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https://pbn.nauka.gov.pl/sedno-webapp/works/871725

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THE IMPACT OF KINEZIOLOGICAL TREATMENT OF PLYOMETRIC TYPE IN THE DEVELOPMENT OF MOTOR AND SPECIFIC MOTOR SKILLS IN HANDBALL

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Abstract

The survey includes a total of 30 young- junior handball players from the Municipality of Gjilan, Kosovo. Handball Club "Drita" is used as an experimental group and the Handball Club "Zhegra" as a controlling group. The assessment of basic and specific motoric skills of the experimental group was done in two time periods, first one before kinesiological treatment and after the kinesiological treatment with plyometric exercises as an additional program with 2 exercises per week.

The purpose of this research was to validate the impact of the 3 months training process with plyometric exercises, on some motoric and specific motoric variables responsible for achieving success in the handball game.

The sample of variables is composed of 9 basic motoric variables and 2 specific motoric variables.

The t-test for the dependent variable shows that the differences gained in all motoric and specific variables after kinezoiologic treatment with plyometric exercises (besides variables running at 30 meters from the high start and foot taping) are statistically significant.

The results obtained after their processing show that kineziologic treatment with additional plyometric exercises has influenced the increase of basic and specific motoric skills.

Key words: PLYOMETRIC; DEVELOPMENT; MOTOR; HANDBALL;

INTRODUCTION

Contemporary handball development is increasingly based on a new technology of handball training process.

The morphological characteristics of handball players are those parts of the anthropological status that are more visible and that contribute to the development and maintenance of all other anthropological dimensions. (Kovač me bp. 1997).

Handball is a fast game and players are able to perform running, change of direction, jump and technical movement in a very short time, faced to handle the tactical situation (Esfahankalati & Venkatesh, 2013)

Plyometric method is one of the most effective methods for improving explosive force for athletes and therefore should be included in the training process of every athlete; we need to be careful about choosing the exercises which depends on the athlete's condition and readiness to execute the set level of plyometric exercises. (Bompa, 1993).

For plyometric training we can say that it is one of the greatest training innovations in the field of sports in the last thirty years. The main purpose of this training method is to increase the explosive force and reactive ability of the muscular system, that is to say elastic force. (Chu, 1993).

The plyometric method is ranked among the most frequently used methods for conditioning in handball (Lehnert et al., 2009)

Researchers have shown that plyometric training, when used with a periodized strength-training program, can contribute to improvements in vertical jump performance, acceleration, leg strength, muscular power, increased joint awareness, and overall proprioception (Miller et al., 2002). Plyometric drills usually involve stopping, starting, and changing directions in an explosive manner. These movements are components that can assist in developing agility (Miller et al., 2001; Parsons & Jones, 1998; Yap & Brown, 2000; Young, McDowell & Scarlett, 2001).

The purpose of this research is to certify the impact of the three month training process with plyometric exercises on some motor and specific motor variables responsible for achieving success in the handball game.

Material and methods

This research includes a total of 30 young handball players – juniors from the Municipality of Gjilan. Handball club "Drita" as an experimental group and Handball club "Zhegra" as a controlling group. The assessment of the basic and specific motor skills of the experimental group was done in two time periods, first (prior to kinesiological treatment) and after the application of kinesiological treatment with plyometric exercises as an additional program with 2 additional exercises per week. Overall, for the purposes of this research, 24 training sessions were held.

For the assessment of motor skills are applied 9 motor skills, and 2 motor-specific variables. Mainly are included manifest variables of speed motor skills, explosive force, coordination and flexibility.

The following variables are included for the assessment of basic motor skills and specific motor skills:

MV30m- Running in 30 metres from high start, MSHTKË - Tapping with foot , MSHTDO – Tapping with hand, MKTPER – Running in octave with bending, MKHANA- Sideways steps (running), MFHMBA – Throwing of medicine ball from standing position, MFPERK – Front bending, MKGJAT – Long jump from place, MKLART- High jump from place, MSGJ1M- Throwing the ball to the wall (square) per one minute, VR3GJP- Running, leading and throwing at goal three times.

