THE LEVEL OF CHOSEN MOTOR ABILITIES
OF 13 YEARS OLD SOCCER PLAYERS

by

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The recognition of motor abilities structure, especially the selection of measurement procedures include the most important aspects in the training process. The aim of the research was to determine the level of chosen motor abilities of 13 year old soccer players in comparison to boys of the same age not participating in any kind of sport. In this investigation an attempt was made to estimate the effects of primary selection and the first stage of soccer training.

The subjects include 40 randomly chosen soccer players born in 1989 – the finalists of the U-14 Polish Soccer Championships. The comparative group consisted of 40 boys born in 1989, which were not active in any kind of sport and were somatically similar to the soccer players. The level of the following motor abilities was estimated: maximal absolute static strength, maximal anaerobic power, speed, reaction time, frequency of movements, senso-motor differentiation, static balance and space orientation. Moreover the morphological age of the examined was estimated.

There were no statistically significant differences in morphological age of both examined groups. The soccer players possessed higher level of motor abilities than comparative group. The highest differences in the results of both groups were noticed in the tests evaluating the following motor abilities: frequency of movements, speed and the maximal anaerobic power. Greater differences were observed in the area of conditioning than in coordination.

Introduction

The control of the training process of young soccer players includes the evaluation of general and specific fitness. The means of control include the observation of the players during the game and the application of different kinds of fitness tests. The soccer bibliography is full of general and special fitness (skills) tests. Unfortunately most of the tests used in soccer training did not include the evaluation of coordination. Moreover the so-called coordination was

identified as agility. Only recently coordination fitness tests in soccer were developed. (Ljach et al. 2000, Ljach 2000). The latest studies on human motor structure allowed to develop more reliable and more valid evaluation methods of motor preparation (Szopa 1998; Szopa et al. 1998) and coordination (Juras and Waskiewicz 1998, Raczek et al. 2002, Mynarski 2000). The presented research was based exactly on these tests. It brings however the difficulty in an attempt to compare the presented results to the other ones.

The aim of the research was to determine the level of chosen motor abilities of 13 year old soccer players in comparison with subjects not participating in any kind of sport. In this investigation an attempt was made to estimate the effects of primary selection and the first stage of the soccer training.

Material and methods

The subjects of the research included 40 randomly chosen soccer players born in 1989 – the finalists of the U14 Polish Soccer Championship. The research was carried out between 27th of July and 3 of august 2002. The average body height and mass of the soccer players were respectively 163,18±7,36 cm and 51,62±8,52 kg. The comparative group consisted of 40 boys born in 1989, students of a grammar, who were not active in any kind of sport and were somatically similar to the soccer players The average body height and mass of the boys representing the comparative group were respectively 161,76±10,03 cm and 52,52±12,05 kg. The differences in the somatical features in both groups were not statistically significant.

The tests for evaluation of motor abilities were verified and characterized with high level of inner reliability and validity. The level of the following motor abilities were estimated:

- Maximal anaerobic power – the standing long jump (Szopa et al. 1996).
- Maximal absolute strength – the medicine ball throw backwards (Szopa et al. 1998).
- Speed – the shuttle run 5 x 10 m (Szopa et al. 1998).
- Reaction time– the catch of the Dietrich's stick (Mekota and Blahus 1983)

- Senso-motor differentiation – the medicine ball throw - 50% of max strength (Mynarski 2000)
- Static balance – „flamingo-balance" (Eurofit 1988).
- Space orientation – the walk to the target (Raczek et al. 2002)

Because of the selection of the research methods and the indirect character of the motor abilities measurements, the results are not always expressed in the SI units, which is difficult in field tests.

Results

As mentioned before, the basic somatic variables of the examined boys were measured. On this basis the morphological age was determined. The arithmetical average of the morphological age of the soccer players was 13,91±1,01while in comparative group 13,89±1,41. The difference was statistically insignificant.

