

INFLUENCE OF DIFFERENT TRAINING PROGRAMMES ON BASIC COORDINATION OF FEMALE HANDBALL PLAYERS

Ivana Bojić, Dragoljub Petković and Miodrag Kocić

Faculty of Sport and Physical Education, University of Niš, Serbia

Original scientific paper

Abstract

The aim of this research is determining the influence of different training programmes (the ones without the ball and the ones in which in ball is used at the beginning and the end of a training session) on basic coordination of female handball players. 60 girls, aged 12 to 14 (± 6 months) took part in the research. They were divided into two subgroups; the experimental E1 group (30 players) and E2 group (30 players). All of the girls were training handball for at least a year. A battery of seven tests was used for evaluating basic coordination. Qualitative differences, as well as the hierarchy of variables which add to a better discrimination between the initial and the final testing of both experimental groups but also enable differentiation between the groups in the final testing, were determined by the canonical discriminating analysis. The results showed that both experimental programmes had a positive influence on the changes of basic coordination of the handball players. However, the programme of the E2 subgroup (in which the ball was used in all the training phases) brought about the changes in a larger number of variables than the E1 programme (which included exercises and movements without the ball).

Key words: basic coordination, female handball players, effects, training

Introduction

The modern game of handball, including its speed, dynamics, the rapid changes of offense and defense, attractive assists and shots, has become more popular with men and women (Bojić, 2008). In addition, the rules of the game and the variety of movements have a positive influence on the development of basic coordination of children. This dominant ability is necessary for successful playing of any other sport (Kuleš & Šimenc, 1983; Hirtz & Starosta, 2002; Srhoj et al. 2006). The novelties in the game have given rise to different approaches to the training process, especially when it comes to the physical, technical and tactical and the psychological preparation of the players. The latest changes in and amendments to the official handball rules, especially the ones concerning the limitations to the duration of the attack (the so-called 'passive game'), require fast passes, sudden and frequent changes of the running direction with or without the ball, but also more efficient attacks, that is, scoring. Therefore, if all the specific movements are practiced without the ball during training sessions, the players will have problems to use those movements with the ball during the game. It is expected that the movements will be slow, passes at high speed will be imprecise and poorly coordinated and the insight into the game bad. All these will result in a poor final score. A greater number of researches have shown that specially programmed training processes, which take into account the age and the biological maturity of the players, can cause the rise in mobility, specific mobility and functional ability of both male and female handball players (Kurelić et al., 1975; Fulgozi, 1994; Bojić et al., 2007; Maksimović, 2000; Azumane et al., 2002; Bompa, 2005; Bojić, 2006; Križan, 2006).

The aim of the research is determining influence of different training programmes on basic coordination of female handball players aged 12 to 14.

Methods

Specimen of examinees

60 girls from the handball club 'Naissa' made up the specimen for this research. They were divided into two subgroups: the experimental group E1 (30 handball players) and the E2 group (30 players as well). They were all aged 12 to 14 (± 6 months) and had been training handball for at least a year.

Set of variables

In this research basic coordination of the examinees was evaluated by the following measuring instruments (as in Metikoš et al, 1972): doing the 'eight' with bending (MKOOSA), sideway steps (MKKUST), driving the ball with the hand (MKVLRU), (as in Kuleš et al., 1973), coordination with the bat (MKOPAL), retrieving and throwing the ball while sitting (MKUBLS), skipping the rope (MKPRVI), (as in Rapp & Schoder, 1977), and sideway skipping (MKBPPE).

Data processing

Qualitative differences, as well as the hierarchy of variables which add to a better discrimination between the initial and the final testing of both experimental groups but also enable differentiation between the groups in the final testing, were determined by the canonical discriminating analysis.

Description of the experimental process

The examinees of the experimental groups E1 and E2 took part in the experimental programmes of the different structures of the initial and the final parts of the training, whereas the main part of the training session was the same for the both groups.

