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**EFFECT OF HILL RUNNING FOR DEVELOPMENT OF AEROBIC
ENDURANCE AMONG SEPAK TAKRAW PLAYERS OF HYDERABAD
DISTRICT IN TELANGANA**

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Abstract

"Sepak" is the Malay word for kick and "Takraw" is the Thai word for a woven ball, therefore sepak takraw quite literally means to kick ball. The choosing of this name for the sport was a compromise between Malaysia and Thailand, the two powerhouse countries of the sport. Endurance means the ability to sustain or with stand prolonged exercise for minutes to hours. There are different types of endurance, which include; aerobic endurance, anaerobic endurance, speed endurance and strength endurance. Endurance training is the act of exercising to increase endurance. The term endurance training generally refers to training the aerobic system as opposed to anaerobic. The need for endurance in sports is often predicated as the need of cardiovascular and simple muscular endurance, but the issue of endurance is far more complex. Hill Running increases leg muscle power, improves fitness, and uses the muscles of the legs, arms and core in ways that are different than running on flat surfaces. The significance of this study is to find out effect of hill running for development of aerobic endurance among Sepak Takraw players of Hyderabad district which will be helpful to Coaches and Trainers to develop the endurance ability. The objective of the study was to determine the effects of the hill running for development of endurance ability among sepak takraw players. The sample for the present study consists of 20 Male male sepak takraw players out of which 10 are experimental group and 10 are controlled group. Hill running training such as short hills, medium hills, long hills, mixed hills running were given to experimental group on alternate days for eight weeks along with general training of sepak takraw and control group were given the general training of sepak takraw. Pre Test and Post Test were conducted for 12 Min Cooper Test to assess the aerobic endurance of both the groups. This study shows that the experimental group has got rapid improvement due to Hill running compare to control group. It was concluded that due to Hill running there is a improvement of Aerobic Endurance. It was recommended that the coaches must include the Hill running programs to athletes for development of endurance.

Key words: Hill running, Aerobic Endurance, Takraw players and Sepak Takraw.

1. Introduction

"Sepak" is the Malay word for kick and "takraw" is the Thai word for a woven ball, therefore sepak takraw quite literally means to kick ball. The choosing of this name for the sport

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sport. Endurance is the important motor ability for sepak takraw players. The basic elements of speed, mobility and strength are all functions of explosive power and agility. Sepak Takraw is Playing Volleyball with the Feet. Sepak takraw is a skill ball game originated from Asia. It combines the teamwork of volleyball, the dexterity of soccer and the finesse of badminton. In Thailand, it is called takraw, but the official name of this internationally recognized game is sepak takraw. Without a doubt it is one of the world's most exciting sports, both to play and to watch, yet it is relatively unknown outside of Southeast Asia. Playing the sport requires little in the way of equipment or preparation but it does require quick reflexes, coordination, agility and above all, technique.

The game is played by two opposing Regus, a team of three players each, on a court separated by a net similar to badminton. It begins with the service, executed by a ball toss from one player to the Server. Then, the players try to beat their opponents using their legs and head, except their hands, inside three kicks. The highlight is the "spike". This is the most dramatic and explosive move in the game for spectators to watch as players go mid-air, twisting and turning to power the ball down into the opponent's court. To play takraw, players can use either a net, a hoop, or simply stand around in a circle formation. Whatever the style, the object is to kick the ball to another player without the ball touching the ground. Sepak takraw combines ball skills (kicking and juggling) with the agility and acrobatic moves of gymnasts and the instinctive reflexes of competitive badminton players. This sport seems to have its origins in ancient Thailand and was invented about 500 years ago. There is a strong martial arts tradition in Thailand with Muay Thai Boxing originating from and still being widely practiced there today. Because of this strong tradition of martial arts which relies on powerful kicks, the sport may have come about as a side project of a few Muay Thai boxers. The kicking aspect of Muay Thai and the kicking aspect of Sepak Takraw are fairly similar and

agility and dexterity in kicking very high objects and flexibility all play a part in both sports.

Endurance is a conditional ability. It is primarily determined by energy liberation process. Endurance is directly or indirectly of high importance in all sports. Endurance is the ability to do sports movements, with the desired quality and speed, under conditions of fatigue. Endurance is a very important ability in sports. In sports endurance ensures optimum speed of motor actions. Good endurance also ensures high quality or skill of movement execution which finds expression in accuracy, precision, rhythm, consistency etc. Endurance training results in the improvement of functioning of various organs and systems of the human body. This in turn improves the ability to recover quickly from training and competition load. The importance of endurance for recovery assumes much more relevance during completion i.e. in between heats, rounds, matches on successive days. Endurance performances are of different nature indifferent sports. Endurance activities have been found to be of high value for maintenance of good organic health, for increasing the general resistance against infection and for cure and treatment of various diseases and metabolic disorder.

