CHAPTER – I

INTRODUCTION

A sport is an organized, competitive, entertaining and skillful physical activity requiring commitment, strategy and fair play in which a winner can be defined by objective means. It is governed by a set of rules or customs. In sports the key factors are the physical capabilities and skills of the competitor when determining the outcome (winning or losing). The physical activity involves the movement of people, animals and/or a variety of objects such as balls and machines or equipment. In contrast, games such as card games and board games, though these could be called mind sports and some are recognized as Olympic sports, require primarily mental skills and only mental physical involvement. Non-competitive activities, for example as jogging or playing catch are usually classified as forms of recreation.

Physical events such as scoring goals or crossing a line first often define the result of a sport. However, the degree of skill and performance in some sports such as diving, dressage and figure skating is judged according to well-defined criteria. This is in contrast with other judged activities such as beauty pageants and body building, where skill does not have to be shown and the criteria are not as well defined. Records are kept and updated for most sports at the highest levels, while failures and accomplishments are widely announced in sport news. Sports are most often played just for fun or for the simple fact that people need exercise to stay in good physical condition. However, professional sport is a major source of entertainment (Douglas Harper, 2008).
1.1 PHYSICAL EDUCATION

Physical Education is one of the most ancient arts of the humanities. In its broadest interpretation Physical Education is defined as the art and science of voluntary purposeful and active human movement. It is clear that Physical Education is concerned with a fundamental mode of human expression. Likewise it is an essential form of non-verbal communication which can be communicated very effectively depending and does, express a wider range of emotions while participating in a group towards the activities of Physical Education (John Nixon, 1980).

1.2 PHYSICAL EDUCATION AND SPORTS

Physical education and training organized instruction in motor activities will contribute to the physical growth, health, and body image of the individual. The historical roots of physical education go back as far as the ancient Chinese (c.2500 B.C.), who had a well-developed system of exercise and physical training.

In ancient Greece the Athenians were concerned with both physical and mental development; consequently they accorded gymnastics, sports, and rhythms an important educational role. During the period of the Roman Empire and later during the middle ages, physical education was primarily used as a form of military training. Interest in physical education as a part of the total individual's development was revived during the Renaissance. It was not until the 19th cent., however, that systems of gymnastics were developed in several European countries, notably Germany, Sweden, and England. During same period gymnastics spread to the United States. Interest in the new system led to a movement to have compulsory physical training in American public schools and
to establish physical education in colleges and universities. The first department of physical education at an American college was established at Amherst, 1860.

1.3 SPORTS

The field of sports is currently undergoing remarkable scientific changes. Research has revamped the whole concept of sports; highly technological innovations through contributions from various disciplines like medicine, engineering, human biology, psychology, etc, have made the sports field more authentic, glamorous and appealing. Different methods are tried to spot out potential talents and train them under near-ideal environments. Sheshan has contended that “Sports is the act of being Physique-genitive behavior against an obstacle in a comparatively structured and institutionalized situation”.

1.4 SPORTS TRAINING

The training process should therefore be principally aimed at an increase of the body’s work output in a given motor regimen. Sports training is, formulated the general methodological concept of an athlete’s preparation, define the general training strategy elaborate the basic model of the training system, and establish the quantitative programme of the preparation.

Sport training is done for improving sports performance. The sports performance as any other type of human performance is not product of one single system or aspect of human personality. On the contrary it is the product of the total personality of the sports person. The personality of a person has several dimensions for example physical, physiological, social and psychic. In order to improve sports performance the
social and psychic capacities of the sports person also have to be improved in addition to the physical and physiological ones. In other words, the total personality of a sportsman has to be improved in order to enhance his performance. Sports training therefore directly and indirectly aim at improving the personality of the sportsman. No wonder, therefore sports training is an educational process (Singh, 1991).

In the Modern world games and sports are popularly planned and executed to promote social harmony, discipline and increased productivity. These activities developed student’s rights, attitudes, values, and help them to grow into balanced, integrated and healthy citizens. The modern age is an age of science and technology and now it is called as computer age. Due to rapid progress in the field, man is blessed with more leisure. In this modern age of micro and macro machines, physical activities in one form or the other are essential for growth and development of human personality. Body and mind movement is the sign of life and activity is the sign of growth and development. Hence sports and games activities should become part of our life.

Physical education is expected to develop interest in such activities and provide for participation in an organized way. Charles A. Bucher has stated that physical education should aim to provide skilled leadership and adequate facilities which will afford to an opportunity for the individual or a group to act in situations which are physically wholesome, mentally stimulating and satisfying and socially sound. Harold M. Barrow (1966) has stated that physical education should have a vital role to play leading to a healthy mind in a healthy body. The participation and outcome in games and sports become a vital yard stick to measure the care of a nation towards its youth.

1.5 IMPORTANCE OF SPORTS
According to **Webster(1999)** sports means diversion, amusement or recreation, a pleasant past time, a past time persuade in the open air, or having an athletic character as, hunting, fishing, racing, baseball, bowling or wrestling. Physical education is vitally concerned and involved with sport. Sport is in human’s blood. Sport is recreation as well as a competition. Basically sports are individual activities relating and revitalizing in nature and meant to provide opportunities to the individuals to make the ‘fullest’ and the most intelligent use of leisure time. Athletic contests have existed throughout the human history, sports and war has been the very life of ancient civilization.

