Chapter: I

INTRODUCTION

1.1 General Introduction

The search for, and identification of young children gifted in sports has gained increasing importance over the years as competition in almost all levels have intensified. This has been accompanied by a corresponding increase in the overall quality of sporting performances. The development of competitive sports and development of the young athletes can be best served if each sportsperson is trained in that particular sports discipline for which he or she is best suited and if Coaches / Trainers select only those athletes for competitive sports who have the necessary physical, psychological and biological potential apart from inherent qualities (Harre, 1982).

Talent search in sports is a recent phenomenon in India. Interest in talent search in all sports has dramatically increased in recent years in our country. It is being realised that truly outstanding sporting performance, even with the best coaching methods, and optimal living and training condition, can be achieved only by the individuals who follow the disciplined schedules required by the sportsperson. Natural talented sportsperson, in comparison with less gifted players, do have a greater chance of success, given the same amount of training and coaching.

With the passage of each Olympic Games, the standard of performance have improved and new records are set for human skills. To a small extent this is due to improvement in equipments and facilities, but to a greater extent it is due to improvement in the methods and availability of scientific coaching. But mostly the improvement is due to the athletes themselves. Perhaps they are gifted now than previously and the search for the better sportsperson has been more successful (Tanner, 1964).
Talent identification and development have always been present in all human endeavours. It is only during the last thirty years that similar process of talent identification had developed in sports. Talent spotting, till recent years in India was purely based on personal experience and intuition except that, a few efforts have been made for talent hunt by the Indian Hockey Federation in 1969, by LNCPE, Gwalior in 1977-78 and now at present by Sports Authority of India. Search for talented children for sports has recently been a popular discussion point in Indian sports circle after a series of poor performance of Indian athletes in international competitions, especially in Asian Games, Olympic Games and World Championships.

Now a days, especially in USA, Germany, USSR and other European countries, teams of sports scientists are working with the top class Coaches in the concerned sports to single out the basic physical characteristics (body size, shape, proportions and constitution), physiological characteristics and psychological qualities, which might be the performance limiting factors for the sports concerned (Mall, 1989). It is then to find out individuals with these attributes and characteristics at the grass root level, using a series of scientifically prepared tests, having its objectivity, reliability and validity.

Identification, selection and development of talented children has become an important area of research in Sports. In competitive sports, only those person can excel who have talent and have a chance of winning a medal in an international competition. Sports talent alone does not guarantee for winning a medal. Talent has to be coupled with hard and rigorous training spread over several years. But talent is the ultimate factor which determines the maximum limit to which sports performance can be improved through training.

The very purpose of identifying talent is to predict with a high degree of probability whether or not a young athlete will be able to successfully compete the various stages of training. In other words, assessment of talent is a process of determining performance precondition (abilities), which a person must have in order to be able to reach a high level of performance and which must be spotted by using appropriate diagnostic technique (Harre, 1982).

Talent identification according to Woodman (1985) is the screening of young athletes to determine those most likely to succeed in sports and directing them towards
the sports to which they are most suited. According to Bloomfield (1980) it is the prediction apparently through good accuracy, whether or not a child has a chance of becoming Olympic athlete, as the chosen receive the chance to develop their potential and unchosen are left to enjoy the sports as play or recreation.

Talent in Sports is the sum total of pre-requisites (and possibilities of their development) possessed by a person which will enable him to achieve high performance in sport in future. The pre-requisites include physique, motor abilities, technical skills, tactical efficiency, personality traits, motives, interests etc. (Singh, 1991). Sports talent is also a product of heredity and environment. But a person must be endowed with basic minimum of biological potential, only then it can be developed through training and other environmental factors to a level needed in performance sports. According to Åstrand and Rodahl (1986) "genetic factor probably play a major role in person's performance capacity, atleast for those persons aspiring to the levels required for attainment of Olympic medals. The individual's response to training is also associated with an endowed genotype". According to them about 70% of individual's maximum force, power and capacity is a matter of genetic factors.

It is often said that "athletes are born and they are made". This statement implies, firstly, a natural endowment or genotypic potential for successful performance and secondly, the opportunity and environment condition to realize this potential. Athletes are the product of possessing some characteristics that covary with performance. (Malina and Bouchard, 1986).

