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Impact of plyometric training on selected physical fitness variables of college women football players

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Abstract
This study was investigated the impact of plyometric training on explosive power on college women players. To achieve the purpose of the study 40 women players were selected from Navarasam College for women. The subjects was randomly assigned to two equal groups (n=20). Group- I underwent plyometric training (PYT) and group - II was acted as control group (CG). The plyometric training was given to the experimental group for 3 days per week (Monday, Wednesday and Friday) for the period of twelve weeks. The control group was not given any sort of training except their routine work. The motor fitness variables of leg explosive power (vertical jump) before and after training period. The data collected from the subjects was statistically analysed with 't' test to find out significant improvement if any at 0.05 level of confidence. The result of the present plyometric training significantly improved explosive power of college women football players.

Keywords: Plyometric training, explosive power college women football players

Introduction
Plyometric exercises are used to develop explosive power. In plyometric exercise, overload is applied to skeletal muscle in a manner that rapidly stretches the muscle (an eccentric or stretch phase) immediately prior to the concentric or shortening phase of action. It is this "pre stretch" that activates the muscles natural elastic recoil elements. Research has indicated that with plyometric training, greater power will be produced if the depth and rate of the movement is short and rapid rather than large and slow. This means that bounding/jumping should be done quickly and depth jump heights should not be too large.

With plyometric exercise similar rules to weight training apply. Generally, up to ten reps can be done per exercise with 2-4 sets of each. Rests should allow quality to be maintained and technique is very important. A sound base of strength is required to perform more difficult exercises safely

Plyometrics or jump training volleyball exercises should be done quickly with the purpose of training muscles to be more powerful. The purpose of jump training is to train the muscles to pre-stretch before jumping. During this pre-stretch, energy is stored in the muscle which can be used to jump higher. For example, when performing a counter movement prior to jumping, elastic energy is stored in the muscles of the legs. If the counter movement is performed quickly, the energy that's stored can be used to aid in jumping higher. If the counter movement is performed too slowly, the energy will be lost. The intensity of volleyball exercises or jumping drills refers to how much stress is placed on muscles, connective tissues, and joints.

Plyometrics improve the functions of muscle, tendons, and nerves so that you can run faster, jump higher, and hit harder. In short, plyometrics exercise can be help you pick-up volleyball game or prepare your body for when you have to save your own life.

Plyometric training conditions the body through dynamic, resistance exercises. This type of training typically includes hops and jumps that exploit the muscles' cycle of lengthening and shortening to increase muscle power. Plyometric exercises start with a rapid stretch of a muscle (eccentric phase) and are followed by a rapid shortening of the same muscle (concentric phase). With plyometric training, the nervous system is conditioned to react more quickly to the stretch-shortening cycle. This type of training enhances a child's ability to increase speed of movement and improve power production. Regular participation in a plyometric training program may also help to strengthen bone and facilitate weight control. Further, plyometric training performed during the preseason may decrease the risk of sports-

related injuries. This may be of particular benefit to young female athletes who appear to be at increased risk for knee injuries as compared to young male athletes.

There are thousands of plyometric exercises, ranging from low intensity double leg hops to high intensity drills such as depth jumps. Although the latter is typically associated with plyometric training for the mature athlete, common games and activities such as hopscotch, jumping rope and jumping jacks can also be characterized as plyometrics because every time the feet make contact with the ground the quadriceps are subjected to the stretch-shortening cycle. In fact, plyometrics are a natural part of most movements, as evidenced by the jumping, hopping and skipping seen on any school playground. With qualified coaching and age-appropriate instruction, plyometric training can be a safe, effective and fun method of conditioning for children and teenagers. However, there is the potential for injury to occur if the intensity and volume of the training program exceeds the abilities of the participants. (Tenke, 1999) [11].

Methodology

In this study the selected 40 college level women players selected from Navarasam college for women. The subjects were randomly assigned in to two equal groups namely, plyometric training (PYT) (n=20) and Control group (CG) (n=20). The respective training was given to the experimental group the 3 days per weeks (alternate days) for the training period of twelve weeks. The control group was not given any sort of training except their routine. The evaluated variables were explosive power was assessed by vertical jump test the unit of measurement in centimetres.

Training programme

The training programme was lasted for 60 minutes for session in a day, 3 days in a week for a period of 12 weeks duration. These 60minutes included 10 minutes warm up, 40 minutes for high intensity plyometric training and 10 minutes and warm down. The equivalent in high intensity plyometric training is the length of the time each action in total 3 day per weeks (Monday, Wednesday and Friday).