1.6 ROLL OF SCIENCE IN SPORTS

Science plays an important role in all spheres of human life. Technological progress during the last century is the result of advancement in mathematics, physics as well as in other applied sciences. Sport activity is not an exception in this regard, although sports sciences have only been recognized considerably as an academic field of study in recent years. All the different branches of sports sciences help to enhance A coach should have the basic knowledge of sports sciences. Coaches and players striving for excellence in any sports discipline must attempt to incorporate all the information that is available from science to impart quality coaching and preparation for competition. Considering the importance of sports and competitions we can say that it has become a social need of the modern civilization.

1.7 MODERN TRENDS IN SPORTS

Coubertin said that, “The important thing in the Olympic games is not swimming but taking part, for the essential thing in life is not conquering but fighting
well”. This is an earlier philosophy during the Olympic Games in Berlin in 1936. Life of people, their philosophy and way of living are undergoing changes. In sports it has become an accepted practice to strive to win. The philosophy of sports participation has undergone a change because now an individual participates in order to win. And even his countrymen induce the sportsmen to win as sports has become a prestigious aspect to prove their superiority over other nations and societies. Frequently the images conjured up by the name of the Nation and its favorite game is going closely linked. For instance England and West Indies are inextricably linked with cricket. In India, it is Hockey that takes pride of place.

Competitions provide the means by which one can show ones worth by competing successfully. Consequently sports competitions have triggered of a rigorous competitions in research on human physiology, bio mechanics, sports medicine etc. Competitive sports now a mania with all Nations of the World. Physical exercise in the form of sports recreation and competition, are the potent factors in keeping an individual physically fit and mentally alert. The performance in a big way at higher level. Philosophy of sports participation has undergone a sea change and today an individual participates in order to win. And even his countrymen induce the sportsmen to win, as sports have become a prestigious aspect to prove their superiority over the Nations and societies. To satisfy the needs of challenge, adventure and self actualization, people need vigorous exertion in various forms. Physical activity has become a medium by which the individual is better able to cope with the successful conditions of modern life.

Our late Prime Minister Indira Gandhi has rightly proclaimed that science applied to sports has enabled modern youth to develop physical capacities beyond anything imagined earlier. At present winning in competitive sports seems to be a
National prestige as each Nation strives to win. Certain Nations even try to project the superiority of their potential ideology through achievements in the field of sports. To bring success, scientific methods are used to coopt every centimeter, every fraction of a second and every fraction of energy out of an athlete who is considered to be almost a machine. Everywhere now efforts are on to get up research laboratories so that ways and means could be found not only to assess but also to accelerate human performance in sports. The best is extracted through various systems of sports training, new sports techniques and tactics, sophisticated equipments, suitable conditions and other compounds. Really sports have now become extremely complicated phenomenon.

1.8 PHYSICAL FITNESS

Physical fitness comprises two related concepts: general fitness a state of health and well-being and specific fitness a task-oriented definition based on the ability to perform specific aspects of sports or occupations. Physical fitness is generally achieved through exercise, correct nutrition and enough rest. It is an important part of life. In previous years, fitness was commonly defined as the capacity to carry out the day’s activities without undue fatigue. However, as automation increased leisure time, changes in lifestyles following the industrial revolution rendered this definition insufficient. These days, physical fitness is considered as a measure of the body’s ability to function efficiently and effectively in work and leisure activities, to be healthy, to resist hypo kinetic diseases and to meet emergency situations (Dheer, 2005).

1.9 THE IMPORTANCE OF PHYSICAL FITNESS

In its most general meaning, physical fitness is a general state of good physical health. Obtaining and maintaining physical fitness is a result of physical activity, proper
diet and nutrition and of course proper rest for physical recovery. In its simplest terms, physical fitness is to the human body is same as fine-tuning is to an engine. It enables people to perform up to their potential. Regardless of age, fitness can be described as a condition that helps individuals look, feel and do their best. Thus we describe it as the ability to perform daily tasks vigorously and alertly, with left over energy to enjoy leisure-time activities and meet emergency demands. Specifically true for senior citizens, physical fitness is the ability to endure, bear up, and withstand stress and to carry on in circumstances where an unfit person could not continue.

In order one to be considered physically fit, the heart, lungs and muscles have to perform at a certain level for the individual to continue feeling capable of performing an activity. At the same time, since what humans do with their bodies directly affects the state of mind, fitness influences to some degree qualities such as mental alertness and emotional expression (Hardcastle, 2006).

1.10 FITNESS AND PAST

Sport training is not mere physical activity involving physical and activity is common to several types of human activities, examples play and dance, physical (or) manual work like household, industries and factories.

1.11 FITNESS AND PRESENT

Today man is indulging in activities to keep him fit because his nature of work does not give him much scope for physical exertion. Most of his works are done by a
machine or a computer and he has to simply sit with it just to coordinate with the work done by it. Most of the cultivated lands have been converted into concrete forests of factorial, horded and the percentage of physical work in the existing field is reduced to a larger extent by the advent of modern farm equipment like tillers and tractors. Man is depending upon a transport system even to cover a small distance and there by refusing his cardiovascular system to increase pulse rate and flow. He has become very busy since far off places are brought closer by aero planes and forgets to keep a time table in his routine for physical exercises.

As a whole, he has become and sedentary in this bush button age. Palm rightly points out when a course of events applied to all mankind and endangers its every life basics. It can no longer be ignored. In view of the consequences of the technological progress is no longer the magnificent hobby of an exclusive elite but an element contributing to the full flourishing of life itself. As we think that everybody must be provided with opportunities for activities. Palm said that it is no longer debated that every individual is entitled to learn to read and write so must every individual be assured of the opportunity for the development and maintenance of his bodily organisms through physical activity. We would otherwise have terrifying future a need of thus a future in which are our goals of technological progress and prosperity would be achieved, but the expense of man kinds health and capacity for location. For these reasons physical inactivity must be combated as vigorous as illiteracy.