Goslin and Burden (1986) have indicated that physical fitness characteristic of an individual are the result of a wide variety of interacting influences. Genetic inheritance, morphology, nutrition, habitual physical activity, general state of health and personal interest all play a part. The effect of these factors influences on fitness characteristics such as agility, speed, flexibility, strength, muscular endurance and both aerobic and anaerobic power.

1.2 Growth and Development

The study of growth and development of man has been an important area of research from time immemorial. In the modern age this field has gained considerable im-
portance because of its greater contribution towards education of the future generation. Growth and development is now studied more thoroughly and an ever increasing attention has been directed toward its various aspect such as morphological, physiological, psychological and social.

High sports performance are possible after a regular and systematic training of about 8 - 10 years. The age of high performance in most of the sports begins at about 18 years of age, therefore systematic training must begin in childhood. At present in most of sports systematic training begins between 8 - 10 years. This has brought into sharp debate, it is suggested that training of children has to be based on principles of growth and development especially on motor development (Singh, 1991).

Growth and development is a life long process. Each and every aspect of human being is subject to the processess of growth and development. Singh (1991) has reported that from sports and physical education point of view three aspect of growth and development are important viz. Physical and Physiological aspect, Motor development aspect and Psychological and Social aspect. The physical and physiological aspect of growth and development studies the changes that is taking place in height, weight, body composition, body proportion, internal organs and systems.

From the stand point of sports the development of motor abilities, movement skills and motor performance is of great importance (Cratty, 1979; Singh, 1986; Winter, 1987; and Harre, 1988). This aspect of growth and development is known as motor development and has been accepted as a vital field of knowledge for Physical Education and performance sports. The training of children has to be based on the principles of motor development with due consideration to the other aspect of growth and development.

Motor development refers to the process through which a child acquires movement pattern and skills. It is a process of continuous modification based upon the interaction of the genotypically controlled rate of neuromuscular maturation, residual effects of prior experience and the new motor experience. In contrast, motor performance is viewed most often in the context of task that are performed under specific conditions and that are amenable to precise measurement. Skill implies accuracy as well as economy and precision in performance and shows a high degree of inter-individual variability (Malina, 1982).
During the period of growth and development, the individual achieves his/her morphological, physiological and psychological attainments. According to Macek and Vavra (1980), increased attention has been paid to the sports in childhood and adolescence, since it has been realised that top performance in many is reached only if systematic and scientific training is started at a very early age. As growing child passess through various stages of growth and development, therefore, a Coach or Physical Education teacher must have knowledge in this regard to enable to train children in better manner.

A growing child participating in sports and physical education programmes must be assessed regularly. Monitoring of growth status is essential along with changes in motor development of growing child though childhood to various stages of growth and development. The growth and development is not a uniform process but is characterised by the development of various parameters (Stemmier, 1977; Ludwig and Hirtz, 1985). Some abilities show faster development in early childhood and some in adolescence. It means that pace of development of motor abilities are dependent upon age and maturity process.

Harrison and Jordan (1966) conducted a longitudinal study on strength in children and found that with increase in age, the strength of various body parts improves at different rates. Hollman and Hettinger (1976) reported moderate increase in strength between 8 - 10 years. Similarly several investigators and scholars have reported rapid improvement in strength abilities during pubescence. (Bringman, 1973; Komadel, 1975; Stemmler, 1976; Shephard, 1978 and Demeter, 1981). However rate of increase of strength in girls is lower than that of boys (Millicer, 1964; Winter, 1976).

Similarly Matto (1977) suggests that there is an optimal age for testing of various physical characteristics, as there are certain ages when development reaches a stage where trend is predictable, that is, adult level agility is reached around 12 - 14 years with little development thereafter. Speed of movement, which depends mainly on central nervous system function matures at around fourteen years, but running speed can still be improved, which improves with limb growth. Power development is largely dependent on speed development. Motor development is undoubtedly the most important aspect of growth and development which has direct implication for the selection of talents and for training of children and youth. The study of motor development provides the scientific base for talent selection and for formulation of training plan for children.
In India very few attempts have been made to study motor development of children and youth (Muthiah, 1976; Joon, 1983 and Singh, 1986). Due to lack of scientific investigation a complete and clear picture of motor development of Indian children of different region are not available. Moreover, India unlike the countries of Europe and America, is a vast country inhabited by people of different social origin and living under vastly different geographical, economical and socio-cultural condition. Several studies have reported differences in motor development among children belonging to different races and living in different geographical and socio-cultural condition. (Hutsinger, 1959; Malina, 1969; Bonds, 1964; Grantham and Back, 1971 and Super, 1976).

