Chapter I

INTRODUCTION

Sport is justly called the "School of Will Power" and the "School of Emotions". In everyday situations not often does one confront such high requirements of will power as during sporting competitions and in sporting activity in general. The moulding influence of sport on a person and, hence, its importance in moral upbringing are conditioned by the breadth and intensity of human relations in the sphere of the sporting activity. These relations on the whole are never narrowed down to the purely personal. Intercollective, intranational and international sports ties bring an athlete into the sphere of broad social relations thus exceptionally increasing the role of the sporting activity as a factor of the social moulding of a personality. Personality traits are thoroughly revealed and tested in the complicated situations of a sporting life (Matveyev, 1981).

It has been shown that many modern sports present, in fact, a specific means of physical education. They allow a maximum degree of development of physical abilities, motorskills and knowledge. Sports aims at the highest achievements and is highly specialized.

Physical fitness beside other qualities is of vital importance to attain highest performance in any sports
activity. Physical fitness is variously defined by different authors. However, it was Kennedy (1977) who highly rated its significance by pointing out that intelligence and skill could function at the peak of their capacity only when the body was healthy and strong and it was physical fitness that was the most important key to a healthy body. Thus physical fitness is the basis of dynamic and creative intellectual activity. The integrated concept of fitness is powerfully explained by Kircher (1978) by pointing out that fitness is a measure of the degree of efficiency of functioning of a person in relation to his potential and such functioning depends on all component factors of physical, mental and social aspects in a mutually interdependent manner. Similar interpretation has been given by Jones, Spainberg and Byer (1972) who stated that fitness implies the ability to function to optimum level of efficiency in all daily living. Total fitness involved intellectual, emotional and social as well as physical conditioning. However, all of them have emphasized the physical aspect of fitness by writing "Totally fit individual has the strength, speed, agility, endurance and social and emotional adjustment appropriate to his age".

Physical fitness per se, is ably defined by Barrow and McGee (1971) as the total functioning capacity to perform some specific task requiring muscular effort which implies sound organic development, motor skill and capacity
to perform physical work with biological efficiency.

Similarly, Bucher (1975) has defined physical fitness as the state which characterized the degree to which the person is able to function implying ability to perform resisting fatigue, performing with a high degree of motor ability and being able to adapt to muscular stress.

Fleishman (1964) points out that though defining physical fitness in terms of performance capacities has its own merits, the more important aspect is that such physical fitness stimulates a person to take to a variety of more efficient physical performances that lead to useful and enjoyable life activities.

Thus it is made abundantly clear that physical fitness is one of the most desirable objectives of education and it is physical education alone that is capable of developing it adequately.

Various sports and events make differing demands on physical fitness which has various components i.e. strength, endurance, speed, agility balance etc. but the strength is the key factor of total fitness. Maximum strength, power and strength endurance are three main characteristics, the later two being the strength abilities, are needed for most of sports.

All qualities of physical fitness depend upon the capacity of the organism to manage the energy required for working under continuous supply of oxygen for energy
metabolism or energy metabolism with delayed supply of oxygen during recovery stage and conditions of neural transmission. Intensive burst of activities i.e. executing high load of work with explosive action in a short duration of time such as, explosive take off in jumps, throwing an implement, kicking the football faster and far etc. depend upon anaerobic capacity.

As a matter of fact, scientific investigators in exercise physiology, biomechanics, sports medicine and other related sports sciences have facilitated numerous modifications in training methods and have introduced their variants which in turn help to achieve highest sports achievement of performance through improvement of strength abilities. However, there are not much changes in the basic methods of training, but now they have been put into more intelligent science based systems that involve higher quality, more quantity and regular and prolonged applications.

It is recognized that resistance training enhance muscular performance; Investigators maintained, that high resistance, low repetition exercises build powerful muscles, whereas low resistance and high repetition exercises produce the quality of endurance, suggesting a functional and specific relationship between training stimulus and response.