1.12 FITNESS AND FUTURE

Through the invention advent and the use of robots mans part in work would be completely brought to nothing. He is going to sit in his chair for a longer time a
danger of inactivity is define to affect him before he is crippled due to inactivity. The whole system of physical education through the country must be revised re designed and re introduced to suit every one of the society. Leper and other emphasize the physical education is to respond to present societal needs the goal and outcome our programmers is a beginning step designing and implementing specific curricular charges to meet new goals must follow physical education can and should make even effort to contribute to improve life styles and health in our students and graducebes. We should take advantage of our present opportunity for physical education to assume longer, leadership role in our schools and society.

1.13 MOTOR FITNESS

Motor fitness means to share responsibility without undue stress, fatigue and help in the quality of health and wellbeing. So that the players should have motor fitness such as speed, agility, power and flexibility. Apart from that player should be sound in technique at the time of play no player speed and movement of the ball and change their technique and fundamental skill in order to execute the movement successfully and it also for the defensive arts skill. Different people have different points of view regarding physical fitness. For a common man a good physique is symbol of physical fitness. In fact physical fitness of a person means the capacity to do the routine work without any fatigue or exertion and after doing his work he has a power to do some more work and recovery is quicker Physical fitness having health plus the capacity to do one’s everyday task to engage in recreational pursuits and to meet emergencies when they arise. Physical fitness is used in two close meanings - general fitness and specific fitness based on the ability to perform specific aspects of sports or occupations (Deason, 1991).
1.14 SPEED

Speed is a complex ability that is necessary to perform fast motor actions in the shortest possible time; it depends on central nervous motor programmes, which are activated by intense will power. Speed is an important factor in almost all court and field games. It can make the difference in whether a performer is able to gain an advantage over his opponent. Larger playing fields afford the opportunity for all-out running. Football, soccer, rugby, baseball, and lacrosse are excellent examples of field games in which both acceleration speed and running speed are basic to success (Jensen and Fisher, 1979).

1.15 AGILITY

This factor was observed by tests, which the subject must quickly change of direction while running. It is the ability to change direction of the body and its parts rapidly. Agility is a combination of several athletic traits. Including strength, reaction time, and speed of movement, power and co-ordination. Agility is very important in all activities involving quick changes in direction are fundamental to foot performance in practically all court games, such as Basketball, Tennis, Badminton, Volleyball and in many field games such as Handball, Soccer, Speedball and Baseball. These games require running agility. Agility, either general, or specific, can be improved by increasing the athletic components, which constitute it. Co-ordination involved in the specific movement is far the most important components of agility. If a person is poorly co-ordinate, he will lack agility regardless of the other traits he possesses.

1.16 LEG STRENGTH
Strength is the ability of a muscle or muscle group to exert force. Examples of specific strength include the sprinter’s need for strength in the thigh and calf muscles, or the shot putter’s requirement for strength in the shoulder and trunk.

1.17 CARDIO VASCULAR ENDURANCE

Ability of muscle or group of muscles to contracting over on extended time against moderate resistance. The friend today public policy recommendation is to emphasize the development of the health related fitness elements and to push for their prominence is school worksite and community programme. Each of the components of health related physical fitness can be measured separately from others with specific exercise applied to their development. In words the degree to which of the five health related components.

Physical fitness is developed in any one particular individual can vary widely for example a person may be story but talk flexibility or one may have good cardio respiratory endurance. But luck in muscular strength. To develop total physical fitness for health each of the five components must be tested separately and then be included with in the exercise prescription.

1.18 HISTORY OF CIRCUIT TRAINING

Elements of circuit training programs were present early on in history. The modern form of circuit training was developed by R.E. Morgan and G.T. Anderson in 1953 at the University of Leeds in England (Kravitz L, 1996). It was initially examined
as a 9 to 12 exercise protocol where participants performed exercises at a moderate intensity (about 40% to 60% of 1 RM values) for a specified number of repetitions or amount of time. Once the repetitions were performed or time expired, the participant would move to the next exercise station with very little rest. Improvements in muscle strength and endurance were observed, as well as components of aerobic fitness (Kravitz L, 1996).

For years, a growing body of research expanded on the benefits of this highly efficient mode of training. Researchers have examined how increasing the intensity of this type of training by using exercises known to significantly elevate the heart rate and limiting rest time could elicit even greater gains in even shorter overall exercise time (Gibala MJ, Little JP, 2010).

1.19 CIRCUIT TRAINING

The ‘circuit’ is split into different exercises, which are known as ‘workstations’. Circuit training is a generalized conditioning program that increases muscular strength and endurance and improves cardiovascular fitness in the general population. It combines low-resistance, high-repetition exercises aimed at improving muscular endurance with exercises that increase flexibility and cardiovascular fitness (McArdle W et al, 2007). An exercise "circuit" is one completion of all prescribed exercises in the program. When one circuit is complete, one begins the first exercise again for the next circuit. Traditionally, the time between exercises in circuit training is short, often with rapid movement to the next exercise. Circuit training is an excellent way to improve mobility, strength and stamina. The circuit training comprises of 6 to 10 strength exercises that are completed one exercise after another. Each exercise is
performed for a specified number of repetitions or for a set time before moving on to the next exercise. The exercises within each circuit are separated by a short rest period, and each circuit is separated by a longer rest period.

