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THE EFFECT OF WEIGHT AND MAXES TRAINING METHODS ON AGILITY AND BODY COMPOSITION OF FEMALE VOLLEYBALL PLAYERS OF ABADAN CITY, IRAN

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ABSTRACT

The aim of this study was to determine the effect of weight and Maxes training methods on agility and body composition of female volleyball players of Abadan city, Iran. The study was a quasi-experimental study in which the comparative method was used. For this purpose, 33 volleyball players in Abadan city were selected to participate in this study on a voluntary basis. Participants had been set in four group of Strength Training (ST) group, Plyometric Training (PT) group, the combined group of Strength and Plyometric Training (SPT) and Control Group (CG) purposefully. Agility and body composition indexes were measured before and after six weeks training program in the experimental and the control group. The Kolmogorov-Smirnov test was used to check the normality of data distribution; Analysis of covariance (ANCOVA) was used to compare the three groups. It's needed to mention that all the conducted analysis was at the $p \leq 0.05$ level by using version 22 of SPSS software. According to the results can be stated that Maxes training improved the agility and body composition. Also, there was no significant difference between the benefits of Maxes training compared to plyometric and weight training in improving the motor-physical readiness factors.

Keywords: Maxes training, plyometric training, weight training, agility, body composition and volleyball

INTRODUCTION

Neuromuscular adaptation is one of the important physiological adaptation by physical activity doing (Valipoor Dehno et al., 2010). Different kinds of exercise and

physical activities apply a special tensions on the muscle that may access to different adaptations due to the nature of the pressure (Valipoor Dehno et al., 2010). Coaches and athletes rely on more than one training system according to various training methods. Training is a form of physical activity that is classified into a variety of strength, endurance, plyometric, resistance, frequency, continuity. The principle of specificity states that the nature of body adaptation depends on the specific type of exercise (Akbarzada et al., 2011).Combining plyometric and weight training is important for the development of the athlete's power (Farhadi et al., 2011). Agility is the ability to maintain or control body position during fast direction changes during a series of movements. Agility allows the athlete to react to a stimulus, motion efficient, quick start in straight direction and provide athletes in order to give direct or quick stop to change direction in order to play fast, smooth, efficient and in iterative method (Sucharitha *et al*., 2014).

Memarzade et al (2014) had examined skill implementation in soccer players after 8 weeks of plyometric training. The results showed that speed running time, dribbling, agility with and without the ball, and VO2max had improved after plyometric training. The effects of combined training (speed - plyometric) on strength, speed, power and agility of karateka athletes were studied by Davaran et al (2014). The results showed that the strength, power and agility of karateka players had significantly increased in the exercise group after 6 weeks of combined training.

Arazi and Asadi (2011) had measured effects of resistance training with different workloads on maximal strength, body composition and endurance. Body composition assessment, hands and feet environment, body weight, strength and endurance were measured before and after eight weeks of training. Body weight, body composition, leg and bench press endurance had increased in all groups. They resulted that the overall and distinct weight training for two months produced similar results.

Mahboubeh et al (2014) Following the test of the hypothesis that plyometric training in land and water has effect on defense and attack jump, agility and muscle bruise of female volleyball players had done a study on 41 elite volleyball players who were randomly divided into three groups of training on land, training in water and control group. The results showed that defense and attack jump was higher in the water group compared with the land group and the

difference was significant. Agility also showed no significant difference among the three groups. The study showed that according to the majority of people's progress in the high jump and agility in the water group compared with the land one as well as injuries reduction in this group, it can be stated that plyometric training in the water is better than plyometric exercises on the land because water has the features of fluency and adhesion.

Vácziet al (2013) examined the short-term effects of extreme plyometric training in improving strength, power and agility of male football players. The results showed that plyometric exercises including one-way and two-way exercises can dramatically improve knee and lower limb's abduction strength and create a slight increase in football-related agility.

Nowadays, the effect of plyometric training and weight training on physical fitness as well as in improving body composition has been confirmed, but the effect of combination exercise such as Maxes have been less investigated on improving these indicators.

Finally, based on available scientific and practical evidences in terms of beneficial effects of combined plyometric and weight trainings on variables of athlete's fitness in different sports fields, it can be concluded where such studies on volleyball players, especially women, is empty. Hence the researchers set out to design and implement this research to find the effectiveness of this method of training on the physical readiness variables (agility and body composition).

Methods and research plan:

The present study was semi-experimental which comparative method was used so that we could compare the effect of Maxes trainings on physical-motor readiness factors (agility and body composition) in girl volleyball players. The study population was the female volleyball players of Abadan city. In this study, available sampling was used to select the statistical sample. After installing the recall, approximately 100 female volleyball players referred to participate in this study voluntarily. The primary criteria for participating in this study wereplayingvolleyball,being healthy (physically and mentally), no specific skeletal and motor complication, lack of specific cardiovascular and respiratory diseases and being physically active for at least two years, respectively. Thus, 60 participants were selected after the initial assessment. The secondary assessment included a higher maximum oxygen consumption more than 40 ml/kg.min and

having the basic skills of volleyball. 33 participants were selected after the second assessment.