2. Significance of the Study

The significance of this study was to find out effect of hill running for development of aerobic endurance among Sepak Takraw players of Hyderabad district which will be helpful to Coaches and Trainers to develop the endurance ability. This Study will bring true facts of sports training to develop the endurance ability among the sepak takraw players.

3. Objectives of the Study

The objective of the study was to determine the effects of the hill running for development of endurance ability among sepak takraw players.

Running on Hills is a form of Strength training that can improve the endurance on the track and road. Hill Running increase the intensity of training and builds strength because of the



resistance they offer when running. Hill Running has a strengthening effect as well as boosting the athletes power and is ideal for athletes who depend on high running speeds. To reduce the possibility of injury hill training should be conducted once the athlete has a good solid base of strength and endurance.

Hill Training offers the following benefits.

- a) Helps develop power and muscle elasticity.
- b) Improves stride frequency and length.
- c) Develops co-ordination, encouraging the proper use of arm action during the driving phase and feet in support phase.
- d) Develops control and stabilization as well as improved speed (downhill running)
- e) Promotes strength endurance.
- f) Develop maximum speed and strength (short hills)
- g) Improves lactate tolerance (Mixed hills)
- h) The benefits of short, medium and long hills are quite different, and can be used at different times of the year.

Short hills

A short hill is one which takes no more than 30 seconds to run up and has an inclination between 5 and 15 degrees gradient. The athlete's energy source on short hills is entirely anaerobic. The athlete should focus on a running technique which has vigorous arm drive and high knee lift, with the hips kept high, so that they are 'running tall', not leaning forwards.

The session is anaerobic so the recovery time can be long, a walk back down the hill, or a slow jog of 60 to 90 seconds. The total volume will depend on the fitness of the athlete and the reason for doing it. A sprinter looking for strength might do 10 repetitions of 15 second duration up a steep slope with a long recovery where as a distance runner who is trying to improve sprinting speed might do 30 repetitions of 15 seconds duration. Short hills of 5 to 10 second duration will help improve the Adenosine Triphosphate and Phosphate-creatine (ATP + PC) energy system and hills of 15 to 30 second duration will help develop

the ATP + PC + Muscle glycogen energy system. Example of short hill sessions:

- 8 to 10 repetitions over 150 meters (middle distance athletes)
- 8 to 10 repetitions over 200 meters (long distance athletes)

Long hills

A long hill is one which takes from 90 seconds to three minutes plus. Here most of the energy comes from aerobic sources, but if parts of the hill are steep and they are running them hard, there will still be an accumulation of blood lactate. There will be local muscular fatigue in the leg muscles, and possibly in the abdominal muscles too, but the main limiting factor will be the athlete's cardiovascular system.

These hills can be used in two ways:

- As a hard aerobic training session during the pre-competition season
- As a hard time-trial session in the early part of the competition period

As these hill sessions are aerobic, the athlete will not use as much power per stride as the shorter hills, and so perhaps would not be used by middle-distance runners, except for one or two time-trial runs. They are particularly good for the cross country or road runner who was running distances of 10,000 m and upwards. A session of, say eight three minutes, with a run back of four or five minutes will make a good hard workout.

Mixed hill running

The attraction of mixed hill training is that it can be fitted in with the terrain the athlete is running on and can, therefore, be interesting and full of variety. If they do a fartlek session round a hilly course, they will be able to fit in a number of different runs. Two advantages can come from this type of hill training:

- **Race simulation.** It is a good principle to rehearse in training the situations they are likely to meet in a race, such as trying to break open a gap by running hard over the top of a



hill and keeping the pace going instead of easing up, as many runners do.

- **Downhill running.** This is something that often causes jarring and strains. I do not advise doing repeated fast downhill runs, but I would suggest that they practice to find the most relaxed way of running downhill without strain.

Mixed hill running can also be used to improve running economy and boost an athlete's VO_2 max. To do this identify a six or seven mile undulating hilly course, commence the session jogging at a modest pace and gradually pick up the intensity as they move through the hills. The key is not just to run up and down a few hills in their workout but to find a place where they can run up and down hills nearly constantly. If they cannot find a six or seven mile course with constant undulations, use a shorter course and run back and forth on it. The key is not to let the flat ground running total more than 25 % of the workout.

During most of the run, the athlete's heart rate should be close to 85% of maximum (85% of maximum heart rate matches up with 76% VO_2 max). Do not let them blast up hills in the early part of the workout, this can stop them working though subsequent miles. The idea is to run constantly at a hard but not super fast speed.

4. Methodology

Aim: To find out the effects of Hill Running for development of Aerobic Endurance among Sepak Takraw players of Hyderabad District of Telangana State in India.

