

**SOME CONDITIONS AFFECTING THE LEVEL OF
CO-ORDINATION SKILLS AND TECHNICAL
ABILITIES IN 14-15-YEAR OLD FOOTBALL
PLAYERS OF SZKOLA MISTRZOSTWA
SPORTOWEGO IN KRAKOW (POLAND)**

by

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In 44 pupils of Szkola Mistrzostwa Sportowego training in football (including 24 sons to parents playing in the past in a team sports game and 20 individuals from parents who did not play any sport in the past), the level of selected co-ordination skills was analysed at recruitment to sports forms in the school and the level of technical abilities and playing efficiency after a 6-month training cycle. It has been found out that the level of the analysed parameters in boys of sport families was significantly higher against the group of sons to parents who never played any sport. Moreover, a significant relationship was found out between the level of co-ordination skills and playing technical skills and efficiency. The scope of issued in question may be a basis for more in-depth theoretical considerations and practical applications aimed at modification of the methods of recruitment and selection currently applied in the training practice. Multiple family-related circumstances are noteworthy here.

Keywords: Youth sport, Football.

Introduction

The problem of importance of movement co-ordination in football was rarely tackled (see the overview in Ljach 1995). Current research show that the leading co-ordination motoric abilities in this sports game are: differentiation of movement (kinaesthetic feeling), motoric adaptation, reaction time, anticipation and space orientation. The motoric adaptation skill seems to be of special importance here, as success in team sports games depends not only on the level

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of technique, but also, or probably predominantly, on its appropriate application and use in games.

This paper is aimed at finding a relationship between the level of basic components of movement co-ordination and technical abilities and playing efficiency in 14-15-year old boys playing football. This problem has also been tackled in the aspect of recruitment quality for sports groups and some family factors.

The following research questions were formulated:

What were the effects of the preliminary recruitment to Szkoła Mistrzostwa Sportowego in reference of movement co-ordination?

What was the level of examined parameters in children of former sports people against children of parents who never played any sports discipline?

Are there any relationships of various co-ordination skills with technique and playing efficiency in young football players and what, if any?

Material and methods

This paper uses part of comprehensive continuous research in boys training football in a 6-month training cycle. The observation covered 44 pupils in total, attending Szkoła Mistrzostwa Sportowego and their parents. The group consisted of 24 individuals, whose parents were professional sports people in a team sports game and 20 sons to parents, who never played any sport in the past.

The School activities were run by renowned specialists, and covered 16 hours of training per week, including 8 hours of multi-purpose training (creating motoric skills), 8 hours of technical and tactical training and 15 matches played in the autumn season.

The examination took into account the following parameters:

1. The basic somatic features (body height and weight);
2. Co-ordination skills (Szopa et al. 1996):
 - speed of movement (“foot tapping”),
 - visual and movement co-ordination (test in the Piorkowski apparatus made in Poland),
 - space orientation tested with the AKN-102 equipment,

- balance tested with the “flamingo balance” test (Eurofit 1988: modified by Żak 1991),
 - simple reaction time for a visual stimulus (ELPOM-301 meter),
 - anticipation determined with the expert method (on a 10-point scale);
3. Special (technical) ability tested with routine tests obligatory in Poland (Talaga 1980), including the following tests:
 - slalom with a ball,
 - running a ball in line in a shuttle run,
 - hitting the target with a ball,
 - ability run in the obstacle run;
 4. Playing efficiency assessed with the expert method during matches (the subjective method with the 10-point scale).

The measurements referred to in items 1 and 2 were taken at the beginning of the training. The level of technical ability, as well as playing efficiency was determined in the examined boys after the 6-month training cycle was completed.

The following methods were applied for the preparation of material:

1. The basic statistical values were calculated for all of the co-ordination skills and special efficiency (the global result) and playing efficiency.
2. Individual values for particular components of movement co-ordination were standardised for average values and standard deviation of population standards for boys of Krakow (Szopa 1988).
3. Recruitment quality was estimated with the value of average standardised differences between the sports group and the population, expressed in the T scale.
4. With the standardised values, correlation factors were calculated between the level of co-ordination skills and test results for special efficiency and playing efficiency. The linear regression model was applied. Special efficiency was treated in this case as a single combined result expressed in the sum of points for standardised factors.
5. The effect of the “family factor” was determined by comparing the average standardised values for specific parameters in boys of sports families against the contemporaries, whose parents never played any sport.

