Chapter – I

Introduction
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INTRODUCTION

Sport has a very prominent role in modern society. It is important to an individual, a group, a nation indeed to the whole world. Sport is an institutionalized competitive activity that involves vigorous physical exertion or the use of relatively complex physical skills by individuals whose participation is motivated by a combination of the intrinsic satisfaction associated with the activity itself and external rewards earned through participation. The essential component of sport is competition, the striving to achieve a prescribed goal. This competition must be under rules and standardized conditions (Howell, et.al., 1994).

Sports participation and appreciation have become integral part of lives. Competitive sports make tremendous demands on the physical conditioning, vitality, endurance and mental powers of the participants. Only the players of fitness can play to the best of their ability. Each sport has its own pattern, muscle load, tempo and duration. In addition to the contentment the physical fitness is also an additional healthy remark in sports
participation. These are the advantages for players who take part in various sports events. However the concern for physical fitness is a common interest of every human being starting from infancy to aged. Today the people of every country are more concerned with physical fitness than ever before as it has become the vital part of winning sports competitions.

Nurturing and improving basic physical qualities and their elements are the main aspects of preparing athletes for sports and games (Homenkora, 1996). The aim of general physical training is to develop major motor abilities such as strength, endurance, speed, agility and flexibility. The means and methods of training should be of both general and specific in order to achieve successful results. In other words, training should be around in nature (Krassilchtchikov, 1997).

Sportsmen undergo various types of training to improve their performance and physical fitness. Training means a systematic and scientific programme of conditioning exercise and physical activities designed to improve the physical fitness and skills of players (Fox, 1984).

Physical fitness is one of the most important factors that determine the performance level of an individual. Sports
performance depends largely on physical fitness factors such as strength, speed, endurance, flexibility and various abilities requiring co-ordination. Sports activity is a physical activity which is not possible without these motor abilities. Fitness factors are the most important for predicting athletic performance. Natural ability is the promise of potential but fundamentals are the foundation of excellence *(Clarke and Clarke, 1987).*

Training is the main component and the basic form of preparing the athlete for higher level of performance. It is a systematically planned preparation with the help of the exercise which realizes the main factors of influencing progress of athlete. The content of training includes all the basic types of preparation of the sportsmen such as physical, technical, tactical and psychological levels. Through systematic training the “fitness level” of the athlete and his acquisition of vital knowledge and skill are improved.

Sports training is a basic preparation of sportsman for better performance through physical exercise. It is based on the scientific principles aiming at education, improvement of general health and organic functions as well as increasing the strength and stability of the musculo-skeletal system and enhanced performance. Development of motor skill is also one of the
objectives of sports training. Sports activities consist of motor movement and action and their success depends largely on how correctly they are performed. Techniques of training and improvement of tactical efficiency play a vital role in training process (Singh, 1991).

In recent years there has been a remarkable expansion of sports sciences. The subject area is now recognized both as an academic discipline and a valid area of professional practice. Sports science is well respected within its parent disciplines, for example Biomechanics, Biochemistry, Physiology, Psychology, Sociology and so on. A new maturity becomes apparent as the sport sciences are increasingly applied to address problems in particular sport rather than to sports in general.

Soccer is the world popular form of sport, being played in every nation without exemption. The most widespread code is association of Football or Soccer. This sport has a rich history though it was formally acknowledged as the people of the world know it today by establishment of the Football Association in 1863. The game soon spread to Continental European countries and later to South America and other continents. The world’s governing body, the Federation of International Football
Association (FIFA), was set up in 1904 and the first Olympic Soccer competition was held four years later (Rink, 1987).

Soccer, as it is seen today, has undergone a tremendous improvement since its birth. Of all the events in human history the one to attract the largest audience was neither a great political occasion nor a special celebration of some complex achievements in the art or science, but simple ball game a Soccer match. If it is examined more carefully one would soon realize, that each Soccer match is a symbolic event of some complexity. One of the greatest strength of the game is its simplicity. At its crudest level all that are needed is a ball and an open space with something to act as a goal post. No other sport is so easily available and so immediately inspiring (Morris, 1981).