1.20 ADVANTAGES OF CIRCUIT TRAINING

1. May be easily structured to provide a whole body workout.

2. May not require expensive gym equipment.

3. Participants normally work in small groups, allowing beginners to be guided by more experienced individuals, as well as benefiting from the supervision of the instructor.

4. Can be adapted for any size workout area.

5. Can be customized for specificity; easy to adapt to your sport.

6. It's the most scientifically proven exercise system. It's time efficient and incorporates strength, flexibility and cardio in the same workout.

1.21 THE BENEFITS OF CIRCUIT TRAINING

Circuit training is a workout routine that combines cardiovascular fitness and resistance training. It was first proposed in the late 1950s as a method to develop general fitness. The initial routines were arranged in a circle, alternating between different muscle groups. By allowing only a short rest interval of 30-90 seconds between stations, cardiovascular fitness is gained along with the benefits of resistance training. (http://www.workout-x.com)
When developing a circuit training routine, a wide variety of exercises and equipment can be utilized. Much of the equipment is relatively inexpensive and includes surgical tubing, jump rope, your own body weight, dumbbells, medicine balls, physioballs and weight training machines. A circuit can consist of as few as six stations to as many as 15 stations based on the goals and pre-training levels of the participants.

Circuit training stations are generally sequenced in a way to alternate between muscle groups, which allows for adequate recovery. The rest interval between stations should be between 30-90 seconds and 1-3 minutes between circuits. A typical gym has several strength training machines and workstations, which enables the creation of several circuits. This benefit of variability challenges the skills of the participant and keeps them interested from session to session.

1) The quick pace and constant changing nature of circuit training places a unique type of stress on the body, which differs from normal exercise activities, like weight training and aerobics.

2) The demands of circuit training tend to prepare the body in the very even, all-round manner. Circuit training is an exceptional forum of exercise which aid in the prevention of injury. Circuit training is the best way to condition all body.

3) Large number of players can be trained at same time.

4) Circuit training can be totally personalized. Whether a person is a beginner, or an elite athlete, training can be modified as per his/her fitness level.
5) Load can be increased gradually.

6) Fighting spirit can be inculcated e.g. if we take the time of the individual circuit, the other player gets the target to finish circuit in least time and this gives a room for improvement.11

7) Circuit training is time efficient. No wasted time between sets. It gives maximum results in minimum time.

8) Circuit training can be done anywhere – at parks and playground areas, indoor stadiums, etc. thus it fulfills the desire for interesting environment.

9) Circuit training doesn’t require expensive equipment.

10) Another advantage is that it’s great fun to do in pairs or groups.

1.22 HOCKEY

“Hockey was a Gentleman’s game to be played for its own sake”.

Chris Moore has defined Hockey, a sport which emerged in the 19th century, has seen huge changes in the latter part of the 20th century. As we move towards the start of the 21st century even more changes can be expected. “It will be, through more evolution than revolution, and that is how it should be.” Hockey is a dynamic team game played by both sex requiring high level of skills, excellent conditioning and well co-ordinate team effort. Modern Hockey demands that all the players should be adapted to all the situations either defending or attacking. Hockey is a game which calls for
strenuous, continuous, thrilling action and therefore attracts the youth all over the World. The skills involved are simple, natural and yet are highly stimulating and satisfying to any child. These skills are dribbling, pushing, flicking, scooping, tackling and dodging the opponent. Hockey is rated as one of the most popular team games in the world. With the involvement of Dhayan Chand, and Dung Dung from India, this sport is getting a dimensional popularity in India, Asian countries and in other European countries as well.

1.23 ORIGIN AND DEVELOPMENT OF THE GAME HOCKEY IN INDIA

Though there is no definite origin of the game, a beginning has to be made to the primitive instincts of man hitting an object with something. About 500 years ago the Persians are known to have played from the horse backs a game like Polo. The young ones imitated the game with short sticks and stones or pebbles. A bas relief unearthed (514-449 BC) shows some Athenians at play, two of whom actually engaged in a Hockey bully. Ron Hendricks has defined as the roots of hockey are buried deep in antiquity. Crude sketches found on the walls of prehistoric caves may lend substantial information on the fanciful notion that the caveman knocked at a stone with a primitive club for his amusement when he was not locked in mortal combat with his deadly enemy, the Iguanodon. Historical records show that a rudimentary form of the game was played in Egypt 400 years ago and in Ethiopia around 1000 B.C. It was the only team game practiced by the Greek in the epoch of Themistocles [525-449]. The ancient Azteus of South America and the Red Indian tribes of North America played a savage stick-and ball-game several centuries before Columbus discovered the New World. The British pride is that they originated the game and gave it to the world. With reference to the English Historians Hockey is a development of other games.
In the pre-Christian era, a stick and ball game had been in practice in the British Islands. Later it came to be known in Ireland as Hurley, in Scotland as shinty and in England and Wales as Bendy, as these games seem to have been played with ball and stick teaming resemblance to the modern one. From England the French People borrowed this game and spread to the whole of the continent.

Modern Hockey was imported to India by Englishman, than the rulers of India in the early years of the 15th century. The credit of starting Hockey in India first goes to Calcutta. The people there played a leading role in popularizing the game in India. In India the game takes the pride of place and it is considered as our National game and it occupies a significant place. The game became popular in other countries and its popularity in the World can be judged in terms of Federation International De Hockey (F.I.H.), this now comprises of more than 130 National Federations as its member. By the time when India represented in the Olympic Games for the first time Amsterdam in 1928 they overshadowed the pioneers of the game such as England. India emerged as Olympic Hockey champions in their debut in 1928 and maintained their supremacy till 1960. In 1980 Moscow Olympic, India regained the gold.

