CHAPTER - I
INTRODUCTION

1.1. SPORTS

“A Precise definition of sport is impossible due to the great variety of meaning in colloquial language. Everything that is understood under the term sport is less determined by the scientific analyses of its boundaries than by daily usage and historically developed and transmitted ties to social, economic, political and judicial structures. The conceptual understanding of sport is always subject to historical process and it cannot be established once and for all. Sport is practiced in certain types of sport as athletics (amateur sport, performance sport, top sport and professional sport) in the school as school sport, predominantly for reasons of health as in recreational sport, sport for competition, physical fitness for the fun of playing sport for all, mass sport, leisure sport, college sport, sport in the armed forces, police sport, prison sport, in groups with typical characteristics as women’s sport, sport for children and youth, sports for disabled, sport for the aged, within denominational associations (church and sport) in the form of artistic movement arrangements as dance, social dance, ballet, jazz dance, rhythmic gymnastics.

In contrast to the activities of daily life and work, sport activity gains its special characteristics by the change in meaning of the content of action, in other words, sport is based on the modification of contexts of reality in terms of reutilization and symbolism of realistic behavior. Sport actions (predominantly motor actions) are to a certain extent “freed” activities, which transcend the purposeful decisions of the workday world. This is not to say that they lack purpose, but they are not totally bound by transitional considerations of utility. Fishing, which is primarily done to catch fish, for example, becomes sport (example
competitive casting) when the goal lies in the perfection and precision of the movement process. To this end, procedures and rules are set which have to be interpreted as ritualistic actions when compared with the original actions. Fishing is modified into so-called “dry fishing”, emphasizing the (athletic) alienation and modification of the initial intention. Motor activities and social interaction are usually characteristics of sport. Criteria such as performance, competition, rules, ideal types of experiences and organization are phenomena used to characterize sport, but have different significance in different situations. The designation of non-motor activities as sport is predominantly done on traditional grounds (example chess) (Borms, 2008).

1.2. TRAINING

The word “Training” in its broad sense refers to any organized and systematic instructional process, which aims at enhancing man’s ability with regard to physical, psychological and intellectual aspects. In the field of sports, training is a process, which involves preparation of a sports person to attain highest level of sport performance. To improve sports performance, one has to, regularly and systematically, perform a variety of exercises and participate in scientifically developed sports training programmes. Mere execution of an exercise does not ensure improvement of performance. Actual effect of exercise depends upon several factors of which the important ones are training load, means of recovery, assessment of loading and performance capacity, sports equipment, nutrition, psychological characteristics and methods adopted for imparting theoretical instruction. If these factors are disregarded, the usefulness of the physical exercise decreases and sports person does not realize optimal benefits (Uppal, 2009).
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. 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 belonging to sports medicine, understand sports training as basically doing physical exercise. Several terms used in training example strength training, interval training, technical and tactical training reflect this line of thinking (Hardayal, 1991).

1.3. SPORTS TRAINING

Sports’ training is a systematic process extending over number of days and even month and years. In the course of training, in addition to application of physical load through physical exercise, theoretical instructions are also imparted so as to provide necessary technical and tactical knowledge and intellectual developments. (Uppal, 2001)

Sports training aim at improving sports performance through physical, physiological, social, intellectual and moral aspects thus contributing to development of all round personality of the sportsperson. In other words the performance of a sports person improves as a result of development of total personality. Therefore, sports training directly or indirectly focuses attention on development of all round personality of a sportsperson. Sports’ training is an educational (pedagogical) process (Uppal, 2001).

In order to have a clear concept of the word “Sports Training”, it is also essential to understand the meaning of the terms “Conditioning” and “Coaching”. Conditioning is a process of gradually preparing the body for strenuous physical activity thus focusing attention on development of physical and motor fitness components (strength, speed,
endurance, flexibility and coordinative abilities) and indirectly enhancing sports performance (Uppal, 2001).

Sports’ training is a process of sports perfection directed by scientific and pedagogic principles and aims at leading a sportsperson to high and top level performance in sport. On an event means of planned and systematic improvement of performance capacity and readiness of performance (Uppal, 2001).

