CHAPTER - 1

INTRODUCTION
CHAPTER I

Introduction

“It's not how hard you train; it's how smart you train”

(O’Donnell)

In the past, the concept of training was limited to competitive sports. However, in recent years, athletic training has become a normal part of an active way of life and today athletic training belongs to the lifestyle of all generations (Hohmann, Lames, and Letzelter, 2002). The purpose of training is first to reveal the genetic potential of the athlete and then to develop that potential without causing damage (Tulloh, 1998). Training is necessary for two basic reasons that, to provide the knowledge and skills to use the performance appraisal system well (Maclean, 2001).

The responses to specific types of training can vary considerably from athlete to athlete. For example, one youth may develop muscle mass after weight training while another may not. Generally speaking, however, the effects of training are highly predictable if coaches use training methods properly (Green and Pate, 1997).

Repeated days and week of training can be considered positive stress because training improves one’s capacity for energy production, tolerance of
physical stress and exercise performance. The major physical changes associated with training occur in the first six to ten weeks (Wilmore, Costil, and Kenney, 2008).

Competition sports involve participants, as individuals or in teams, who compete with each other to find out who is best at the activity. The idea behind this category of sports is a pure test of skill and physical condition (Beashel and Taylor, 1996). In nearly every athletics event, speed parameters are determining factors. This has particular emphasis in connecting training (Tarasti, 1998).

Training is a stress that has positive and negative results. Adaptation to training is seen with increased physical, physiological, psychological state of human being (Vanghn, 1995).

A person with a lot of talent will almost outperform a person with little talent and a lot of training. Athletic performance is ultimately limited by the quantities of useful force and mechanical power that can be generated and sustained (karp, 2006). Sports technicians got little help from sports physiology, as regards training for speed (Vittori, 1996).

Speed is not a simple matter of leg length, muscle fiber type, race, culture or environment. While genetic predisposition will influence every human capability, greatest error one can make is to underestimate the range of potential that exists in every person. If an athlete does not demonstrate obvious sprinting ability at an early age, or on the first day of training, they should not
the specific type of work required by the sports concerned. An increase in the
capacity for work does not depend on the development of specific qualities, but
on the body’s specialization in a specific direction to speed, strength and
endurance. This conclusion indicates that a change is needed in the theory and
methodology of training, especially in regard to physical conditioning
(Verkhoshansky, 1996).

Jumping to a beat or rhythm makes rope jumping an ideal tool for
cultivating coordination and agility. There is only one right way to jump for
better sports performance: you must train with the rope the way you want to
move in your sports (Lee, 2003). Rope jumping is an excellent way of
developing cardio respiratory endurance, strength, agility, coordination and a
sense of wellness (Greenberg, Dintiman, and Oakes, 2004). Only high-intensity
jump rope training produce the greatest benefits in the least amount of time for
improved fitness and sports performance (Lee, 2003).

Jumping rope has many benefits, primarily conditioning the heart and
lungs; however, it can increase body awareness and develop better hand and
foot coordination (Kahn and Biscontini, 2007). The jump rope is a tried and
true method for improving conditioning and coordination. If one has never
jumped rope before, he can expect a challenge. The rope can be very frustrating
to a beginner (Enamait, 2005).

Running has long been accepted as an essential training component for
the competitive athlete in almost every sport. Running is a skill that most of us
learn at an early age. Because no two persons are anatomically exactly the
same, each person will have a slightly different running style or form. However, there are certain things that all runners should pay attention to in terms of running style and proper form to help make running more efficient and reduce the possibility of injuries (Prentice, 1994).

Form running drills are used to help ingrain neuromuscular movement patterns and increase leg turnover (Baechle, 1994). Form running drills are not necessarily specific to running in that most drills exhibit leg movements that are not exactly run-like. However, if done correctly and quickly, the form drills can help increase speed or at the very least, increase footwork (Sandler, 2005).

