CHAPTER - I

INTRODUCTION

1.1. TRAINING

The word “Training” has been a part of human language since ancient times. It
denotes the process of preparation for some task. This process invariably extends to a
number of days and even months and years (Singh, 1991).

1.2. SPORTS TRAINING

The term “Training” is widely used in sports. There is, however, some
disagreement among sport coaches and also among sports scientists regarding the exact
meaning of this word. Some experts, especially who belong to sports medicine,
understand sports training as doing physical exercise. Several terms are used in training
namely strength training, interval training, technical and tactical training reflects this
line of thinking (Hardayal, 1991).

The main aim of sports training is to achieve the high sports performance. This
high sports performance can only be achieved if the training is done in the scientific
and systematic manner. During sports training any method or procedure can help
improve and maintain the performance is called as training means. Similarly, any
material or immaterial object which helps to achieve the objectives of the sports
training is also called as training means. There are various means and methods of
training for better understanding of students/ sportsman, teacher/ coaches and scientists.
In general term training is commonly used in human language but in broad sense training may be defined as an organized and systematic instructional process to improve the individual’s physical, psychological and intellectual performance capacity.

In sports the term training is often used by the players, coaches and scientists but there are some disagreement among the coaches and scientists regarding the exact meaning of this term. Because the experts, and some other coaches are not understood the meaning of the word in the form of interval training, strength training, technical training and tactical training.

In the light of the various concepts, meaning of the term and nature of the training, it is essential to study some of the important definitions given by the various experts in the field of sports.

The performance of an individual depends upon the performance capacity of a sportsperson; this capacity is complex in nature and depends upon certain factors like speed, strength, flexibility, endurance and coordinative abilities. If we take the physique into an account which is moreover genetic and it cannot be trained by means of training but other factors are trainable to some extent (Sunder, 2011).

1.3. PHYSICAL TRAINING

Physical training of sportsmen refers to the speed, strength, endurance, flexibility and coordinative abilities. These qualities are performance prerequisites of any sports. Requirement of these qualities vary from sports to sports because some sports require single ability whereas other requires combination of two. To improve these abilities sportsman should participate regularly in general, specific and competitive sports activity demanded for particular sports (Sunder, 2011).
1.4. ASPECTS OF SPORTS TRAINING

Important factors of sports performance may differ from individual to individual, because sport training is an individual matter. However, it does not imply in any way that sport training cannot or should not be given in group. The fact is that for mobilizing performance potentials, it is necessary to provide sports training in groups, which can be done by providing required emotional basis.

Group training has proved to be economical is an important factor in group education, while planning load and frequency management in sports training, an important place should be provided to the individual factors (Sunder, 2011).

1.5. SPEED TRAINING

Speed in training theory defines the capacity of moving a limb or part of the body’s lever system or the whole body with the greatest possible velocity. Maximum value of such movements would be without loading. Thus, the discus throwers, arm will have greatest velocity in the throwing phase if no discus is held and velocity would be reduced as the implement’s weight is increased relative to the athlete’s absolute strength (Dick, 2006).

Speed is measured in meters per second, as, for example, in qualifying the value for speed of moving one part of the body’s lever system relative to another; the forward speed of the body in sprinting or at point of take-off in jumping; and the velocity of the implements and balls at release or on being stuck. The time taken to achieve the certain task may also be considered a measure of the athlete’s speed (Dick, 2006).

Speed is a critical component of the complex requirement for achievement in competitive sport. Speed may be a determining factor, as in, for example, reacting to be the starter’s pistol, or indirectly, as, for example, in the development of kinetic energy
in jumping. The difference between direct and indirect is that, with the former, optimal speed is close to maximum whereas with the latter, optimal speed is a critical percentage of maximum which allows maximum expression of relevant strength. It is therefore important to bear in mind that speed increases may not necessarily lead to improved performance. The pattern of speed and acceleration of relative movement must be synchronized so that each part of the lever system can make an optimal force contribution (Dick, 2006).

Whenever any object or body travel / cover certain distance in relation to time refers to the term speed. In simple term distance covered per unit time is called as speed. The speed is recorded in meter per second.

In sports the speed may be defined as the ability to execute motor action (movement) under given condition in minimum possible time. In other words speed may be defined as the capacity of an individual to perform successive movements of the same pattern at a fast rate.