For the system of variables have been calculated basic statistical and distribution parameters for each variable, and as well as asymmetric and normal distribution measures.

Minimum and maximum values (R.min-R.maks), arithmetic average (Ma), standard deviation (Ds),

The asymmetry parameters (SKEW dhe KURT), Normality of the distribution of each variable is tested by the test of: Kolmogorov-Smirnov (Ko-Sm) and Shapirow and Wilks (Sha-Wi) and also Coefficient of variation (Kv)

To determine the level of transformation or the difference between the initial and the final state, to the experimental group is applied T-test (Paired Samples T- Test) for dependent variables that makes it possible to test the difference between arithmetic averages of motor variables in two different time periods.

To determine the level of transformation or the difference between the experimental and controlling groups in the final state is applied T-test (Independent-Samples T- Test) for independent variables that makes it possible to test the difference of arithmetic averages of motor variables in two different time periods between the two independent groups.

The results are analyzed while using statistical program SPSS version 20.00.

RESULTS AND DISCUSSION

Table 1. Basic statistical parameters of motor and specific motor variables before kinesiological treatment to the HC ”Zhegra” as a controlling group.

	N	Min	Max	Mean	Std. Dev.	Skew	Kurt	Ko-Sm	Sha-Wi	Kv
MV30m	15	4.70	6.17	5.4053	.32213	.311	2.453	.058	.197	5.959
MSHTKË	15	17.00	25.00	21.9333	2.18654	-.659	.476	.200*	.500	9.969
MSHTDO	15	29.00	39.00	32.8667	2.94877	.439	-.278	.200*	.388	8.971
MKTPER	15	12.93	14.36	13.6993	.40355	-.095	-.130	.200*	.911	2.945
MKHANA	15	9.20	11.70	10.5027	.73010	-.017	-.642	.200*	.943	6.951
MFHMBA	15	380.00	700.00	543.4667	101.68710	-.189	-.992	.200*	.348	18.711
MFPERK	15	23.00	41.00	30.3333	5.55063	.430	-.948	.125	.349	18.298
MKGJAT	15	171.00	199.00	186.6000	8.77334	-.307	-1.172	.182	.297	4.701
MKLART	15	28.00	40.00	33.6000	4.13694	.182	-1.190	.200*	.268	12.31
MSGJ1M	15	20.00	37.00	26.4667	4.71876	.664	.075	.200*	.516	17.82
VR3GJP	15	14.23	22.15	18.0853	2.47227	-.154	-.902	.200*	.540	13.67

In (Table 1), are presented the basic statistical parameters of motor and specific motor variables prior to the kinesiological treatment of the HC ”Zhegra” as controlling group. We notice that all applied motor and specific motor variables show a normal asymmetry (Skew) and a normal distribution of results. (Ko-Sm dhe Sha-Wi). To the majority of variables,

asymmetry coefficients indicate that their arithmetic averages point to lower (hypocurtic) results and that most of the variables results are grouped to the highest score.

Table 2. Basic statistical parameters of motor and specific motor variables after traditional kinesiological treatment to the HC ”Zhegra” as a controlling group.

	N	Min	Max	Mean	Std. Dev.	Skew	Kurt	Ko-Sm	Sha-Wi	Kv
MV30m	15	4.71	6.09	5.3847	.44410	.167	-1.612	.051	.063	8.247
MSHTKË	15	20.00	25.00	22.6000	1.54919	-.149	-.476	.200*	.379	6.854
MSHTDO	15	24.00	32.00	27.8000	2.83347	-.027	-1.464	.200*	.134	10.19
MKTPER	15	12.67	14.86	13.5560	.68704	.552	-.720	.200*	.239	5.068
MKHANA	15	9.59	11.40	10.5927	.58290	-.186	-.938	.180	.263	5.502
MFHMBA	15	480.00	680.00	569.3333	58.12138	.180	-.492	.200*	.636	10.20
MFPERK	15	18.00	34.00	24.6667	4.16905	.552	.874	.200*	.357	16.90
MKGJAT	15	175.00	200.00	186.0000	7.30949	.475	-.776	.200*	.400	3.929
MKLART	15	29.00	40.00	33.4000	2.77231	.564	1.099	.200*	.452	8.300
MSGJ1M	15	27.00	40.00	32.6667	3.86683	.352	-.393	.200*	.487	11.83
VR3GJP	15	13.19	19.50	16.0213	2.00865	-.159	-1.135	.170	.159	12.53