An elite athlete’s running technique is shaped by a number of physical characteristics such as flexibility, power, neuromuscular function, body composition and so forth, running technique contributes to the competitive edge of a short distance runner. Efficient running biomechanics helps to keep injuries at bay and ensure that the runner’s neuromuscular potential is fully exploited. It also helps to save the energy, which in turn result in better racing (Skof and Stuhec, 2004).

The most important element for success is maximum running velocity, though a fast reaction time after the start signal and quick acceleration. To achieve such a velocity, a sprinter requires a strong body and efficient running movements (Ito, Fukuda, and Kijima, 2008). Sprints to improve running rhythm can be used to evaluate speed training, because every step made by the athlete can be kept under control throughout every phase of his preparation (Donati, 1996).
necessarily be directed toward some other discipline. Over time, the capacity to run faster can be developed. Here is the simple truth. Speed is not a matter of fact, a question of luck or even a gift of genetics. Speed is a skill! Like any skill, it can be learned and developed by those who know how (Seagrave, 1996).

Speed is a performance-determining factor for almost all athletic events. It can be developed only if there is a maximum plasticity of the cerebral cortex, which happens only during childhood and youth. The development of speed through an increase in stride rate and length is a primary task of connecting training (Arbeit, 1998).

One should not forget that speed training favors an athlete’s functional condition. Therefore, in the annual training cycle, the optimal distribution of concentrated volumes of special physical conditioning training (including speed endurance) should take into account the main events of the competition calendar (Verkhoshansky, 1996).

Speed training produces global morphological and functional changes in the organism. However, the adaptive changes of the central nervous system, physiological and bio-chemical, develop much more slowly than do the capacities for strength and endurance. These changes can be maintained only for very brief periods of time. Therefore, there is no specific mechanism that is solely responsible for speed, for strength or for endurance. Every type of sporting activity uses the same functional systems. However, during the training process, these systems may acquire a specialization, depending upon
The stick drill is very effective in helping sprinters improve their stride frequency and decrease their ground contact time (Henson and Turner, 2000). The stick drill can be setup to improve leg turnover, rhythm or stride length. The sticks can provide a model that forces a neuromuscular adaptation by the athlete. For example, if an athlete has a normal stride of seven feet and it can be reduced to six and a half feet, by placing the sticks six feet apart, and it will force the athlete to place his feet down quicker thus forcing a faster turnover. By repeating this drill regularly the body will learn (adapt) to fire quickly without drastically changing running form. Once free to run without the sticks the athlete will repeat the higher frequency with the benefit of a normal stride (Thigpen, 2002).

Use stick drill to reduce the athlete's stride length by 5% (between sticks) in the 30m speed zone. To cover this interval at full speed, the sprinter must increase his tempo (frequency of stride) (Barber, 2002).

**Need of the Study**

New applications and new theories have given emphasis to training methods that play an important role in developing the speed parameters. Many research studies suggest that speed improvements has been challenged by the changing expectations of the skills and performance, and therefore, coaches try to find a variety of training methods. In other words effective training gives special attention to athletes how to train and how to maintain and evaluate their performance in different aspects.
There is general agreement that jump rope is performed in short bursts and at high intensity. It is by far the best exercise method for athletes because it develops cardiovascular fitness and sports specific skills necessary for championship performances, in a short time period. It targets the athlete's anaerobic energy system and focuses on developing the fast twitch muscle fibers. Jump rope produces competitive advantages in speed, quickness, agility, balance, coordination, explosiveness, leg, knee, ankle and foot strength. Jump rope program is designed to produce a synergistic effect among athletes' quickness, speed, strength, endurance and timing and to optimize the advantages of all of them.

This synergy will create the edge in performance that makes the difference between winning and losing. In the end it's about getting the edge and holding it long enough to win. And that edge doesn't have to be much. One point, a fraction of a point, one second, a fraction of a second. Not much time and space. Championship performances are determined by times that can be measured in blinks of an eye, snaps of the fingers, or the length of a car key. But that may be the difference between placing first and second place, gold or silver. There are many great athletes whose sports careers have been greatly enhanced by the jump rope. Mark McGuire, Mohammed Ali, Emmit Smith, and many Olympic gold medalist are only a few.