Like strength and endurance abilities speed is one of the important conditional abilities which depend upon the nervous system of the body. Looking into complex nature of movement of different games and sport / event which required some distance to be covered in the cyclic manner for example 100 meters, but in boxing the boxer required to perform certain movement with high speed where the sportsman do not need to travel the distance in relation to time. These types of movement are called as acyclic movement. There are certain sports movement like dribbling and jump shot in basketball where both type of cyclic movements are required to perform a task (Sunder, 2011).
Speed is best defined as the “rate of performance” of an activity. This can refer to any movement or action. In athletics, the velocity at which one executes a movement can be the difference between success and failure. Speed is a culmination of reactive ability, rapid force development, rapid force application, and effective movement technique. Generally, when the force demands of an activity increase, the velocity output of the movement decrease as demonstrated by the force – velocity curve. The goal of speed training program is to move this curve up and to the right, which would mean being able to create greater force at higher velocities of movement. This, in combination with an ability to maintain biomechanically related body and limb positioning, creates an increase in the velocity of movement. Speed of movements greatly affects an athlete’s abilities with regard to linear speed, agility and quickness. The following are essential components of well-designed program to improve speed of movement (http://www.sport981.com).

- Stability, strength and power
- Muscle and Joint elasticity
- Joint mobility and flexibility
- Movement techniques
- Specialized drills

1.6. JUMPING ABC TRAINING

The Jumping ABC drill is a fundamental movement skill which is introduced in early stage. The focus for the coaches and the physical education teachers should be on students developing the introductory components of the vertical jump. The jumping ABC is a locomotor skill that involves to jump as high as possible. It is the basis for jumps used in gymnastics, some forms of dance and a range of sports, such as
basketball, volleyball and football. It is similar to the other jumping drills in terms of its phases, components of preparation and landing. Because the jumping ABC drills is related to a wider range of sports, games and physical activities, it is considered to be a more fundamental movement skill than the other jumping techniques.

Fundamental motor skills are common motor activities with specific observable patterns. Most skills used in sports and movement activities are advanced versions of fundamental motor skills. The presence of all advanced forms of the motor skills can be detected in the patterns used in these sport specific motor skills. Similar relationship can be detected among other fundamental motor skills, specific motor skills and movements.

Sports persons normally develop motor skills in sequential manner. Fundamental motor skills comprise of one level in the continuum of motor skill acquisition. Children at the fundamental motor skill stage are building upon previously learned movements and preparing for the acquisition of more advanced skills (www.eduweb.vic.gov.au).

1.7. SAQ TRAINING (Speed, Agility and Quickness)

Speed, agility, and quickness training has become a popular way to train athletes, with continually increasing need to promote athletic ability, this type of training has proven to enhance the practical field abilities of participants in a wide variety of sports. It is practiced in addition with conventional resistance training in the gym and serves to assist in the transfer of the strength gained the performance in the arena of play. Nearly every sport requires fast movements of arms or legs, and speed, agility, and quickness training can improve skill precisely in these areas. Hence, all athletes can benefit when speed, agility, and quickness training is integrated into their training programs.
Although this type of training has been around for a number of years, many athletes have not practiced it. This is due to lack of primary education regarding both its specific benefits and how to integrate it into a complete training program.

In particular, speed, agility, and quickness training are intended to increase the ability to extend maximal force during high-speed movements. It manipulates and capitalizes on the stretch–shortening cycle (SSC) while bridging the gap between traditional resistance training and functional specific movements. Some benefits of speed, agility, and quickness training include increased muscular power in all multi-planer movements, brain-signal efficiency, kinesthetic spatial awareness, motor skills, and reaction time. The acquisition of greater balance and reaction time will serve to allow the athlete to maintain proper body position during skill execution and react more proficiently to any change in the playing environment. Quick movements are useless if the athlete trips over his or her own feet.

Many athletes and coaches do not realize that speed, agility, and quickness training can cover the complete spectrum of training intensity – from low to high. Each athlete will come into a training program at a different level, so the level of intensity must coincide with the athlete’s abilities. No significant preparation is needed to participate at this level of speed, agility, and quickness training. Higher-intensity drills require a significant level of preparation. A simple approach to safe participation and increased effectiveness is to start a concurrent strength-training program when beginning speed, agility, and quickness training.

The SAQ training method more frequently uses the programmed method than random type conditioning after the SAQ continuum. One SAQ session is composed of seven (7) components, where the main part of the session, explosion and expression of potential, are combinations of programmed and random conditioning, integral planning
and programming is required to progress from fundamental movement patterns to highly positional specific movements (Yap and Brown, 2000).

