COMPARATIVE ANALYSIS OF THE PERFORMANCE FEMALE HANDBALL PLAYERS MOTOR CAPACITY VALUES IN A TRAINING MACROCYCLE

Verejan Galina [1]

[1] *State University of Physical Education and Sports, Chisinau, Republic of Moldova*

Abstract

The progressive conceptual training model is a theoretical construction centered on the growth of motor and psychomotor capacities of female handball players in the initial advancement period the 5th year, necessary for the identification, analysis and exact capitalization of the circuits of scientific determination of training activities, in an annual training macrocycle accomplished at the system and process level. Its main purpose is to optimize the decisions to carry out the necessary training elements in a long term within a macrocycle, reflected in the global training units, each concrete activity, lesson, training hour, for periods of the sports training 5th advancement group.
In the development, implementation and improvement of the training process programming methodology, the approach of the progressive concept **based on the process** is promoted, starting from the idea that for the female handball players' training to work qualitatively and effectively.

Key words: *progressive conceptual model, motor and psychomotor training, technical-tactical training, performance female handball players, training process, macrocycle, sports training efficiency*

1. Introduction

Contemporary sports training are characterized, among other things, by a specific effort to synchronize motor training with the rhythm of the development of technical-tactical sports mastery (Șufaru, 2007). Regarding the instructive-educational process in handball, recently, on a national and global level, new methods are proposed to introduce the art of the system/model of effective planning of the annual macrocycle (Dumitriu, 1997; Eftene, 2004).

The organized pedagogic experiment aims to perfect sports-specific attributes, at the individual and collective level, in summary, in relation to coordination in physical training and objectives of improving the technical-tactical training of handball players.

Numerous theoretical studies and experimental research this positive influence of physical effort on the development of the motor capacities of the subjects in sports training at various ages, training levels, stages and training periods in an annual cycle [Dumitriu, 1997; Ulmeanu, 1966).

The aim of research consists in perfecting the training system for the period of an annual macrocycle for the motor and psychomotor training of performance handball players.

Research objectives:

1. The study on the theoretical-scientific and practical approaches in order to essentialize the motor and psychomotor dimensions of the training of female handball players for a period of 1 year;
2. Setting up the experimental methodology regarding the determination of the effective and necessary motor and psychomotor elements of modern handball, as well as the possibilities of their interaction, in order to obtain the highest results;
3. Appreciation of the efficiency of the developed experimental methodology and its argumentation for determining the optimal approach regarding the motor and psychomotor training of performance female handball players in an annual macrocycle;
4. Theoretical-experimental argumentation of the motor and psychomotor training program of female handball players for the 1-year macrocycle period.

The purpose and objectives of the research are directed towards the development of motor and technical-tactical expression possibilities, consequently, of great importance and actuality in women's handball, keeping the algorithm of the training of sportsmanship, with a view to creating a model or a system of operations in a strictly established order, regarding solving the problem of streamlining sports training in an annual macrocycle, starting with advanced training in the 5th year of training, to establish the coordination report, the existing relationship in motor and technical-tactical training between the initial training and the final training in an annual macrocycle. In order to implement the experimental structure and content, planning models were developed after which the process of ascertaining and basic training of the experimental groups was carried out. At the base of this "model" is the methodological system of the training process devoted to the motor training of female handball players in an annual macrocycle.

The values of the motor capacities of the performance female handball players during the initial period of advancement, the 5th year of training in the macrocycle, are presented in Table 1. The parameters of speed, strength in speed regime, coordination, explosive strength, necessary for the formation of technical-tactical skills, were recorded within the ascertaining experiment.

2. Material and method

Research methodology – the research of the theoretical-conceptual, methodological and practical essences exposed in the specialized literature; analysis of the documentary materials of sports training of female handball players in an annual cycle; longitudinal experimental observation, testing the level of motor training; the method of modeling sports training; method of ascertaining experiment; the statistical-mathematical method of processing the collected data; the Table method (Epuran, & Maroliceanu, 2002; Ulmeanu, 1966).