The experimental group E1 had in its initial and the final part of the training session exercises and movements without the ball, whereas the experimental E2 group used the ball in all the exercises and movements. The training programme which was used by the E1 subgroup included various training grounds for developing coordination (both general and specific), in this case without the ball. The other group, E2, used the ball in all the exercises and in all training grounds included in the training process. The main part of the training session was identical for both groups of examinees and was aiming at practicing and perfecting all the technical and tactical elements of the handball game. The experimental programmes were conducted in the first training cycle and they lasted for about 12 months (36 training sessions).

Results

Table 1. Central and dispersion parameters of basic coordination of the experimental group E1 in the initial testing

	SV	Min	Max	SD	SE	Skew	Kurt
MKOOSA	19,88	18,00	22,00	1,19	0,22	-0,06	-0,82
MKKUST	20,98	18,10	24,00	1,62	0,30	0,14	-0,87
MKVLRU	8,74	6,90	10,20	0,85	0,16	-0,34	-0,41
MKOPAL	10,25	6,50	20,60	3,28	0,60	1,87	4,28
MKUBLS	7,13	5,40	11,40	1,17	0,21	1,68	4,87
MKPRVI	12,73	2,00	23,00	5,42	0,99	0,24	-0,61
MKBPRE	39,83	31,00	50,00	4,03	0,74	0,31	0,56

Table 2. Central and dispersion parameters of basic coordination of the experimental group (final)

	SV	Min	Max	SD	SE	Skew	Kurt
MKOOSA	20,06	17,40	22,50	1,34	0,24	-0,24	-0,67
MKKUST	21,86	18,00	24,40	1,57	0,29	-0,36	-0,16
MKVLRU	8,46	6,50	10,40	0,87	0,16	0,11	-0,02
MKOPAL	9,35	5,90	16,10	2,68	0,49	0,94	0,00
MKUBLS	8,89	5,50	12,60	1,97	0,36	0,11	-0,91
MKPRVI	15,20	4,00	32,00	7,78	1,42	0,71	-0,38
MKBPRE	43,43	37,00	55,00	3,96	0,72	0,82	1,33

Table 3. Central and dispersion parameters of basic coordination of the experimental group (initial)

	SV	Min	Max	SD	SE	Skew	Kurt
MKOOSA	20,96	16,80	25,50	2,41	0,44	0,22	-0,98
MKKUST	19,37	15,80	24,80	2,52	0,46	0,36	-0,79
MKVLRU	8,63	6,20	12,50	1,45	0,26	0,94	0,92
MKOPAL	9,66	5,40	14,60	2,38	0,44	0,20	-0,19
MKUBLS	10,64	6,90	17,40	2,41	0,44	0,63	0,63
MKPRVI	16,70	4,00	35,00	8,77	1,60	0,38	-0,81
MKBPRE	42,27	33,00	51,00	4,31	0,79	-0,38	-0,11

Tables 1, 2, 3 and 4 show central and dispersion parameters of basic coordination of the examinees of both groups in the initial and final testing. However, due to the brevity of this work the interpretation of the results is impossible. The canonical discriminating analysis (table 5) shows that there is a very important discriminating function which is not only significant and high (Sig. = .000) but which is also explained with 78% (Canonical R= .78). The discriminating trait of the variables is showed through the Wilks' test and is very high (.40).

Table 4. Central and dispersion parameters of basic coordination of the experimental group E2 in the final testing

	SV	Min	Max	SD	SE	Skew	Kurt
MKOOSA	19,78	16,70	23,80	1,65	0,30	0,17	-0,00
MKKUST	19,05	15,80	23,00	1,34	0,24	0,56	2,02
MKVLRU	7,85	5,60	11,30	1,12	0,20	1,07	2,15
MKOPAL	8,73	5,60	13,20	2,03	0,37	0,50	-0,47
MKUBLS	9,32	6,70	15,40	1,99	0,36	0,95	1,48
MKPRVI	19,30	2,00	39,00	9,27	1,69	0,03	-0,39
MKBPRE	47,77	38,00	60,00	4,93	0,90	0,51	0,85

Table 5. The importance of the isolated discriminating function between the initial and the final testing of the basic coordination of the experimental E1 group