1.24 NATIONAL GAME

The game Hockey was played in certain areas like Punjab even colonial roll come into existence. It was known as “khido Kunti” by them. When the Britishs introduced modern hockey, in an organized manner the game become very popular and reached the corners of the country. The standard of the game reached dizzy heights and on its maiden appearance at the Olympics in 1928, India obtained the gold medal. The next consecutive five Olympics saw India retain its position as number one in the World.
The love and devotion of innumerable players and spectators towards the game brought International recognition and consequently hockey was acclaimed as.

1.25 REASONS FOR THE SUCCESSIVE DEFEAT OF INDIAN HOCKEY

The Indian hockey team’s pinnacle and pits seems to be two sides of the same coin perhaps no other country has experienced the sweetness of triumph and the despair of defeat as much as the Indians are. The performance of Indian hockey team in the last two decades had been very disappointing. Apart from 1975 World Cup at Kulalumbur the devalued Moscow Olympics in 1980 and the Asian games and other International tournaments we have very little to be proud of. Even in the recently concluded World Cup India got only eight place out of twelve countries. After analysing India’s performance in Olympics, World Cup and Champions Trophy one can easily understand India’s present position in World Hockey. From 1928 to 1956 India was on the top in Olympics and later we were relegated to the status of a mere medal list and now our position is far below. The question posed prominent these days in Indian sporting circle is that why Indian hockey has nose-dive today almost to a nadir status. Where have we gone wrong? Are we really as bad as our results show? Have our standards determined to such an extent? Whether will we able to regain our past glory? Have other non-Asians gone ahead? Is it because of the change of playing ground? Have the changes in the rules really affected our traditional style of hockey? Is officiating responsible for? Are our coaches not moving with the time? Do we have to change our style and system of play? Who is responsible for this downfall? Is it the management or the players? These are some of the serious questions to be answered to regain the past golden glory of Indian hockey.
1.26 REASONS OF THIS STUDY

It is felt that the plight of Indian hockey is inconsistent. Because the ignorance of latest techniques for our team to play on the synthetic field for which the game is now played. For coaches and also for players ignorant of the new techniques that have to be mastered before they can overwhelm in International outfits. Artificial turf has completely revolutionized the style and system of play. Our players however learned to play hockey on grass and gravel grounds. They get the opportunity to play on artificial field only when they are selected for the National Coaching camp or in the Sports promotional schemes. The frequent changes of National Coaches and nominations of unqualified coaches have also adversely affected the performance of Indian hockey team. Many changes in rules have also affected the traditional style of Indian hockey Where Most of the time we experiment these changes of rules only at the competition venue.

The frequent changes of Umpiring styles according to the new rules by the Non Asian umpires affect the game, because in Asian Countries we do not strictly amend the new rules in the domestic competitions. The game has also suffered and the players indulged in rough play because of bad umpiring. Proper coaching camp especially long-term plans are not formulated and implemented for the promotion of the game. Lack of scientific back up and failures to incorporate the scientific findings lead to unfruitful results, i.e. the systematic talent search programmes, to select suitable sportsmen to play hockey and to be trained scientifically and systematically. Since 1920, India regained supreme in the world of hockey nearly her 40 years. India which once was considered to be the magician with hockey sticks was now pushed back in the world level competitions. The successive defeat of Indian hockey team in major events has created a pessimistic view over our teams. Though there are number of reasons for our defeats and
the improvement of the Western countries in this game such as change of rules, change of playing ground, lack of facilities, lack of proper selection, long term training etcetera. People are critical about the present standard of Indian hockey by comparing it with the good golden days of India in hockey three decades ago. In case India wants to regain the lost reputation, lot of spadework has to be done. One among them is systematic talent search programmes to select the suitable sportsmen to play hockey and to be trained scientifically and systematically.

The game of hockey is largely depends upon skills, Physiological make up of the body, Psychological built up and motor qualities of the player. The performance of Hockey is based on the proficiency of techniques such as dribbling, hitting, stopping, flicking, scooping and passing. A complete review of the game and findings enable to make structural changes within the frame work of training and can establish improvement at all levels to achieve better performance in International competitions. A giant stride revolution has to be made to regain the supremacy of Indian hockey in the World.

1.27 MOTOR FITNESS VARIABLES SELECTED FOR THE STUDY

The performance of any game depends upon the motor fitness of the players, even though proficiency in fundamental skill and other variables play important role. Hence it becomes necessary to explain the physical variables and its significance. The game of hockey nowadays is being played in three types of grounds namely gravel, grass and artificial ground. After the introduction of the artificial field the players, coaches and the conditioning experts now understand that the motor fitness variables are playing vital role to reach high level performance in the artificial ground. All the major tournaments
like Olympics, world cups, Asian games, champion trophy and Commonwealth games are being played only in the artificial ground. Playing in the artificial field requires high level of physical efficiency, especially in speed, agility, strength and endurance. Among the many motor fitness variables the investigator being a hockey coach feels and experienced that the following motor fitness variables namely speed, agility and strength are more important and selected those as motor fitness variables for this study.

