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WEIGHTS AND THE PLYOMETRIC TRAINING AS CONNECTION TO IMPROVE MUSCLES CAPACITIES GROWTH AMONG VOLLEYBALL PLAYERS

Purpose. The researchers used the experimental method, design by three experimental groups controlled by the control group. Each group is composed of 16 players. Practice deference method to develop their muscles capacity training (Training with weights, plyometric, mixed and traditional as group control). Material and methods. After applying the training program for 10 weeks and after treating statistically the brut results. Results. The researchers found significant differences between the pre and post in favor post measurement for each method training practiced. Record in favor of a group dealing with the weight and plyometric training compared to other models training used in this study, according to post-test results. In the benefits of mixed (weights and Plyometric) flown by training separately at the last control group. Our results are in conformity with the conclusion present by Valdan M, et al (2006) that mixed training is the effectiveness of the force development characterized by the speed [1]. Compared to weights and Plyometric separately [2]. Confirmed by Toplica et al., (2002) throughout the training season [3].

Keywords: *Training with weights - Plyometric Training - Muscle Ability*

Ваги та пліометричні тренування як зв'язок для підвищення росту м'язів у волейболістів. *Призначення. Дослідники використовували експериментальний метод, розроблений трьома експериментальними групами, контрольованими контрольною групою. Кожна група складається з 16 гравців. Практикуйте метод відхилення, щоб розвивати підготовку м'язів (тренування з вагами, пліометричними, змішаними і традиційними як груповий контроль). Матеріал і методи. Після застосування програми тренування протягом 10 тижнів і після лікування статистично брут результати. Результати. Дослідники виявили значні відмінності між попередньою і посадою на користь пост-вимірювання для кожного практичного методу навчання. Запис на користь групи, що займається ваговою та пліометричною підготовкою, порівняно з іншими моделями навчання, що використовуються в цьому дослідженні, за результатами після тестування. У перевагах змішаних (ваг і пліометричних) пролетіли навчання окремо в останній контрольній групі. Наші результати відповідають висновку Valdan M, et al (2006), що змішана підготовка - це ефективність розвитку сил, що характеризується швидкістю [1]. Порівняно з вагами і Пліометрично окремо [2]. Підтверджено Toplica et al., (2002) протягом всього тренувального сезону [3].*

Ключові слова: *Тренування з вагами - Пліометричне тренування - здатність м'язів.*

Introduction. Sports training is considered an educational task. It is based on scientific methods that are used in different sides of preparation, physical appearance, skillfulness, planning and psychological training. Beyond the Principle of complementary between these sides is realized in order to let the player reach the highest sports levels. For that, the sports training was planned on scientific bases by wide spreading the use of different sciences to improve the players' performance in executing the planned program [4]. The game of volleyball is one of the group games, which is inevitably treated with the hand of evolution to develop the game. Heconsiders himself one of the specificities of the favourite game. Currently, it is clearly showed that these creations are distinguished from their dynamics and their excitations, in particular, those who are more defensive at the moment of the attack. They are rich in technical skill games. Indeed the last ESRB includes smash of passage with different types of shipment, striking, blocking, reception service and receipt of bullets.

The training with weights has an important role in the development of muscle strength of the volleyball player as the nature of the performance skills in this sport requires a force characterized by the speed and then the training with weights is necessary among the contents of training programs 5]. Additionally to the Plyometric training techniques that are used by athletes in all types of sports to increase strength and explosiveness [6]. Plyometric consists of rapid stretching of a muscle (eccentric action) immediately followed by a concentric or shortening action of the same muscle and connective tissue. The stored elastic energy within the muscle is used to produce more force that can be provided by a concentric action alone [7].

For many researchers, plyometric training becomes one of the methods commonly used in the development of the distinctive force as fast as many of the sporting activities that require the integration of the maximum speed with maximum force muscle. Where this method contributes to overcoming the problems that the development of the distinctive strengths characterized by the speed faces [8]. Mentioned by Gambita (1999) that an attempt is made to reach a maximum degree of efficiency with force with methods, which are different or opposite in the direction inside the module or within a range of exercises9. Likewise, it is possible across the exchanging between weight either by using the explosive manner/method or by changing the load level or by changing the kind of contraction and muscle tension or from weight to plyometrics.