It is also well recognized that strength training
is a key to success for all sports and games. An adequate amount of strength is needed for all games and sports. Weight training is one of the ways to develop specific type of strength due to the fact that resistance can be manipulated at will.

Now modern weight training equipments i.e. multigym and isokinetic machines are available for the development of specific strength for specific group of muscles.

But the unique thing about training is that different program do different things to the body. Some program develops muscle strength, while other improves the function of heart and circulatory system. One of the best way to train for increasing muscle strength is by lifting weights.

To increase the working ability of the heart and circulation, running and cycling are good exercises. Although training program differs depending on which organs need to be conditioned. There is something common to all of them. They all increase physical performance by applying the same principle. This principle is called the over-load principle which holds that changes take place when work is gradually increased and conditioning improves. This is the principle followed to develop muscle size and strength.

Weight training has its best effect when the exercises are done through the longest range of motion
possible. This allows to stimulate the maximum amount of muscle fibers. But it has another effect as well: when we fully contract one muscle, we are stretching its opposing muscles. Therefore weight training done correctly leads to an increase in flexibility also.

An other way to develop muscular endurance, strength and circulo-respiratory endurance is circuit training which represents a series of exercises that are performed in a circuit and in a progressive manner, doing a prescribed allocation of work at each station. As the performer becomes stronger, the number of repetitions and the quality of the exercise are increased (Bucher C.A. 1972). Circuit Training is a training method by which exercises of various kinds are performed in sequence with or without apparatus after having given a dosage (No. of repetitions, intensity of stimulus, duration of pauses etc.) planned before hand and inter-spaced by intervals (Uppal et.al. 1983).

The idea of circuit training was first put into practice at leads University in 1953 by Gream T. Adamson. The aim of circuit training is to improve muscular endurance, strength and circulo-respiratory endurance by progressive loading based on the individual's capacity. This was unique English contribution to the programming of physical education during the late fitness. Circuit training is a form of general fitness training based on sound
physiological principles. Circuit Training has three main characteristics:

1. To develop muscular and circulo-respiratory fitness.
2. To apply the principle of progressive loading.
3. To enable a large number of performers to train.

Simultaneously by employing a circuit of consecutively prescribed exercise rounds the performer perform a prescribed exercise and checks his progress against the clock (Morgan and Adamson 1972).

Circuit Training has proved to be one of the best method to achieve physiological conditioning among students in physical education classes or members of athletic teams. The major advantages of circuit training are economy of time imparent in the organisation of a circuit, small amount of space and equipment required, and ease in supervising a training program. Another advantage of the circuit is that bad weather does not effect the circuit schedule since all the stations can be arranged indoors. The activities in the circuit are varied and thus seem to hold the interest of the athlete.

Berger (1962) demonstrated that three sets of 4-8 repetitions per set with as much resistance as could be handled produce optional strength gains. Berger and Hardage
Penman (1969) measured acquisition of leg strength in subjects trained by dynamic leg extensions against a resistance allowing only 12 repetitions, maximal effect isometric leg extensions, and running up and down stadium bleachers. He found that the smallest gains in strength were made by these subjects trained by running bleachers.

Anderson and Kearney (1982) concluded that human skeletal muscle makes both general and specific adaptations to a training stimulus, and that the balance of these adaptations is to some extent dependent upon the intensity and duration of the training protocol used.

The optimal frequency of exercise participation required to elicit changes in physical fitness or strength characteristics is difficult to establish since it is dependent upon the particular aspect of fitness desired, the age and fitness level of the subjects involved, as well as the intensity and duration of the training regained. Thus, to testify or to determine the optimal frequency of training, this study was undertaken to compare the effects of various training frequencies on the strength characteristics of Senior Secondary School boys by employing weight training and circuit training means.
Statement of the Problem

The purpose of this study was to compare the effects of varied schedules in weight Training and circuit Training on strength characteristics of secondary school students.