1.28 SPEED AND ITS IMPORTANCE IN HOCKEY

Speed in one of the most important motor fitness component which is highly essential for many physical activities. The speed is the ability of an individual to perform successive movements of the same pattern at a fast rate. Hardayal Singh (1991) has quoted that the speed is the performance per requisite to do motor actions under given conditions in minimum time. Speed is a influential factor in the explosive sports such a sprints, jumps and most field events. Generally in team events with higher speed and strength wins because they are the fastest team. Speed is more valuable in team games like hockey, football, basketball and track and field events. The Performance of any game depends upon physical variables. For any competitive sports activities speed is highly crucial to achieve high level performance. In a team game like hockey, speed is more essential because the ball moves faster than the man. After the introduction of the artificial field namely Astroturf, Poly grass, super turf speed plays most important role for the team to decide the champion. Ball moves faster in the artificial field than the other two grounds namely grass and gravel ground. Hockey players playing in the forward line must have good speed with the ball and without the ball to score more goals and also to fallback and receive the ball from the teammates. Speed is also more essential for half line and fullbacks when it arises they also should run faster to defend their goal.
from scoring. Speed is considered as one of the most important physical variable for a hockey player to achieve high level performance Harold and Rosemary (1982).

1.29 AGILITY AND ITS IMPORTANCE IN HOCKEY

Agility plays an important role in the training of technique and tactics in competition. The aim of training skills is to bring the athlete closer and closer to the ideal form of the progression of movement. The agility may be explained as the physical ability which enables an individual to rapidly change body position and direction. In any physical activity or in any game situation, the controlled ability to stop or to start and to change direction rapidly and move quickly is a very essential factor and this quality decides one’s performance level and the speed of acquiring any skill. The absence of that ability among the participants would spoil the original game score (Johnson and Nelson, 1980)

The agility changing position and direction of the body quickly at a higher speed is very much useful in speedy games like hockey, basketball, soccer and events like high jump and pole vault. Players having more agility perform better than others in games and sports. The agility or the ability to move quickly with changes in direction or position enhances the performance in a variety of activities. Dancing, walking on ice covered site walks, and completing many aspects of employment are enhanced by an adequately developed level of agility (Martin, 1994).

Agility is more important for the entire hockey players playing in different position like forwards, halfbacks and fullbacks. After removing the obstruction rules in hockey agility with the ball and without the ball became more important for the attacker to control over the ball during the game to beat or to dodge the defender. Hockey players
must have good agility in all the three types of play fields with the ball and without the ball. Defender also will make a semi circular movement either to left or to right and can clearly make a pass to the teammate without any difficulty. When the forwards are having the ball it is very difficult for the defender to tackle because if the defender allows the forward to his right side and tackle the forward turn towards his left side and dodge the defender easily. If the defender allows left side the attacker will dodge the defender without any difficulty and to tackle the ball from the defender when they are in possession of the ball.

1.30 STRENGTH AND ITS IMPORTANCE IN HOCKEY

The strength is the capacity of an individual to bring into play maximum muscle contraction at fastest rate of speed. Strength plays a major role in all the competitive sports. In hockey power has been considered as more important variable equally with other physical variables. After the introduction of the artificial field the competition rules for hockey also changed. All the major tournaments like Olympics, World Cup, Asian Games, Asia Cup, Common wealth games, SAF Games are played only in the artificial field. The hockey players must have adequate strength to execute all the skills at any time in any situation. More strength is necessary to player in the artificial field than in the other grounds. In any field power is required to play faster; power is the basic requirement for the improvement of speed. The hockey players playing in different position and also in different playfields react quickly according to the situation arises. During the game, players run fast to receive the ball in the gap and sometimes to create space. To speed up the game, players must have good power with speed. In the artificial ground, ball is faster than the player and also the ball is faster in the artificial turf field than the other playfields. Modern hockey requires highly speedy player with sufficient
power. To score goal, the players must have very good power, can play the ball in the
goal with more speed. For a long clearance, to take free hit, hit in or 16 yards free hit
players should have optimum power to achieve their ultimate aim. In modern hockey the
results depends upon the penalty corner conversion. Most of the European countries used
to score goals through penalty corners much more easily. European countries used to
train specialists to score through penalty corners by executing push scoop technique.
Strength is more important for a hockey player to play better in all the three playfields.
Hence power plays a major role for the hockey players to achieve higher level of
performance (Harold and Rosemary, 1982)

1.31 ENDURANCE AND ITS IMPORTANCE IN HOCKEY

Endurance is defined as the capacity to work under strain for a long period of
time without undue fatigue. Endurance is one of the basic components of general athletic
ability and it is usually considered to be the most important component of physiological
fitness. The game of hockey requires high level of endurance. After the introduction of
artificial surface the game has become faster compared to other playing surface like
gravel and grass.

The speed of the ball is more in the artificial surface than in the grass and gravel
surfaces. Every hockey player must adopt themselves to play the game according to the
playing surfaces. Hockey is a game in which endurance is of prime importance. Hence
endurance occupies an important place in the game of hockey. Cardio vascular
endurance is the ability to continue successive movements with heavy load at a
maximum speed for a short period of time. Taking into consideration of the above facts
endurance was selected as physical variable for this study.
1.32 PERFORMANCE VARIABLES IN HOCKEY AND ITS SIGNIFICANCE

Hockey is one of the fastest field sports being played on a 91.40 mts Length 55 meters width rectangular play field. The game had a rapid growth and development and switched onto artificial field nowadays. To play on such artificial field requires greater amount of speed, agility, strength, endurance and neuromuscular coordination besides perfection of techniques or fundamental skills. There are a number of fundamental skills in hockey namely hitting dribbling, pushing, scooping, stopping, flicking, tackling, dodging and passing. The good performance of a hockey player depends upon the perfection and proficiency of fundamental skills,

1.33 PERFORMANCE VARIABLES CHOSEN FOR THE STUDY

Among many performance variables in hockey the following variables have been selected for the investigation. They are dribbling, hitting and trapping. The execution of the performance variables may differ from one play field to another play field (ie) one field to other field. The investigator selected three types of playfields namely gravel field, grass field and artificial turf field. The execution of the performance variables definitely differ while executing the particular skill in a particular field compared to other ground.