3. Results and Discussion

The method of testing psychomotor abilities was carried out in the process of systematic training, strictly programmed, planned and carried out during a macrocycle, having a systemic effect on the psychomotor evolution of performance female handball players (Ciubotaru, 2021; Eftene, 2004):

1. Speed run for 30 m (s)
2. Shuttle run 3 X 10 m (s)
3. Standing long jump (cm)
4. Lifting the trunk vertically from lying on the back for 30 s (no. of repetitions)
5. Throwing the handball at a distance (m)
6. Throwing the 2 kg medicine ball behind the head (cm)

The exercises of speed running, 3x10m shuttle, Standing long jumping were practiced for the development of the capacities to adapt running steps and jumping to the structure of the handball game, for the development of the motor and psychomotor qualities of speed, explosive force specific to the technical - tactical elements, for technical-tactical improvement in various situations of the handball game, in close correlation with most cases, in execution and the conditions provided in the regulation.

Since the experimental stage is of special importance for the analysis of the experimental results, we present below the main concrete modes of action with dependent and independent variables of the experimental groups and the control when testing motor parameters according to the algorithm established in the structure of the coordination report model regarding the initial advancement period-specific training methodology, the 5th year of training.

The key concept of the elaborated model is constituted from a holistic perspective, not only as a multitude of forms of streamlining individual technical-tactical training (for example, learning the execution technique, physical, tactical, basic training activities, etc.), forms of achieving training in the interaction process of handball players. The result is analyzed and diagnosed on several psychomotor and technical-tactical training plans with immediate trend value, microcycle, and long term, the Olympic cycle of the specific and global skill potential.

Through its psycho-pedagogical purposes of sports training, it advocates a progressive integrative conception of instructional assistance at all stages of equipping performance female handball players with specific knowledge and skills, and at the same time intends to progress the indicators towards a global evaluation at the end of the Olympic cycle.

The verification of the control parameters was carried out according to the tests in Table 1, with a team of 26 performance female handball players, for the motor tests mentioned in the table. In the 30m speed running at the initial advancement test, both groups were homogeneous. The calculated value of Student's **t** criterion compared to its tabular value indicates insignificant differences between the results of the experimental groups in advancement conditions ($t=1.89$, $P>0.05$).

At the final testing of the advancement training period the calculated value of **t** Student criterion highlights significant differences between the results obtained in the 30m speed run, the performances being superior 5.25" in the experimental group compared to the control group 5.54" with a difference of 0.30s (t=5.119, P<0.001) with a probability of 99.9%, the coefficient of variability being 3.71.

The progress of 15-year-old female handball players is due to the use of special running exercises during the preparation period of sports training, intended for 161 hours of training per school year, and general physical training exercises with 135 hours annually, planned in the first double macrostructure of the Olympic cycle.

The results of the 30m speed run obtained by the experimental group directly influenced the development of coordination running capacity in the 3x10m shuttle and the development of explosive force in the standing long jump, achieving significant results with a probability of 99.9%. One of the characteristics of scientific training in the experimental group is the gradual increase in effort, arm work. This was achieved by repeating the special athletics exercises systematically, in such a way that their intensity and duration gradually increased during the training period of the Olympic macrocycles.

The special exercises for increasing the intensity of the arm work positively influenced the development of the reaction capacities of the movements and the explosive force when throwing the handball at a distance and throwing the 2kg medicine ball behind the head, the results being significant with an increase from 384.78m to 396 .07m at the final test (t=6.187, P<0.001) in the experimental group.

Abdominal strength when lifting the trunk from lying on the back, for 30", the number of repetitions of the initial test action, the comparison of the results obtained by the two groups is insignificant. The calculated value of **t** Student is equal to an index of 1.919, at P>0.05. At the final test, the results increased significantly in both experimental groups, due to the increase in the neuromuscular system through coordinated movements, precise in time, rhythmic, rapidity in changing the states of contraction and short-term relaxation of the muscles.

Specifically, the experimental advanced group, the 5th year of training demonstrated superior performance in the 30m speed run, the long-distance handball ball throw, the 2kg medicine ball throw and the standing long jump compared to the control group. There is also a significant difference between the results obtained at the initial and final testing, calculated value (t=5.70-7.164) is at P<0.001 (Table 1).

