

Original Article

Monitoring and upgrading of coordinative and conditional capacities of young athletes practicing handball

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Abstract

Introduction The study has been finalized, through a method of manual observation and detection of data, the monitoring of the sporting behavior of a sample of 24 young male athletes, aged between 15 and 17, practicing handball at amateur / school level.

Methods The aim was to monitor and strengthen individual and team fundamentals through the improvement of the percentages of passage and shooting on goal, taking care of the development of the coordinative and conditional skills. The research was carried out over a period of six months, from December 2016 to June 2017, through analytical and global training methods developed in twenty (20) additional hours of work in addition to the work sessions provided for the annual program. Motor tests were administered with the athletes divided into groups A and B, at the beginning, midterm and at the end of the observation period.

Conclusions and results The final output showed the improvement percentage of about 4% for group A and about 14% for group B.

Keywords : Handball, passing, shooting, precision, strength

Introduction

Handball (Trillini, Pacifico, 2015) has agonistic characteristics that determine a neuromuscular (Aachbach et al., 2017) and cardio-circulatory (Hermassi et al., 2017) involvement of the athletes of the alternating anaerobic-aerobic type. It is the team sport that highlights the effectiveness of the passage, of the shot, the assist, in a competitive context where the motor skills of an athlete, divided into coordinative (Magni 2009) and conditional (Di Tore, Raiola, 2012), are always evaluated according to the performance (Raiola, 2017) and the results obtained individually and / or with the team. Handball (Mirzaei et al., 2013) favours, especially in the youngest, the development of motor and psychic qualities (Yarrow, Brown, Krakauer, 2009) of the collective and competitive spirit, THE self-organization and self-management skills. In the handball player are constantly activated all cognitive processes (Benso, 2007) related to the resolution of problematic situations highlighted during the game phases from the position of the athletes and teams in the field, from the position and the movement of the ball, from the position and movement of teammates and opponents (Carbonell-Martinez, Jimenez-Olmedo, 2017). Handball is a sport of situation (Hennig, 2017) in which the phases of a competition, which lasts a total of 60 minutes with two 30-minute times each, develop through technical and tactical actions of attack and defense with interruptions established only by technical regulation (IHF, 2016). The sporting discipline has characteristics of high variability due to the unpredictability of the game phases that athletes must know how to manage, especially using open skills (Picco, 2017), with the maximum speed and accuracy possible. The motivation to practice sports (Borghi et al., 2017), the development of technical skills (Miller et al., 2017), particularly the shooting (Hatzimanouil et al., 2017) of the transition and spatial organization, represent some of the indispensable conditions for obtaining positive competitive results. The exact assumption of positions in the playing area by the athletes, during a competition, related to the concepts of front, back, right, left, above, below and to those rhythmic of closeness, distance, succession, determine the effectiveness of the application of individual and team fundamentals.

The technical regulation modulates the rules relating to the spatial organization that may affect the development of the game and therefore the victory of a race such as the ban on stopping, excluding the goalkeeper, in the goal area or the prohibition to hold back the ball for more than three seconds and do not take more than three steps without passing or dribbling (Florin, 2017). Aim of the game is the scoring of a goal in the opponent's net with shots made in double support, in elevation, in extension or in dive.

In the light of these considerations, a research was carried out, for six months, on a sample of young athletes practicing handball at amateur / school level, aimed at monitoring and strengthening the coordination skills (Montesano, Tafuri, Mazzeo, 2016) and conditional extrinsic in the individual fundamentals of shooting and passing (Erculj, Strumbelj, 2015).

Methods and Materials

Participants The research was carried out on a sample of 30 young male athletes, aged between 15 and 17 (Asker, 2017), practicing handball at amateur and school level.

Objectives and Procedures

The study, conducted with an observational method and with manual detection, had the objective of monitoring and enhancing the passing and shooting percentages (Hatzimanouil et al., 2012) by training the explosive strength of the upper limbs (Montesano, 2016) and lower limbs with specific exercises using competition balls and medicine balls. The characteristics and the percentages relative to the shoots and passes of each athlete have been detected through the administration of initial, intermediate and final tests (Marella, Risaliti, 2007) and of specific exercises during training sessions carried out on a regulatory field and with homologated equipment. The results of the initial survey allowed the division of the athletes into two groups: the control group, consisting of the athletes with the percentage of shooting and the highest pass called group A, and the route group, consisting of the athletes with lower percentages called group B.

The two groups, during the racing season, followed the normal training method (Barba, Tafuri, 2007) prepared by the technical staff consisting of three weekly training sessions, characterized by athletic exercises, techniques (Montesano, 2014) and tactics, proposed to the athletes in the form alternating with prevalent neuromuscular and cardiocirculatory involvement. Only group B, the route group, were given additional monthly exercises of passage and shooting for a total of 20 sessions, subdividing the space of the field into bands and sectors of play: Longitudinal band (Fig. 1), the space (ABC) that the players and the ball occupy advancing from the defense zone to the attack zone; each player should occupy a band during the movement from defense to attack to have his own space of action, not to hinder the movements of the companions and to choose the appropriate time to receive a pass, pass or pull to the net.