1.4. RESISTANCE BAND TRAINING

Recognized as the original system of progressive resistance for over 25 years, Thera–Band or Elastic Resistance Band has been proven to increase strength, mobility and function, as well as reduce joint pain (Jette, et.al., 1999; Mikesky, et.al., 1994 & Topp, et.al., 2002). Evidence – based exercise programs utilizing Thera – Band bands and tubing rehabilitative injuries, improves the functional ability of older adults, improve athletic performance, and aid in treating many chronic diseases (www.thers-band.com).

Thera – Band resistance bands and tubing are low – cost, portable and versatile, made of natural rubber latex. They are easily recognized by the trademark. Thera – Band colours are Tan (Chocolate), Yellow, Red, Green, Blue, Black, Silver and Gold. Advancing through the sequential system of progressive resistance provides positive reinforcement and feedback for gauging results. The progressive resistance level speak of success, the colours tell you its Thera _ Band. The colors like Tan, Yellow, Red, Green and Blue are specially designed for the beginners; the colors like Black, Silver and Gold are specially designed for advanced athletes (www.thera-band.com).
Training with resistance bands is a great way to build muscular strength while improving balance. Because it can be used in a variety of ways, it can increase the strength and improve the muscle tone progressively. Resistance band training provides a linear form of resistance which allows getting a larger range of motion than other strength training methods. Before starting resistance band training, it’s important to inspect the band and prepare it for use. Resistance band exercises with a longer band and as progress the performance through move to shorter bands, which will increase the resistance (Jaclyn, 2012).

Resistance band shoulder exercise, start by standing or sitting and holding the band in front of the arms straight out several inches apart. Repeat as many times as it feels comfortable. Resistance Band biceps exercise, stand on the band while holding the handles with the palms facing out. Then, while keeping the abdominal pulled up and in, bend the knees slightly as when bend the arms, bringing the palms toward the shoulders. Repeat as many times as much as possible. Resistance Band glutes exercise, stand on the band, keeping the feet shoulder-width apart. Increase the tension by doing half of a bicep curl, repeat until you feel uncomfortable. Resistance Band back muscle exercise, put the band around the back where it is the widest and grip the ends firmly. Then, hold the hands out in front of the shoulder while slowly extend the arm, pulling the band. Finally, bring the hands together in front of your body and release back to the starting position slowly. Resistance Band abdominal exercise, by tying a knot in the middle of the band and then close that knot in a door, just about two feet off the ground. Then, facing away from the door, you lay on the back with your knees bent, next raise the arms over the head, grasping the ends of the
band in each hand. Then raising the head off of the floor, take the left hand to the right knee. Down the lower back and repeat with the right hand to left knee (Jaclyn, 2012).

1.5. CORE TRAINING

Core stability is the effective use of the core muscles to help stabilize the spine, allowing your limbs to move more freely. Good core stability means you can keep your midsection rigid without forces such as gravity affecting your movements. The positive effects of this include reducing livelihood of injury, better posture, increased agility and flexibility, and improved coordination. Core training also help to improve your proprioception – the way your body reacts and recovers from being unbalanced (Sara, 2006).

The “core” of the body is simply what’s between the shoulder and hip – basically the trunk and pelvis. Draw an imaginary line around the center of the body, starting at the navel, and most of the muscles bordering that line are core muscles. Core training is a system that re-educates the body so that it will help effectively. It’s an intelligent workout that strengthens the body from inside out. It is safe and effective way to exercise.

The core is a crucial group of muscles, not only for sports, but for typical daily activities as well. It’s essential that your core is strong because it comes into play just about every time you move. The core acts to produce force, it stabilizers the body to permit other musculature to produce force and it’s also called upon to transfer energy. Everyone can benefit from core training, from new exercisers working on their fitness to exercise enthusiasts looking for increased performance. It can help the elderly who wish to remain fit
and flexible, and women after pregnancy to get their abdomen and pelvic floor muscles back into shape (Sara, 2006).