1.34 DRIBBLING AND ITS IMPORTANCE IN HOCKEY

Dribbling is one of the most pleasurable skills and considered as very important performance variables. Dribbling chosen for the study is one of the most
important skills in the game of hockey. During the game when the defenders are in
dangerous zone, completely covered by the opponents the defenders in position to clear
the ball from the dangerous zone, dribbling is so useful and successful. Dribbling helps
the forwards at the time of scoring when there is no chance to give pass or to take
straight hit into the goal, to control the ball or to make control of the ball dribbling is so
useful. So every player, including the goalkeeper must be perfect in dribbling in all the
playfields. The body position while dribbling the ball in the artificial field will differ
from the body position while dribbling the ball in the grounds like grass and gravel. The
ball moves faster in the artificial fields than the other two playfields. Dribbling the ball in
the artificial ground, gravel and grass field are more or less same but there may be slight
difference in the body position while dribbling the ball in different playfields.

1.35 HITTING AND ITS IMPORTANCE IN HOCKEY

The players who are experienced in playing at different field may hit the ball
with the force what is needed at that situation and thus hitting plays a vital role in the
performance of hockey. The body position may also differ while executing the hitting
method from player to player, level of participation, experience and also from one field
to another ground. Hitting is another fundamental skill in the game of hockey. It is the
most significantly skill involved in hockey. To speed up the game, to give cross passes,
and to give diagonal passes, hitting technique is used. When the ball crosses the side line
“Hit in” is to be taken. For this the player must be proficient in executing hitting
technique. The technique of hitting is very important to take 16 yards free hit, and also to
take long corner hit. Hence every hockey player must be perfect in executing the hitting
technique at any time.
The ball hit will travel fast in the artificial turf field compared to grass field and gravel ground, whereas the ball hit will move slowly in the grass field. So the magnitude of force applied to hit the ball may vary depending on the nature of the field.

1.36 TRAPPING AND ITS IMPORTANCE IN HOCKEY

Trapping is one of the most challenging skills for a hockey player when playing in different playfields. The ball must be placed in a strong control position ready for the next pass or dribble or change of direction or in expectation of a challenge or tackle from the opponent (Walter, 1989). Trapping is one of the most demanding skills in the game of hockey. Perfect trapping can help the players to keep possession of the ball, to build up the attack to defend from the attack to stop goal scoring by the opponent, to re-start the game due to infringements and receiving passes from own teammate. Trapping the ball in the grass field and gravel field is more difficult than in the artificial field since the ball have the tendency to bounce in the grass field and gravel field than in the artificial turf field (Barnes and Richard, 1979).

1.37 NEED FOR THIS STUDY

After the introduction of artificial turf field, India is not able to perform well as expected in the international matches. What is the reason for the debacle? The total performance has deteriorated slowly besides physical, psychological and performance variables and also there is no consistency in performance in the artificial turf field. Besides that Indian hockey players could not match with the European counterparts in the physical, psychological and performance components. The reason for this deterioration of performance is to be analyzed. It is of the view that the hockey players
have to go all out spending all the physical stock in them while they are playing in the artificial turf field. Experts feel that the proficiency in the performance variables are the vital importance when matches are played in the artificial turf fields. Recent studies have shown that the total performance varies when matches are played in different playfields. By keeping this in mind and considering the variations of performance in varied playfields this study was done. No research studies have been done so far in such analysis. Very few studies have been done in some games other than hockey. This motivated me to do this research.

1.38 STATEMENT OF THE PROBLEM

The purpose of the study was find out the effect of circuit training on grass, gravel and synthetic field on motor fitness and performance variables of college Men hockey players.

1.39 OBJECTIVES OF THE STUDY

The objectives of the study are the following:

1. To find out the effectiveness of circuit Training on grass, gravel and synthetic field on selected motor fitness variables (speed, agility, leg strength and endurance) of college Men hockey players.

2. To find out the effectiveness of circuit Training on grass, gravel and synthetic field on selected performance variables (dribbling, hitting and trapping) of college Men hockey players.
3. To find out the superiority effectiveness of circuit Training on grass, gravel and synthetic field on selected motor fitness variables (speed, agility, leg strength and endurance) and performance variables (dribbling, hitting and trapping) of college Men hockey players.

1.40 HYPOTHESES

The study has been designed to test the following hypotheses:

1. It was hypothesized that there would be significant improvement due to Circuit training on grass, gravel and synthetic field on selected motor fitness variables such as speed, agility, leg strength and endurance of college Men hockey players.

2. It was hypothesized that there would be significant difference due to Circuit training on grass, gravel and synthetic field on selected motor fitness variables such as speed, agility, leg strength and endurance of college Men hockey players.

3. It was hypothesized that there would be significant improvement due to Circuit training on grass, gravel and synthetic field on selected performance variables such as dribbling, hitting and trapping of college Men hockey players.

4. It was hypothesized that there would be significant difference due to Circuit training on grass, gravel and synthetic field on selected motor fitness variables such as dribbling, hitting and trapping of college Men hockey players.