Soccer is one of the most popular sports in the world in terms of spectator sports and participation of players. It is fast, quick, aggressive and attractive. It is considered as a strenuous game because the game demands a high degree of fitness as well as intelligence and alertness of mind. The following factors such as speed, strength, ability, balance and flexibility are the basic qualities for all the elite Soccer players (Rink, 1987).
Soccer is perhaps India's one of the oldest favourite sports. It is played widely all over the country and is as popular in India as it is in Europe and Latin America. The game Soccer was introduced in India during 1880 by the British people who ruled over India. The sport had become popular first in Bengal before it spread to other parts of the country. The Christian Missionaries started many educational institutions in Pre-Independent India. The Indian players got the opportunity to learn Soccer through these institutions. This was the milestone for spreading Soccer to the nook and corner of India. The military officers, priests and teachers contributed much to the promotion, growth and development of Soccer in India.

A prerequisite for playing Soccer is possession of the skills and fitness to do so. Fitness refers to a range of individual characteristics and in a game like Soccer is a composite of many attributes and competencies. As a consequence, fitness for Soccer is said to be multivariate and also specific to the sport. It compromises physical, physiological, psychomotor and psychological factors. Such qualities needed in contesting and retaining possession of the ball, maintaining a high work-rate for 90 minutes of play, reacting quickly and appropriately as
opportunities arise and regulating mental attributes before and during match-play.

Soccer players need a high level of fitness to cope with the physical demands of the game and to allow for their technical skills to be utilized throughout the match. Therefore, fitness training is an important part of the overall training programme. Fitness training has to be multifacet in order to cover different aspects of physical performance in Soccer. Thus, training can be divided into a number of components based on the different types of physical demands during match.

With appropriate training, performance of a player during a match can be increased and the risk of injury can be reduced. In order to design an efficient training programme it is important to be aware of the different components of fitness training in Soccer. *(Reilly, 1996).* Since 1970, physical conditioning has been become an integral part of Football. Most defenders are required to run down the wing, while attackers often check back to link up with the halfbacks. An average professional player runs about 6-9 kilometers (4-6 miles) per match. Some midfielders cover up to 13-15 kilometers (8 miles) *(expertfootball, 2007).*
Soccer fitness training must be done right in order to preserve speed, agility and power. Fitness training done incorrectly may also lead to injury. Conditioning for Soccer is a key component to Soccer success. Only 2-3% of the game is spent with the ball. This means the coach needs to spend a significant amount of time increasing fitness levels for his team (elitesoccerconditioning, 2007).

Strength and conditioning training is now an integral part of athletic preparation for all serious athletes and sports teams. However, the issue of how best to train to prepare for athletic competition is very controversial. Issues such as volume and frequency of training, choice of exercise and movement cadence are debated by athletes, coaches and exercise scientists. One of the most controversial issues in this field is the use of ‘explosive’ exercises to increase strength and power. These can be defined as “resistance exercises characterized by maximal or near-maximal rates of force development or by high acceleration”. Typical examples of such exercises, commonly prescribed by strength coaches, are Olympic-style lifts such as the clean and jerk and snatch, and derivatives of power clean and hang clean. Also, so-called ‘plyometric’ exercises defined as “maximal, all out-quality efforts in each repetition of exercise”, as well as performing any
weight training exercises at a relatively fast cadence, are popularly believed to be effective in enhancing strength, power and the rate of force development. This is based on the fact that muscle fiber composition provides the potential for the neuromuscular system to produce fast speeds, in particular fast twitch fibers. However, the selective recruitment of muscle fiber type is impossible. As such, muscle fibers are recruited by the nervous system in a logical progression according to the force requirements and not the speed of movement. For example, slow twitch fibers meet the demands of low muscular intensity, whereas the fast twitch fibers are eventually recruited when the other fatigue resistant fibers are exhausted. Therefore slow twitch fibers are recruited first and fast twitch last and there is no definite proof that undertaking explosive tasks will by-pass this process (Bruce, 2007).

Strength training now plays a major role in Soccer. However, simply lifting weights with the traditional approach of "3 sets of 10 repetitions" is not an efficient way to spend training time. Soccer skills require a balanced development of explosive power and muscular endurance. Some players may benefit from increasing their lean body mass but even they should focus on converting much of their strength into Soccer-specific power.
Strength training for Soccer also helps correct muscle imbalances. Soccer players in particular are prone to developing overly strong quadriceps in relation to their hamstrings and a well-formed strength plan can address this and prevent future injury (Gioftsidou, 2006).

