

Effects Of Plyometric Training On Flexibility In Women Volleyball Players

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Abstract: Volleyball is most popular game in the global and played at competitive and recreational level in all ages and both male and female group. The purpose of the research was to study the effect of Plyometric exercise on Flexibility and athletic power in students. The 25 volleyball players were selected for sample size of the study and their age ranged between 20 -25 years. Only training was given to the experimental groups. Exclusion criteria were the presence of chronic medical conditions such as asthma, heart disease or any other condition that would put the subjects at risk when performing the experimental tests. The Plyometric exercise training program was planned as 12 weeks 4 days a week and 30 minutes in a day. The result reveals that there was significant effect of Plyometric exercise on Flexibility ($p < 0.05$) in female volleyball players.

Keywords: Plyometric exercise, Flexibility, volleyball players

INTRODUCTION

Volleyball is played throughout the world and India and is also played at Olympics. Considering the increasing popularity of volleyball all around the world, it is also a recreational sport and most prestigious game. Flexibility is a component of physical fitness and the ability of joint and muscle to move through its maximum range of motion (Sinku, 2018). Flexibility through stretching is one of the basic tenets of physical fitness. Volleyball doesn't require extreme flexibility, but needs a normal healthy range of motion. Legs just need to comfortably be able to squat. Flexibility increases range of motion, improves technique, and enables more force to be exerted. Therefore, implementing a volleyball-specific strength and conditioning program significantly helps prevent injuries. Flexibility is prevalent for athletes to stretch before and after exercise to reduce risk of injury and increase performance, (Franco, Signorelli, Trajano & Oliveira 2008, Gergley 2009). Plyometrics includes explosive powerful training exercises that are trained to activate the quick response and elastic properties of the major muscles in the body. Volleyball is a sport played by two teams consisting of 12 players each on a playing court, divided by a net. The object of the game is to send the ball over the net in order to ground it on the opponent's court and to prevent the same effort by the opponent. Bosco (1985) states that plyometric exercises can increase participants' ability to use elastic energy. Researchers state that plyometric exercises can change the elasticity of muscles and tendons, to enable them to store bigger quantities of elastic energy during a given stretch-shortening movement.

METHODOLOGY

Two groups were targeted, Experimental group (plyometric exercise group) and control group. 25 women Volleyball players from Chandrapur as experimental group selected under plyometric exercise group and 25 women Volleyball players as a control group. Only training was given to the experimental groups. Voluntary to participate in the Plyometric exercise training programmes. Exclusion criteria were the presence of chronic medical conditions such as asthma, or any other condition that would put the subjects at risk when performing the experimental tests. The subjects were free of smoking, alcohol and caffeine consumption, antioxidant supplementation and drugs during the programmes. They completed an informed consent document to participate in the study. This study involves the impact of plyometric exercise intervention training programme on Athletic power of students in experimental design.

TRAINING PROGRAMME

The Plyometric exercise programme was planned for 4 days a week 30 minutes in a day for 12 weeks including 10 minutes warm up period and 05 minutes cool down. The following Plyometric exercise was taken for women Volleyball players. The Plyometric exercise includes Front Box Jump, Lateral Box Jump, Weighted Lateral Jumps, Broad Jumps, Skater Jumps, Scissor Jumps, Dot Drill, Lateral Box Shuffles, Barbell Squat Jumps, Medicine ball chest pass test, Squat Jump, Bent knee sit ups, Squat thrust, Strudel thrust, Bench press, Pull ups, Depth jump.

FLEXIBILITY

This component was measured by using Sit & Reach Test. The main aim of this test is to evaluate the flexibility of the subject. For conducting the test a stable wooden box 25 Cm's. high on one side is requires. Procedure: Subject sits bare foot with the box with both feet together with toes in line with the edge of the box. From this position he bends forward and while keeping his knees straight. He extends his hands along the scale as forward as possible. Both the hands should be parallel. At a maximum reach he holds the position for about 2 seconds. Scoring: The result is read from the scale. Two attempts are given at recovery rest of 30 seconds. In case a subject is not able to extend his hands even to the level of the box then the distance from the 0 Cm's. Mark to the tip of middle finger should be measured with a scale and recorded as negative score. Pre and Post Test was taken from 25 other students as a control group. Plyometric training programme was given to the experimental group , mean, S.D. and t-test was utilized the level of significant was set up at 0.05 level.