According to previous studies, the researchers concluded that the use of plyometric training has great importance in the development of physical characteristics and so does the training with weight. These studies agreed on the necessity of using both methods to develop the muscle power, especially the lower limbs and the process of upgrading [10].

Matavulj et al (2001) found that Plyometric training improved jumping performance in teenage basketball players11] and Kotzamanidis (2006) reported that Plyometric training enhanced jumping performance and running velocity in prepubertal boys [12].

The problem of the study design while observing the training sessions concerning the national championship teams of volleyball. It was obvious that there was a lack of diversification and combining modern method of training, particularly about special physical attributes development referring to this point of view the current study focuses on the use of both weight and plyometric

training to know the exchanging relationship between both methods in muscle and acclivity development for the volleyball players.

This study aims to find out the reciprocity relationship between the weight and plyometric training and its impact on the muscle capacity and the acclivity for the volleyball players through a proposed training program to identify:

1- The effect or the impact of weight and plyometric training on the muscle capacity and accession for the volleyball players.

2- Differences had taken place between the effect of training with weights and training with plyometrics, weight and plyometric training on the muscle capacity for the volleyball players.

3- The reciprocity relationship has an impact on the effect of training with weights and training with plyometrics, weight and plyometric training on the muscle capacity for the volleyball players.

Methodology: Researchers used the experimental method by choosing four groups. Three of them experimental and one control.

The research sample: The sample included 64 basketball players(16-18years) exercising in 04 teams from the West regional championship divided into equal four groups, with 16 players for each group. The first group using weight training, the second group using plyometric training, the third group using both kind of training and the fourth group is the control sample.

Physical tests:

1- Three partridge with right leg.
2- Three partridge with left leg.
3- Push medical ball (3kgs).
4- Vertical jump test.

Test protocol: Three partridges right/left leg: this test aims to measure the power characterized by the speed for the legs muscles. The candidate stands on one of his feet at the start line executing consecutive three partridges for as long as possible distance. Two tries are given for each leg (right/left). The best result is taken.

Push medical ball (3kgs). The candidate takes the initial position behind the start line holding the medical ball 3kgs standing in front of the throw zone. After giving the signal the candidate tries to throw the medical ball for as long as possible distance without lifting his feet from the ground while throwing. The best try is counted.

Vertical jump height test (VJHT). The vertical jump test has been shown to be a reliable test in measuring the jump performance of athletes. Each subject performed two practice jumps prior to testing to ensure proper jumping techniques. They were instructed to jump vertically (initiated from a knee flexion of 90°) and execute a maximum vertical jump while swinging their arms actively. Jump height was determined using a measuring tape fastened to a dark paper on which each candidate's pre-test and post-test jump chalk prints would be clearly recorded. Each candidate performed 2 practice jumps and the best score was used for analysis.

The main experiment: The fundamental experiment was applied for 10 weeks at a rate of three training sessions per week. The duration of each session was 100 mn taking into account the training load principals. The first group used a weight-training program, the second team Plyometric training while the third group applied a mixed training program combining training with weights and plyometrics, while the fourth group receive an ordinary training program.

Results

Table 1

Shows the parity homogeneity between the four groups in the variable under research.

Tests	Source of variation	Total square deviations	Average squares	P value calculated	Level significance
Three (3) partridge with right leg	Between groups	0.28	0.09	0.46	Non-significant
	Within groups	13.01	0.26		
Three (3) partridge with left leg	Between groups	0.04	0.01	0.14	Non-significant
	Within groups	5.02	0.06		
Push medical ball (3kgs).	Between groups	0.89	0.39	0.74	Non-significant
	Within groups	24.44	0.37		
Vertical jump test fixture.	Between groups	0.25	0.09	1.66	Non-significant
	Within groups	4.59	0.06		

F tabular value at the significance level 0.05 = 2.76 Degree of freedom (03,60).

It is obvious from the table that there were no statistically significant differences between the four groups (experimental & control). Because the calculated value is between 0.09 and 1.66 which is inferior of the tabulated (2.76) which confirmed parity before starting the basic study.