6. The above data were supplemented with the results of history on the family lifestyle, the sports past and the presented movement activity.

Results

In the result of the preliminary recruitment it was found out that the scope of general body structure, the examined boys do not significantly differ from their contemporaries of the Krakow population (Table 1). Some differences become significant between the sons of former sportsmen and individuals, whose parents did not practise any sport professionally. The latter are slightly higher and have heavier bodies. In reference to body height, the average difference is 1.2 cm, and amounts to 2.4 kg in reference to body weight.

Table 1. Characteristics of the basic somatic features in the examined boys.

Feature	Children of former sports people		Krakow population of 15-year olds		Children of parents who do not practice sport	
	\bar{x}	s	\bar{x}	s	\bar{x}	s
Body height	170,6	6,0	170,2	7,1	171,8	7,2
Body weight	58,2	7,7	57,6	9,7	60,6	9,1

Boys from families with sport traditions clearly dominate (compared with differences for body size values) over their contemporaries, whose parents never practised any sport discipline in the past (Table 2). Standardised differences, except for body balance, are close to or exceed values of one standard deviation (10 points in the T scale). It has to be emphasised that the group of boys recruited from the families of former sports people in the scale of results obtained constitute more uniform population than the group of children from parents who never practised any sport in the past. Differences prove it within the calculated standard deviations.

Predominance of boys from sport families over their contemporaries from the control group in reference to movement co-ordination components is also reflected in the results of technical abilities and playing efficiency (Table 3). In

all the cases, the differences found out are statistically significant and clearly exceed the value of one standard deviation.

Table 2. Characteristics of co-ordination predisposition in the examined boys against population standards.

Sample	Children of former sports people		Points in the T scale	Children of parents who do not practice sport		Points in the T scale
	\bar{x}	s		\bar{x}	s	
Space orientation (s) [•]	53.6	6.2	63.0	67.8	8.1	53.5
Visual and movement co-ordination (number)	94.9	9.3	67.7	73.8	14.4	58.6
Speed of movement (s) [•]	6.7	0.7	74.2	8.0	1.0	63.3
Balance (s) ^{••}	7.3	4.2	50.1	7.0	4.3	49.7
Reaction time (s) [•]	0.186	0.013	55.2	0.214	0.018	46.1
Anticipation (in points)	6.71	1.12	-	4.91	1.44	d=1.80 ^{xx}

^{xx} P ≤ 0.01

[•] shorter time means better result

^{••} longer time means better result

Table 3. Characteristics of technical abilities and playing efficiency in the examined boys and significance of differences.

Sample	Children former sports people		Children of parents who do not practice sport		d
	\bar{x}	s	\bar{x}	s	
Technical abilities (in points)	6.83	1.04	5.21	1.57	1.62 ^{xx}
Efficiency of outdoor playing (in points)	6.70	1.38	5.26	1.71	1.44 ^x
Efficiency of hall playing (in points)	6.57	1.33	4.79	1.74	1.78 ^{xx}

^x P ≤ 0,05

^{xx} P ≤ 0,01

Table 4. Values of correlation factors for co-ordination skills with the level of technical abilities and playing efficiency in the examined boys.

Sample	Technical abilities	Result of outdoor game	Result of hall game
Spatial orientation	0.68*	0.42*	0.44*
Visual and movement co-ordination	0.66	0.43	0.45
Speed of movement	0.62*	0.59*	0.57*
Balance	0.32	0.28	0.22
Reaction time	0.44*	0.48*	0.49*
Anticipation	0.81	0.82	0.85

* the negative value was multiplied by – 1

The significant relationship of the sport technique with the level of movement co-ordination is confirmed with the co-ordination factor quantification (Table 4). These are largest in reference to anticipation, then to space orientation, visual and movement co-ordination and movement speed. Low factors define the relationship of technical abilities to body balance alone.