In (Table 2), are presented basic statistical parameters of motor and specific motor variables after the kinesiological treatment to the HC ”Zhegra” as a controlling group. We notice that all applied motor and specific motor variables show a normal asymmetry (Skew) and a normal distribution of results (Ko-Sm dhe Sha-Wi). To the majority of variables asymmetry coefficients indicate that their arithmetic averages point towards higher (epicurtic) aand that most of the variables results are grouped to the lower results.

In (Table 3), are presented basic statistical parameters of motor and specific motor variables before the kinesiological treatment to the HC ”Drita” as an experimental group. We notice that three variables (two motor variables and one specific motor variable), show an emphasized asymmetry (Skew) and that majority of variables have normal asymmetry coefficients and results show that their arithmetic averages point towards higher (epicurtic) results and that most of variables results are grouped to the lower results.Regarding the

distribution of the results the applied motor and specific motor variables show for a normal distribution of the results (Ko-Sm dhe Sha-Wi).

Table 3. Basic statistical parameters of motor and specific motor variables before the kinesiological treatment to the HC ”Drita”as an experimental group.

	N	Min	Max	Mean	Std. Dev.	Skew	Kurt	Ko-Sm	Sha-Wi	Kv
MV30m	15	5.04	6.20	5.5053	.34303	.338	-.519	.200*	.613	6.23
MSHTKË	15	18.00	26.00	22.0000	2.17124	.145	-.417	.200*	.896	9.87
MSHTDO	15	28.00	35.00	31.8667	2.23180	-.342	-.624	.200*	.443	7.00
MKTPER	15	12.06	14.95	13.2960	.78688	.596	-.195	.200*	.589	5.92
MKHANA	15	9.14	12.59	10.5960	.91767	.523	.185	.200*	.862	8.66
MFHMBA	15	430.00	700.00	544.0667	92.45576	.402	-1.370	.066	.109	16.99
MFPERK	15	19.00	43.00	31.4000	5.72962	-.024	1.085	.200*	.747	18.25
MKGJAT	15	170.00	192.00	182.1333	6.99864	-.389	-.730	.200*	.352	3.84
MKLART	15	28.00	42.00	33.7333	3.34806	.610	1.712	.191	.253	9.93
MSGJ1M	15	22.00	36.00	26.9333	4.19977	1.028	.133	.036	.056	15.59
VR3GJP	15	13.30	20.21	16.4213	2.32882	.393	-1.313	.123	.126	14.18

In (Table 4), are presented the basic statistical parameters of motor and specific motor variables after the kinesiological treatment to the HC ”Drita”as an experimental group. We noticed that (two motor variables and one specific motor variable),show an emphasized asymmetry(Skew) and that majority of variables have normal asymmetry coefficients and results show that their arithmetic averages point to wards lower results (hypocurtic) and that majority of the variables results are grouped towards higher results. Regarding the distribution of the results the applied motor and specific motor variables show for a normal distribution of the results (Ko-Sm dhe Sha-Wi) except the variable long jump from place(MKGJAT) that has avoidance from normal distribution.

Table 4. Basic statistical parameters of motor and specific motor variables after the kinesiological treatment to the HC ”Drita”as an experimental group.

