Chapter One

Introduction
INTRODUCTION

Sport is big business that thrives upon performance. Sport is such a pervasive human activity that to ignore it, is to overlook one of the most significant aspects by contemporary society. It is a social phenomenon, which extends into education, politics, economics, art, mass media and even international diplomatic relations. Involvement in sport either directly as participant or indirectly as spectators almost considered a public duty by people.

It is fact of life now a days, that as soon as one deals with competitive sport and particularly top-level competition sport, the doctor, scientists and coaches are involved straight away. Everywhere multidisciplinary teams string up around training sites, seeking to isolate and identify the ingredients of success, to improve performance by changing this movement, that method of preparation, one piece of equipment or another etc.

To be competitive and to get on the top, sports-persons and teams have to undergo years and years of gruelling training in skills, technique, tactics and strategies of the game and performance, simultaneously keeping a very high degree of physical fitness. Coaching now is not simply an art; it has become a very complex science – a science not of skill training but of human engineering. Sport biosciences such as exercise physiology, sport sociology, sport medicines have begun to play an extremely crucial role in training of athletes.

More than ever before it is necessary today, for the physical educator and coach to recognize the vital part which science plays in the successful conduct of
physical education and athletic programs. To contribute to the best of one's ability to all aspects of physical education an athlete requires a good understanding of the available scientific knowledge. Not only such understanding will result in better teams and programs of activities but also enable to ground the health of peoples. Also to know the reasons as to why select a specific task, scientific knowledge is essential.

There is historical evidence that as early as 532 B.C. some people recognized that optimal nutrition was important for athletic performance and sports excellence. Perspectives with respect to diet and exercise have an extensive history. It is reported that trainers of athletes occupied an important place in Greek society, for in addition to teaching exercise formed part of the training. In those far off days of the first Olympic Games (776 B.C.) there are records that the athlete was concerned with what they ate. When it was realized that muscles are made up of proteins, it was logical that they ate it. During the centuries many things have influenced the diet of athletes.

Nutrition is concerned primarily with the part played by nutrients in body growth development and maintenance. The word nutrient or “food factor” is used for specific dietary constituents such as proteins, vitamins and minerals. Dietetics is the practical application of the principles of nutrition; it includes the planning of meals for all. Good nutrition means “maintaining a nutritional status that enables us to grow well and enjoy good health.

Nutrition in the athletes means the diet of athletes. Diet fads are dangerous to the athlete on the following grounds:
1. They induce the athletes to consume some foods, which are assumed to possess special nutritional properties as against foods of proven nutritive value.

2. Special foods are costly while being not superior to common articles of diet and hence drain away the financial resources of the individual.

3. The practice of diet faddism makes the individual less receptive to sound scientific concepts of nutrition.

An adequate and balanced diet is essential for normal functioning. What we eat influences our work, play, psychological status and health.

A relationship between nutrition and fitness has been recognized only recently. Athletes are now turning to nutrition, as well as psychology, to try to gain a competitive edge. The result has been the emergence of a whole new focus in nutrition called sports nutrition, which emphasizes the positive effect of nutrition and dieting patterns on athletic performance. Sports nutrition research attempts to either document or refute much of the anecdotal information that has become the basis of a very lucrative “Sports Health” business and a source of at least some false hope for aspiring athletes.

Nutrition is an important feature of any training program. In general, however, an individual in sports requires a greater calorie intake than does the sedentary person. Among many factors, which influence nutrition needs, the amount of physical activity and muscular work are the most important. Sports activities differ widely in the amount of nutrition required to support them.
Nutrition and physical performance are improved and sustained with appropriate nutrition but can deteriorate with nutritional deficiencies.

Athletes recognize that the food intake is an important determinant of their athletic performance. First, food is the source of energy for training and competition. Second, the diet is a critical determinant of body composition, i.e. how much one weight the state of hydration etc. this latter factor is critical in influencing one's tolerance to heat, efficiency of energy metabolism and the onset of fatigue during competition. Lastly, eating serves critical psychological needs for the athlete just as it does for the non-athletes. The young high school or college athlete may need to be reminded of how meals can be in developing desirable associations with friends and teammates. The quality of his or her diet will be directly related to the environment in which it is regularly taken.