Running ABC is one of the most efficient ways to maintain and improve speed technique, balance and muscle tone as you age. The purpose of drills is to increase the biomechanical efficiency (economy of movement) through
practice of specific movements as well as strengthening/stretching peripheral muscle groups/fascia/tendons/ligaments. They can be added in the beginning or at the middle of most runs. Many people find a few drills useful after the warm up but before a track or tempo workout.

The stick drill can be setup to improve leg turnover, rhythm or stride length. The sticks can provide a model that forces a neuromuscular adaptation by the athlete. The aim is to teach a smooth pattern of acceleration from a still start to a full-speed striding. The goal is to have each stride becoming progressively longer as speed increases. To perform this drill lay out sticks at increasingly greater intervals to force the sprinter to adapt their steps to a pattern of acceleration.

However, there still exists uncertainty as to the mechanism by which improving speed performance within various training methods. Does jump rope training or running ABC drills or stick drill training alone improve athletes’ speed performance? or whether it improves speed performance along with other kind of trainings? Although numerous research studies have been conducted on the effects of jump rope training or running ABC drills or stick drill training on speed performance separately, no study was found that addresses the effects of above mentioned training along with the speed training to improve the performance of speed related variables.

Thus, the investigator interested with the jump rope training, running ABC and stick drill training followed by speed training on speed parameters.
Statement of the Problem

Keeping the above concept, the purpose of this study was to find out the relative effects of jump rope training, running ABC, and stick drill training followed by speed training on speed parameters such as acceleration, speed, stride length, stride frequency, mobility, explosive power (vertical and horizontal), and speed endurance.

Particularly, the study was conducted to investigate if there were any significant differences in acceleration, speed, stride length, stride frequency, mobility, explosive power (vertical and horizontal), and speed endurance among participants trained namely the jump rope training, running ABC, and stick drill training followed by speed training respectively. As such, the study was focused on the following questions:

Research Questions

1. Would the jump rope training, running ABC, and stick drill trainings followed by speed training programme improve the selected dependent variables while the presence of covariate (control)?

2. Would the jump rope training, running ABC, and stick drill training followed by speed training programme differs each other and also with control group while improving the selected dependent variables?

Assumptions

Validity of this study will rely on the following assumptions:
1. Participants will perform the jump rope training, running ABC, and stick drill training protocol correctly.

2. Participants will perform the assigned three different training sessions separately, for three alternative days per week.

3. Participants will perform speed training immediately after the end of jump rope training, running ABC, and stick drill training sessions.

4. Participants will not perform any vigorous exercise during the course study.

5. Participants will be tested accurately by the standardized test items.

6. Participants complied with the best of their ability to the training and testing directions.

Hypotheses

It has been scientifically accepted that any systematic training over a continuous period of time would lead to produce changes on athletic qualities. Based on this concept and research questions the following research hypotheses were formulated and it was tested at 0.05 level of confidence.

1. There would be significant improvement on selected speed parameters due to the effect of jump rope training, running ABC, and stick drill training followed by speed training.

2. There would be significant differences on selected speed parameters among the experimental and control groups.
Delimitations

The following were the delimitations of the study

1. To achieve the purpose of the study, sixty male (n=60) students studying in Dr. Sivanthi Aditanar College of Physical Education, Tiruchendur, Tamilnadu, India, were randomly (Simple Random Sample) selected as participants.

2. The age of the participants ranged from 20 to 25 years.

3. The participants will be divided into four categories – jump rope, running ABC, stick drill, and a control group with no prior structured experience in jump rope, running ABC, and stick drill training.