Strength training can be resulted in hypertrophy of the muscle, partly through an enlargement of muscle fibers. In addition, training with high resistance can change the fiber type distribution in the direction of faster twitch fibers. There is also neuromotor effect of strength training and part of the increase in muscle strength can be attributed to changes in the nervous system. An improvement in muscular strength training through isolated movements seems closely related to training speeds (Reilly, 1996).

Strength is the ability of the body, or a part of the body, to apply or withstand force. The development of strength relies on resistance training and involves exercising at various loads, modes, speeds, angles and frequencies. The combination of these variables dictates the outcome of the resistance training programme.

Strength is required for power production, stabilizing a joint, supporting arms and legs (core stability), avoiding injury, and
coping with contact. The resistance used during strength training can be one's bodyweight, bodyweight plus a weighted vest, barbells and dumbbells with light, medium or heavy loads, medicine balls or an unstable surface such as a wobble board or swiss ball (fitness4football, 2007).

At present and for the past 10-20 years strength training has been the principal method for conditioning and preparing athletes for participation in sports. Different types of physical exercises are used with or without additional resistance to improve and maintain strength and related qualities. The most commonly used and the most effective exercise with additional resistance is the weight training exercises. These exercises are done with additional weights i.e., barbell, dumbbell, iron shoe and so on. These exercises are very effective for the improvement of maximum strength and explosive strength (Yessis and Hatfield, 1986).

There are innumerable exercises in which the body weight of the sportsman acts as resistance for improving strength i.e., all types of jumps, wall bar exercises for strength, pull-ups, rope climbing, sit-ups, etc. These exercises, if properly done, are very effective for improving explosive strength and strength endurance. Most of these exercises can be done without any equipment. The
load intensity in these exercises is automatically related to one's own body weight. In several sports and other cases where weight training equipment is not available and through exercises with one's own body weight as resistance (Singh, 1991).

Key to the development of muscular strength is the progressive resistance training which can be best achieved through selected weight training exercises. A group of 6 to 8 exercises with varying sets and repetitions involving different parts of the body is usually included in a programme of weight training. In weight training, repetition refers to the number of times a resistance is overcome and a set is the period during which the required number of repetitions are to be performed without the weight being put down. To start with, the weight should be so adjusted as may be comfortably overcome by an individual and as the strength improves the weight could be correspondingly increased (Uppal, 1992).

Plyometric refers to exercise that enable a muscle to reach maximal strength in as short a time as possible. Such exercise usually involved some form of jumping, but other modes of exercise exist. Plyometric exercise utilizes the force of gravity to store energy in the muscles (potential energy). This energy is utilized immediately in an opposite reaction, so the natural elastic
properties of the muscle will produce kinetic energy. Elastic strength is the ability of muscles and connective tissues to rapidly exert a force in order to produce maximal power with linear, vertical, or combination movements (Baechle, 1994).

Hurdling, hopping and jumping over objects require balance for proper execution. Changing directions rapidly while dribbling or marking would be almost impossible without good balance. Plyometric, whether performed with one or two legs, will force the body to learn balance and at the same time create strength in a balanced position. This training has a carryover effect to the most fundamental Soccer actions—jumping, heading, tackling, striking, and positioning (humankinetics, 2007).

Plyometric are jumps or combinations of jumps that produce quick and powerful movements using a stretch reflex. A stretch reflex occurs when a muscle lengthens (stretches) and then immediately shortens - the reflex action occurs when the muscle changes from the lengthening to the shortening action. These are specific training mode for Football because the movements replicate the game's mixture of vertical and horizontal acceleration against the ground and the triple extension of the ankle, knee and hip joints. Thus plyometric enhance power, speed and agility (fitness4football, 2007).
In Soccer, lower body strength is required for kicking, jumping, tackling, twisting and turning and also forms the foundation for explosive speed. Upper body strength is required for shielding the ball, holding off opponents, throw-ins and also contributes to overall power and explosiveness. The changing nature of Soccer demands better skills and increased physical abilities. It is a known fact that Soccer players should be better in physical, physiological, morphological measures and body composition components. But there is no previous study to the knowledge of investigator, to find out the series and parallel method of combined weight and plyometric training, which contribute for successful outcome in Soccer game. The present study is a sincere attempt on the above concept.

**STATEMENT OF THE PROBLEM**

The present study was designed to find out the effect of combined weight and plyometric training in series and parallel methods on selected power related and performance factors such as speed, explosive power, elastic power, shooting, dribbling and passing abilities among Soccer players.
HYPOTHESES

It has been scientifically accepted that any systemic training over a continuous period of time would produce desirable changes in athletic qualities. Based on this concept, the following hypotheses were drawn.