After selecting the final samples, they were divided into four groups. Strength training (ST) group, plyometric training (PT) group, combined plyometric and strength (SPT) group and control group (CG). The participants participated in a justify session to learn about the research purposes and how the tests were run, at first. In the second session, all measurements related to body composition and anthropometric characteristics were performed. Strength training, plyometric training, Maxes training and control group were examined for 8 weeks. After measuring anthropometric characteristics and acquainting the volleyball players with how to do the trains, participants were asked to complete the health and self-satisfaction questionnaires.Physical fitness tests (agility, body composition) of the volleyball playerswere measured and recorded before the pre training program session. Agility was measured through T test. Three cones took placed at a 5 meters distance from each other on a line. The fourth cone placed at a distance of 10 meters far from the central cone. So the cones come in a T shape. Participants (in their own groups) had done training programs of plyometric, strength and Maxes in addition to their daily physical activity for 8 weeks after measuring Motor-physical fitness and body composition factors. In the meantime, control group did not do any training program except daily physical activity (volleyball). Participants were evaluated again upon completion of the eight-week training program. Volleyball players' fitness Factors (agility, body composition (fat percent)) was measured and recorded again. Finally, the post-test results were compared with pre-test results after eight weeks of physical activity. Kolmogorov-Smirnov was used to test of data distribution normality. Analysis of covariance (ANCOVA) is used to compare the three groups. It's needed to mention that all the conducted analysis was at the $p \leq 0.05$ level by using version 22 of SPSS software.

FINDINGS

According to the table (1) results, weight training has an effect on agility of female volleyball players (p=0/0001 &F (1, 17) = 20/21), and the time of agility test was significantly reduced in post-test.

According to the table (2) results, Maxes training has effect on agility of the female volleyball players (p=0/0001 & F (1, 17) = 23/95), and the time of agility test was significantly reduced in post-test.

According to the table (3), weight training has no effect on fat percent of the female volleyball players (p=0/63 & F (1, 17) = 0/23), and the time of agility test was significantly reduced in post-test.

According to the table (4), Maxes training has no effect on fat percent of the female volleyball players (p=0/43 & F (1, 17) = 0/67).

According to the table (5), there is no significant difference between effects of weight and Maxes trainings on agility of female volleyball players (p=0/74 & F (1, 17) = 0/11).

According to the table (6), there is no significant difference between the effects of weight and Maxes trainings on fat percent of female volleyball players (p=0/20 & F (1, 17) = 1/79).

Table 1: The covariance analysis results of the effect of weight training on agility

Variable	Source	Sum of squares	Degrees of freedom	The mean of squares	F statistic	The significance level
Agility	**pre-test**	**1/41**	**1**	**1/41**	2/09	**0/16**
	group	**13/65**	**1**	**13/65**	20/21	**0/0001**
	Error	**183**	**17**	**10/77**		

Table 2: The covariance analysis results on the effect of Maxes training on agility

Variable	Source	Sum of squares	Degrees of freedom	The mean of squares	F statistic	The significance level
Agility	**pre-test**	0/07	**1**	0/07	0/12	0/74
	group	15/23	**1**	15/23	23/95	0/0001
	Error	10/80	**17**	0/64		

Table 3: The covariance analysis results of the effect of weight training on fat percent

Variable	Source	Sum of squares	Degrees of freedom	The mean of squares	F statistic	The significance level
Fat percent	**pre-test**	7/59	*1*	7/59	0/58	0/45
	group	2/97	*1*	2/97	0/23	0/63
	Error	220	*17*	13		

Table 4: The covariance analysis results on the effect of Maxes training on fat percent

Variable	Source	Sum of squares	Degrees of freedom	The mean of squares	F statistic	The significance level
Fat percent	**pre-test**	23/13	*1*	23/13	2/25	0/15
	group	6/88	*1*	6/88	0/67	0/43
	Error	174	*17*	10/28		

Table 5: The results of covariance analysis about comparing the effects of Maxes and weight trainingon agility

Variable	Source	Sum of squares	Degrees of freedom	The mean of squares	F statistic	The significance level
Agility	**pre-test**	1	*1*	1	2/67	0/12
	group	0/05	*1*	0/05	0/11	0/74
	Error	6/38	*17*	0/37		

Table 6: The results of covariance analysis about comparing the effects of Maxes and weight training on fat percent

Variable	Source	Sum of squares	Degrees of freedom	The mean of squares	F statistic	The significance level
Fat percent	**pre-test**	29	*1*	29	2/60	0/12
	group	0/81	*1*	0/81	0/07	0/79
	Error	191	*17*	11		

CONCLUSIONS

The results showed that doing eight weeks of the training programs is effective in improving the agility. The results is consistent with Memarzadeh et al. and Davaran et al. studies, but it is inconsistent with the results of Arazi and Asadi, However, the applied training programswere different in the studies. Also, the results of Mahboubeh, et al (2014) study showed that defense and attack jump, was higher in the water group compared with the land group and the difference was significant statistically as well asagility showed no significant difference among the three groups.

The results are quite inconsistent with the above study. The results are inconsistent with the above study. The training program is one of the major differences between the two studies, although both studies were about volleyball players. Váczi et al (2013) results showed that plyometric training including one-way and two-way exercises can significantly improve knee flexibility and power of lower limb, and create a slight increase in the agility associated with soccer. Thus, it can be stated that polyometric training can improve the special performance of soccer players at the preparation sessions during the season, especially in low-level players, that is inconsistent with the results of present study because amount of changes were statistically significant in this study. The difference between the studies is referred to different training programs and different participants.Also, The training program in the present study is combined Maxes, while it was plyometric training program. Different training programs have different effects on different athletes. The participants were female in the study while the participants were male soccer players in the mentioned study.

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