	N	Min	Max	Mean	Std. Dev.	Skew	Kurt	Ko-Sm	Sha-Wi	Kv
MV30m	15	4.47	6.60	5.3420	.56852	.205	.784	.199	.213	10.64
MSHTKË	15	20.00	27.00	24.2667	2.12020	-.455	-.717	.137	.236	8.74
MSHTDO	15	29.00	40.00	34.3333	2.91956	.236	-.130	.200*	.963	8.50
MKTPER	15	11.90	13.60	12.6653	.46063	.443	-.403	.200*	.561	3.64
MKHANA	15	8.47	11.03	9.7333	.67811	.172	-.003	.200*	.988	6.97
MFHMBA	15	530.00	780.00	645.4000	74.20223	-.084	-.750	.066	.331	11.50
MFPERK	15	23.00	39.00	30.5333	4.35671	.072	-.205	.200*	.981	14.27
MKGJAT	15	188.00	220.00	198.5333	10.05603	1.499	1.244	.001	.001	5.07
MKLART	15	34.00	45.00	37.8000	3.32093	.864	-.209	.076	.037	8.79
MSGJ1M	15	30.00	48.00	37.2667	5.35146	.539	-.560	.126	.475	14.36
VR3GJP	15	12.19	17.20	14.2620	1.54622	.437	-.766	.200*	.498	10.84

INTERPRETATION OF DIFFERENCES INSIDE THE GROUP AND BETWEEN THE GROUPS

In order to determine whether or not there is is a statistical difference inside the controlling group, respectively team of HC ”Zhegra”as a controlling group in nine basic motor variables and two specific variables is applied the **T**-test for dependent variables (Table 5). From the given table we noticed that is gained a significant statistical difference between the initial and final state to the controlling group in these basic motor variables, Tapping with hand $p<0.000$, Front bending $p<0.007$ and in specific motor variables throwing the ball in a square for one minute $p<0.000$, and Running, leading and throwing at goal three times $p<0.000$.

Table 5. Differences in arithmetic averages of motor and specific motor variables before and after the kinesiological treatment with traditional exercises to the team of HC ”Zhegra”as controlling group.

	Paired Differences			t	df	Sig. (2-tailed)
	Mean	Std. Dev.	Std. Error Mean			
MV30m - MV30m	.02067	.63909	.16501	.125	14	.902
MSHTKË - MSHTKË	-.66667	3.03942	.78478	-.849	14	.410
MSHTDO - MSHTDO	5.06667	3.51460	.90746	5.583	14	.000
MKTPER - MKTPER	.14333	.58686	.15153	.946	14	.360
MKHANA - MKHANA	-.09000	1.12702	.29100	-.309	14	.762
MFHMBA - MFHMBA	-25.86667	103.50560	26.72503	-.968	14	.350
MFPERK - MFPERK	5.66667	7.01699	1.81178	3.128	14	.007
MKGJAT - MKGJAT	.60000	11.04407	2.85157	.210	14	.836
MKLART - MKLART	.20000	3.60951	.93197	.215	14	.833
MSGJ1M - MSGJ1M	-6.20000	1.82052	.47006	-13.190	14	.000
VU3GJP - VU3GJP	2.06400	.70408	.18179	11.354	14	.000

In order to determine the difference between controlling group and experimental group respectively, team of HC ”Zhegra” as controlling group and team of HC ”Drita”as an experimental group in nine basic motor variables and two specific variables is applied **T**-test for independent variables (Table 6). From the given table we noticed that no significant statistical difference was found between the groups in arithmetic averages before the kinesiological treatment, which means, to the initial state.

Table 6. Difference in arithmetic averages to motor and specific motor variables between the team of HC"Zhegra"as controlling group and team of HC"Drita"as an experimental group before the kinesiological treatment.

	Levene's Test for Equality of Variances		t-test for Equality of Means				
	F	Sig.	t	df	Sig. (2-tailed)	Mean Diff.	Std. Error Difference
MV30m	.489	.490	-.823	28	.417	-.10000	.12150
MSHTKË	.013	.910	-.084	28	.934	-.06667	.79562
MSHTDO	.904	.350	1.047	28	.304	1.00000	.95485
MKTPER	6.137	.020	1.766	28	.088	.40333	.22833
MKHANA	.399	.533	-.308	28	.760	-.09333	.30278
MFHMBA	.089	.768	-.017	28	.987	-.60000	35.48552
MFPERK	.317	.578	-.518	28	.609	-1.06667	2.05974
MKGJAT	1.882	.181	1.541	28	.134	4.46667	2.89773
MKLART	1.588	.218	-.097	28	.923	-.13333	1.37414
MSGJ1M	.287	.596	-.286	28	.777	-.46667	1.63105
VR3GJP	.020	.889	1.897	28	.068	1.66400	.87695