1.3 Anthropometry and Sports

In the recent years, the selection and development of talent in sports have gained greater importance. It involves integral approach of different sport science specialists with the all round development in the science of sports, the elements of scientific basis of selection is being inducted in the procedure of selection of sportsperson at various levels in advanced countries. The knowledge from various scientific discipline has been used to improve the criteria of selection of talents. Various tests protocols are designed for evaluating the fitness of young children. Proposal are made for the selection of potential athletes with the designs of tests and body size prediction. Individual physique, growth and performance are also important field in this regard. The genetic factor of performance are also been worked, though to a limited extent in the field of sports (Sodhi, 1991).

A high level performance in sports and games not only requires certain physical qualities like speed, endurance, explosive power, agility etc., but also a good physical structure. Under modern condition, especially related to training for sports and games with a focus on superior performance, adequate importance is given to the physique and body build of each athlete. Therefore it is evident that the ‘body build’ gets primary attention at the time of the selection of sportsperson for various sports and games, where superior competitions are involved.

The morphological characteristics play an important role in competitive sports. Studies on physique is useful in choosing suitable physical activity for an individual whose main objective is competition. According to Carter et al. (1952), the athletes who wish to achieve success in sports at a high level can compare their physique with those of Olympic athletes.
In modern sports, the anthropometric measurements and their relationship with various motor abilities are an important guide for Coaches for classification and selection of sportsperson according to their age, ability etc. Several factors such as age, height, weight influence the selection of players. Heggen (1977) have reported that organismic variables such as body and limb size (height, weight and limb length), sex and age impose several important constraints upon the over all organisation of the movement. For specific skill, the outlined organismic variables will have direct impact upon the manner in which the performer realizes successful goal achievement. Several other studies have been conducted on relationship between physical performance and height, weight and age (Hunt, 1975; Espenschade, 1963 and Hindmarch, 1960) and it has been observed that positive correlation exist between anthropometric measurements and performance on selected motor ability tests. Age has also a direct bearing on the physical performance.

At extremes of performance, somatotype is fairly closely related to physical performance. To be successful in international competition an athlete should have (or should acquire) the appropriate somatotype, that is the characteristic of those who are already successful (Carter,1981). Examination of data on young athletes (12 - 18 yrs.) shows that successful athletes have somototype quiet similar to those of outstanding older athletes. The studies conducted so far seem to indicate that mesomorphy is positively associated with performance and endomorphy is negatively associated with performance of static and isometric strength (Carter,1980 and Stepnicka,1976).

Sodhi (1991) have reported that studies of body composition in certain sports indicated that the athletes who were very lean but heavy because of well developed musculature were superior in performance in certain sports. While on the other hand athletes who have substantial amount of adipose tissue found more difficulty in endurance activity. Contrarily, distance swimming, water polo and synchronised swimming are sports where moderate level of fats may actually aid performance by providing additional buoyancy (Carter and Tuhaiz, 1984).

Various studies made by Cureton (1951), Kroll (1954) and Hirata,(1954), on physique and performance indicated and suggested that different body size, shapes and proportions are beneficial in different sports activities. From this it may be concluded that morphological characteristics have an important role to play in the performance of various physical activities.
Therefore, Coaches and Physical Education teachers while selecting their children for sports must give due consideration to the skill possessed by them but at the same time they must also give due weightage to various anthropometric measurements such as height, weight, girth and somatotype of an athlete. It is frequently remarked that "A good tall sportsman is better than a good short sportsman".

