is a repetitive force.

The physical strength has a great importance in football. A specific strength with football player is reflected by the strength reflection while jumping, the pushing strength with sprint, strength of stopping and pushing while changing the moving direction, strength of kicking by foot and with a head, strength of throwing the ball with a hand, stability on the ground and in the air, in duels (Gardasevic, 2010). One of the factors that affect the strength is the football players is their age. In child's development the strength increases with increasing a muscle size. Psychomotor strength, primarily static and repetitive, according to some authors is 50% innate, and systematic training can have a significant effect on it.

The main objective of this study was to determine the level of quantitative changes of repetitive strength in football cadet level, under the influence of a programmed football training which included one preparatory period of forty-two days.

Methods

This was a longitudinal study with an aim that in the two time-varying points determine quantitative changes of repetitive strength in football cadet level (15 year±6 months) under the influence of programmed training process, which included a summer preparation period for the competition season in a unique cadet league of Montenegro and the cadet league middle region of Montenegro. The training program lasted 42 days and was carried out on the auxiliary football field of FC Sutjeska Niksic. The training program included 44 trainers units, within which 8 friendly matches were played.

For data processing only the results of those respondents who have undergone a complete program of work and who have joined the initial and final measurement are taken. This study included a sample of 120 young cadet football players of 4 teams, all from Niksic. Before programmed work all respondents had passed medical check-ups to make sure they could access the training process. When selecting the instruments (tests) it was taken into account that they meet the basic metric characteristics, which means the appropriate age and objective material and spatial conditions. For the assessment of repetitive strength the following tests were used:

1. Lying-sed for 30 seconds (MRSLSJ)
2. Push-ups (MRSSKL)
3. Lifting upper body while lying on stomach (MRSSKL)

Considering that these are a cadet age players (15-year-olds±6 months), in a sensitive period of psychophysical development, program is tailored specifically to their age, taking into account the time spent in the previous training process. Time

structure of the training ranged from 60 to 120 minutes, depending on the goals and objectives of the training unit and it was divided into 3 phases:

- Introductory-preparatory part (25-30% of the duration of training)
- The main part (60-65% of the duration of the training)
- The final part (up to 10% of the duration of training)

In the introductory-preparatory part of the training the emphasis was on raising the operating temperature in children. As a tool a various elementary games with a ball were used that enabled work on the elementary basics of technique and tactics, also the various polygons with exercises coordination were used. A variety of games and exercises to increase joint mobility and strengthen muscles also applied at this stage.

At the first stage of the main part of the training the intensity is slightly increased compared to the warm-up phase and the training program was implemented through a variety of ball games. With a game method the respondents were taught and practiced football skills through a large number of repetitions. At the second stage of the main part of the training the players mostly had a free game on two goals that allowed them a creative activities and highlight of individual, imagination, independent thinking and hard work, applying the elements that teach by the method of the game from the first stage of the main part, and thus strengthening the willing quality. At this stage of the training the intensity was the greatest. At the final part of the training the task was lowering the physiological curve to an optimum level, and low-intensity activities were used: stretching and relaxation

exercises, competitive game of penalty kicks, free kicks.

Data obtained from the survey were analyzed using descriptive and comparative statistics. In the area of descriptive statistics for each variable both in the initial and the final state central and dispersion parameters were processed as well as measures of asymmetry and flatness. The hypothesis of normal distribution of results was tested on the basis of Kolmogorov and Smirnov test. In the area of comparative statistics, to determine differences in the variables used to estimate the repetitive strength at the start (initial state) and at the end (final state) of the training program in the preparation period, we used the discriminative parametric procedure Student's t-test for large dependent samples.

Results

In Tables 1 and 2 are shown the basic descriptive statistical parameters of variables for estimations of the repetitive strength in the initial and final measurement, where the values of central and dispersion tendency were calculated: arithmetic mean (Mean), standard deviation (Std. Dev.), standard error of arithmetic mean (Std. Error), the coefficient of variation (CV%), minimum (Minimum) and maximum (Maximum) values, the range of results (Range), the curvature coefficient (Skewness) and elongation (Kurtosis), as well as the values of Kolmogorov and Smirnov test (K-S test).

First the central and depression parameter of variables for assessing repetitive strength in the initial state were analyzed (Table 1).

Table 1. Central and depression parameter of variables for assessing repetitive strength in the initial state

| No. | Variables | Mean | Std. Dev. | Std. Error | CV% | Minimum | Maximum | Range | Skewness | Kurtosis | K-S test |
|-----|-----------|-------|-----------|------------|-------|---------|---------|-------|----------|----------|----------|
| 1. | MRSLSJ | 25,08 | 3,20 | 0,29 | 12,74 | 19 | 33 | 14 | 0,28 | -0,54 | 0,11 |
| 2. | MRSSKLI | 16,73 | 7,69 | 0,70 | 45,97 | 3 | 35 | 32 | -0,06 | -0,30 | 0,16 |
| 3. | MRSZULI | 37,93 | 6,69 | 0,61 | 17,63 | 25 | 53 | 28 | 0,00 | -0,52 | 0,68 |

By analyzing the central and dispersion parameters of variables for assessing the repetitive strength in the initial state-it is evident that the variable Push-ups (MRSSKLI) has a great heterogeneity of results, standard deviation shows us the great deviation of individual results from arithmetic mean, as well as a large coefficient of variation, which has the largest value in this test of all motor variables. This is because there are players who have made only 3 pushups, but there are also some that made even 35, so there is a large range of results, which is again an indicator that the low class football clubs take less into account the development of repetitive strength of players. The

values of skewness and kurtosis are in the range of -1 to +1, meaning that the curvature and elongation of results do not differ significantly from normal schedule, provided that the skewness at the variable Lifting upper body while lying on stomach (MRSZULI) shows an ideal symmetrical schedule of results, which means there is no obliquity of curve. Values of Kolmogorov and Smirnov test shows that the results are normally distributed.

