



Science, Movement and Health, Vol. XVII, ISSUE 2 Supplement, 2017

September 2017, 17 (2, Supplement): 228-232

Original article

## IMPROVING STRENGTH TO WOMAN HANDBALL PLAYERS

CAZAN Florin<sup>1</sup>, GEORGESCU Adrian<sup>1</sup>

### Abstract\*

*Aim.* The development of strength can not only be done to become strong. On the contrary, the purpose of force development is to serve specific needs in a certain sport (more possibly in any other sports game, in handball), to develop specific force or combinations to increase the performance of athletes to the highest possible level.

A senior handball player performs about 50 to 60 jumping on average on and without ball, with and without finishing in attack and defense, the motor skills typically being carried out with the load of their own weight with and without possession of the ball, with external presence in Direct body combat with the opponent in rhythm and tempo imposed by alternating the playing phases.

For these reasons, we consider strength a fundamental component in the handball game and must be carefully prepared and valued.

*Methods.* The subjects of the research are 18, components of the women's handball team Neptun Constanta, with an average age of  $26.94 \pm 3.78$  years, team working in the National League, League I. In the initial testing, subjects were subjected to anthropometric measurements, then after a 20-minute warming consisting of stretching, light running, run-and-school elements (jogging up, running with swinging back, running with swinging forward), Stepped step, stepped step, step added, crossed step, etc.), gymnastics, accelerated running, sprints, the subjects underwent the following tests in this order:

-testing the force of lower limbs, abdomen, upper limbs:

1-abdominal force: repeats in 30 seconds

2-long jump

3- squats with heavy weighting : a maximum repeat

4- pull-ups: maximum number of repetitions

5-flat bench press: a maximum repeat

In the 12 weeks (July 1 - September 20, 2016) of the two tests, the Neptun Constanta team had included in the training program the training program we designed to optimize the force

*Results.* The parameter values recorded in the two initial and final tests differ statistically significantly from 5 parameters in 5, which means a proportion of 100% of the tests. At these parameters, following the verification of statistical hypotheses using Test t, the null hypothesis was rejected, the significance threshold (p) being calculated being less than 0.05. Parameter averages calculated for final testing indicate an improvement in the athletes' preparation for initial testing at all samples. Statistical scatter indicators: standard deviation, amplitude and variance coefficient, we can say that the handball team Neptun Constanta is homogeneous in relation to this parameter category.

*Conclusions.* The basic finding of this paper is that the force of the subjects has increased, which confirms the hypothesis that by carrying out a rigorously standardized program based on specific strength exercises, the level of training of the driving force will increase.

For the development of detention it is necessary to act either by increasing the maximum force or by increasing the contraction rate of the muscles or by combining these two working directions. It can work alternately or simultaneously. The coach should know the shortcomings of each athlete and set the rules for transforming the maximum force into explosive force.

*Keywords:* strength, improve, woman handball player.

### Introduction

The development of force can not only be done to become strong. On the contrary, the purpose of force development is to serve specific needs in a particular sport (more possibly in any other sports game, in handball), to develop specific force or combinations to increase performance of athletes to the highest possible level.

The combination of strength and resistance

results in muscle strength. But there are plenty of sports that require this muscle strength, while there are other sports that require less muscle strength (Cornie, 2007). Because the type of muscular strength needs is so different, it is necessary to make a clear distinction between sports and the type of muscle strength required (<http://www.martinbuchheit.net/>). Knowing this distinction the coach will be able to determine the

<sup>1</sup>Ovidius University Constanta, Faculty of Physical Education and Sport, Constanta, ROMANIA

E-mail address: cazan10florin@yahoo.com

Received 22.03.2017 / Accepted 14.04.2017

\* the abstract was published in the 17<sup>th</sup> I.S.C. "Perspectives in Physical Education and Sport" - Ovidius University of Constanta, May 18-20, 2017, Romania



type of force to be trained for each sport.

**Objectives**

A senior handball player performs approximately 50 to 60 jumping on average on and without ball, with and without finishing in attack and defense, the motor skills typically being carried out with the load of their own weight with and without possession of the ball, with external presence in direct body combat with the opponent in the rhythm and tempo imposed by alternating the playing phases (<http://www.coachesinfo.com/>).

In this context, the muscular activity, characterized by force, is presented under a wide range of manifestations: maximum force, explosive force (Impellizzeri, 2008; Negrea et al., 2010).

For these reasons, we consider strength a fundamental component in the handball game and must be carefully prepared and valued.

**The hypothesis of the work**

It is assumed that performing a rigorously standardized program, based on power circuits combined with technical procedures, will increase the level of training of the driving force.

**Method**

In accordance with experimental research rules in the field of physical education and sports, the group of selected subjects is of small size (18 sports).

The subjects of the research are 18, components of the women's handball team Neptun Constanta, with an average age of  $26.94 \pm 3.78$  years, team working in the National League, League I.

The research was carried out on the Neptun

Constanta team. Tests took place in the Sports Hall in Constanta, where the team is holding official matches, with a field approved by the Romanian Handball Federation and in the gym of the same hall. Subjects were initially tested on July 1, 2016. Final testing took place on September 20, 2016.