Objective of the Study

1) To compare the effects of varied schedules in weight training and circuit Training on strength characteristics of secondary school boys.

2) To compare effects of weight training and circuiting Training on maximum strength, power (explosive strength) and strength endurance.

3) To compare the effects of four days a week Training schedule of weight Training and circuit Training on maximum strength, power (explosive strength) and strength endurance.

4) To compare the effects of two days a week Training schedule of weight training and circuit training on maximum strength, power (explosive strength) and strength endurance.
Delimitation

1. The study was delimited to the male students of Bhupindra Khalsa Senior Secondary School Moga, District Faridkot, Punjab.

2. The study was delimited to the students of classes eleventh and twelveth only.

3. The study was confined to only selected strength characteristics namely maximum strength, Power (explosive strength) and strength endurance.

Limitation

The subjects of the study were having different nature of habits, diet, personal exercises routine as they were coming from different places and having different socio-economic status. Thus these factors were not under control and it was treated as limitation of the study.

The sophisticated equipments are in existence to measure the strength characteristics, but non availability of these equipments was also considered as limitation of the study.
Hypothesis

1. It was hypothesized that four day weight training in a week would have considerable effects on strength characteristics.

2. Four day circuit training a week would also have considerable effects on strength characteristics.

3. Degree of effects of weight training and circuit training would be varied.

Definitions of the Terms

Circuit training

It is a series of exercises that are performed in a progressive manner, doing a prescribed allocation of work at each station (Morgan and Adamson, 1972).

Strength endurance

Strength endurance is the athlete's tolerance level against fatigue in strength performance of longer duration it reveals itself by a relatively high strength
combined with an unusually high endurance capacity (Harre, 1982).

Maximum strength

Maximum strength as being the greatest force an athlete is able to exert for a given contraction of muscles (Harre, 1982).

Power (explosive strength)

Power is the ability of an athlete to overcome resistances by a high speed of contraction (Harre, 1982).

Significance of the Study

Sports achievement is always a many-sided phenomenon and it depends on many factors and conditions such as individual gift of athletes and a degree of their preparedness for an achievement; The scope of sports culture and general social conditions of its development and the effectiveness of the system of training, its content, organisation, natural and technical provision. The first of these factors is relatively conservative because it is based on natural inclinations where as the effectiveness of sports training system is dynamic because it constantly changes as
the athlete engages in sport as consequence of an expedient activity. It means that through purposeful scientific training an athlete masters rational forms of movement, improves them and purposefully developing his gifts, develops abilities necessary for his sport. Thus a scientific training method is decisive factor which directly influence the improvement of results. However, athlete's effort on self improvement is prerequisite for the same.

It is notable that the achievements at the present-day stage of development of sports, swiftly, increase with a corresponding increase in volume of training. Even the most gifted sportsman will not perform outstandingly if he does not work persistently, train systematically and prepare himself for next achievement.

As the system of sports training (especially its scientific and methodological foundations) improve, its effects on the general level of sports achievements increases. It is obviously indicative that Olympic record of the first modern Olympic games which in those times seemed to be outstanding, to days are within reach of thousands of thousands rank-and-file athlete. This explained, in particular, by the evolvement of new, scientifically substantiated training method and of course improvement of sports infrastructure and equipment, as well as other factors such as sports awareness, rekindle way of organisation etc.
Thus keeping in view the vitality of weight training and circuit training methods in all sports training programs, the attempt has been made to investigate scientifically the comparative effectiveness of varied schedules of training on strength characteristics such as maximum strength, power (Explosive strength) and strength endurance by employing weight training and circuit training means. Hence the result of the study would be of great practical significance for coaches, physical educationist and sports scientist in the following ways:-

1. The study would help to know which of the two training methods is better in improving strength characteristics.

2. The study would also help to know which of the two training schedules (frequencies) was better in improving maximum strength, power (explosive strength) and strength endurance.