A logical sequence in the learning process must not be neglected because it develops neural structures that are prerequisite for elite – level upgrade. Consequently, elite players manipulate with their bodies without the loss of speed, balance, strength, and control. Also, with correct movement patterns (technique) and greater muscle power, they accelerate faster. Some studies (Baker and Newton, 2008; Chatzopoulos, et.al., 2007 & Fatouros, et.al., 2000) found that leg muscle power is a poor predictor of agility performance that emphasizes even more the integral influence within the vast range of capabilities (Jovanovic, 2011).

Furthermore, the SAQ training method consolidates speed, agility, and quickness through the range of soccer specialized exercise. All exercises are performed with optimal bio – mechanical movement structures, and consequently, energy and time savings are made. Power performance aside from major abilities has the need for optimal joint mobility, dynamic balance, appropriate loco motor system, and energy production among others (Jovanovic, 2011).

SAQ training sessions has developed and improved all the athletes motor skills with and without a ball by fine tuning individual balance and core strength. It is used to increase speed strength agility and quickness of the athletes. Some benefits of SAQ training include increase in muscular power in linear, horizontal and multi – planer movements. It has also increased the body spatial awareness, motor skills and reaction time.

All of these skills are necessary to complete in almost any sport or activity and so make up such a big part now training sessions now across the world. It is used to
improve the specific sport and it is important that the athlete repeats the exact body mechanics that they have performed on the field. It also maintained the correct body mechanics, so that the drills correctly reflect the movements in the sport to avoid creating bad habits. It is all about repetition and short burst, the athlete should do drills between 2 – 10 seconds with at least 20 seconds rest between repetitions and the complete session can be as short as 5 minute long (Nageswaran, 2013).

1.8. AGILITY

Traditionally agility has been described as the ability to change body direction and position rapidly. This view of agility was extended by Chelladurai in 1976 who described the perceptual and decision making component of agility. In 2002, a deterministic model was proposed that defined agility as including a change of direction (COD) speed component encompassing technical, strength and power factors, as well as a perceptual and decision making component. More recently, the definition of agility has been revised to reflect the fact that in most sports, such as invasion sports like basketball or soccer and racket sports like tennis or badminton, change of directions in response to a stimulus, usually from an opponent’s actions. Agility is rapidly whole body movement with change of velocity or direction in response to a stimulus. Although agility movements are typically reactive, there are a few scenarios in sport where changes of direction movements are preplanned with no decision making (Young and Farrow, 2013).

1.9. SPEED ENDURANCE

Speed endurance is the ability to maintain high speed sprinting. It has two metabolic facets, alactic speed endurance and lactic (glycolytic) speed endurance. These metabolic processes are not absolutely separable, and training the lactic system
certainly trains the alactic system. The alactic system, or short speed endurance, predominates in exercise through the 200 meters. The lactic system, long speed endurance, begins contributing to intense exercise after about 5 seconds, however and probably becomes the dominant system between 10-20 seconds of activity.

Due to various reasons, the coaches separate in training the groups of sprinters who better at the 100-200 meters (the short sprints) from the 200-400 meters runners (the long sprints). This is due not only to the different energy demands the two types of sprints, but also to reduce anxiety among short sprinters who dread training distances beyond 300 meters in length.

Although these workouts vary with the cycle being used at the moment, short sprinters do repetitions of 100-300 meters, with volume of 2-10, depending on the length of the work interval and its intensity (speed). Long sprinters do repetitions of 150-600 meters, with volumes of 2-12, with the same considerations as the short sprinters.

The coaches categorize all of our speed endurance work as “interval” work, as there is a work interval (sprint) and recovery interval (rest) involved, rather than use the many other names (repetitions, extensive, intensive).

Then the coaches categorize our interval work by the intensity (speed), duration (time or distance) and degree of total fatigue created by each work interval and the total workout. The volume of the workout is then determined by the contribution of each interval to the fatigue of lactic acid and alactic acid energy system (Dare and Kearney, 1998).
1.10. EXPLOSIVE POWER

Power can be defined as the force applied multiplied by the velocity of movement. As the work done is equal to the force times the distance moved, and velocity is the distance moved divided by the time taken, power can also be expressed as work done per unit time.

Power output for the athlete can range from 50 to 60 watts produced during light cycling and jogging, to around 7,000 watts produced during the second phase of the pull for the Olympic clean. This review examines the higher levels of power output produced during a single, maximum effort muscle action, which we will term “explosive muscle power”.