Table 1. Statistical characterization of the individual tests` results in the compared groups

The motor ability (test)	Soccer players			The comparative group			Difference (d)
	$\bar{x}$	SD	V (%)	$\bar{x}$	SD	V (%)	
Shuttle run 5 x 10 m [s]	12,90	0,70	5,43	16,02	1,43	8,92	3,12**
Flamingo-balance [rep./60 s]	9,80	3,70	37,76	10,24	3,13	30,57	0,44
Medicine ball throw backwards [m]	8,11	1,60	19,74	6,26	1,47	23,50	1,85**
Medicine ball throw - 50% of max strength[%]	75,79	24,40	32,19	79,05	18,95	23,97	3,26
Catch of the Dietrich's stick [cm]	20,06	3,61	17,99	21,92	3,37	15,37	1,86
Foot tapping [rep./15 s]	82,29	12,18	14,80	47,14	4,75	10,08	35,15**
Walk to the target [cm]	39,54	18,22	46,07	51,14	20,99	41,07	11,608
Standing long jump[m]	205,85	15,02	7,29	162,36	19,69	12,13	43,49**

In table 1 general statistical characteristics of the examined motor abilities of both compared groups was presented. The level of the outcomes of the tests estimating the examined motor abilities indicates a great inner-group differentiation in both groups. It can be judged by fairly high values of the variation coefficient.

In soccer players the highest differentiation of results was observed in tests of space orientation (V=46,07%), static balance (V=37,76%) and senso-motor differentiation (V=32,19%). The lowest values of the variation's coefficients were determined in tests of speed (V=5,43%) and maximal anaerobic power (V=7,29%).

In the comparative group the highest differentiation of the results was noticed in tests of space orientation (V=41,07%) and static balance (V=30,57%). The variation's coefficients of the other tests are between 8,29% and 23,97%. In table 1 the comparison of the average values of individual tests of the motor abilities in both groups are presented. The data show that the average level of the speed (shuttle run 5x10 m) is by 3,12 s better in soccer players than in the comparative group. This difference is statistically significant (p<0,01).

In static balance test the criterion of the estimation was the minimal number of the attempts needed to keep the body balance during 1 minute. In soccer players the mean values was equal 9,8 while in comparative group 10,24 and the difference appeared as statistically insignificant. The greatest differences (p<0,01) between the compared groups occurred in the results of maximal absolute strength test. The results of tests estimating senso-motor differentiation and the reaction time of the compared groups were not statistically significant. The statistically significant (p<0,01) difference was noticed in foot tapping test. The average results of the soccer players ($\bar{x}$=82,29 repetitions) are by 35,15 attempts better than in the comparative group ($\bar{x}$=47,14 repetitions). In order to determine the level of space orientation the "walk to the target" test was used. The estimation criterion was the distance from the target point. In this test the soccer players also achieved better results ($\bar{x}$ =39,54 cm, is by 11, 60 cm higher than in the comparative group). This difference is statistically significant (p< 0,05). In the comparative analysis of

maximal anaerobic power results soccer players reached the significantly higher level of this ability (p<0,01)

Discussion

The applied motor abilities tests gave the opportunity to evaluate the global estimation of the physical fitness of the young soccer players.

The compared groups did not differ in the somatic parameters (body height and body mass), therefore they had the same morphological age. It proves that the somatic features were not taken into consideration during the selection process. Estimating the level of motor abilities in soccer on the example of the finalists of the U-14 Polish Soccer Championships the soccer players abilities profile was developed, normalized on the comparative group (fig. 1)
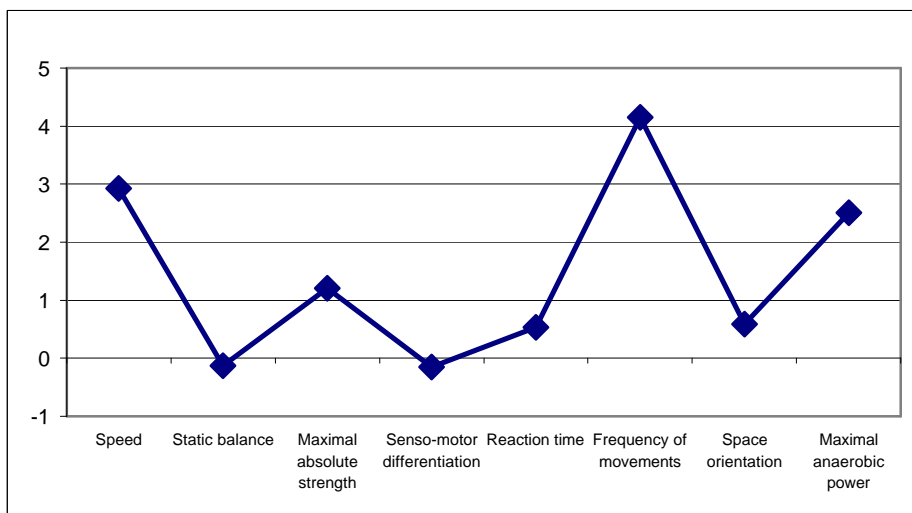