Table 2

Shows the differences between pre-test and post-test in each method

Statistical study		Pas-test		Post-test		T value
Samples	Tests	X	Y	X	Y	calculated
Training with weights group	Three partridge with right leg	3.76	0.18	4.79	0.10	20.06
	Three partridge with left leg	3.25	0.07	4.48	0.5	18.16
	Push medical ball 3kgs.	9.12	1.26	12.18	1.60	9.02
	vertical jump test fixture	3.14	0.33	3.67	0.25	6.30

training with plyometric group	Three partridge with right leg	3.51	0.11	4,97	0.21	17.04
	Three partridge with left leg	3.21	0.06	4,68	0.20	19.41
	Push medical ball 3kgs.	8.06	1.28	12,58	1.42	7.77
	vertical jump test fixture	3.12	0.22	3,92	0.27	6.41
Mixed training group (weight & Plyometric)	Three partridge with right leg	3.52	0.12	5.10	0.22	23.51
	Three partridge with left leg	3.15	0.211	4.95	0.30	19.97
	Push medical ball 3kgs.	8.00	1.25	13.31	1.29	10.26
	vertical jump test fixture	3.14	0.24	4.02	0.37	6.67
The control group	Three partridge with right leg	3.49	0.36	4.41	0.29	7.75
	Three partridge with left leg	3.19	0.39	3.58	0.36	7.81
	Push medical ball 3kgs.	8.25	1.38	10.06	1.33	8.24
	vertical jump test fixture	2.98	0.40	3.34	0.56	4.50

Tabulated T value at 63 degrees of freedom and significant level 0.05= 2.13.

Through the results obtained and mentioned in the above table, it is clear that the differences were statically significant compared to the Tabular T value 2.13 in all tests for all the groups in favour of post-measurement. Because the T calculated value is between 6.3 and 23.6 for the experimental groups while the controlled group is between 4.5 and 14.66 and all of them are superior to the tabulated value (2.13).

Table 3

shows the post-test analysis between the four groups for the physical tests under study

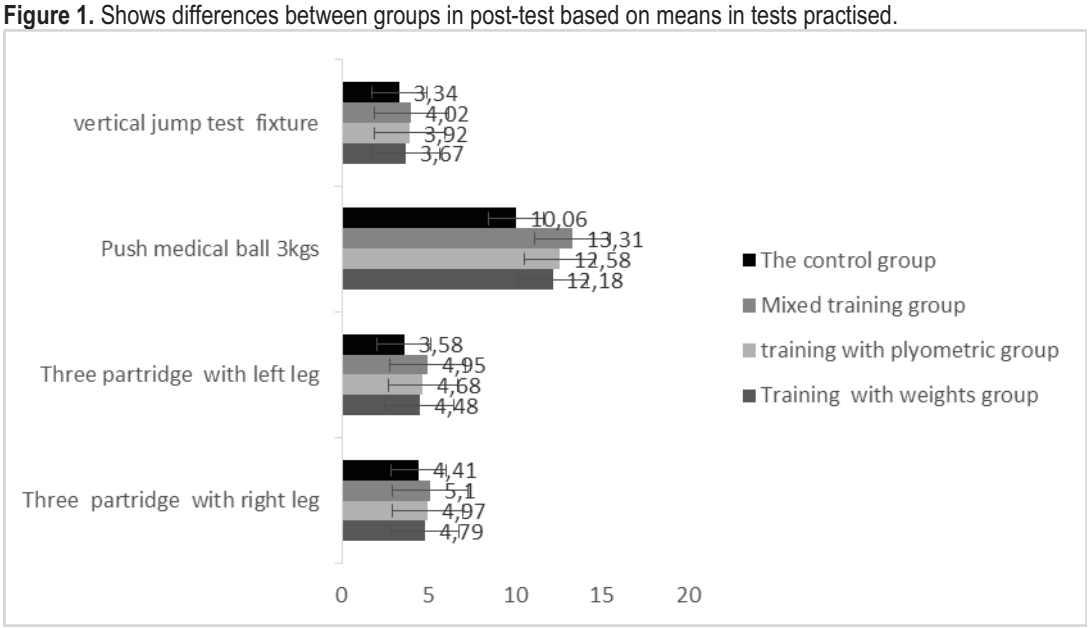
Tests	Variation Source	Total square deviations	Average squares	P value calculated	Level of significance
Three (3) partridge with right leg	Between groups	6.27	2.09	41.8	Significant
	Within groups	3.43	0.05		
Three (3) partridge with left leg	Between groups	9.18	3.06	38.25	Significant
	Within groups	4.95	0.08		
push medical ball 3kg	Between groups	52.39	17.46	8.15	Significant
	Within groups	128.68	2.14		
Vertical jump test fixture	Between groups	4.39	1.64	8.58	Significant
	Within groups	10.52	0.17		

F tabular P value at the significance level 0.05=2.76, the degree of freedom (03,60).