Eigen-	Canonical R	Wilks'	Chi-Sqr.	df	Sig.
1.51	.78	.40	50.12	7	.000

Table 6. Group apexes

Initial	-1.21
Final	1.21

It points to the fact that the experimental training process brought about the changes in basic coordination of the experimental E1 group examinees between the initial and the final testing. The results of the group apexes -1.21 and 1.21 (table 6) point to the significant distance between the initial and the final testing of the basic coordination of the E1 group examinees. The factor structure of the isolated discriminating function (as shown in table 7) analysis shows that the greatest contribution to the discriminating function is made by the following variables: retrieving and throwing the ball while sitting (MKUBLS = .45), sideway skipping (MKBPRE = .37), sideway steps (MKKUST = .23), skipping the rope (MKPRVI = .15). The less substantial contribution is made by the following variables: driving the ball with the hand (MKVLRU = -.13), coordination with the bat (MKOPAL = -.12) and doing the 'eight' with bending (MKOOSA = .06). The successfulness of the separation between the initial and final testing of the applied variables for the evaluation of the basic coordination of the E1 group examinees shown as the percentage group in table 8 indicates that the separation was done with the precision of 88.33% of the total value of the canonic correlation ratio of 78 %. This means that the changes in testing results appeared in 88% of the number of examinees. The canonical discriminating analysis (table 9) shows that there is a very important discriminating function which is not only significant and high (Sig. = .002) but which is also explained with 59% (Canonical R= .59). The results of the group apexes 72 and -.72 (table 10) point to the significant distance between the initial and the final testing of the basic coordination of the E2 group examinees. The factor structure of the isolated discriminating function (as shown in table 11) analysis shows that the greatest contribution to the discriminating function is made by the following variables: doing the 'eight' with bending (MKOOSA = -.83), sideway steps (MKKUST = .42). Somewhat smaller contribution is made by driving the ball with the hand (MKVLRU = -.42).

And coordination with the bat (MKOPAL = -.40), and minimal by sideway skipping (MKBPRES = .11).

Table 7. The factor structure of the isolated discriminating function of the basic coordination

MKOOSA	.45
MKKUST	.37
MKVLRU	.23
MKOPAL	.15
MKUBLS	-.13
MKPRVI	-.12
MKBPRES	.06

Table 8. Precision of the result classification

	Per cent	Initial	Final
Initial	90.00	27	3
Final	86.67	4	26
Total	88.33	31	29

Table 9. The importance of the isolated discriminating function between the initial and the final testing of the basic coordination of the experimental E2 group

Eigen-	Canonical R	Wilks'	Chi-Sqr.	df	Sig.
.53	.59	.65	23.15	7	.002

Table 10. Group apexes

Initial	.72
Final	-.72

Table 11. The factor structure of the isolated discriminating function of the basic coordination

	Function 1
MKOOSA	-0.83
MKKUST	0.42
MKVLRU	0.42
MKOPAL	0.40
MKUBLS	0.29
MKPRVI	-0.20
MKBPRES	0.11

Table 12. Precision of the result classification

	Per cent	G 1:1	G 2:2
Initial	80.00	24	6
Final	76.67	7	23
Total	78.33	31	29

The successfulness of the separation between the initial and the final testing of the applied variables for evaluating basic coordination of the E2 group examinees (table 12) shows that the results are homogenous in the initial testing up to 80% and in the final one up to 76.67%. The results shown in table 13, point to the great significance of the differences between groups E1 and E2 (Sig. = .000) in the final testing. The value of the canonical correlation ratio (Canonical R) explains the discriminating properties of the function with 79 per cent. The discriminating trait is .38 and points to the differences in basic ability and mobility between the experimental groups in the final testing. The results in the group apexes shown in table 14 indicate that their separation is significant and high and goes from 1.26 to -1.26. This also separates the values of the results between the E1 and E2 groups in the final testing.

Table 13. The importance of the isolated discriminating function between the E1 and E2 groups in the final testing of the basic coordination

Eigen-	Canonical R	Wilks'	Chi-Sqr.	df	Sig.
1.64	.79	.38	52.98	7	.000

From the position of the apexes it can be concluded that the values with the negative mark indicate positive changes in E2 experimental group in the final testing.