Statistical analysis

The collected data before and after training period of 12 weeks on the above said variables due to the effect of plyometric training was statistically analyzed with 't' test to find out the significant improvement between pre and posttest. In all cases the criterion for statistical significance was set at 0.05 level of confidence. (p<0.05)

Table 1: Computation of 't' ratio on selected physical parameters on experimental group and control group (Scores in numbers)

Group	Variables		Mean	N	Std. Deviation Pre	Std. Deviation Post	T ratio
Explosive Power	Experimental Group	Pre test	221.13	20	8.66667	1.94120	4.465*
		Post test	229.80	20			
	Control Group	Pre test	199.1333	20	10.46667	12.03996	.869
		Post test	188.6667	20			

*significant level 0.05 level degree of freedom (2.09, 1 and 19)

Table I reveals the computation of mean, standard deviation and 't' ratio on selected motor fitness variables namely explosive power of experimental group. The obtained 't' ratio on explosive power of were 4.46 respectively. The required table value was 2.09 for the degrees of freedom 1and 19 at the 0.05 level of significance. Since the obtained 't' values were greater than the table value it was found to be statistically significant.

Further the computation of mean, standard deviation and 't' ratio on selected motor fitness variables namely explosive power of control group. The obtained 't' ratio on explosive power of were.869 respectively. The required table value was 2.09 for the degrees of freedom 1and 19 at the 0.05 level of significance. Since the obtained 't' values were lesser than the table value it was found to be statistically not significant.

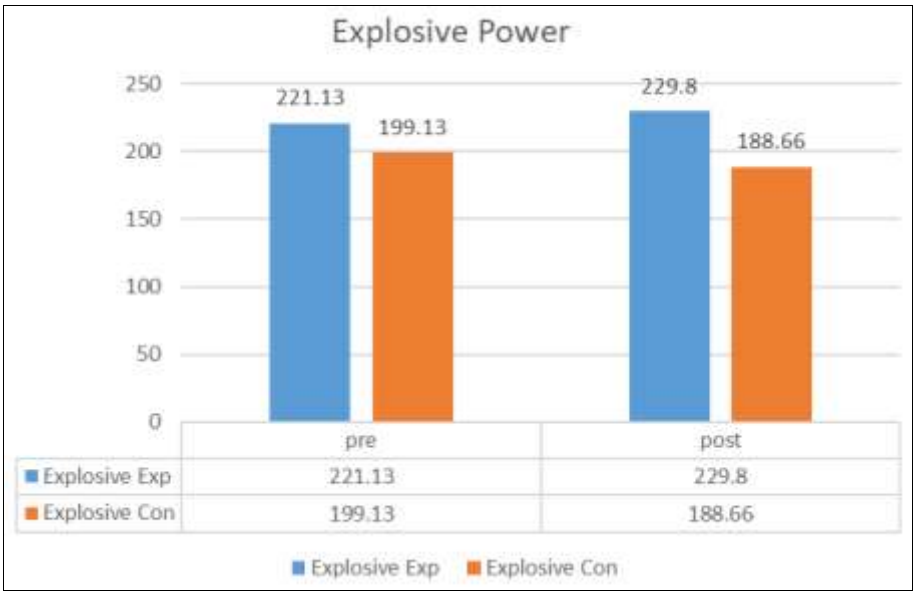

Fig 2: Bar diagram showing the mean value on Explosive Power of college level women players on Experimental and Control group

Discussion and Findings

The present study experimented the effect of plyometric training on selected physical fitness variables of women football players. The result of the study shows that the plyometric training improved the explosive power. The findings of the present study had similarity with the findings of the investigations referred in this study. However, there was a significantly changes of subjects in the present study the explosive power was significantly improved of subject in the group may be due to the in plyometric training.

French *et al.*, (2006) [13] suggested that plyometrics are worthwhile training activities for improving power and agility in youth soccer players.

Chatzinikolaou *et al.*, (2010) [14] revealed that plyometric exercises training sessions. Improving repeated sprint ability in young elite soccer players: repeated shuttle sprints vs. explosive strength training.

Chelly *et al.*, (2008) [15] reported that biweekly plyometric training of junior soccer players (including adapted hurdle and depth jumps) improved important components of athletic performance relative to standard in-season training.

The discrepancy between the result and the result of previous studies might be attributed to several reasons, such as the training experience level of the subjects, the training programme, the intensity used and the duration of the training programme.

Conclusion

It was concluded that 12 weeks of plyometric training significantly improved the Explosive power of college women football players.

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