1.41 ASSUMPTIONS

Assumptions of the study are:
1. Students will attend all training sessions.

2. Extra training will not be performed outside the required sessions.

3. Test participants will follow the testing protocols of the study.

4. Test participants will give maximal effort during all training and testing sessions.

1.42 DELIMITATIONS

The study was delimitated to the following factors.

1. The study was restricted to randomly selected eighty male hockey players from Adhiyamaan College of Engineering, Hosur for grass field, Alagappa University College of Physical Education, Karaikudi for gravel field and Sourashtra College of Arts And Science, Madurai for synthetic field, were selected as subjects.

2. The age of the subjects ranged from 18 to 25 years and all the subjects were healthy and normal.

3. The selected subjects (N=80) were classified into four groups of twenty each (n = 20) at random. Group I underwent circuit training on grass field, group II underwent circuit training on gravel and group III underwent circuit training on synthetic field, group IV acted as control.

4. The duration of the training period was restricted to twelve weeks and the number of sessions per week was confined to three days, which was considered adequate for selected criterion parameters.
5. The following Motor fitness variables namely: speed, agility, leg strength and cardio-respiratory endurance were selected as criterion variables for the study.

6. The selected performance variables such as dribbling, hitting and trapping were selected as criterion variables for the study.

7. The data will be collected at prior to and immediately after the experimental period.

1.43 LIMITATIONS

The following uncontrollable factors associated with the study were considered as limitations of the study.

1. The changes in climate conditions (atmospheric temperature, relative humidity, wind velocity and other meteorological factors) during the period of experimentation and at the time of testing were considered as limitations.

2. The growth and development of the subjects if any, during the period of experimentation and the possible influence on the criterion variables could not be controlled. However, the control group was involved to nullify the effect of anatomical and physiological maturation.
3. The quantum of physical exertion, life style and physiological and psychological stress and other factors that affect the metabolic functions were also considered as limitations.

4. The factors like diet, daily routine, food habits, climatic conditions (will not control), which will have an effect on the results of the investigation will not be controlled and they will be considered as limitations. No motivational techniques will be used.

1.44 DEFINITION OF THE TERMS

The following terms pertinent to the study are defined for clarity and clarification and to avoid possible difficulty and confusion in understanding them.

1.44.1 Circuit training

Circuit training is simply defined as a series of physically, resistance-based and aerobic activities, separated by short defined time period to complete each station. (Grice, 2003)

1.44.2 Hockey

The hockey is a dynamic game played by both sex, requiring high level of skills, excellent conditioning and well coordinated team effort. Horst Wein (1981)

1.44.3 Motor Fitness
Motor fitness may be defined as a readiness or preparedness for performance by muscle activity without fatigue. It concerns the capacity to move the body efficiently with force over a responsible length of time (Bucher and Prentice, 1985).

1.44.4 Performance

Hockey playing ability may be defined as the execution of fundamental skills in the game situation. The playing ability would include like dribbling, pushing, hitting, scooping and stopping etc.

1.44.5 Playfield

Playfield may be defined as the playing condition of the ground. Hockey playing fields are in three types. They are grass field, gravel field and artificial turf field.

1.44.6 Speed

Speed is the ability of an individual to make successive movement of the same kind in the shortest period of the time (Singh, 1991).

1.44.7 Agility

Agility- is the ability to stop, start and change the direction of the body or body parts rapidly under control (Baechle, 1994).

1.44.8 Leg Strength
Leg strength is the capacity of the lower limbs to exert muscular force (Baumgartner and Jackson, 1987).

1.44.9 Cardio respiratory endurance

Cardio respiratory endurance is the ability of the lungs and heart to take in and transport adequate amounts of oxygen to working muscles which allow activities involving large muscle groups to be sustained for a long period of time (Foss et al. 1993). It is the ability of the heart and lungs to work at optimal efficiency during continuous exercise (William et al, 2004).

1.44.10 Dribbling

Horst Wein (1981) has defined that dribbling is to proceed further having full control over the ball in a required speed towards the desired directions preferably towards the opponent’s goal.

1.44.11 Hitting

Hitting is to strike the stationary or the moving ball with the flat side of the stick to a determined destination at certain speed and also abiding by the rules of the game of hockey (i.e.) flat side or face of the stick only used for playing the ball Wein (1981).
1.44.12 Trapping

Trapping is a technique used to stop the ball coming from one place by the flat side of the stick or the reverse stick also abiding by the rules of the game of hockey *Bames and Kentwell (1979).*

1.45 SIGNIFICANCE OF THE STUDY

The present investigation will contribute significantly to the field of physical Education and sports in the following ways.

1. The results of the study will be helpful for the Coaches, Physical Educationists and the State Association personnel to know about the standard of their teams in different playfields.

2. The results of the study will be helpful for the Coaches and Physical Educationists to know about the importance of training and coaching in the artificial turf fields to achieve higher performance, especially from the grass root level in order to co-op with the modern artificial fields.

3. The results of the study will focus the attention of the Government and Sports Promotion Bodies to know about the importance of artificial turf fields to achieve higher level of performance in the National and International events and also the importance of laying artificial turf fields in each districts and regions of all the Southern regions to make equal competition and prepare better National and International players for the district, region, state and country too.
4. The results of the study will be helpful for the future research to select new problems relating to the study.

5. Based upon the results of the study the selection, training and coaching programmes may be designed in relation with the different playfields.

6. The findings of the study will add quantum of knowledge in hockey especially in the area of playfields.