From the results illustrated in table (03) it is obvious that F statistical is a significant difference. Support by mean in the benefits of mixed (weights and Plyometric) flown by training separately at the last control group.

Discussion. Table (02) is clear that there were no moral differences between the four groups (experimental &control) which mean that there was a case of homogeneity. As well as Table (03) shows the presence of statistically significant differences between pre and post measurements for each group in favour of post-measurement in the test under research. The presence of statistically significant differences for the controlled group in favour of post-test is due to the effect of the executed training but this was a slight improvement. This what we do notice through the T calculated value which was between 4.50 & 23.51 for the applied tests by comparing the pre and post measurement which was in favour of the post-tests for each group. In the opposite of means that are in favour of mixed training group (weight & Plyometric) compared to another model. See figure1.

Figure 1. Shows differences between groups in post-test based on means in tests practised.



For the plyometric training group also the statistically significant differences were in favour of the post-test. This what we do notice through the T calculated value, which was between 6.43 & 19.41 for the applied tests by comparing the pre and post

measurement for the Plyometric training group. Support by Valdam et al., (2006) concerning the force development characterized by the fastness, the same results obtained by the weight-training group and this also agreed with Hofman study (2007)10]. However, the mixed training group were the best based on means calculate present in figure 1. This means that the mixed training, which combines both weights and plyometrics, is better than the training with each one of them separately and its use is necessary for the player's muscles force development.

This what has been obtained from the results to prove while comparing between the pre and post measurements by using T (6.67, 19.97) for the group using both weight and plyometric training. It is clear from what has been said above that there is great progress which confirms, also, that the mixed training method has a huge effect in the power development characterized by speed and this what Chu D.A [6] mentioned inviting to use this kind of training throughout the training season.

- In the test of three partridge with right and left leg, we notice the superiority of the weight-training group on the plyometric training group; this is due to the motor performance nature of basketball game than long jump. Matavulj et al. (2001) found that Plyometric training improved jumping performance in teenage basketball players11].

- Concerning the push of medical ball test, the differences were not statistically significant between weight and plyometric training and mixed training in favour of the mixed training. Hence, the differences were statistically significant between the mixed training group and the controlled group in favour of the mixed training [13].

- Through the results obtained by the mixed training group, which were the best, we are convinced that the diversity in the use of both weight and plyometric training is very important to obtain the best results in the force development characterized by fastness (muscle capacity) for volleyball players.

This kind of training has a great impact on the jump improving through the explosive power improvement for the legs' muscles based on the contraction of the central and no-central muscles so that the muscles fibres contractions (extension & shortening). This is what Kotzamanidis (2006) confirmed12]. He reported that Plyometric training enhanced jumping performance and running velocity in prepubertal boys.

- For the vertical jump, the differences were statistically significant between all the groups In the vertical test the F calculated value 8.58 which is superior to the tabulated (2.76) in favour of the group using both weight and Plyometric training [3].

The researcher attributed the vertical jump was the best for the plyometric training because of the quick muscle strength use. In another hand the researcher explained this by noticing that the biometrical training consisted on high jump exercises which increase muscles fibres excitability that lead to the involvement of a large number of them giving birth to a strong and fast contraction increasing exploding performance, this is in conformity with what rahimi, naser (2005)2]. In another hand, the mixed training group was the best among all the experimental groups proving the study held by Valdan M and others, which mentioned that the differences between weight training with plyometric have more effect than training separately [14].