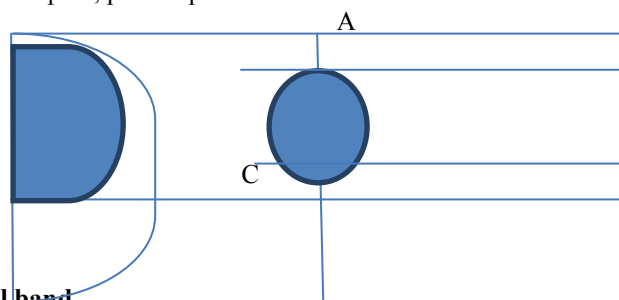


Figure 1 - Longitudinal band

Shooting and passing tests and additional training sessions

1) exercises for the detection of percentages of passing to a hand (Fig. 2):

The 30 athletes, in turn, leave the door after receiving the passage of the goalkeeper occupying the longitudinal strips ABC in reference to the roles, goalkeeper (p), central (c), pivot (p), right back (td), left back (ts), right wing (ad), left wing (as), and carrying out, with the dominant limb, 40 steps towards the companions positioned in the areas of their competence, respecting the three-step rule, thus simulating actions of race.

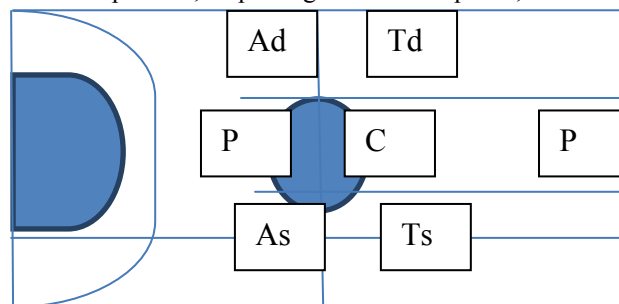


Figure 2 - Passing positions

2) exercises for detecting shooting percentages (Fig. 3):

The 30 athletes make a total of 20 shots on the net, n. 5 for each position (1,2,3,4), not exceeding the 6-meter line.

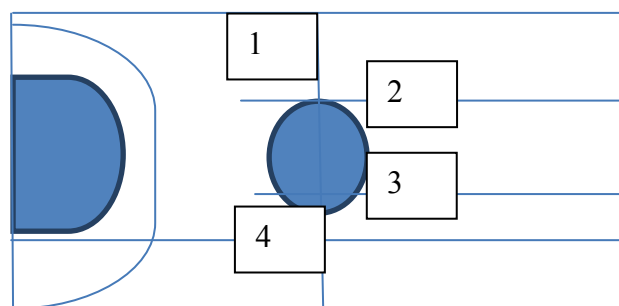


Figure 3- Shooting positions

3) isotonic and isometric strengthening exercises during training sessions in the gym with medicinal flasks weighing between 1kg and 3kg.

The analytical methodology has favored the development of the individual fundamentals, passage and shot, for each exercise with the use of the regulatory flask and of the medicinal flasks. During the strengthening sessions (Galazoulas, 2017) for the exercises for the steps the athletes used the medicine balls with a weight ranging from 1 to 3 kg. while for the enhancement of the shooting technique they used only a medicine ball weighing 1 kg alternating with the regulatory tender.

Materials and resources

- Handball field of regulatory size, 40m. x 20m., with doors, positioned at the center of the bottom line, 2m high and 3m wide,
- regulation handball balls,
- medicinal flasks weighing between 1 and 3 kg.,
- No. 2 athletes with the function of detectors of the number of passes and shots,
- Detection grids

Variables

The additional exercises were carried out on Tuesdays from 3 to 4.30 pm. The athletes carried out the tests following the progressive numbering of the identification number (Group A: 1,24,5,9,10,11,14,17,19,22,26,27,28,29 - Group B: 3, 6,7,8,12,13,15,16,18,20,21,23,24,25,30) and the upgrading in the gym. The wrong passage or shot was not repeated but the test continued without interruption. Progressively, the time and space variable was introduced to make young people adapt to the three-second and three-step rules (IHF Technical Regulations, 2016). In the last four workouts the times for the tests for the steps have been reduced to two minutes while for the 1 minute shots.

Results

Initial detection

The starting survey (Table 1) was carried out by administering the passage tests (theoretical number accurate passages 40) and shooting tests (theoretical number accurate shots 20) to all athletes. Initial data showed that the percentage between 90% and 100% had been reached by only four athletes in the passage test while only one athlete had totalized a 100% percentage in the exercise of the shots.