The calorie requirements are increased considerably, during athletic activities. Depending on the intensity and duration of the daily exercise of the athlete, the total daily requirement may range from 3000 to 5000 Kcal., as compared with the calorie requirements for very hard work of 3600 to 3900 Kcal/day. It is evident that the calorie requirements of athlete may be as high as or higher than those doing very hard work. About 20-25 percentage of the calorie should be derived from fats, as otherwise, the diet will be too bulky and difficult to consume.

Diets provide 3000-5000 Kcal/day should include liberal amounts of fruits and fruit juices, cane sugar and glucose, as these serve as readily available sources of energy immediately before and after the athletic practice. They also
provide adequate amount of proteins, vitamins and minerals to meet their requirements.

Sportsman requires a well balanced diet which contains adequate energy and nutrients to maintain both normal and daily activities and activities associated with training and competition. The two distinct aspects of the sportsman's diet must be considered - the first is the diet in training on a daily basis and the second is the diet in the immediate pre-competition itself.

The individual is likely to be on a mixed diet that contains a combination of nutrients. The three major constituents of the diet, classed as energy nutrients, are carbohydrates, fats and proteins and they are usually very abundant in foods. Carbohydrates and fats are made up of carbon, hydrogen, and oxygen and proteins contain nitrogen. Some twenty-two different amino acids are known and must be present for the building of new tissue and the maintenance of the tissue already formed. The need for energy is provided by the carbohydrate and fat contents of diet.

In short period of work, carbohydrates are used as principal fuel, and in endurance exercise, energy is derived from fatty acids, although glycogen reserves are readily depleted by prolonged work at intensities greater than 60% of aerobic capacity. The trained individual may use more fat for muscular work than the untrained. Diets rich in carbohydrates have been recommended to maintain higher work efficiency. It has been shown in prolonged exercise, high carbohydrate diets are superior to high fat diets and that endurance capabilities are closely related to the concentration of muscle glycogen. Protein, on the other
hand, contributes very little to the total energy expenditure during exercise and therefore, high protein diets do not improve work performance or endurance. The protein requirement during heavy work is not increased, and protein nitrogen is only necessary to meet the general demands of growth, development and maintenance.

Vitamins are organized nutrients. They themselves don't give energy, but they help in getting energy under the conditions prevailing in the body. The action of many of the vitamins is required for ATP production. Without vitamins ATP production would come to a halt. The recommended intakes of each of the vitamins are essential to all athletes and others undertaking physical work. Severe vitamin deficiencies are known to impair work performance. There is no general support for the view that the supplementary intake of any vitamins can benefit athletic performance. In general it may be said that the 'B' vitamins do not appear to be useful in aiding physical performance when added in amounts above those normally required. Majority of studies showing no evidence of a beneficial effect of ascorbic acid supplementation on performance, it can be concluded from the results of trials that vitamin C can not be regarded as cryogenic aid. A number of claims have been made that vitamin E can improve physical performance. Amounts in excess of those other vitamins recommended are not known to improve performance in any way.

The body contains more than 19 minerals all of which must be derived from foods. About 4% of the body weight is made up of minerals. Minerals don't supply energy, but like vitamins are essential for regulation of the body functions.
The numbers of minerals also are required in the daily diet for the maintenance of health including calcium, phosphorus, potassium, chlorine, sodium, magnesium, iron, and such important trace elements make up less than 5% of the body weight. They serve as constituents in building and give rigidity to the hard tissues of the body.

Large bulky meals should certainly be avoided shortly before exercise. This is especially true for the athlete competing in an endurance event. A period of 2 hours or more should elapse after a heavy meal before participating in any form of strenuous exercise. A sportsman's main meal should be taken in the evening after a cessation of the day's physical activities. A substantial breakfast may be taken but luncheon should be light and easily digested.

The influence of number, relative size and spacing of meals on physical performance has been studied by various workers. The results have shown that a patterns of five meals a day lead to a total work output greater than that observed with three meals a day.