Discussion

Special nature and complexity of football result in the fact that it is never known which predisposition should be taken into account in recruitment and selection and which of them specifically determine teaching and improving the technique. How important this problem is one can see from the results of empirical examinations presented above. The major problem is quite clear here, especially in the context of unconventional methods of preliminary selection. The high level of movement co-ordination found in sons of former sports people (compared against the group of boys, whose parents have never practised sport professionally) may result from genetic factors, as well as specific influences of external circumstances.

Lower average results of co-ordination skills with their greater variability in the group of sons of parents who have never practised any sport professionally lead to the fact that in this group cases are often noted of low (compared against the population) movement co-ordination in the examined boys. Such persons, despite adequate somatic predisposition, do not show hope for high sports results in the future, as it is co-ordination skills, which are the basic predisposition in playing technique. This is proved by the high correlation factors calculated between technical abilities and movement co-ordination components included into the study, whose training history is limited with some borderlines of biological growth. This was found out in the research by Szczepanik and Szopa (1993), who found out that the end of pubescence is such a borderline.

Some regularities are noteworthy in the interpretation of results obtained, which refer to genetic control over some co-ordination skills. The strongest genetic factors (inheritance factors in the range of 0.4-0.6 close to body height in this group) in the examination of Krakow population (Szopa et al. 1996) show space orientation, thus being a predisposition representing high level of co-ordination (movement direction). Slightly weaker, to be qualified as relatively average, is the genetic control of visual and movement co-ordination (h^2 from 0.27 to 0.52), thus being a predisposition of slightly lower co-ordination level. What is interesting is that in the scope of both predisposition discussed, increasing strength of genetic factors proceeding with age and larger share of the genetic factor are noted in boys than in girls. The simple reaction time seems to be a feature of weak genetic factors, very unstable, not only in the sense of estimating genetic variation in the population (h^2), but also of the so-called intra-individual variability.

In the light of the findings quoted above, the own results of the study seem to confirm the fact that the described components of movement co-ordination belong to these features, which show strong ecosensitivity with major, at times, genetic control. The results of the questionnaire with parents on family lifestyle and physical activity of their children may be justification for this thesis. However, despite the fact that this paper does not include any statistical information due to editorial limitations, it is worth of stating here that analysis of several open questions allows for finding high degree of differentiation in

physical activity called by the name of the family lifestyle. This is the major factor, though it is not uniform, in the families of former sports people and applies to the way free time is spent, the number of recreational sports practised and time dedicated for physical culture. It seems that the high level of co-ordination skills noticed with boys of the group of parents who were former sports people is justified not only with the genetic factors, but also may result mostly from copying their parents' lifestyle (former sport people, including representatives of the country).

Domination of boys from former sports families over their contemporaries in the control group in reference to co-ordination skills affects, which is obvious, the similar arrangement of results for technical abilities and playing efficiency. This fact is to be closely related to significant correlation factors between the sport technique and the level of particular movement co-ordination elements, mostly anticipation, space orientation and visual and movement co-ordination. It may be concluded that football (like other team games) is a game determined with the third, thus the highest level of co-ordination (Farfiel 1960). It seems that spatial accuracy of movement executed in minimum time units and under changing conditions is the result of the circumstances.

Low correlation factors, which determine the relationship between technical abilities and body balance may prove that static balance is a low-forecast sample in the case under discussion.

Lower values of correlation factors obtained between particular movement co-ordination parameters and playing efficiency may prove that game efficiency is also decided upon by other factors. It is probable that the factors are, for example, abilities based on energy background

Summary

The problem presented here in the light of results obtained does not allow for complete and authoritative conclusions, the more so because this paper is of preliminary nature and is rather an invitation to the discussion. The results described here are a departure point for more long-term research run within the programmed didactic experiment with football boys. The scope of issues under question is just a basis for more in-depth theoretical search and practical

applications aimed at modifying recruitment and selection methods applied currently in the training practice. Many family factors are worth noting here. The data presented are also related to the viewpoint of sport training effects. Co-ordination skills are not only determined by effective and proper movement execution, but also the process of its teaching. Similar conclusions were drawn by Szczepanik and Szopa (1993), who proved that early shaping of co-ordination predisposition facilitates teaching of movement technique in young volleyball players.

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