In (table 7), are presented differences inside the experimental group where the obtained results after statistical processing with **T**-test for dependent variables show that kinesiological treatment with additional plyometric exercises in training sessions has greatly contributed to the rise of almost all motor and specific motor results. From the given table we noticed that it is gained a significant statistical difference between the initial and final state to the experimental group in the following basic motor variables, Running in 30 meters $p>0.370$, Tapping with foot $p<0.027$, Tapping with hand $p<0.036$, Octave with bending $p<0.023$, Sideways running $p<0.030$, Throwing of medicine ball from standing position $p<0.000$, Front bending $p<0.652$, Long jump from place $p<0.000$, High jump from place $p<0.002$, and in specific motor variables Throwing the ball in a square for one minute $p<0.000$, and Running, leading and throwing at goal three times $p<0.000$.

It is not gained significant statistical difference in two basic motor variables Running in 30 meters $p>0.370$ and Front bending $p<0.652$. The obtained results indicate that speed is something from birth , you are born with speed ability and very little can affect its rise. Although with plyometric exercises we have significantly improved the speed score, but such a result is statistically not significant. Plyometric exercises have not influenced in increasing of flexibility, which is reasonable, because they increase explosive force.

Table 7. Difference in arithmetic averages in motor and specific motor variables before and after the kinesiological treatment with traditional exercises to the team HC ”Drita ” as an experimental group.

	Mean	Std. Dev.	Std. Error Mean	t	df	Sig. (2-tailed)
MV30m - MV30m	.16333	.68230	.17617	.927	14	.370
MSHTKË - MSHTKË	-2.26667	3.55501	.91790	-2.469	14	.027
MSHTDO - MSHTDO	-2.46667	4.12080	1.06398	-2.318	14	.036
MKTPER - MKTPER	.63067	.95903	.24762	2.547	14	.023
MKHANA - MKHANA	.86267	1.38438	.35745	2.413	14	.030
MFHMBA - MFHMBA	-101.33333	80.16649	20.69890	-4.896	14	.000
MFPERK - MFPERK	.86667	7.27880	1.87938	.461	14	.652
MKGJAT - MKGJAT	-16.40000	14.07531	3.63423	-4.513	14	.000
MKLART - MKLART	-4.06667	4.28397	1.10612	-3.677	14	.002
MSGJ1M - MSGJ1M	-10.33333	5.45981	1.40972	-7.330	14	.000
VU3GJP - VU3GJP	2.15933	1.10028	.28409	7.601	14	.000

In (table 8) are presented the differences between experimental group and the controlling group where the obtained results after statistical processing with the analyses of **T**-test for independent variables show that kinesiological treatment with additional plyopmetric exercises in training sessions has greatly contributed in rising of almost all motor and specific motor results. From the given table we noticed that is gained a significant statistical difference between initial and final state to the experimental group in the following basic motor variables, Running in 30 meters $p>0.820$, Tapping on foot $p<0.020$, Tapping with hand $p<0.000$, Octave with bending $p<0.000$, Sideways running $p<0.001$, Throwing of medicine ball from standing position $p<0.004$, Front bending $p<0.001$, Long jump from place $p<0.001$, High jump from place $p<0.000$, and in specific motor variables Throwing the ball into square for one minute $p<0.012$, and Running, leading and throwing at goal three times $p<0.011$.

It is not gained significant statistical difference in basic motor variables Running in 30 meters $p>0.802$. Although with plyometric exercises we have significantly improved the speed score, but such a result is statistically not significant.

Table 8. Differencein arithmetic averages to motor and specific motor variables between the team of HC ”Zhegra”as a controlling group and team of HC ”Drita”as an experimental group after kinesiological treatment.