The obtained data show us the result of a scientifically conducted training process; it is of major importance regarding the development of motor and mental qualities and a high acquisition of technical-tactical skills during the preparation period of the 1-year macrocycle.

Table 1 *Comparative analysis of the motor capacity value of female handball players during the initial advancement period, the 5th instruction year in the annual training macrocycle*

No. crt.	Parameters tested	Exp. gr.	Statistical significance		t	P
			Initial advancement testing	Final advancement testing		
			$\underline{x}$± m	$\underline{x}$± m		
1	Speed running 30m (s)	E	5,52 ± 0,055	5,24 ± 0,047	5,75	<0,001
		C	5,69 ± 0,0071	5,54 ± 0,035	2,62	<0,05
		t	1,89	5,119		
		P	> 0,05	<0,001		
2	Shuttle running 3x10m (s)	E	8,38 ± 0,102	8,14 ± 0,094	2,437	<0,05
		C	7,93 ± 1,152	7,68 ± 0,044	0,222	<0,05
		t	0,389	4,423		
		P	>0,05	<0,001		
3	Throwing the handball at a distance (m)	E	25,21 ± 0,627	29,00 ± 0,549	7,164	<0,001
		C	26,38 ± 0,621	27,67 ± 0,443	2,459	<0,05
		t	1,270	3,305		
		P	>0,05	<0,01		
4	Throwing the 2kg medicine ball behind the head (cm)	E	384,78 ± 0,941	396,07 ± 0,862	6,187	<0,001
		C	382,00 ± 1,152	384,58 ± 1,507	2,915	<0,05
		t	1,869	3,32		
		P	>0,05	<0,01		
5	Standing long jump (cm)	E	195,86 ± 1,019	200,86 ± 0,784	5,70	<0,001
		C	194,35 ± 0,532	195,08 ± 0,975	2,18	<0,05
		t	1,313	3,789		
		P	>0,05	<0,001		
6	Lifting the trunk vertically from lying on the back for 30 s (no. rep.)	E	17,14 ± 0,549	18,50 ± 0,627	2,571	<0,05
		C	16,00 ± 0,266	16,67 ± 0,355	2,32	<0,05
		t	1,919	2,53		
		P	>0,05	<0,05		

Note: n=14+12=26 f=24 t=2,064 2,796 3,745
Exp. - n=14 f=13 t=2,160 3,012 4,221 r=0,553
Cont .-n=12 f=11 t=2,201 3,1064,437 r=0,602
P=0,05-0,001
95.0%-99.9% probability

The continuity of female handball players motor training in terms of the development to a higher degree of the specific motor qualities of the female athletes they train in, advanced ones the 5th year, allows them to reach the working capacities to study in the first year of sports mastery.

4. Conclusions

1. The global study and the generalization of theoretical-scientific approaches in view of the general requirements and the determining factors of the performance capacity in an annual macrocycle and development in contemporary sports training have not been subjected to special research in the theory and practice of training 14- 15 year-old female handball players.

2. The somato-functional, motor and mental characteristics that handball advertises recommend an optimal age. This is given by the level of somatic parameters and the morpho-functional substrate, when reaching to high values, allow us to appreciate them further to achieve performance. With some approximation, it will be possible to establish even the level that these parameters will reach at the end of the growth period, which will lead to high performance results of female handball players with a probability of 99.9%.

3. The training of performance female handball players aims to improve the motor components of the performance, respectively the motor qualities: strength, speed, expansion, skill, resistance. The concept of training should not be limited only to the sphere of motor qualities, as it also includes anatomical-functional permits, coordination and regulation capacities, respectively somatic development, the development of the biological and psychological components of performance, as well as physiological functions.

4. The experimental group of advanced 5th year of training demonstrated superior performance in the 30 m speed running, long distance handball throw, 2 kg medicine ball throwing and in the standing long jump compared to the control group. There is a significant difference between the results obtained at the initial and final testing, the calculated value t= 5.70-7.164 is at P<0.001, with 99.9% probability.

5. The planning of the training process in handball represents the way of organizing the work and the material subject to learning, used by the coach in order to actively and consciously acquire the skills, abilities and knowledge necessary to achieve performance in the team handball game.

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