Central and dispersive parameters of variables for estimation of the repetitive strength in the final measurement showed the following values (Table 2)

Table 2. Central and dispersive parameters of variables for estimation of the repetitive strength in the final measurement

| No. | Variables | Mean | Std. Dev. | Std. Error | CV% | Minimum | Maximum | Range | Skewness | Kurtosis | K-S test |
|-----|-----------|-------|-----------|------------|-------|---------|---------|-------|----------|----------|----------|
| 1. | MRSLSJF | 29,34 | 2,81 | 0,26 | 9,56 | 25 | 37 | 12 | 0,37 | -0,09 | 0,18 |
| 2. | MRSSKLF | 30,10 | 9,28 | 0,85 | 30,83 | 15 | 50 | 35 | 0,50 | -0,33 | 0,22 |
| 3. | MRSZULF | 46,23 | 6,70 | 0,61 | 14,48 | 33 | 64 | 31 | 0,14 | -0,55 | 0,09 |

By analyzing the central and dispersive parameters of variables for estimation of the repetitive strength in the final stage-it may be noted that the values of arithmetic means in all three variables at a higher level than in the initial state. Also, it is noticeable that with all three variables the results are more homogenous than in initial state, though the results of variable Push-ups (MRSSKLF) still belong to the moderate homogenous group. The standard deviation in this variable tells us about the great deviation from the arithmetic mean, for the

reason that there is a large range of the results. The positive values of skewness means inclination of the results towards the worse results, which means that the tests are quite hard for this age. Kurtosis values are negative for all three variables and talk about slight platykurtic, but not statistically significant. The values of Kolmogorov and Smirnov test shows that the results are normally distributed in all three variables.

To determine the statistical significance (significance) of differences in arithmetic means (partial quantitative changes) of

variables for estimation of the repetitive strength, the t-test was applied to for large dependent samples. The values of t-test were on the level of significance (Sig.) from 0.01 ($p < 0.01$) in all the variables for the evaluation of repetitive strength. The

differences of arithmetic means of the initial and the final measurement of variables for evaluating repetitive strength are shown in Table 3.

Table 3. The values of t-test between the arithmetic means of the initial and the final measurement of variables for evaluating repetitive strength

| | Variables | Mean | Std. Deviation | Std. Error | Correlation | T-test | Sig. |
|-------|-----------|-------|----------------|------------|-------------|--------|------|
| Par 1 | MRSLSJI | 25,08 | 3,20 | 0,29 | 0,81 | -24,98 | 0,00 |
| | MRSLSJF | 29,34 | 2,81 | 0,26 | | | |
| Par 2 | MRSSKLI | 16,73 | 7,69 | 0,70 | 0,80 | -26,41 | 0,00 |
| | MRSSKLF | 30,10 | 9,28 | 0,85 | | | |
| Par 3 | MRSZULI | 37,93 | 6,69 | 0,61 | 0,96 | -46,41 | 0,00 |
| | MRSZULF | 46,23 | 6,70 | 0,61 | | | |

Based on the results gained it can be noted that there are statistically significant differences in all variables for estimation of the repetitive strength, and therefore can be said that there was a statistically significant positive partial effects of the training program in the preparation period, and the t-test values were significant at the reliability level $p < .01$ for all variables for estimation of the repetitive strength.

Discussion

On the basis of the obtained parameters it can be concluded that the statistically significant partial quantitative effects (changes) in all the variables for estimation of the repetitive strength obtained as a result of the training program applied in the preparation period. The method of work that has been applied in this training program abounds with exercises dominated by powerful explosive movements, so that the positive transformations are not unexpected. In this age it comes to an increase in biological growth and development of muscles,

increase of muscle cross-section, which can certainly contribute to positive results (Gardasevic, Bjelica & Vasiljevic, 2016).

Based on the results of t-test for large dependent samples, with the variables for estimation of the repetitive strength the statistically significant differences were determined in all pairs of variables between the initial and final states, at the level of statistical significance (significance), $p < 0.01$. It can be concluded that the training program of work in preparation period has led to the positive transformation in all variables that were estimating, by the structure of a hypothetical setting of the models, the repetitive strength. In this research the authors were guided by the fact that such a training program of work in preparation period is a very efficient way of working in terms of raising the level of repetitive strength with cadet football players. The authors conclude that the summer period of 42 days, at cadet football players, with such training work program, is optimal for lifting the repetitive strength to the level required for the competition. The gained results can be directed towards innovation of plans and programs of work in the preparation period, and adjusting the same to the needs of the population concerned.

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