Explosive power output is the main determinant of performance in activities requiring one movement sequence to produce a high velocity at release or impact. Explosive muscle actions are required in throwing, jumping and striking activities. In addition, sudden bursts of power are needed when rapidly changing direction or accelerating during various sports or athletic events (Newton and Kraemer, 1994).

1.11. MUSCULAR ENDURANCE

Muscular Endurance is the measure of how well muscles can repeatedly generate force, and the amount of time they can maintain activity. Muscular endurance is necessary for everyday activities, which typically involve low impact movements. It is crucial for every fitness activity, from the mostly anaerobic weight lifting repetitions to the intense aerobic activities like jogging. Muscular endurance combines both aerobic and anaerobic energy and training for endurance not only involves repeatedly generating force, but the speed of recovery in a muscle.
Like muscle strength, muscular endurance is increased through overload, overtaking the muscle with a lighter weight but more repetitions is the best way to train for muscular endurance. Rest and recovery are necessary for the muscle, but decreasing the time between sets is a way to force the muscle to have faster rate. If more than 12 repetitions are being performed, less than a minute between sets is recommended (http://sjdbh.ycdsb.ca/).

1.12. NEED OF THE STUDY

Training for success in sports can be the biggest challenges faced by most players and coaches. It becomes increasingly important to select the proper techniques and specific trainings to particular games, because, as technique and performance increase, the available range of exercise that optimally stimulates improvement narrows. Thus, the training programme shifts from general preparation to more specific preparation for competitive sports and games.

In most of the games, the inventions of new training methods have improved the performance of the players. Likewise, the researcher made an attempt to include the new training methods (Speed Agility Quickness (SAQ) Training (SAQT) and Jumping ABC Training (JABCT) and Speed Training (ST) to develop the sports on specific physical variables like agility, speed, speed endurance, muscular endurance, horizontal explosive power and vertical explosive power.

Therefore, crucial to appropriately select the means of training to meet the need of the sports. The study has to use to compare the effect of SAQ training and jumping ABC training associated with speed training on speed and power parameters among Engineering College Gamesmen, which can train more effectively by both types of
training associated with speed training to find out the improvement and significant difference on the dependent and independent variables.

Thus, makes the investigator to put an effort to compare the two types of newly invented training on the selected speed and power parameters among Engineering College Gamesmen.

1.13. STATEMENT OF THE PROBLEM

Recently, there has been a remarkable change in sports sciences and technology, innovation on the development of the equipment, training and teaching. The means and methods show a remarkable change in the field of sports and games. It created a greater knowledge and its application has contributed to the progression towards higher levels of performance in competitions.

In modern sports, sports become very competitive and high level competitions were organized in more numbers. So, sports persons and coaches always respond to develop and maintain the physical fitness components towards modern technology, new types of training have improved the performance and maintain the performance for the competition. Because of the increased high number of competition, require the new method of training to maintain or improve the performance level. So, the researcher compares the effect SAQ training and jumping ABC training in association with speed training on selected speed and power parameters among the Engineering College Gamesmen.

Keeping the above concept the purpose of the study was to compare the effect of SAQ training and jumping ABC training in association with speed training on speed and power parameters among Engineering College Gamesmen.
Particularly, the study was conducted to investigate, if there were any significant difference in selected speed and power parameters among the Engineering College Gamesmen trained namely SAQ training associated with speed training and jumping ABC training associated with speed training respectively. Thereby, the study was focused on the following questions:

1.14. RESEARCH QUESTIONS

1. Would twelve weeks training program, three days per week improve the selected dependent variables?

2. Would the SAQ Training Associated with Speed Training and Jumping ABC training associated with Speed Training on the selected dependent variables while the presence of covariate (pre test)?

3. Would SAQ training associated with speed training and jumping ABC training associated with speed training program have differ each other while improving the selected dependent variables?

1.15. ASSUMPTIONS

The validity of this study will rely on the following assumptions:

1. Students may perform the SAQ training associated with speed training and jumping ABC training associated with speed training protocol correctly.

2. Students may perform the assigned training sessions separately each group, for three days per week.

3. Students may not perform any critical training during the course study.

4. Students may be tested accurately by standardized items.

5. Students compiled with best of their ability to the training and testing directions.
1.16. HYPOTHESES

It has been scientifically accepted that any systematic training and learning over a period of time would lead to produce changes in selected dependent variables. Based on the study conducted and reviewing the related literature available in the area, the investigator framed the following hypotheses and was formulated and it was tested at 0.05 level of confidence.