Primary need for the diet of the athlete is to meet additional nutrient requirement imposed by the training load. In sports involving prolonged strenuous exercise on a regular basis, participation has a significant effect on energy balance. If body weight and performance levels are to be maintained, the high rate of energy expenditure must be matched by a high-energy intake. Attention on the eating habits should be given whole of the year. Athletes should start the refueling process after they finish training as soon as they can. The muscle capacity is grater over the first hour after the training. Athletes should
take small but more frequent meals. The athlete should start competition fully recovered from the rigors of training with at least normal glycogen stores. Competition should start at least with normal glycogen stores. Athletes should increase fluid intake and do eat something on the morning of competitions and after meals try to relax. Sportsmen should take fluids and carbohydrate rich food if competition is throughout the day.

To achieve an improved energy economy as one of the conditions of a higher level of physical performance both adaptations to a modified food intake and adaptation to a specified physical workload are necessary. Simultaneous adaptive processes concerning both nutrition and exercise, induced for a sufficiently long time, with special stress on the developmental period are obviously necessary to achieve a modified states of nutritional and energy balance favorable for a desirable level of physical performance.

Kinanthropometry is defined as the quantitative interface between human structure and function. This interface is examined through the measurement and analysis of age, body size, shape, proportion, composition and maturation as they relate to gross body function. It provides a coherent rationale for the study of physique and physical performance, monitoring change and assessing structural constraints that may affect performance or relate to health or well-being (Rose, De Rose and Word, 1988).

The study of human structure extends to antiquity. Hippocrates 400 BC defined one of the first biological classification systems and identified pathological correlates. In recent years the quantitative interface between human
structure and function has received increasing attention and an impressive body of research literature has appeared. In the first phase of scientific era of measurement, the central concern was anthropometric measurements, which began in 1860. Growth measures, body type and body components are three areas that are currently focused in anthropometric measures with growth patterns and prediction of success in motor abilities as well as assessment of obesity.

Human bodies are widely divergent in their size, shape, and composition characteristics. It would, therefore, be seen that the full anthropometric description of human physique would require the assessment of a great number of body dimensions. This inference is clearly seen to be supported in regard to past anthropometric practice; many lengths, breadth, girth, and skinfolds of different types have been measured in order to describe the anthropometric profiles of human bodies.

It is well known fact that anthropometric measures play a vital role in the competitive performance. A good body structure characteristic is one of the essential requirements for high-level athletic performance along with other factors. Tanner (1964) observed that structure measures such as length, breadth, and circumference of body parts to achieve optimum playing advantage are one aspect of scientific approach that is receiving greater attention. The most important guide for coaches and athletes themselves are anthropometric measures and their relationship with various other components.

Kinanthropometry is quite a new discipline in the group of sports science and is basically required for solving problems related to growth and development.
Among the main objective of studying athletes from the anthropometric point of view, it is to find out the characteristics of physique which vary between athletes with respect to the reals of competition to find out the intra-group and inter-group differences in physical characteristics among the various groups of athletes and how athletes in various sports differ in this regard with respect to their specialization and specific field positions.

Kinanthropometrical studies indicate that there are significant differences in the body size, shape to different sport specialities. Consequently special body constitution is a pre-requisite for each sport. It is in this era of Kinanthropometry and clinical Anthropometry that much research in the comparison of athlete's sporting performance has yet to be done.

Thus, for many centuries athletes, coaches, trainers and physicians have passed down many radical ideas on nutrition for optimal athletic performance. It is unfortunate that so many coaches and athletes are poorly informed on the nutrition of athletes, because this ignorance makes them susceptible and value of some special dietary manipulation. Often scientific proof is lacking to support special diets or supplement programs.

As the nutritional components and kinanthropometrical measures play a vital role in the achievement of better performance of athletes so the research scholar thought to undertake the present study.
STATEMENT OF THE PROBLEM

The purpose of this study was nutritional and kinanthropometrical survey of North and South Indian athletes.