Conclusion. In order to raise the level of the volleyball game, we have to focus on the best preparation of the training program, which takes in account the requirement of efficiency by the use of the most appropriate and most successful training methods. Support by this study in the benefits of mixed training, which improve strength and power, additional to preserve maximal sprinting speed in athletes, according to Rahimi, Naser (2005)2]. Admitted by Kotzamanidis (2006) in its impacts great then their used separately [12]. The results obtained are in conformity; also, with the results obtained by Matavulj (2001) to maximal power production mixed training is the best to approach than weight or plyometric training alone11].

Література

1. Владан М., Драган Н., & Радомір k, "Вплив пліометричного тренування на вибухову силу м'язів ніг волейболістів на одиночній нозі і двома ногами злітних стрибків". Фізичне виховання та спорт, вип. 6, №. 2, с. 169-179, 2008.

2. Rahman R & Naser B, "Ефекти плиометричного, вагового та пліометричного тренування на анаеробну потужність і м'язову силу", фізичне виховання і спорт, вип. 3, немає. 1, с. 81-91, 2005.

3. Toplica S & Radmila k, "Ефекти пліометричної моделі спортивної тренування на розвиток вертикального стрибка волейболістів", "Фізичне виховання і спорт", вип. 1, немає. 9, р. 11, 2002.

4. Тальха Г.Д., наукова енциклопедія в спортивній підготовці. Каїр: Центр книговидавництва, 1999.

5. Баставісі А, основа спортивних тренувальних теорій. cairo: Dar alfir al arabi., 1999.

6. Чу Д.А. Стрибки в плиометричний, 2-е видання. Шампейн, IL: Кінетика людини, 1998.

7. Marginson, V., Rowlands, A., Gleeson, N. та Eston, R, "Порівняння симптомів індукованого фізичним навантаженням пошкодження м'язів після і початкового і повторного нападу Plyometric у чоловіків і хлопчиків". "Журнал прикладної фізіології, вип. 99, с. 1174, 2005.

8. Абузаїд І, плани і наукові основи побудови команди в колективних іграх. Олександрія: центр знань, 2005.

9. Гамбіта.В, плиометричний для початківців. Рим: основний n.s.a.by i.a.a.f.magazine, 1989.

10. Хоффман, "Вплив короткострокової пліометричної та резистентної програми навчання на фітнес-показники у хлопчиків віком від 12 до 15 років", Журнал спортивної науки і медицини, вип. 5, немає. 6, с. 525, 2007.

11. Матавуль Д., Куколж М., Угарковіч Я., Тіханій, Я. і Ярич С., "Вплив пліометричного тренування на продуктивність стрибків у юних баскетболістів" 41, с. 159, 2001.

12. Kotzamanidis, C, "Вплив пліометричного тренування на ходову продуктивність і вертикальний стрибок у препубертатних хлопчиків", Journal of Strength and Conditioning Research, vol. 20, с. 441-445, 2006.

13. Abdelmaksoud.A, теорії спортивної підготовки. Каїр: книговидавничий центр, 1997.

14. Ламберт.Г, навчальний посібник з будівництва. Париж: Ед Biro, 2005

References

1. Vladan M., Dragan N. & Radomir K. (2008), "The effect of plyometric training on the explosive strength of leg muscles of volleyball players on single foot and two-foot takeoff jumps".Vol.6 no 2. Pp," Physical education and sport, vol. 6, no. 2, pp. 169-179.

2.Rahman R., Naser B. (2005), "The effects of plyometric, weight and plyometric-weight training on anaerobic power and muscular strenght," physical education and sport, vol. 3, no. 1, pp. 81-91.

3. Toplica S. & Radmila K. (2002), "The effects of the plyometric sport training model on the development of the vertical jump of volley ball players," Physical education and sport, vol. 1, no. 9, p. 11.

4. Talha H. D. (1999), scientific encyclopedia in athletic training. Cairo: :The book publishing center.

5. Bastawisi A. (1999), the basis of sports training theories. cairo: Dar alfir al arabi.

6. Chu D. A. (1998), Jumping into plyometric, 2nd edition. Champaign, IL: Human Kinetics.

7. Marginson V., Rowlands A., Gleeson N. and Eston R. (2005) "Comparison of the symptoms of exercise-induced muscle damage after and initial and repeated bout of Plyometric exercise in men and boys," Journal of Applied Physiology, vol. 99, p. 1174.