Core training will also tone the torso and abdominal muscles and improve the posture – if the core is strong, the lower abdominal muscle will be drawn in toward the spine and help to sit up straight. Balance and coordination will be improved, and most important of all, core stability will help to keep the spine healthy and flexible throughout life (Sara, 2006).

1.6. 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 determining factor directly, 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 movements must be synchronized so that each part of the lever system can make an optimal force contribution (Dick, 2006).

Speed is the quickness of movement of a limb, whether it 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 (power) and speed endurance. Speed is influenced by the athlete's mobility, special strength, strength endurance and technique. Energy for absolute speed is supplied by the anaerobic alactic pathway. The anaerobic (without oxygen) alactic (without lactate) energy system is best challenged as an athlete approaches top speed between 30 and 60 meters while running at 95% to 100% of maximum. This speed component of anaerobic metabolism lasts for approximately eight seconds and should be trained when no muscle fatigue is present (usually after 24 to 36 hours of rest). The technique of sprinting must be rehearsed at slow speeds and then transferred to runs at maximum speed. The stimulation, excitation and correct firing order of the motor units, composed of a motor nerve (Neuron) and the group of muscles that it supplies, makes it possible for high frequency movements to occur. The whole process is not very clear but the complex coordination and timing of the motor units and muscles most certainly must be rehearsed at high speeds to implant the correct patterns. Flexibility and a correct warm up will affect stride length and frequency (strike rate). Stride length can be improved by developing muscular strength, power, strength endurance and running technique. The development of speed is highly specific and to achieve. It is
important to remember that the improvement of running speed is a complex process that is controlled by the brain and nervous system. In order for a runner to move more quickly, the leg muscles of course have to contract more quickly, but the brain and nervous systems have to learn to control these faster movements efficiently. If the athlete maintains some form of speed training throughout the year, the muscles and nervous system do not lose the feel of moving fast and the brain will not have to re-learn the proper control patterns at a later date. In the training week, speed work should be carried out after a period of rest or light training. In a training session, speed work should be conducted after the warm up and any other training should be of a low intensity (http://www.brianmac.co.uk/speed.htm).

1.6.1. REACTION SPEED DRILL

The athletes start in a variety of different positions - lying face down, lying on their backs, in a push up or sit up position, kneeling or seated. The coach standing some 30 meters from the group then gives a signal for everyone to jump up and run towards him/her at slightly faster than race pace. Repeat using various starting positions and with the coach standing in different places so that the athletes have to change directions quickly once they begin to run. Speed reaction drills can also be conducted while controlling an item (example football, basketball, hockey ball) with an implement (example feet, hands, hockey stick) (http://www.brianmac.co.uk/speed.htm).

1.6.2. ACCELERATION TRAINING

Murray (2005) looked at weighted sledge training and their effect on sprint acceleration and they concluded that training with a weighted sledge will help improve the athlete's acceleration phase.
Lockie, et al., (2003) investigated the effects of various loadings and concluded that when using a sledge a light weight of approximately 10-15% of body weight should be used so that the dynamics of the acceleration technique are not negatively affected.

Starts over 10-20 meters performed on a slight incline of around five degrees have an important conditioning effect on the calf, thigh and hip muscles (they have to work harder because of the incline to produce movement) that will improve sprint acceleration.

1.6.3. SPRINTING SPEED

Downhill sprinting is a method of developing sprinting speed following the acceleration phase. A hill with a maximum of a 15° decline is most suitable. Use 40 meters to 60 meters to build up to full speed and then maintain the speed for a further 30 meters. A session could comprise of 2 to 3 sets of 3 to 6 repetitions. The difficulty with this method is to find a suitable hill with a safe surface. Over speed work could be carried out when there are prevailing strong winds - run with the wind behind

(http://www.brianmac.co.uk/speed.htm).

1.7. LIPOPROTEINS

The lipoproteins are composed of proteins, triacylglycerol, phospholipids, esterify cholesterol, un-esterifies cholesterol and free fatty acids. The apoproteins are important for the function of each lipoprotein because they can serve as cofactors, transfer lipid, and act as receptor finding sites. Many different types of apoproteins have been isolated, and several are known to be specific to certain types of lipoproteins.
Cholesterol is an important molecule for optimal cell function. Cholesterol is found within cell membranes, and therefore every cell needs cholesterol. Almost every cell can synthesis cholesterol. The cholesterol synthesized by the body is referred to as endogenous cholesterol, and the cholesterol that is observed from the diet is termed exogenous cholesterol (Robert & Scott, 1997).