1.4 Regional Variation

The climatical and geographical variation also influence the growth and development. Sodhi (1991) has reported that mean body weight of population in hot region is demonstrably lower (in all continents) than that in the temperate and cooler climates. The ratio of sitting height and the total height becomes less as mean temperature increases geographically i.e. lower limb tend to be longer in hotter climate. Body weight/surface area ratio also declines from temperate to hotter climates. According to Tanner (1977) linearity of physique tends to be more prevalent in people living in hotter region which fits with the finding that growth period is prolonged and maturation is somewhat delayed in warm regions. A linear build, i.e. a relatively greater height per unit body weight is attained by delayed skeletal maturation. It is reported that African children are noticeably more leaner than Europeans of the same age. However evidence and finding are complicated due to other factors such as nutrition, disease, social class etc.

Socio-economic status also influences and plays a dominant role in the growth and physical development of children. Children from different socio-economic classes within same community differ in their average body size at all ages which is probably due to nutrition and environment (living). Height and weight of children may be also be influenced by socio-economic status of the children.

The height and weight of children varies according to regional variation in India. According to report of Indian Council of Medical Research (1989), the children from Punjab and Delhi are taller and heavier than children from other states on an average, where as the mean heights and weights of children from Andhra Pradesh, Kerala, Madras, Poona are comparatively low. The sexual maturation also varies from one region to other region which ultimately affect the physical growth and development.
Talented young sportspersons are identified either in the recreational centres or in elementary schools during physical education classes. Programmes of Physical Education in schools are one of key foundation of successful system of sports in any country and is also an important base for selection process. When a system of Physical Education is not evident in any comprehensive fashion, as in case in India, where only 1% of school children take part in sports, it is unlikely that pyramidal system of development favoured by most countries will be able to operate (ICSSPE Research Report, 1985).

Countries do produce champions when environmental condition would seem to militate against it. An improvement in the matter of health and nutrition coupled with an increase in general physical fitness through school physical education programmes, are clearly priorities for any developing countries concerned to promote its sporting talent in a systematic way. Apart from these basic requirements, the Soviet researchers Zatsiorsky et al. (1973) have indicated that basic requirement in development of the consistent and dependable system of selection is to determine the ideal qualities for success in particular sports.

Several bodies like SAI and other organisation have started identifying talented children for sports. Yet they have not succeeded because enough is not known about status of children due to lack of sports science tests battery to isolate anatomical, physiological, psychological and technical strength and weaknesses. A series of sports science tests applicable to sports such as to measure strength, speed, endurance, agility, flexibility, somototype, body composition, skill etc are essential for talent selection. Further more, the process of talent identification should be modified to suit to sports science expertise available.

Before attempting to develop system of talent identification it might be useful to consider the system or methods which are already existing in countries like USSR, Europe, East Germany etc. Jarver's (1981) search for talent in U.S.S.R is based on carefully planned system over a period of several years. Information is obtained on numerous performance factors at various ages. In Soviet system after basic selection, only suitables are further guided upto 10 - 12 years and after final selection beyond 13 -14 years, a specific programme is carried on for higher training.
Basic selection at the age of 8-10 years is made through mass screening. The screening must be based on general observation and numerous field tests of general nature, which includes tests of strength, speed, endurance, agility, power etc. Preliminary selection takes place at 10-12 years of age. The final selection occurs at 13-14 years of age for boys and 11-13 year of age for girls. The final selection is based on number of sports specific performance factors including level of achievement, rate of improvement, stability of performance, general and specific physical capacities tests, psychological tests and anthropometric characteristics.

Though the area of spotting talent for sports is at its infancy stage in India, but many advance countries like G.D.R, Brazil, USSR etc have adopted various systems of selecting talents at the grass root level. Various attempts have been made to improve the means of selecting/searching talent in India in the recent times but till recently, a concrete system or means has not yet been able to evolve in India for searching talent at the grass root level. This is due to the fact that there is a wide diversity in the growth and development pattern of children from one region to the other region in India itself. These wide diversity are influenced by different ethnic, religious, social and cultural factors and due to the variety of customs and dietary habits.

Shephard (1991) have also reported that although Canada and United States are close neighbour and share atleast one common language, but still there are number of important geographic, social and cultural differences between these two countries which have left their distinctive imprint upon pattern of fitness and health care in these two countries.