Table 1 - Initial detection of the percentages of precision in the passages and the shots

Athletes	Total precise passages	% precise passages	Total precise shots	% precise shots
1	36	90	18	90
2	32	80	20	100
3	29	72,5	14	70
4	39	97,5	17	85
5	33	82,5	13	65
6	27	67,5	12	60
7	27	67,5	11	55
8	30	75	13	65
9	35	87,5	17	85
10	38	95	16	80
11	34	85	15	75
12	28	70	12	60
13	30	75	12	60
14	32	80	18	90
15	24	60	11	55
16	29	72,5	12	60
17	35	87,5	14	70
18	31	77,5	13	65
19	37	92,5	15	75
20	25	62,5	14	70
21	28	70	10	50
22	32	80	16	80
23	30	75	11	55
24	31	77,5	12	60
25	28	70	11	55
26	34	85	17	85
27	35	87,5	16	80
28	32	80	18	90
29	38	95	17	85
30	31	77,5	13	65

The analysis of the average percentages allowed the division of the athletes into two groups: A and B (table 2). Group B included athletes who had a lower percentage of overall average accuracy between passes and shots

Table 2 - Subdivision in groups with average percentage contribution between steps and shots

GROUP A				GROUP B			
% precise passages	% precise shots	Athletes	% average total	% Total precise passages	% precise shots	Athletes	% average total
90	90	1	90	72,5	70	3	71,25
80	100	2	90	67,5	60	6	63,75
97,5	85	4	91,25	67,5	55	7	61,25

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82,5	65	5	73,75		75	65	8	70
87,5	85	9	86,25		70	60	12	65
95	80	10	87,5		75	60	13	67,5
85	75	11	80		60	55	15	57,5
80	90	14	85		72,5	60	16	66,25
87,5	70	17	78,75		77,5	65	18	71,25
92,5	75	19	83,75		62,5	70	20	66,25
80	80	22	80		70	50	21	60
85	85	26	85		75	55	23	65
87,5	80	27	83,75		77,5	60	24	68,75
80	90	28	85		70	55	25	62,5
95	85	29	90		77,5	65	30	71,25

Intermediate detection

The intermediate survey (Table 3), carried out after three months, showed slight improvements in Group A, whose average total percentage was 78.91%, while in Group B, whose average total percentage was 67, 2%, there were recorded increases in performance, compared to initial data, equal to about 3% with an increase of about 5% for athletes identified with numbers 15 and 25.

Table 3 - Percentage of intermediate increase of passages and shots

<i>GROUP A</i>				<i>GROUP B</i>			
% precise passages	% precise shots	Athletes	% average total	% precise passages	% precise shots	Athletes	% average total
90	90	1	90	75	70	3	72,5
80	100	2	90	68	60	6	64
98	85	4	91,25	67,5	55	7	61,25
85	65	5	75	75	65	8	70
87,5	85	9	86,25	72	60	12	65/66
95	80	10	87,5	75	60	13	67,5
85	75	11	80	66	59	15	62,5
80	90	14	85	72,5	64	16	68,25
87,5	70	17	78,75	77,5	65	18	71,25
93	75	19	84	62,5	70	20	66,25
82	80	22	81	72	53	21	62,5
85	85	26	85	78	59	23	68,5
88	80	27	84	77,5	60	24	68,75
80	90	28	85	74	61	25	67,5
95	85	29	90	77,5	65	30	71,25

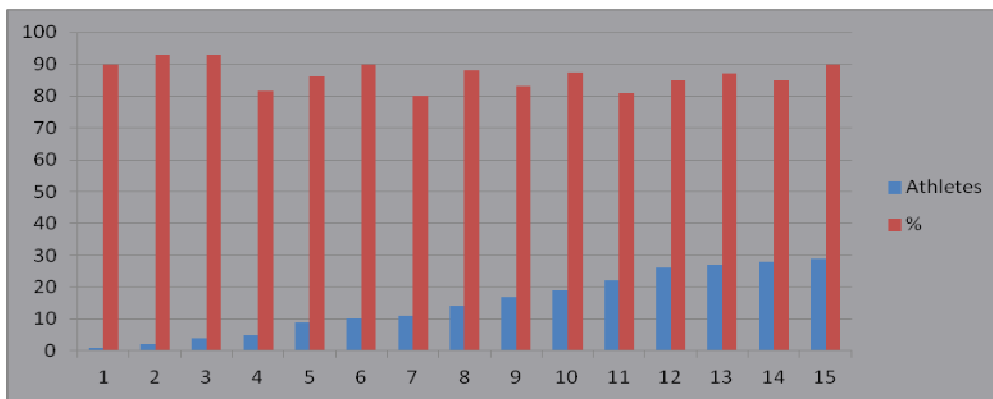
Final detection

The final survey (Table 4) showed an overall average improvement of around 4% for Group A, with percentages of performance for each athlete who exceed, except in one case, 80%.