The role of the liver in the metabolism of lipoprotein begins with digestion. The liver produces bile and cholesterol, which are both secreted into the small intestine to aid in the digestion and absorption of lipid. The cholesterol and triacylglycerol absorbed and produced by the intestinal mucosa cell are packaged into chylomicrons and released into the lymph circulation. The liver then processes the chylomicrons into VLDL, which transport triacylglycerol to the extra hepatic tissues. As previously described, the enzymes lipoprotein lipase that is bound on the inner endothelial lining of blood vessels catabolizes the circulating triacylglycerols to FFA and glycerol. The remaining remnants of VLDL are removed from circulation by the liver or are converted to LDL. The LDLs contain relatively more cholesterol than the other lipoproteins.

Low-density lipoproteins are removed from circulation by the LDL receptor located on the membranes of hepatic and extra hepatic tissue. Individuals who are deficient in or have defective LDL receptor have large blood cholesterol concentration, a condition termed familiar hypercholesterolemia.

High-density are formed by the liver and by the addition of specific apoproteins by the liver to immature HDL produced in the small intestine, High-density lipoproteins remove free cholesterol from the circulation, esterifies them, and either internalize them within their own structure or transfer them to the other lipoproteins for eventual metabolism.
by the liver. Consequently, having high HDL concentrations in the blood is an effective means to remove excess cholesterol from the circulation and return it to the liver for catabolism (Robert & Scott, 1997).

Cholesterol is a fatty substance known as a lipid and is vital for the normal functioning of the body. It is mainly made by the liver but can also be found in some foods. Cholesterol is carried in your blood by proteins, and when the two combine they are called lipoproteins. There are harmful and protective lipoproteins known as LDL and HDL, or 'bad' and 'good' cholesterol.

Low-density lipoprotein (LDL) carries cholesterol from the liver to the cells that need it. If there is too much cholesterol for the cells to use, it can build up in the artery walls, leading to disease of the arteries. For this reason, LDL cholesterol is known as "bad cholesterol" (http://www.nhs.uk/conditions/cholesterol/pages/introduction.aspx).

High-density lipoprotein (HDL) carries cholesterol away from the cells and back to the liver, where it is either broken down or passed out of the body as a waste product. For this reason, it is referred to as "good cholesterol" and higher levels are better. The amount of cholesterol in the blood (both LDL and HDL) can be measured with a blood test. The recommended cholesterol levels in the blood vary between those with a higher or lower risk of developing arterial disease (http://www.nhs.uk/conditions/cholesterol/pages/introduction.aspx).
1.8. HEMOGLOBIN

Hemoglobin is a protein complex found in the red blood cell. A single red blood cell contains about 250 million hemoglobin molecules. Hb binds with oxygen. Every molecule of hb can bind with 4 molecules of oxygen. Thus, each RBCs can bind with up to billions of oxygen molecules. In normal healthy males, the Hb ranges from 14.0 to 18.0 gms.100 ml-1 of blood and from 12.0 to 16.0 gms.100 ml-1 (Sandhya, 1999).

Hemoglobin plays a significant role in endurance events, as it is oxygen carrying compound that is delivered to the active tissues. During exercise there is no change in the total Hb. The reason being the RBCs that contains Hb does not leave the capillaries during exercise. During exercise the degree of hemo concentration or hamodilution determines the Hb concentration. The Hb will increase with hemo concentration and falls with hamodilution (Sandhya, 1999).

1.9. NEED OF THE STUDY

Training for success in sports can be the biggest challenges faced by most athletes 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 stimulate 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 invention of new training methods has improved the performance of the players. Likewise, the researcher made an attempt to include the new training methods (Resistance Band Training (RBT)) and Core Training (CT)) to develop the sports specific physical and hematological components like agility, flexibility, horizontal
explosive power, speed, and vertical explosive power, hemoglobin, high density lipoprotein (HDL), and low density lipoprotein (LDL)

It is, 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 resistance band training, core training associated with speed training on selected physical and hematological variables among college students, Which can be train more effectively by both types of training associated with speed training to find out the improvement and significance difference on the dependent and independent variables.