1) There would be significant improvement on power related and performance factors such as speed, explosive power, elastic power, shooting, dribbling and passing due to the effect of combined weight and plyometric training in series and parallel methods among the experimental groups.

2) There would be significant differences among the experimental groups on speed, explosive power, elastic power, shooting, dribbling and passing after the experimentation.

DELIMITATIONS

The study was delimited to the following factors.

1) This study was restricted to forty five Soccer players from Adhiyamaan Educational and Research
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Institutions, Hosur, Tamil Nadu, India during the academic year 2006-2007.

2) The age of the subjects ranged between 19 and 22 years.

3) The subjects were divided at random into three groups of fifteen each (n=15). Group I underwent combined weight and plyometric training in series method, Group II underwent combined weight and plyometric training in parallel method, and Group III acted as control.

4) The duration of the training period was restricted to 12 weeks.

5) The study was restricted to two methods of training and they were designated as series training and parallel training. Series method group underwent weight training programme for 7 weeks followed by plyometric training programme for the next 5 weeks. Parallel method group underwent weight training programme and plyometric training programme in the alternate sessions in each week for twelve weeks and
control group underwent no specific training but they had regular Soccer play.

6) The following dependent variables namely speed, explosive power, elastic power, shooting, dribbling and passing were selected for the present study.

7) The selected criterion variables for the study were assessed by the following standardized test items; speed was assessed by 50 meters run, explosive power was assessed by standing broad jump test, elastic power was assessed by bunny hop test and shooting, dribbling and passing were assessed by Mor-Christian Soccer test.

8) The data were collected two days prior to and two days after the training period.

**LIMITATIONS**

The following limitations were considered while interpreting the results of the study.

1) The previous experience of the subjects in the field of sports and games which might influence the training and data collection were not considered.
2) Psychological factors, food habits, rest period, life style etc., could not be controlled.

3) The weather conditions such as atmospheric temperature, humidity and meteorological factors during testing and training periods were also not considered.

4) Though the subjects were motivated verbally, no attempt was made to differentiate the motivation levels during the period of training and testing.

5) Since the manual operation was made during 50 meter run and dribbling test, the time was recorded in one tenth of a second.

**DEFINITION OF OPERATIONAL TERMS**

**Soccer**

Soccer is a game in which there are eleven players a side in which one of whom shall be a goal keeper. The ball is round and is to be kicked through the goal posts under the crossbar. No handling of the ball is allowed except by goal keeper *(Barrow and Mc Gree, 1988).*
Sports Training

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

Weight Training

A form of strength training or resistance training using either free weights or a weight training machine (Kent, 1994).

Plyometric Training

Plyometric training refers to exercises that enable a muscle to reach maximal strength in as short a time as possible (Baechle, 1994).

Series Training

Series training indicates the process of performing a particular training during the first phase followed by the another form of training in the next phase.

Parallel Training

Parallel training indicates the process of performing two different forms of training in the alternative sessions.
Speed

Ability to perform rapidly successive movements over a short period of time in a single direction (Singh, 1991).

Explosive Power

It is the quality of a muscle to contract forcefully in the quickest possible time (Dick, 1980).

Elastic Power

The ability of the muscles to exert force quickly to overcome resistance with a high speed of contraction (Seagrave, 1996).

Shooting

Shooting is a fundamental and versatile technique used for scoring.

Dribbling

Dribbling is nothing more than moving with the ball across the field. It is a skill used to relocate a player into desirable positions where he can shoot or pass the ball.
Passing

Passing is the exploitation of possession by transferring the ball from one teammate to another. Passes could be offensive or defensive in their nature. Regardless of their purpose, passes are executed with the desire to keep possession of the ball.

SIGNIFICANCE OF THE STUDY

1) The ultimate goal of research in physical education is to help coaches and physical educators to train their athletes and players based on new concepts to improve their performance.

2) The results of the study may be useful to the professional colleagues of physical education and sports in the following ways.

i. To study the effect of combined weight and plyometric training with series and parallel methods on selected power related factors among Soccer players.

ii. To study the effect of combined weight and plyometric training with series and parallel methods on selected performance related factors among Soccer players.
3) The study would add new knowledge in the area of sports training.

4) The study would provide guidance to physical educators and coaches to prepare strength training schedules for Soccer players.