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Assessment study on the impact of plyometric exercises for the development of speed among sprinters of Kurukshetra university

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Abstract

The Plyometric exercises are a vital component for Sprinters for maximal speed and should be included in any conditioning program. Plyometric exercise such as hopping, bounding, jumping etc., are very essential to the Sprinters. Plyometric is used to increase the speed or force of muscular constructions, providing explosiveness for a Variety of sport specific activities. Plyometrics are useful for several sports notably soccer, rugby, basketball, track and field athletics, racket sports and martial arts. The aim of the present study to find out the effect of Plyometric exercises for the development of Speed among Sprinters of Kurukshetra University in India.

Method: The sample for the present study is 40 Kurukshetra male sprinters from various colleges of Kurukshetra University in Haryana State. The experimental group is 20 male Sprinters and controlled group is 20 University Male Sprinters. The twelve weeks of training were given to the experimental group which consists of Plyometric exercises on alternate days i.e., three sessions per week and controlled group were given general training – 30 meter Run were used for Pre Test and Post Test for both the experimental and controlled group to find out the effect of Plyometric exercises for development of Speed.

Result: This study shows that due to the Plyometric exercise the experimental group has shown vast improvement compare to the controlled group in Pre Test and Post Test results.

Conclusions: It is concluded that due to Plyometric Exercise there will improvement of Speed among Sprinters of Kurukshetra University.

Keywords: Plyometric exercises, sprinters, speed etc.

Introduction

Plyometrics — plyos for short — is a type of exercise that trains muscles to produce power (strength + speed). Plyometric exercises involve a stretch of the muscles, immediately followed by a contraction of the same muscles — which is why it's sometimes referred to as "jump training." While strength training mostly creates nervous system and muscular adaptations to get stronger, plyometric exercises will help improve explosiveness — our ability to generate maximum force in a minimum time. Picture a sprinter taking off at the starting line, or an Olympic long jumper jumping from stillness, they both need explosive power to do what they do. Plyometrics is an important component of most professional sports performance training as it focuses on the "speed" component of power.

Plyometrics is a type of exercise training that uses speed and force of different movements to build muscle power. Plyometrics training can improve your physical performance and ability to do different activities.

Plyometrics can include different types of exercises, like pushups, throwing, running, jumping, and kicking. Athletes often use plyometrics as part of their training, but anyone can do these workouts. People who are in physical rehab after an accident or injury use plyometrics to get back into good shape and physical function.

If you're in good shape and looking to ramp up your workout, you may enjoy the challenge of plyometrics. It's a great way to train if you're into high-impact sports that involve a lot of running or jumping, like tennis, skiing, or basketball.

When you're getting started, work with an experienced trainer who can show you how to safely jump and land. Start slow and low. Mix a few plyometric moves into your regular workout.

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Because plyometrics is high-impact and intense exercise, check with your doctor first if you aren't active now or if you have any health problems.

Plyometrics isn't the workout for you if you don't like to sweat or are just looking to strengthen your core.

Plyometric training involves and uses practicing plyometric movements to enhance tissues abilities and train nerve cells to stimulate a specific pattern of [muscle contraction] so the muscle generates as strong a contraction as possible in the shortest amount of time. A plyometric contraction involves first a rapid muscle lengthening movement (eccentric phase), followed by a short resting phase (amortization phase), then an explosive muscle shortening movement (concentric phase), which enables muscles to work together in doing the particular motion. Plyometric training engages the myotatic reflex, which is the automatic contraction of muscles when their stretch sensory receptors are stimulated. Plyometric drills are used in many sports training programs to help build speed, power, improve coordination, agility, and improve sports performance. Any athlete that participates in sports that involve jumping, landing, or explosive moves can benefit from plyometric drills. Many plyometric exercises are especially geared toward football training. Using plyometrics for soccer is one the most effective ways to increase explosive speed and power. Speed is a key component of Physical fitness which is very important for athletes specially sprinters for giving the high level of performance in competition. Speed is the performance pre requisite to do motor actions under given conditions in minimum of time. Speed is the quickness of movement of a limb, whether this is the legs of a runner or the arm of the shot putter. Speed is an integral part of every sport and can be expressed as any one of, or combination of, the following: maximum speed, elastic strength and speed endurance.

Plyometric training is often interchangeable with power training. However, as some traditionally use plyometric training to define a specific movement pattern in which three distinct phases of movement occur rapidly, not all power training is plyometric training (though all plyometric training is considered power training). Further, the movement patterns categorized in the NASM OPT Model's Phase 1 would better be classified as power patterns and not plyometric since they all involve a long pause (isometric) between the eccentric and concentric phases.

By contrast, Power Lifting is a sport and often confused with power/explosive training. To clarify, it is a misnomer as its primary focus is strength enhancement and development and traditionally does the bulk of training with heavy, slow lifts. Plyometrics is built upon various scientific principles (stretch-shortening cycle, optimizing sarcomere length, and stretch reflexes) that can help individuals tremendously boost their power output [2, 3].