Thus, makes the investigator has put an effort to compare the two types of newly invented training on the selected physical and hematological variables among the college students.

1.10. STATEMENT OF THE PROBLEM

Recently there has been a remarkable change in sports science and technology, innovation on the development of equipment, training and teaching. The means and methods shows 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 competition was organized in more numbers. So, sports persons and coaches always respond to develop and maintain the physical, physiological, biochemical and hematological components toward modern technology, that is new types of trainings has improved the performance and maintain the performance for the competition. Because of the increased high number of competition, thus may require the new method of training to maintain or improve the
performance level. So, the researcher puts to compare the effect of resistance band training, core training associated with speed training on selected physical, hematological and bio – chemical variables among college students.

Keeping the above concept the purpose of the study was to compare the effect of resistance band training, core training associated with speed training on selected physical hematological and bio - chemical variables among college students.

Particularly, the study was conducted to investigate, if there were any significant difference in selected physical and hematological variables among the college students trained namely resistance band training associated with speed training and core training associated with speed training respectively. As such, the study was focused on the following questions:

1.11. RESEARCH QUESTIONS

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

2. Would the resistance band training associated with speed training and core training associated with speed training on the selected dependent variables while the presence of covariate (pre test)?

3. Would resistance band training associated with speed training and core training associated with speed training program differs each other while improving the selected dependent variables?
1.12. ASSUMPTIONS

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

1. Subjects may perform the resistance band training associated with speed training and core training associated with speed training protocol correctly.

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

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

4. Subjects may tested accurately by standardized items.

5. Subjects complied with the best of their ability to the training and testing directions.

1.13. 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 significance.

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

2. There would be significant difference among the experimental groups on the development of selected dependent variables.
1.14. DELIMITATIONS

1. To achieve the purpose of the study, Thirty Six (36) students studying in Bachelors Degree in physical Education (B.P.Ed) and Master Degree in Physical Education (M.P.Ed) from Dr. Sivanthi Aditanar College of Physical Education, Tiruchendur, Tamil Nadu, India were selected randomly as subjects.

2. The age of the subjects ranged from 21 to 28 years.

3. The selected subjects were randomly divided into three groups namely, Resistance Band Training Associated with Speed Training (RBTAST), Core Training Associated with Speed Training (CTAST) and Control Group (CG).

4. The resistance band training associated with speed training group received training through various colors of resistance band such as tan, yellow, green, red and silver for the students for 45 minutes duration after the period of 10 minutes warm up in the college ground.

5. Core training associated with speed training group received the training for 45 minutes duration after the period of 10 minutes warm up in the college ground.

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

7. The duration of the experiment last for 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 following dependent variables were selected for this study, such as
Physical Fitness Variables

a. Agility

b. Flexibility

c. Horizontal Explosive Power

d. Speed and

e. Vertical Explosive Power

Hematological and Bio - Chemical Variables

a. Hemoglobin

b. High Density Lipoprotein and

c. Low Density Lipoprotein

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

10. The sample for the present study have been delimited to Thirty Six (36) students studying in Bachelors Degree in physical Education (B.P.Ed) and Master Degree in Physical Education (M.P.Ed) from Dr. Sivanthi Aditanar College of Physical Education, Tiruchendur, Tamil Nadu, India were selected randomly as subjects.

11. The age of the subjects of the study may only apply to Inter collegiate participants’ ranges between 21 to 28 years old male students.

12. Subjects were selected on the basis of random sampling.
13. The data were collected on selected dependent variables at prior and immediately after
the experimental period as pre and post tests respectively.

14. All students (Participants) were healthy, physically active individuals with more than 5
years of the training experience and also participated in the various level of inter
collegiate and open category tournaments.

15. Training (Resistance Band Training Associated with Speed Training / Core Training
Associated with Speed Training) sessions supervised by the scholar.