India has its own unique cultural, social, geographical, demographical characteristics. Because of these wide diversity in terms of above factors, it is impossible to identify a definite set of procedure for the selection of young children possessing talent for sports in India. As per literature it is evident that studies have been conducted on motor development among children in India, (Muthiah, 1976; Joon, 83 and Singh, 1986) but no studies have been reported in the area of talent selection based on anthropometric and motor quality profiles according to different geographical region of India. More over there is no clear cut guidlines and norms available for selecting talents between 8-14 years of age on the population of different geographical region of India and in particular of Eastern and North East Region.
1.5 Statement of the Problem

The present investigation is concerned with the study and comparison of selected Anthropometric and Motor quality profiles of 8 - 14 years boys of Eastern and North East Region of India.

1.6 Purpose of the Study

It appeared that reports on the longitudinal as well as cross sectional studies on physical growth and motor quality development of the Indian children were scanty. Extensive studies available around us were also insufficient to bridge the gap in the knowledge of the influence of multifarious factors on physical and motor development of the children between 8-14 yrs. of age. More over due to lack of suitable tests as well as norms based on the Regional variation are not available in India, which was a matter of great concern, while dealing with the selection of the talented boys for sports from different Regions of India. Keeping all these in views, the objectives of the present study were as follows:

(i) To evaluate the Anthropometric and Motor quality profiles of boys between 8-14 years of age of Eastern and North East Region of India.

(ii) To analyse and compare the differences in selected Anthropometric and Motor quality profiles between the boys of Eastern and North East Region of India.

(iii) To study and compare the growth and development pattern of boys of Eastern and North East Region of India according to their chronological age.

(iv) To study the relationship between selected Anthropometric characteristics and Motor quality variables of Eastern and North East Region boys.

(v) To formulate the standard norms for the selected Anthropometric and Motor ability tests for Eastern and North Eastern Region boys between 8 - 14 years of age for future selection and comparison.
1.7 Significance of the Study

In general present study may be of great importance for those who deal with the human material especially children, who are concerned with Physical Education and Coaching/Training in sports. The significance of the present study may be as following :-

(i) The finding of the present study may throw new light about the potentialities of the boys of Eastern and North East Region of India.

(ii) The present study may provide new insight regarding the growth and development trends of the boys of different age group (8 - 14 yrs.) of Eastern and North East Region of India, which will help to classify and select the boys for different sports and games based on anthropometric and Motor quality tests protocol.

(iii) The study may help to find out the boys of a particular region who are endowed with required potential, which may be suitably exploited for the further development to become the future champions.

(iv) Comparative analysis of physical structure and Motor quality profiles of boys of Eastern and North East Region can be made from this study.

(v) The norms based on the present study may help the Coach/Trainer and Physical Educationist for the selection and comparison of performance of boys of Eastern and North Eastern Region of India.

(vi) The study may help to formulate a battery of tests, which may be reliable for the selection of talented boys from Eastern and North East Region states of India.

(vii) The present study may also help to “Catch them young and train them right” scheme for the upliftment of the sports status of the nation.

1.8 Delimitation of the Study

(i) The subjects of the present study were delimited to three (3) states of Eastern Region of India i.e. Bihar, West Bengal and Orissa and five (5) states of North East Region of India i.e. Assam, Arunachal Pradesh, Manipur, Meghalaya and Tripura.
(ii) The age range of the subjects of this study was delimited between 8-14 years of age only, which were further sub divided in seven (7) different age categories i.e. 8 yrs., 9 yrs., 10 yrs., 11 yrs., 12 yrs., 13 yrs. and 14 yrs.

(iii) The subjects for the present study were further delimited to boys only who were studying in different schools of different states of Eastern and North East Region of India and who were actively involved in physical education and sports programmes of schools.

(iv) The study was confined to selected absolute and relative anthropometric variables viz. Height, Weight, Body Fat percentage and Somatotype components (i.e. Endomorphy, Mesomorphy and Ectomorphy).

(v) The study was further confined to seven (7) selected motor abilities i.e., speed, agility, explosive strength of legs, explosive strength of arms and shoulder, grip strength, back strength and cardio-vascular endurance.

1.9 Limitation of the Study:

(i) The ethnic, racial climatic and environmental conditions are more or less same in all the seven States of North Eastern Region of India, but the data collection were restricted to Assam, Arunachal Pradesh, Manipur, Maghalaya and Tripura only.