In the initial testing, subjects were subjected to anthropometric measurements, then after a 20-minute warming consisting of stretching, light running, run-school elements and jumping school (running up the knees, running with the swing of the calves back, running with swinging the calf before, stepped step, stepped step, step added, crossed step, etc.), gymnastics, accelerated running, sprints, the subjects underwent the following tests in this order:

-testing the strength of the lower limbs, abdomen, upper limbs:

- 1-abdominal force: repeats in 30 seconds
- 2-long jump
- 3- squats with heavy weighting : a maximum repeat
- 4- pull-ups: maximum number of repetitions
- 5-flat bench press: a maximum repeat

-The final test was carried out identically to the initial test, the order of the tests being respected.

In the 12-week period (1 July-20 September 2016) of the two tests, Neptun Constanta team had included in the training program our training program for strength optimization.

Team players underwent a special program that consisted of 3 strength training per week: Monday, Wednesday and Friday and 2 training sessions for development: Tuesday and Thursday.

**P - Force education program**

Objective: Analytical development of the muscles of the lower limbs, back, abdomen, scapular humerus and arms

Operational Objective: Improving the strength of the main muscle groups involved in technical-tactical actions with 10%

	<b>Exercises</b>	<b>Dosage volume / intensity</b>
<b>Lower limbs</b>	1.Succession of 6-8 jumping from squatting in squatting	2X
	2.Seminal lenght with shoulder strap	85-100% -1-4 times
	3.Semilight on one leg, with the shoulder strap on the shoulders	85-100% -1-4-times
	4. Semigroflexion on one leg, with shoulder blade, with 2-3sec isometric hold and vigorous pushing	40-50% RM-6-8 times each leg
	5. Standing with the shoulder strap on the shoulders, climbing on a 40cm box on one leg	85-100% RM 1-4 repeats each leg
	6. Standing on the shoulders, climbing on a 40cm cubicle on one foot, descending, climbing again on the same foot and with the other foot one step forward on the crate	85-100% RM 1-4 repeats each leg
	7.Press the press with one foot	85-100% RM 1-4 repeats each leg
	8.Shooting with tips on the shoulders	85-100% RM 1-4 repeats each leg
	9.Life facially to the device, flexion of thighs on the thighs	85-100% RM 1-4 repeats



Arm, scapulo-humeral belt	1. He was lying down from his chest with the dumbbell	85-100% RM 1-4 repeats
	2. Lying on the inclined plane, pushed from the chest with the dumbbell	85-100% RM 1-4 repeats
	3. Lying on the inclined plane, pushed from the chest with dumbbells	85-100% RM 1-4 repeats
	4. From sitting on the pectoral device, side waves	60-70% RM 8-10 repeats
	5. Flopping to the parallel	10-12 repeats X3series
	6. Triceps from sitting on the pulley	60-70% RM 10-12 repeats X3 series
	7. Triceps from the back of the back with the dumbbell	60-70% RM 10-12 repeats X3 series
	8. Triceps from the back with the dumbbell with one hand	60-70% RM -12 repeats X3 series each arm
	9. Triceps sitting on a bench with the two-handed dumbbell	60-70% RM 10-12 repeats X3 series
	10. From the shoulder blade support on the bench and the soles on the ground, the 5kg medical pouch with two hands above the head	10-12 repeats X3 series
	11. From the back, with slightly kneeling knees, the 5kg medical bird with two hands above the head	10-12 repeats X3 series
	12. Standing out of the helmet	60-70% RM 10-12 repeats X3 series
	13. Travel with upper arms down in the front plan or neck with wide socket on the bar to the helmet	60-70% RM 10-12 repeats X3 series
	13. From hanging to the bar, traction at the back of the neck	Maxim X3 series
	14. Stand out of the stand with the dumbbell	60-70% RM 10-12 repeats X3 series
	15. From standing shoulders with the dumbbell	60-70% RM 10-12 repeats X3 series
	16. Standing the lifting of the dumbbell from the ground to the chest and then above the head	60-70% RM 10-12 repeats X3 series
	17. Lying down on the bench with wobbling chest	60-70% RM 10-12 repeats X3 series
	18. He was lying with palm rest at the level of flotation shoulders	Maxim X3 series
19. He was lying on palm resting at shoulder-to-shoulder flops	Maxim X3 series	

## Results

Tab. No.1 Results Initial Test

Results Final Test Results

Test Player	Abds nr. rep.	Long jump M	Squat 1.max rep.	Flat bench press 1rep max.	Pull-ups nr. rep.	Abds nr. rep.	Long jump M	Squat 1.ma x rep.	Flat benc h press 1rep max.	Pull-ups nr. rep.
S.I.	33	1,8	70	60	7	40	1,95	80	70	10
P.M.	33	1,65	80	70	7	41	1,9	90	80	10
T.M.	37	1,85	70	60	7	44	2	80	70	9
A.A.	44	1,7	65	65	7	45	1,95	75	75	10
T.L.	38	1,9	75	65	7	42	2	85	75	10
P.D.	38	1,85	70	60	8	43	2,1	80	70	11
M.D.	31	1,7	75	65	7	40	1,95	85	75	10
C.A.	33	1,75	65	55	6	39	2	75	65	10