1.15. 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. Psychological factors, food habits, rest period; life style 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.

1.16. DEFINITION AND EXPLANATION OF THE TERMS

1.16.1. RESISTANCE BAND TRAINING

A resistance band is an elastic band used for strength training. They are also
commonly used in physical therapy, specifically by convalescents of muscular injuries.
1.16.2. CORE TRAINING

The progressive training of the musculature of the lumbo-pelvic-hip complex and/or the transversus abdominis, which has a central role in posture and in stabilizing the lumbar spine (http://medical-dictionary.thefreedictionary.com/Core+Training).

1.16.3. SPEED TRAINING

Speed training is one of the types of sports training which develops the sprinting speed, movement speed, and acceleration and speed endurance of the sports person. This training needs the basic physical fitness components like strength and flexibility (Hardayal, 1991).

1.16.4. AGILITY

Agility may be defined as the physical ability which enables an individual to rapidly change body position and direction in a precise manner (Johnson & Nelson, 1988).

1.16.5. FLEXIBILITY

Flexibility, as a component of physical fitness, is the ability of an individual to move the body and its parts through as a wide range of motion as possible without undue strain to the articulations and muscle attachments (Johnson & Nelson, 1988).

1.16.6. HORIZONTAL EXPLOSIVE POWER

A horizontal explosive power is the act of leap one's center of gravity horizontal plane solely with the use of one's own muscles; it is a measure of how distance an individual or athlete can cover the horizontal distance from a standstill (Johnson & Nelson, 1988).
1.16.7. SPEED

The ability to cover the distance within the possible shortest period of time is termed as speed (Hardayal, 1991).

1.16.8. VERTICAL EXPLOSIVE POWER

A vertical explosive power is the act of raising one's center of gravity higher in the vertical plane solely with the use of one's own muscles; it is a measure of how high an individual or athlete can elevate off the ground (jump) from a standstill (Johnson & Nelson, 1988).

1.16.9. HEMOGLOBIN

The iron containing pigment in red blood cells that binds oxygen. The oxygen-carrying pigment and predominant protein in the red blood cells. Hemoglobin forms an unstable, reversible bond with oxygen. In its oxygenated state it is called oxyhemoglobin and is bright red. In the reduced state it is called deoxyhemoglobin and is purple-blue. (http://www.medicinenet.com/script/main/art.asp?articlekey=15738).

1.16.10. HIGH DENSITY LIPOPROTEIN

A cholesterol carrier regarded as a scavenger that removes cholesterol from the arterial wall and transports it to the liver to be metabolized. HDL cholesterol is the well-behaved "good cholesterol." This friendly scavenger cruises the bloodstream. As it does, it removes harmful bad cholesterol from where it doesn't belong. High HDL levels reduce the risk for heart disease - but low levels increase the risk

1.16.11. LOW DENSITY LIPOPROTEIN

A cholesterol carrier theorized to be responsible for depositing cholesterol in the arterial wall. Elevated LDL levels are associated with an increased risk of heart disease. Lipoproteins, which are combinations of fats, lipids, and proteins, are the form in which lipids are transported in the blood. Low-density lipoproteins transport cholesterol from the liver to the tissues of the body.


1.17. SIGNIFICANCE OF THE STUDY

There are perhaps few sports in this world where it is determined to be faster or more powerful. In today’s sporting world, coaches are being called upon to produce the optimal amount of physical improvement in the least amount of time. The results of the study may contribute the following.

1. There are various uses of new innovative technology in Physical Education; besides the assessment and training functions. It is a great resource for achieving higher performance for the players.

2. The application of proper principle and procedure of the new innovative trainings are helped the sports person to improve their qualities.

3. These new innovative trainings helps the coaches and the physical education people to prepare their sports person.

4. New innovative training acts as a catalyst for fundamental change of the sports persons to learn the training.
5. The findings of the study will add the quantum of knowledge in the area of training methods.

6. The resistance band training and core training are an important area of sports training for the development of sports profession and performance of the sports persons.

7. It helps to develop creativity and problem solving skills, identity and self reliance in trainer.