(ii) Due to lack time, money, transport facilities and over and above due to adverse weather and political conditions in NER of India, the investigator could not cover all the seven States of NER of India.

(iii) Though the tests and measurements on selected variables were conducted on different dates during the three years period but the time and month remained more or less the same in ER and NER respectively. Thus, it may be accepted that environmental and climatic condition would not affect the performance of the subjects of ER and NER.

(iv) However, due to environmental and climatic variation of ER and NER of India, the investigator could not control the influence and effect of these factors on performance of the subjects in motor quality tests.
Due to lack of time and extensive nature of the study, the investigator could not study the growth and development trend of motor quality variables in detail.

1.10 Meaning and Definition of the Terms

Anthropometry

The measurement of structure and proportion of the body is called as Anthropometry (Phillip and Hornak, 1979).

Anthropometric Measurements

Anthropometric measurements are dimensions of the structure of the human body taken at specific sites to give measures of length, girth, mass and percentage of subcutaneous fatty tissue (Clarke, 1976).

Morphology

Morphology refers to constitution of the adult person which is formed by the manifestation of genetical endowment and as a result of adaptation process to environmental effects.

Physique

Physique refers to the shape, size and form of an individual (Sodhi, 1991).

Somatotype

A somatotype is a description of present morphological confirmation, which is expressed in three numerical rating, consisting of three sequential numbers, always recorded in same order (Sodhi, 1991).

Endomorphy

Endomorphy implies a trend toward the predominance of soft roundness throughout the different regions of the body and particularly a massiveness of the digestive viscera (fatness).
Mesomorphy

Mesomorphy refers to the accentuated development of the certain body structures derived from the embryonic mesoderm; particularly bone, muscle and connective tissue (Muscularity).

Ectomorphy

Ectomorphy means predominance of surface area relative to bulk and of the brain and central nervous system relative to mass (linearity).

Speed

It is the performance pre-requisite to do motor actions under given conditions (movement task, external factor, individual pre-requisites) in minimum of time (Theiss and Schnabel, 1987).

Strength

Strength is the ability to overcome or the act against resistance. It is the product of voluntary contraction of muscle caused by the neuro-muscular system (Singh, 1991).

Explosive strength

Explosive strength is the ability of a muscle or a group of muscles to release maximum force in the shortest possible time, in an explosive manner, projecting the body or an object (Clarke, 1976). It is the ability to overcome resistance with high speed.

Strength Endurance

It is the ability to overcome resistance or to act against resistance under the conditions of fatigue (Singh, 1991).

Endurance

Endurance is the ability to do sports movements, with the desired quality and speed, under condition of fatigue (Singh, 1991).
Cardio-vascular Endurance

It is the ability of lung and heart to take in and transport adequate amounts of oxygen to the working muscles, allowing activities that involve large muscles masses (e.g., running, swimming, bicycling) to be performed over long period of time.

Agility

Agility is the physical ability which enables an individual to rapidly change body position and direction in a precise manner. (Johnson and Nelson, 1979).

Motor ability

Motor ability is the ability to perform motor skills involving all basic performance traits including coordination.

Physical Fitness

The physical fitness is the sum total of five motor abilities namely strength, speed, endurance, flexibility and coordinative abilities (Singh, 1991).

Training

It denotes the process of preparation for some task.

Sports Training

Sports training is a pedagogical process, based on scientific principles aiming at preparing sportsmen for higher performances in sports competition (Singh, 1991).

Growth

Growth indicates the enlargement of the cells, fibres and muscles, elongation of skeleton and increase in the general volume of the body parts and organic systems. It is quantitative in sense that can be measured.

Development

Development is a wider term indicating advancement, more unfoldment and a progressive change - a sort of growing forward to a greater maturity. It is a process of qualitative transformation which brings about maturity and functional improvement.
Sports talent

Sports talent is the sum total of pre-requisites (and possibility of their development) possessed by a person which will enable him to achieve high performance in a sport in future (Singh, 1991).

Talent Identification

It is a process of determining performance pre-conditions (abilities) which a person must have in order to be able to reach a high level of performance and which must be spotted by using appropriate diagnostic techniques (Harre, 1982).