The sample for present study is 20 Male Sepak Takraw Players of Hyderabad District in Telangana. The Experimental Group consists of 10 Sepak Takraw Players and Controlled Group consists of 10 Male Sepak Takraw players. Hill running training such as short hills, medium hills, long hills, mixed hills running were given to experimental group on alternate days for eight weeks along with general training of sepak takraw

and control group were given the general training of sepak takraw. Pre Test and Post Test were conducted for 12 Min Cooper Test to assess the aerobic endurance of both the groups.

Tools: Cooper 12-minute Run Test

The Cooper 12 minute run is a popular maximal running test of aerobic fitness, in which participants try and cover as much distance as they can in 12 minutes.

Purpose: to test aerobic fitness (the ability of the body to use oxygen to power it while running)
equipment required: flat oval or running track, marker cones, recording sheets, stop watch.

Procedure: Place markers at set intervals around the track to aid in measuring the completed distance. Participants run for 12 minutes, and the total distance covered was recorded. Walking is allowed, though the participants must be encouraged to push themselves as hard as they can to maximize the distance covered.

5. Results

The results of the study showed that the Experimental Group Sepak Takraw Players has improved from Pre Test to Post Test due to the Hill Running.

T-Test

The Experimental Group Pre Test Mean is 2658.00 and Post Test Mean is 2730.40. There is a improvement of Mean from Pre Test to Post Test was 72.40. That means due the Hill Running the Control Group has improved a lot.

The Control Group Pre Test Mean was 2647.50 and Post Test Mean was 2640.00. There was a decrease of Mean from Pre Test to Post Test was 7.50 due to the general Training of Sepak Takraw. The Result of the Study shows that the Experimental Group has improved a lot compare to the Control Group.



Table - 1 showing the Paired Samples Statistics of Experimental Group and Control Group of Sepak Takraw Players In Pre Test and Post Test in 12 Min Run Cooper Test.

12 Min Run Cooper Test		Mean	Std. Deviation	Std. Error Mean	N
Experimental	Pre Test	2658.00	90.468	28.608	10
	Post Test	2730.40	93.223	29.480	10
Control Group	Pre Test	2647.50	74.470	23.550	10
	Post Test	2640.00	76.992	24.347	10

Table - 2 showing the Paired Samples Correlations of Experimental Group and Control Group of Sepak Takraw Players In Pre Test and Post Test in 12 Min Run Cooper Test

12 Min Run Cooper Test		N	Correlation	Sig.
Experimental	Pre Test & Post Test	10	.972	.000
Control	Pre Test & Post Test	10	.976	.000

The Correlations of the Experimental Group of sepak takraw players from Pre Test to Post Test was .972 and Correlations of the control Group of sepak takraw players from Pre Test to Post Test was .976

Paired Samples Test of Experimental Group and Control Group of Sepak Takraw Players In Pre Test and Post Test in 12 Min Run Cooper Test

12 Min Run Cooper Test		Paired Differences	t	df	Sig. (2-tailed)
		Mean			
Experimental	Pre Test - Post Test	-72.400	-10.404	9	.000
Control	Pre Test - Post Test	7.500	1.406	9	.193

The Mean differences of the Experimental Group of sepak takraw players from Pre Test to Post Test is -72.400 and Mean differences of the Control Group of sepak takraw players from Pre Test to Post Test is 7.500.

6. Discussion

The Strength, Speed and Endurance are the important abilities for successful performance. The dominant ability is the one from which the sport requires higher contribution to achieve the high success in the sports and games. Most sports require peak performance in at least two abilities.

The Relationships among strength, Speed and endurance create crucial physical athletic qualities. Specific development of a biomotor ability must be methodical. A developed dominant ability directly or indirectly effects the other motor abilities. When an athlete develops strength he may experience a positive transfer to speed and



endurance. On the other hand, a strength training program designed only to develop maximum strength may negatively effects the development of aerobic endurance. Similarly, a training program aim exclusively at developing aerobic endurance may have a negative transfer to strength and speed. Aerobic Endurance plays very important to role in playing the Sepak takraw game for long period under the conditions of fatigue efficiently and effectively. Sepak Takraw player having better aerobic endurance can perform better in the match. Hill Running also develops strength in legs which was very important to hit the Sepak Takraw ball to achieve the high results.

7. Conclusions

It was concluded that the due to the Hill Running develops the strength and power in the legs. It also improve the co-ordination in the arms and legs and promotes in developing the Aerobic Endurance. In this study, it was concluded that

Due to the Hill Running the Aerobic Endurance develops a lot in the Sepak Takraw players.

8. Recommendations

Similar studies can be conducted among females and in other sports and games. This study is useful to the Coaches to prepare the conditioning program to improve the motor abilities of the Sepak Takraw players.

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