	Levene's Test for Equality of Variances		t-test for Equality of Means				
	F	Sig.	t	df	Sig. (2-tailed)	Mean Diff.	Std. Error Difference
MV30m	.006	.937	.229	28	.820	.04267	.18627
MSHTKË	2.065	.162	-2.458	28	.020	-1.66667	.67800
MSHTDO	.114	.739	-6.219	28	.000	-6.53333	1.05047
MKTPER	3.013	.094	4.170	28	.000	.89067	.21357
MKHANA	.146	.705	3.722	28	.001	.85933	.23088
MFHMBA	1.422	.243	-3.126	28	.004	-76.06667	24.33662
MFPERK	.298	.590	-3.768	28	.001	-5.86667	1.55696
MKGJAT	.474	.497	-3.905	28	.001	-12.53333	3.20991
MKLART	.580	.453	-3.939	28	.000	-4.40000	1.11697
MSGJ1M	2.283	.142	-2.698	28	.012	-4.60000	1.70471
VR3GJP	2.111	.157	2.688	28	.011	1.75933	.65450

CONCLUSION

The characteristics of the handball game are very fast action with explosive and multiple cyclic and acyclic movements that require complex player skills and a high degree of coordination, functional and cognitive skills that are the basis for strong, quick and precise actions.

In this research is treated the most important field of motor skills, which is as important as current, becauseknowing and to know the level of motor development of handball players means doing programs with the goal of direct orientation in training sessions.

The researches of this nature in handball are important to gather as much information on how to develop these motor skills that are responsible for success in handball game.

The research was conducted in order to see how important the kinesiological treatment with additional plyometric exercises in raising basic motor and specific motor skills.

The results obtained indicate that the plyometric exercises applied to the junior handball players in training sessions have a significant impact on the development of those physical skills that are basic and important in achieving the results in any sport, also in handball game. These results suggests that with different training technologies, while applying various training methoids can be achieved different effects in latent and motor space to the young handball players.

References

1. Bompa, T. (1993). Power training for sport – plyometrics for maximum power development. Coaching Association of Canada, Canada.

2. Bala, G., Kiš, M., Popovic, B. (1996). Training in the development of motor behavior of young children. (The coaching in the development of motor behavior of small children). In: Yearbook 8, 83-87. Belgrade: Faculty of Physical Education

3. Esfahankalati, A., & Venkatesh, C. (2013). Relationship between Psychomotor Variables and Performance in Elite Female Handball Players. European Academic Research , 1 (9), 2574– 2585

4. Kovač, M., Kovač, J. (1997). Relacije morfoloških karakteristika i specifičnih motoričkih sposobnosti rukometašica. Glasnik Antropološkog društva Jugoslavije, br. 33, str. 171-176.

5. Lehnert M, Lamrova I, Elfmark M. Changes in speed and strength in female volleyball players during and after a plyometric training program. Acta Universitatis Palackianae Olomucensis Gymnica. 2009; 39(1):59-66.

6. Miller, M.G., Berry, D.C., Bullard, S., & Gilders, R. (2002). Comparisons of land-based and aquatic-based plyometric programs during an 8-week training period. Journal of Sport Rehabilitation, 11, 269–283.

7. Oxyzoglou, N., Ore, G. & Rizos, S. (2004). Differences in anthropological characteristics and explosive power and lower limbsof Greece and Serbian high level handball players. Proceedings of the 3rdInternational Conference on Management. Downloaded from the internet on October 10, 2010 via http://user.sch.gr/oxyzoglou

8. Potach, D., and Chu, D. (2000). Plyometric Training. In: Essentials of Strength training and Conditioning (Second Edition). T.R. Beachle and R.W. Earle,ed. Champaign, Human Kinetics, pp. 427 – 470. USA.

9. Parsons, L.S., and Jones, M.T. (1998). Development of speed, quickness and agility for tennis athletes. Strength and Conditioning Journal, 20:14–9.

10. Chu, D. (1993). Jumping into plyometrics. VHS. Human Kinetics, Champaign II, USA.

11. Young, W.B., McDowell, M.H. and Scarlett, B.J. (2001) Specificity of spring and agility training methods. Journal of Strength and Conditioning Research 15, 315-319.