RESULTS

Table-1
Descriptive statistics of personal characteristics of women volleyball players

Sr. No.	Components	Means Scores	Standard Deviations
1.	Age (Year)	21.32	3.60
2.	Weight (Kg)	62.21	6.56
3.	Height (cm)	161.20	8.67

Table -1 depicted the morphological characteristics of Women volleyball players , the Mean Scores (S.Ds.) age of women volleyball players was 21.32 (3.60) years, mean scores (S.Ds.) weight was 62.21 (6.56) Kg, and mean scores (S.Ds.) height was 161.20 (8.67) cm

TABLE – 2
Pre and post-testof mean scores, standard deviation and t-ratio of flexibility of control group.

Components	Test	Number	Mean	S.Ds.	T-ratio
Flexibility	Pre-Test	25	10.98	2.41	1.45 NS
	Post-Test	25	11.01	2.47	

Table - 2 Pre and post-test of mean scores, standard deviation and t-ratio of Flexibility of Control Group. With regards to pre and post-test of Flexibility of control group they have obtained mean values were 10.98 and 11.01 respectively, whereas they obtained standard deviation 2.41 and 2.47 respectively. The findings of the study indicates that no significant difference of Flexibility was found in pre and post test of control group (without training group of women volleyball players .

Figure-1 shows the Pre and post-testof mean scores, standard deviation of flexibility of control group.