Improvement to the Rate of Force Development and the maximum power output of various movement patterns related to sport is crucial to improving sport-related tasks. Still, it is also extremely valuable in return to play, post-rehabilitation, and pre-habilitation (or injury reduction) protocols. Note the following areas of injury reduction [3]:

- Improved control for varus and valgus movements at the knees during landing
- Enhanced dynamic knee stability during the deceleration phase of landing
- Enhanced anaerobic power and vertical jump height
- Improvement in overall power and change of direction speed in all planes of motion (sagittal, frontal, and transverse)

Plyometric training can add a fun and challenging component to training programs. However, like most training protocols, it must be introduced, coached, and progressed systematically to avoid injuries.

Unilateral and gravity accelerated patterns such as bounding, hops, depth jumps, and combination jumps demand a solid foundation of stability, motor control, coordinated patterning, eccentric strength, joint integrity, flexibility, and technical proficiency to avoid injury.

How Plyometrics Works?

Plyometrics ("plyo," for short) used to be called "jump training." It's a technique you can use in many different ways. For instance, you can do plyometrics to help train for basketball, volleyball, tennis, or any other activity that uses explosive movements.

You'll do a series of jumps and hops, like jump squats or one-leg hops. You might jump up and onto a box or bench, or jump over cones. Some moves will be faster than others.

Every time you land from a jump, your muscles get a stretch. That gives your next jump even more power. The combination of stretching and contracting your muscles whips them into shape. You won't do plyometrics every day, because your muscles will need a break from all that jumping. If you aren't active now, you may need to start working on your basic fitness first and later have a pro show you how to do the moves, so you don't get injured.

It's a fun alternative to an everyday strength training workout that boosts your muscle power, strength, balance, and agility. You can either do a workout based on plyometrics, or add some plyo moves to your usual routine without giving it an entire session.

Intensity of Plyometrics

This workout uses maximum power to strengthen your muscles. The moves are quick and explosive, so prepare to use a lot more energy than you do in a typical strength training session.

Areas Plyometrics Targets

Core: No. This workout doesn't specifically target your core.

Arms: No. Most plyometric workouts don't target your arms. But if you want to work them, you can add upper-body moves, like medicine ball throws and plyometric pushups.

Legs: Yes. Expect your legs to get in great shape from all the jumping and hopping.

Glutes: Yes. Moves like jump squats fire up your glutes to make them stronger.

Method

The purpose of the present study is to find out the effect of Plyometric exercises for the development of Speed among Sprinters of Kurukshetra University. The sample for the present study is 40 Male Sprinters from various colleges of Kurukshetra University, Kurukshetra, Haryana. The experimental group is 20 male sprinters and controlled group is 20 University Male sprinter. The twelve weeks of training were given to the experimental group which consists of Plyometric exercises on alternate days i.e. three sessions per week and controlled group were given general training. Plyometric exercises such hopping, bounding, box jumps, tuck jumps etc. are used in the training for the experimental group. 30 Meter Run were used for Pre Test and Post Test for both the experimental and controlled group to find out the effect of Plyometric exercises for development of speed.

30 Meters Run

Purpose: The aim of this test is to determine speed.

Equipment required: Measuring tape, or marked track, stop watch, cone markers etc. Flat and clear surface of at least 50 meters.

Procedure: The test involves running a single maximum sprint over 30 meters, with the time recorded. A thorough warm up should be given, including some practice starts and accelerations. Start from a stationary position, with one foot in front of the other. The front foot must be on or behind the starting line. This starting position should be held for 2

seconds prior to starting, and no rocking movements are allowed. The tester should provide hints for maximizing speed (such as keeping low, driving hard with the arms and legs) and encouraged to continue running hard through the finish line.

Results

This study shows that due to the Plyometric exercise the experimental group has shown vast improvement compare to the controlled group in Pre Test and Post Test results.

Discussion

Table 1: Pre Test in 30 M Run the Mean score of Experimental Group is 4.51 and controlled group is 4.59 there is a difference of 0.08 between both the group

Pre Test	Group	N	Mean	Std. Deviation	Std. Error Mean	t	df	Sig. (2-tailed)
30 M	Experimental Group	20	4.51	0.24	0.08			
						-1.81	38.00	0.09
30 M	Control Group	20	4.59	0.46	0.15			

In Table 1 in Pre Test in 30 M Run The Mean score of Experimental Group is 4.51 and controlled group is 4.59 there is a difference of 0.08 between both the group.

Table 2: Post Test in 30 M Run the Mean score of Experimental Group is 4.31 and controlled group is 4.61 there is a difference of 0.30 between both the groups

Post Test	Group	N	Mean	Std. Deviation	Std. Error Mean	t	df	Sig. (2-tailed)
30 M	Experimental Group	20	4.31	0.22	0.06			
						-1.81	38.00	0.09
30 M	Control Group	20	4.61	0.44	0.13			

In Table 2 in Post Test in 30 M Run the Mean score of Experimental Group is 4.31 and controlled group is 4.61 there is a difference of 0.30 between both the groups. The Experimental group has increased 0.20 between Pre Test to Post Test due to plyometric training and controlled group is decreased by 0.02 due to the general training.

Conclusion

It is concluded that due to the Plyometric Exercises there will be improvement of Speed among sprinters of Kukulshetra University.

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