Table 14. Group apexes

	Function 1
E1 group	1.26
E2 group	-1.26

Table 15. The factor structure of the isolated discriminating function

	Function 1
MKOOSA	-0.76
MKKUST	0.38
MKVLRU	-0.24
MKOPAL	0.19
MKUBLS	-0.10
MKPRVI	0.08
MKBPRES	-0.07

The factor structure of the isolated discriminating function (as shown in table 15) analysis shows that the greatest contribution to the discriminating function is made by those variables which evaluate the coordination of the legs: sideway steps (MKKYCT -7.6) and sideway skipping (MKBPRES .38), whereas the least contribution is made by doing the 'eight' with bending (MKOOSA -0.7).

Table 16. Precision of the result classification

	Percent	E1 group	E2 group
E1 group	90.00	27	3
E2 group	86.67	4	26
Total	88.33	31	29

The successfulness of the separation between the experimental groups E1 and E2 (in table 16) shows that the changes in the tested variables occur in 88.33% of the examinees. The difference is dominant in the results of the variables evaluating the coordination of hands and legs, to the advantage of the E2 experimental group.

Discussion and conclusion

The results of the canonical discriminating analysis showed that different programmed training processes, within 36 training sessions, changed the basic coordination of the examinees of both groups. However, the results of the 4 out of 7 testing instruments are better in the examinees of the E2 group than in the examinees of the E1 group. Hence, it can be concluded that both programmes had positive influences on the changes in basic coordination, but E2 programme had slightly better effects on the changes within the tested parameters. Exercises and movements with the ball applied in all the phases of a training session (the introductory, the main and the final parts) during the experimental period with the examinees of the

E2 group showed that training programmes of young female handball players should include the ball in all the exercises and movements. In this way their mobility (both basic and specific) will be efficiently and rapidly developed, which is necessary for the success in this sport. The results of this research have a lot of significance for

handball training because they prove that more varied training programmes (with or without the ball) in the initial and final parts of a training session contribute to the development of basic coordination which is indispensable for mastering technical and tactical elements of handball.

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UTJECAJ RAZLIČITIH TRENAŽNIH PROGRAMA NA TEMELJNU KOORDINACIJU RUKOMETASICA

Sažetak

Cilj istraživanja je utvrđivanje uticaja različitih programa trenažnog procesa (bez lopte i sa korišćenjem lopte u uvodnom i završnom delu treninga) na bazične - koordinacione sposobnosti rukometašica, uzrasta 12 - 14 godina. Uzorak je činilo 60 devojčica, uzrasta od 12 do 14 godina \pm 6 meseci podeljenih na dva subuzorka - eksperimentalnu grupu E1 (30 rukometašica) i E2 (30 rukometašica), koje se najmanje jednu godinu se bave rukometom. Bazične koordinacione sposobnosti ispitnica u ovom istraživanju, procenjuju se baterijom od sedam testova. Za utvrđivanje kvalitativnih razlika i hijerarhije varijabli koje doprinose razlikovanju (diskriminaciji) između inicijalnog i finalnog merenja kod obeju eksperimentalnih grupa, ali i razlike između grupa na finalnom merenju, primenjena je Kanonička - diskriminativna analiza. Rezultati su pokazali da su oba eksperimentalna programa pozitivno uticala na promene bazično koordinacionih sposobnosti rukometašica, ali i da je program E2 grupe (sa korišćenjem lopte u svim fazama treninga), uticao na veći broj ispitivanih varijabli u odnosu na program E1 grupe (vežbe i kretanja bez lopte).

Ključne riječi: bazična koordinacija, rukometašice, efekti, trening

Received: February 15, 2010.

Accepted: May 10, 2010.

Correspondence to:

Asst.Prof. Ivana Bojić, PhD.

University of Niš

Faculty of Sport and Physical Education

18000 Niš, Čarnojevića 10A, Serbia

Phone: +381 (0)18 510 900

E-mail: bojicka2003@yahoo.com