4. The duration of training period was restricted to 12 weeks and the number of sessions per week was confined to three.

5. The criterion variables selected for this study were acceleration, speed, stride length, stride frequency, mobility, explosive power (vertical and horizontal) and speed endurance.

6. The selected criterion variables for the study were assessed by the following standardized test items: acceleration was assessed by 30 meters run, speed, stride length, and stride frequency was assessed by 50 meters run, mobility was assessed by sit and reach test, explosive power (vertical and horizontal) was assessed by vertical jump and standing broad jump and speed endurance was tested by 150 meters run.
7. Since the manual operation was made during 30 meters, 50 meters, and 150 meters run, the time was recorded in one tenth of a second.

8. The data was collected on selected criterion variables, two days prior to and immediately after the training period.

**Limitations**

The following limitations will not be considered while interpreting the result of the study:

1. The study will be conducted over the course of 12 weeks and will not be able to control for variations in the environmental conditions and the level of acclimatization.

2. Only 20 to 25 age male participants will be included in the study; therefore, results can not be generalized to other populations.

3. The experimenter cannot control all outside activities, nutrition, supplements, physical activity, and social habits of the participants.

4. Though the participants were motivated verbally, no attempt was made to differentiate motivation level during the period of training and testing.

**Significance of the Study**

1. The ultimate goal of research in physical education is to help coaches and physical educators to train their sports persons based on new concepts in improving their performance.
2. A unique aspect of this work is that it includes recommendations for the practical use of research findings.

3. Speed training is one of the very important training regimens to improve speed parameters.

4. The result of the study may be useful to the professional colleagues of physical education and sports in strengthening their knowledge about the training and its effect.

5. The study would add knowledge in the area of sports training.

6. The study would help the trainers and coaches to recommend the jump rope training, running ABC, and stick drill training include in their training schedule to improve speed components.

**Operational Definitions**

**Acceleration**

Accelerations involve varying pace suddenly and dramatically to make a move past or away from competitors within a race (Benyo and Henderson, 2002).

**Explosive Power**

The ability to expend energy in one explosive act or in a series of strong, sudden movements as in jumping or projecting some object, as far as possible (Kent, 1994).

**Jump Rope**

Jump rope conditioning your heart and lungs; however, it can increase body awareness and develop better hand and foot
coordination (Kahn and Biscontini, 2007).

**Mobility**

Mobility is the capacity to perform joint actions through a wide range of movement (Brook, 1997).

**Running ABC**

Sprinting with good form is a motor learning process that must be learned at slow speed (60-75% of maximum) and transferred to high speeds (Baechle, 1994).

**Speed**

Speed is “the displacement per unit time and is typically quantified as the time taken to cover a fixed distance. Tests of speed are not usually conducted over distances greater than 200 meters because longer distances reflect anaerobic or aerobic capacity more than absolute ability to propel the body at maximal speed” (Baechle and Earle, 2000).

**Speed Endurance**

Speed endurance is the ability to repeatedly perform maximal or near-maximal sprints with various sports-specific recovery intervals (Baechle, 1994).

**Speed Parameters**

The factors which contribute the performance of speed are defined as speed parameters for this study.

**Speed Training**

Speed training is to condition the athlete to move at high velocity, employing maximal power when needed. In order to do this, the neuromuscular system must be conditioned to
very fast movements and training need to be very specific, with a very high anaerobic component (Bloomfield, Ackland, and Elliott., 1994).

**Stick Drill**

The "stick drill" can be setup to improve leg turnover, rhythm or stride length. The sticks can provide a model that forces a neuromuscular adaptation by the athlete (Thigpen, 2002).

**Stride Frequency**

Stride frequency is the number of stride (steps) taken in a given amount of time (Baechle, 1994).

**Stride Length**

Stride length is simply the distance covered in one stride during running (Baechle, 1994).

**Training**

Training is the planned and systematic realization of measure (training contents and training methods) for the durable attainment of goals (training goals) in and through sport (Hohmann, Lames, and Letzelter, 2002).