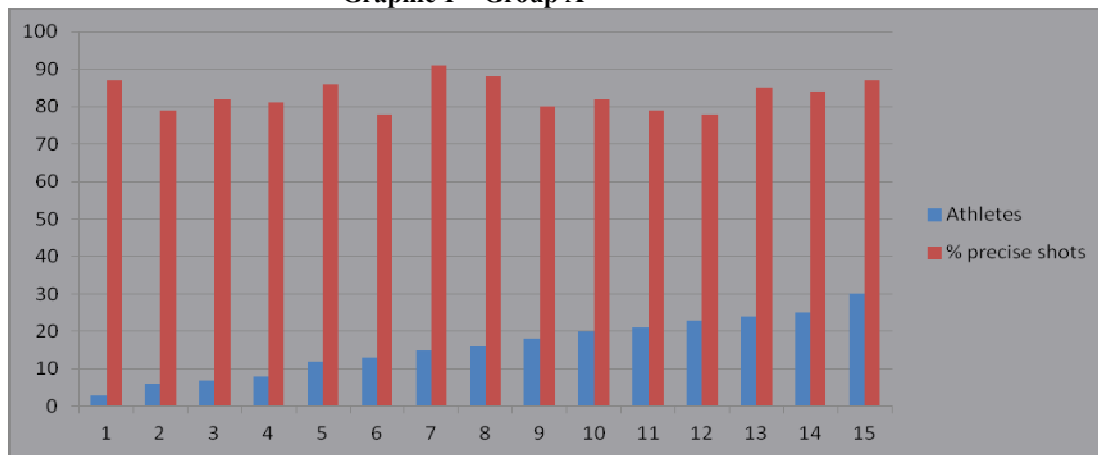
For Group B, the individual percentages are slightly below 80%, while an average improvement of around 14% has been recorded compared to the intermediate phase.

Table 4 - Average percentage of final increase in passages and shots

<i>GROUP A</i>				<i>GROUP B</i>			
% precise passages	% precise shots	Athletes	% average total	% precise passages	% precise shots	Athletes	% average total
90	90	1	90	87	83	3	85
86	100	2	93	79	83	6	81
98	88	4	93	82	73	7	77,5
87	76	5	81,5	81	79	8	80
87,5	85	9	86,25	86	79	12	82,5
95	85	10	90	78	79	13	78,5
85	75	11	80	91	87	15	88,5
86	90	14	88	88	78	16	83
89	77	17	83	80	72	18	76
93	82	19	87,5	82	80	20	81
82	80	22	81	79	78	21	78,5
85	85	26	85	78	83	23	80,5
88	86	27	87	85	77	24	81
80	90	28	85	84	79	25	81,5
95	85	29	90	87	81	30	84



Graphic 1 – Group A



Graphic 2 – Group B

Discussion

The adolescent period (Giorgi, 2004) is a delicate phase of growth for young people, who often provide performances inferior to their real capacity. Improvement of motor skills for young athletes must be facilitated through training courses that pay special attention to the auxological stages. The research showed that monitoring and strengthening the pass and pull rates through training paths that adequately stimulate the subjects on the motor level, improving the ability of body orientation in space, self-esteem and the relationship with the others, with the development of individual responsibility and the collaboration between the players, in fact there are significant improvements in performance (Naughton, 2000). The effectiveness of the proposed exercises allowed each athlete to become aware of the importance of the positions in the field and of the execution times of the technical gestures both at individual and team level, with greater attention to collaboration with the teammates, and this was confirmed by the results of the intermediate and final tests.

Conclusions

Young athletes participated enthusiastically and constantly to the additional training sessions e experiencing the handball experience joyfully and consciously, so that the choice to keep performing this activity must not be seen as something imposed, but as a pleasant activity in their leisure time (Montesano, Tafuri, Mazzeo, 2016). In fact, the correct planning of additional training (Raiola, D’Isanto, 2016) has encouraged the development of collaboration. The exercises proposed during the research path allowed each athlete to become aware of the importance of his positions on the field and the execution times of the technical gestures, both at individual and at team level, with an increased focus on the collaboration with his teammates, and this was confirmed by the outcomes of the intermediate and final tests. In particular, at the general motor level, they have improved body orientation skills in space; at the specific technical and tactical level, through the collaboration between multiple players and the choice of solutions depending on the handball, the teammates and the defenders. The results of the research showed a general improvement in performance (Luiselli, Woods, 2011), validating the choice of additional training methods. At the end of the competitive season, the data processed showed that the percentages of increase in passing and shooting percentages improved about 14% for group B.

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