S.T.	41	1,90	65	55	7	44	2	75	65	9
B.S.	28	1,6	75	65	8	38	1,85	85	75	10
S.A.	27	1,6	65	55	7	39	1,9	75	65	9
N.F.	38	1,95	70	60	6	42	2,1	80	70	9
S.M.	31	1,8	70	60	8	41	1,95	80	70	11
B.G.	38	1,8	60	50	5	41	1,95	70	60	8
S.G.	31	1,75	65	55	6	38	1,90	75	65	7
M.M.	34	1,7	60	50	7	39	1,95	70	60	9
D.A.	32	1,75	60	50	7	40	2	70	60	10
V.U.	33	1,85	65	55	8	39	2,1	75	65	10

The basic finding of this paper is that the force of the subjects has increased, which confirms the hypothesis that by performing a rigorously

standardized program, based on power circuits combined with technical procedures, the level of training of the driving force will increase.

Nr. crt	Tests		Media	Diferent F-I	$\sigma$	Cv (%)	t	P
1	Abds	I	34.44	18.55%	4.46	12.95%	9.50	0.00001
		F	40.83		2.12	5.20%		
2	Long jump	I	2.30	7.78%	0.18	7.70%	6.97	0.00001
		F	2.48		0.08	3.28%		
3	Squat	I	127.50	8.93%	14.17	11.11%	5.44	0.00001
		F	138.89		7.58	5.46%		
4	Flat bench press	I	101.11	14.01%	7.58	7.50%	10.95	0.00001
		F	115.28		5.55	4.81%		
5	Pull-ups	I	8.67	32.69%	2.06	23.75%	12.20	0.00001
		F	11.50		1.42	12.39%		

### Discussions

As we can see between initial testing and final testing in the experimental group, there are significant differences in strength tests.

The parameter values recorded in the two initial and final tests differ statistically significantly from 5 parameters in 5, meaning a 100% proportion of the tests. At these parameters, following the verification of the statistical assumptions using Test t, the null hypothesis was rejected, the significance threshold (p) being calculated being less than 0.00001. Parameter averages calculated at final testing indicate an improvement in athletes' training over initial testing at all samples. Statistical scatter indicators: standard deviation, amplitude and variation coefficient, we can say that Neptun Constanta handball team is homogeneous in relation to this category of parameters.

It is known that strength can be greatly developed, for example after a month with 3-4 lessons per week, the force almost doubles and after a week of training interruption, about 80% of the achieved level is lost (<http://w.w.w.assets.usoc.org/>).

Thus, we can assert, by analyzing the motor tests, that there has been an improvement in the level of development of the drive quality The force from

the initial test to the final test.

Just like Manole 2008, Mihaila 2008, we can say that the improvement of handball players' strength is one of the coach's priorities

### Conclusions

The basic finding of this paper is that the force of the subjects has increased, which confirms the hypothesis that by performing a rigorously standardized program based on specific strength exercises, the level of training of the driving force will increase.

For the development of detention, it is necessary to act either by increasing the maximum force or by increasing the contraction rate of the muscles or by combining these two working directions. It can work alternately or simultaneously. The coach should be aware of the shortcomings of each athlete and set the rules for turning the maximum force into explosive force.

We consider this experiment to be in the reality of modern handball training with 3 weekly strength training.

### Aknowledgements

Thank you for all of subjects who participated



in my experiments. No funding was used for this study.

### References

- Cornie P, Mccauley G, McBride J, 2007, Power Versus Strength-Power Jump Squat Training: Influence on the Load-Power Relationship, *Medicine & Science in Sports & Exercise*:Volume 39(6) June
- Impellizzeri FM, Rampinini E, Castagna C, Martino F, Fiorini S, Wisloff U, 2008, Effect of plyometric training on sand versus grass on muscle soreness and jumping and sprinting ability in soccer players, *British Journal of Sports Medicine*, vol. 42,
- Manole V, 2008, *Condiția fizică în handbalul feminin*, Edit.qim, Iași.
- Mihaila I, 2008, *Handbal- pregătirea fizica specifica diferentiata*, Editura valinex SA, Chisinau
- Negrea V, Negrea M, Teodor D, 2010, Influence of physical training pliometrics exercises the fifth graders, *Ovidius University Annals, Series Physical Education and Sport/“Science, Movement and Health”*, Vol. 10, Issue 2, Supplement, 2010, ISSN 1224-7359: 729-731.
- <http://www.martinbuchheit.net/>- articole scrise de M. Buchheit despre pregătirea fizică în handbal.-accesat in 24.04.2017
- <http://www.coachesinfo.com/>accesat in 25.04.2017
- [http://w.w.w.assets.usoc.org/.../Physical\\_condition\\_in\\_high\\_performance\\_team\\_handball](http://w.w.w.assets.usoc.org/.../Physical_condition_in_high_performance_team_handball).accesat in 24.04.2017