8. Abuzaid I. (2005) plans and scientific basis to built a team in collective games. Alexandria: knowledge center.

9. Gambita V. (1989) Plyometric for beginners. Rome: basic n.s.a.by i.a.a.f.magazine.

10. Hoffmann (2007), "Effects of a short-term plyometric and resistance training program on-fitness performance in boys age 12 to 15 years," Journal of sports science and medicine, vol. 5, no. 6, p. 525.

11. Matavulj D., Kukolj M., Ugarkovic J., Tihanyi J. Jaric S. (2001) "Effects of Plyometric training on jumping performance in junior basketball players," Journal of Sports Medicine and Physical Fitness, vol. 41, p. 159.

12. Kotzamanidis C. (2006), "Effect of Plyometric training on running performance and vertical jumping in prepubertal boys," Journal of Strength and Conditioning Research, vol. 20, pp. 441- 445.

13. Abdelmaksoud A. (1997), Sports training theories. Cairo: the book publishing center.

14.Lambert G. (2005), Training guide of building. Paris: Ed Vigot.

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ПРАКТИЧНА РЕАЛІЗАЦІЯ КОНЦЕПЦІЇ ПРОФЕСІЙНО-ПРИКЛАДНОЇ ФІЗИЧНОЇ ПІДГОТОВКИ СТУДЕНТІВ МИСТЕЦЬКИХ СПЕЦІАЛЬНОСТЕЙ

Проведене дослідження щодо визначення методичних передумов та наукових знань для створення, обґрунтування концепції професійно-прикладної фізичної підготовки студентів мистецьких спеціальностей. Здійснено теоретико-методичне узагальнення та формулювання методологічної основи роботи, а саме окреслення потреби створення концепції професійно-прикладної фізичної підготовки студентів мистецьких спеціальностей спрямованої на формування їхнього свідомого ставлення до формування та збереження професійного здоров'я. Розробка концепції передбачає врахування передумов реалізації професійно-прикладної фізичної підготовки у закладах культури і мистецтв, зокрема соціально-педагогічних, особистісних (мотиваційних) та біологічних. Окреслено ряд концептуальних підходів, які слугують підґрунтям мети, завдань, принципів реалізації концепції: системний, гуманістичний, особистісно-орієнтований, індивідуальний, технологічний. Ключовими концептуальними підходами практичної реалізації професійно-прикладної фізичної підготовки студентів мистецьких спеціальностей є особистісний і діяльнісний підходи з врахуванням особливостей майбутньої професії. В статті представлено фрагмент практичної реалізації концепції на прикладі алгоритму технології корекції фізичного стану студентів спеціальності «Музичне мистецтво» спеціалізації «оркестрові духові та ударні інструменти».

Ключові слова: *студенти спеціальності «Музичне мистецтво», технологія, професійно-прикладна фізична підготовка.*

Асаулюк И.О. Практическая реализация концепции профессионально-прикладной физической подготовки студентов специальности искусство. *Проведено исследование по определению методических предпосылок для создания, обоснования концепции профессионально-прикладной физической подготовки студентов специальности искусство. Осуществлено теоретико-методическое обобщение и формулирование методологической основы работы, а именно определение потребности создания концепции профессионально-прикладной физической подготовки студентов специальности искусство направленной на формирование их сознательного отношения к формированию и сохранению профессионального здоровья. Разработка концепции предполагает учет предпосылок реализации профессионально-прикладной физической подготовки в учреждениях культуры и искусств, в частности социально-педагогических, личностных (мотивационных) и биологических. Определены ряд концептуальных подходов, которые служат основой цели, задач, принципов реализации концепции: системный, гуманистический, личностно-ориентированный, индивидуальный, технологический. Ключевыми концептуальными подходами практической реализации профессионально-прикладной физической подготовки студентов художественных специальностей является личностный и деятельностный подходы с учетом особенностей будущей профессии. В статье представлен фрагмент практической реализации концепции на примере алгоритма технологии коррекции физического состояния студентов специальности «Музыкальное искусство» специализации «оркестровые духовые и ударные инструменты».*

Ключевые слова: *студенты специальности «Музыкальное искусство», технология, профессионально-прикладная физическая подготовка*