DELIMITATIONS

1. The study was delimited to the sprinters (100,200 and 400 M.).
2. The study was delimited to the university players participating in All India Inter University Athletic Championship.
3. The study was delimited to the male sprinters only.
4. The study was delimited to the selected kinanthropometric variables and nutritional components.
5. The study was delimited to the selected North Indian and South Indian university athletes.

LIMITATIONS

1. Socio-economic status of athletes was considered as one of the limitation of the study.
2. Non-availability of sophisticated instruments and facilities were taken as a limitation.
3. Difference in daily routine and in training schedule was another limitation of the study.
HYPOTHESIS

1. It was hypothesised that there would be no significant difference in the nutritional status and kinanthropometrical measures of North and South Indian athletes.

2. It was hypothesised that there would be no significant relationship in the nutritional status and kinanthropometrical measures of North and South Indian athletes.

DEFINITION AND EXPLANATION OF THE TERMS

Nutrition: It has been identified as the science of nourishing the body properly or the analysis of the effect of food on the living organism.

The council on foods and nutrition of the American Medical Association elaborates-Nutrition is the science of food, the nutrients and other substances therein, their action, interaction, and balance in relation to health and disease and the process by which the organism ingests, digests, absorbs, transports, utilizes and excretes food substances.

Kinanthropometry: It is defined as the study of human size, shape, proportion, composition, maturation and gross function in order to help understand growth, exercise, performance and nutrition (Ross et al. 1980).

International Society for the Advancement of Kinanthropometry (ISAK) also elaborates it as, “Kinanthropometry is a scientific specialization dealing with the measurement of man in a variety of morphological perspectives, its
implication to movement and those factors which influence movement, including: components of body build, body measurements, proportions, composition, shape and maturation; motor abilities and cardio-respiratory capacities; physical activity including recreational activity as well as highly specialized sports performance”.

**Body Height**: Maximum distance from the point vertex on the head to the ground.

**Sitting Height**: Vertical distance from the point vertex to the sitting plane.

**Weight**: The body is the measurement of physical as material frame of the material organism as determined by means of weighing.

**Upper Arm Length**: It is the distance from to the acromiale to the olecranon.

**Fore Arm Length**: It is the distance from radiale to the stylion.

**Upper Leg Length**: It is the distance from Trochanter to the Proximate lateral Tibial border.

**Lower Leg Length**: It is the direct length between the knee joint line and the tip of the medial malleolus.

**Foot Length**: It is the distance from medial malleolus to the flanges.

**Upper Arm Girth**: It is the perimeter distance of the right arm parallel to the long axis of the humerus at mid-acromiale-radiale distance.

**Fore Arm Girth**: Measurement of the circumference of the greater bulge of the fore arm muscles.

**Chest Girth**: Maximum circumference of the chest at the level of nipples during the normal breathing.
Waist Girth: Horizontal circumference of the waist at the level of naval.

Thigh Girth: Horizontal circumference with the measuring tape placed as high as possible in glutei fold while subject standing erect without stretching and his feet placed slightly apart.

Calf Girth: Horizontal circumference of the lower leg at the level of the great bulge of the calf muscle.

Body Composition: It is the proportion of the lean body mass with deposited fat.

The two-component model used commonly divides the body into a fat portion, and further divides the fat free mass into skeleton, muscles and the remainder (organs, nerves, blood vessels and fluids etc.)

**SIGNIFICANCE OF THE STUDY**

Now-a-days the physical educator and coaches are giving more emphasis on the kinanthropometry while selecting game or event for an individual. With this they are recommending the diet for proper nutrition of young athletes. They are emphasizing more on scientific aspects for the improvement in the athletic performance.

This study might prove the following contributions:

1. It would be helpful to guide the young athletes for their dietary intake.

2. The study would help the coaches to select sprinters keeping in view the required kinanthropometrical measures.
3. It would be giving clear picture of the nutritional status for the particular event and then can be compared with the nutritional status of international athletes.

4. It would be helpful to prepare the best diet for the sprinters.

5. The physical educators and coaches would be able to utilize kinanthropometrical and nutritional requirement for adequate training to enhance the performance of the athletes.