Fig. 1. The profile of the soccer players motor abilities

According to the soccer players conditioning criteria, prepared by Zajac and Waskiewicz (1998) the results of the soccer players standing long jump test (206 cm) are very good.

On the basis of long-term studies of motor development Raczek et al (1998) presented methods of diagnosis of coordination along with estimated

grades of their level. According to the presented norms, soccer players results of space orientation ($\bar{x}$=39,54 cm) represents the level between very good (30 cm) and good (45 cm). However, the boys from the comparative group ($\bar{x}$=51,14 cm) represent the level between good (45 cm) and satisfactory (60 cm). In reaction time test the results of the soccer players ($\bar{x}$=20,06 cm) as well as the comparative group ($\bar{x}$=21,92) can be estimated as good.

The analysis of results indicates a higher level of all motor abilities in the group of the examined soccer players compared to comparative group. The statistically significant differences were determined in the results of speed (p<0,01), maximal absolute strength (p<0,01), foot tapping (p<0,01), space orientation (p<0,05) and maximal anaerobic power (p<0,01). Higher level of maximal anaerobic power was also registered by Szopa and Srutowski (1990) in a group of well trained boys compared to the untrained ones. The authors studied the effects of initial selection and the increased physical activity on the motor development of 11–14 year old volleyball players. The results indicated faster development of motor abilities (including maximal anaerobic power, maximal absolute strength and reaction time) of the volleyball players.

The influence of directed training on coordination abilities and the rate of motor learning of the young volleyball players were the aim of research by Szopa and Szczepanik (1993). The research showed that directed training improved reaction time, space orientation, static balance and speed of movements of the young volleyball players in comparison to untrained boys.

Golaszewski and Wieczorek (2001) compared the somatic structure and motor fitness of young soccer players to untrained boys. They observed significant differences in the level of the static balance. Authors did not confirm any significant differences in tests of local strength (pull ups on the horizontal bar), maximal anaerobic power and agility. The results of the presented studies did not confirm those results.

On the basis of analyses of experts considering the importance of coordination in soccer, Ljach (1995) enumerated as follows: the senso-motor differentiation, reaction time and space orientation. In the research (fig.1) among three mentioned abilities, statistically significant differences between the groups of soccer players and the comparative ones were noticed only in test of

differentiation, static balance and reaction time) the results of the soccer players were only slightly better (statistically insignificant) then the results of untrained boys. One may assume that among motor abilities the motor abilities had the dominant importance in the training of the young soccer players

The presented results of the research describing the level of chosen motor abilities of 13 year old soccer players may be considered as norms which should be an aim in the soccer training of 13 year old soccer players. Certainly it is not a "model of the young champion", but it brings the opportunity to compare the level of development of given motor abilities with mature players. It can also indicate the direction of the training process, especially the need of improving coordination.

Conclusions

1. The analysis of the results did not prove any statistically significant differences in morphological age of both examined groups. Therefore, the somatic traits were not an effect of selection.
2. The young soccer players presented a higher level of the motor abilities than untrained boys from the comparative group. The biggest differences between groups were observed in following abilities: frequency of movements, speed and the maximal anaerobic power.
3. The level of speed, strength and maximal anaerobic power were of greater importance than coordination. It may be suggested that coordination training is neglected in young soccer players.

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