1. There would be significant improvement on the selected dependent variables due to the effect of SAQ training associated with speed training.

2. There would be significant improvement on the selected dependent variables due to the effect of jumping ABC training associated with speed training.

3. There would be significant difference among the experimental groups on the improvement of selected dependent variables.

1.17. DELIMITATIONS

1. To achieve the purpose of the study, forty five (45) students (men) studying from various Engineering Colleges in and around Erode District, Tamil Nadu, India were selected randomly as subjects.

2. The age of the subjects ranged from 18 to 25 years.

3. The selected subjects were randomly divided into three groups namely, Speed, Agility, Quickness (SAQ) training associated with speed training (SAQAST), Jumping ABC training associated with speed training (JABCAST) and Control Group (CG).

4. The SAQ Training associated with speed training received training through different level intensity for the students for 45 minutes duration after the period
of 10 minutes warm up in the SDAT (Sports Development Authority of Tamil Nadu) ground.

5. Jumping ABC training associated with speed training group received the training for 45 minutes duration after the period of 10 minutes warm up in the SDAT (Sports Development Authority of Tamil Nadu) ground.

6. Control group has acted as control, they did not go for any specific training, they did their regular curricular activities related with their syllabus.

7. The duration of the experiment last twelve weeks and the number of sessions per week was confined to three alternative days, in addition to the regular academic programme as per the curriculum.

8. The standardized tests were used to collect relevant data on the selected dependent variables.

9. The sample for the present study has been delimited to the forty five Inter collegiate participated students.

10. The age of the subject of the study may only apply to Inter collegiate participants’ ranged between 18 to 25 years old male students.

11. Subjects were selected on the basis of random sampling.

12. The data were collected on selected dependent variables at prior and immediately after the experimental period as pre and post tests respectively.

13. All students (Participants) were healthy, physically active individuals with more than 5 years of the training experience and also participated in the various levels of inter collegiate and open category tournaments.
14. Training (SAQ Training Associated with Speed Training / Jumping ABC Training Associated with Speed Training) sessions would be supervised by the scholar.

15. The following dependent variables were selected for this study, such as

**Speed Parameters**

a. Agility  

b. Speed  

c. Speed Endurance  

d. Muscular Endurance

**Power Parameters**

a. Horizontal Explosive Power  

b. Vertical Explosive Power

**1.18. LIMITATIONS**

1. The previous experience of the subjects in the field of sports and games, which might be influencing on the data collection, was not considered.

2. The psychological factors, food habits, rest period; life style so on and so forth could not be controlled.

3. The weather conditions such as atmospheric temperature, humidity and meteorological factors during testing period were also not considered.

4. Though the subjects were motivated verbally, no attempt was made to differentiate the motivation level during the period of testing.
1.19. DEFINITION AND EXPLANATION OF THE TERMS

1.19.1. SAQ TRAINING

Speed, Agility and Quickness (SAQ) training is an innovative training to develop the whole some efficiency of the athlete for the performance development. SAQ training is intended to increase the ability to exert maximal force during high – speed movements. It manipulates and capitalizes on the stretch – shortening cycle while bridging the gap between traditional resistance training and functional specific movement (Brown & Ferrigno, 2005).

1.19.2. JUMPING ABC TRAINING

Jumping ABC training is the basic fundamental jumping exercises given to the athletes and the sports persons for the improvement of the performance. Jumping ABC techniques comprises of the basic fundamental jumping movements in all the level of intensities (Brown & Ferrigno, 2005).

1.19.3. AGILITY

It is the ability to make successive movements in different directions efficiently and repeatedly (Barrow, McGee & Tritschler, 1989).

1.19.4. SPEED

It is the performance pre requisite to do motor actions under given conditions (movement task, external factors and individual prerequisites) in minimal time (Hardayal, 1991).
1.19.5. SPEED ENDURANCE

Speed Endurance is the ability of an individual to move quickly and vigorously for the prolonged period of time under the given conditions or under response or under the stimulus \cite{DareKearney1998}.

1.19.6. MUSCULAR ENDURANCE

It is the ability of the muscle or group of muscles to continue contracting over and extended time against moderate resistance \cite{BarrowMcGeeTritschler1989}.

1.19.7. EXPLOSIVE POWER

It is the ability of a muscle or group of muscles to generate maximum force in a single explosive effort or force in the fastest possible time \cite{BarrowMcGeeTritschler1989}. 