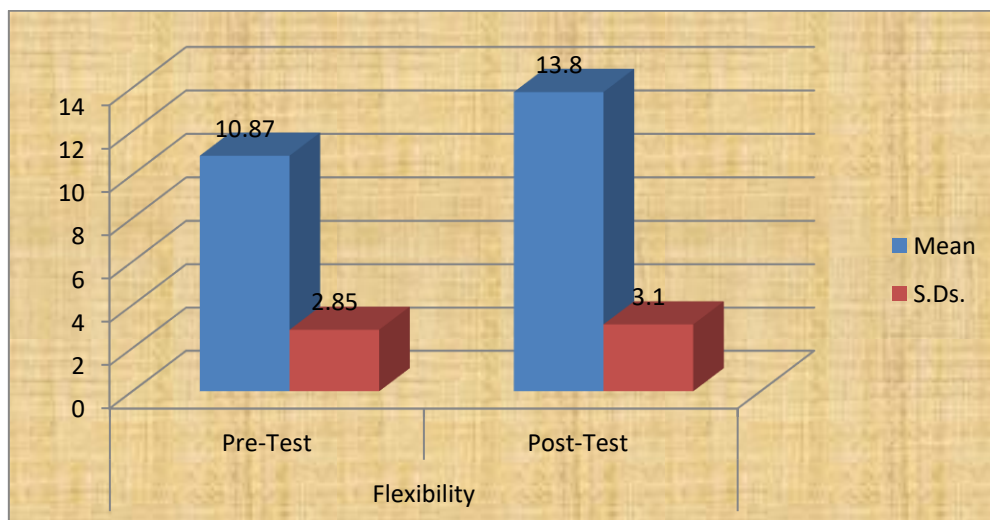


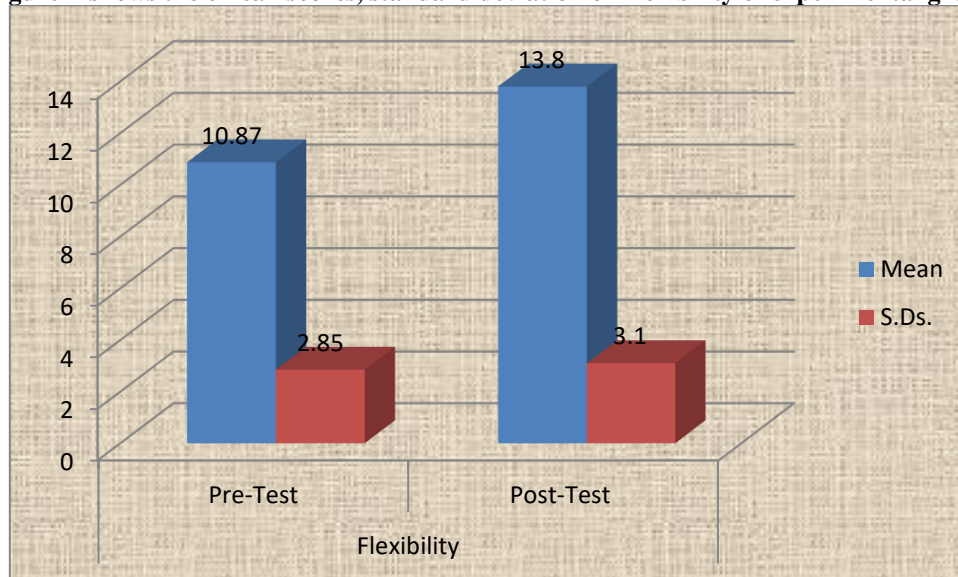
TABLE – 3
Pre and post-test of mean scores, standard deviation and t-ratio of flexibility of experimental group

Components	Test	Number	Mean	S.Ds.	T-ratio
Flexibility	Pre-Test	25	10.87	2.85	3.17 *
	Post-Test	25	13.80	3.10	

*= Significant

Table - Pre and post-test of mean scores, standard deviation and t-ratio of Flexibility of experimental group . With regards to pre and post-test of Flexibility of experimental group they have obtained mean values were 10.87 and 13.80 respectively, whereas they obtained standard deviation 2.85 and 3.10 respectively. The result reveals significant effects of Plyometric exercise was found on Flexibility in experimental group ($t=P<.05$) The findings of the study shows that 12 week Plyometric exercise training programme improve Flexibility of women Volleyball players .

Figure-2 shows the mean scores, standard deviation of Flexibility of experimental group



DISCUSSION

The findings of the study shows that 12 week Plyometric exercise training programme improve Flexibility of women volleyball players .Good flexibility increases the muscle's tissue temperature, which in turn improves blood circulation and promotes nutrient transport in the body (Gergley 2009,Pearce , Zois&Carlson2009). It is well recognized that , volleyball involves repetitive overhead motions, such as spiking and blocking, players are prone to overuse injuries of the shoulder. In addition, volleyball players are particularly susceptible to finger injuries.Flexibility training not only promotes muscle relaxation, it also reduces stress in the lower back by relaxing the hamstrings, hip flexors, quadriceps, and other muscles attached to the pelvis (Marshall & Wallace 2009.Needham).With improved circulation and increased nutrients being delivered to all the muscles in the lower back, lower back aches will be a thing of the past thanks to regular stretching and flexibility exercises (Pacheco, Balius , Perrier ,Pavol, Hoffman ,2011 ,) Flexibility training play a very beneficial role in maintaining a healthy, pain-free body (Pacheco, Balius , Aliste. 2011) . Poor flexibility in the hip flexor muscles may lead to an anterior pelvic tilt, where the pelvis is tilted down to the front (Moran, McGrath ,Marshall & Wallace 2009). This increases the lumbar lordosis, which is the sway in the lower back.(Jaggers, Swank, Frost& Lee 2008). The low back is a common source of chronic pain among volleyball players. The cause of most low-back pain is related to muscle or ligament strain. The pain usually resolves with rest, and improve the flexibility . Athletes are at high risk of overuse injuries and stress fractures due to lack of flexibility (Gomes , Simao& Marques 2011.Jaggers, Swank, Frost& Lee 2008). Flexibility provides assistance in the reduction of chronic overuse injuries and therefore is not a useful injury preventative strategy for endurance athletes(Kistler, Walsh, Horn & Cox 2010). Flexibility has been shown to enhance performance when instituted prior to strength and power activities. (Moran *et al.* , Torre ,Castagna&Gervasoni 2010). The full range of motion in both shoulders to function at the optimum level in volleyball game . While lower body **flexibility** significantly improves performance, upper body **flexibility** is an absolute must. The most obvious range required in **volleyball** is shoulder flexion or an ability to bring the arms directly overhead

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