INTRODUCTION

Right from the inception of human history, sports have always played a greater role Whereas, it was the concentration of hard work and frolic to start with, sports became an independent item gradually and in the modern world, sports of various kinds have gained a status as equal as a profession. The latter-day world attaches great importance to sports and game as it has never been before.it is not only in the purview of increasing physical strength but also sports provide scopes for psychological well-being along with opening up a scope financial stability.

In an individual personal realm, sports extend further scopes mainly in the four levels: physical strength, social adaptation psychological growth and physiological efficiency. Towards bringing about total efficiency these four levels, various activities are to be performed. According to Anaheim, different activities help increase in the efficiency of circulatory, respiratory, metabolic, and neurological and temperature regulating functions of an individual's physique. **(Anaheim 1987)**

Along with the development of physical education, the branches of sports science also attained relevance side by side and functioning of complimentary field, newer and newer innovations, findings and method have been introduced or evolved in the field of sports. Now, there are myriad of methods adopted by physical education professionals to improve the determiners that help increase the efficiency required for proper functioning of circulatory, respiratory metabolic and neurological and temperature regularity aspects. All these developments are in line with demand of each games and sports. Anaheim defines sports as an institutionalized competitive activity in which an individual

showcases his physical power or his skills to perform a relatively complex physical activity. It is mostly motivated by the activity itself or external reward earned through participation **(Anaheim 1987)**

In the field of sports and science, researchers have been conducted in order to make an individual a well performing sports person. As performance is determined by the physical fitness of the individual. The following components are to be focused accordingly while preparing for an event:

1. Strength
2. Endurance
3. Speed
4. Flexibility
5. Agility
6. Coordination

The components always demand relentless training. Most advisable training method to achieve the same fitness are plyometric training, weight training, circuit training, interval training, fartlek training, altitude training, resistance training set training

1.1 Sports: A history Evolution

Latest discoveries of cave arts like lascaux in France and also artifacts of antiquity obtained from Africa and Australia provide us with the hints to establish that some kinds of sports were extant even before 30000 years.it was established the method of carbon dating. If not in its modern forms, we can extrapolate those sports were a major part of almost all societies around 4000 BC in China, gymnastics was performed and it was

considered as sports event. Based on the monuments of pharaohs, it is discovered that different sport event like fishing swimming were entertained. Also, items like javelin throw, high jump and wrestling were major sports event. Iranian martial arts zourkhaneh shall be traced back to warfare skill taught in ancient Persia. Also, origins of the item like polo and jousting have their roots in Ancient Persia**. (Sing, H 1984)**

In ancient Greece was famous for the events it organized and was widely considered the center for sports events. The events like wrestling, running, boxing, javelin, discuss throw and chariot race were conducted as sports event along with fostering military culture. The worldly acclaimed Olympics have its roots in the games conducted in every four years in a village called Olympia.

In the development of sports and games what one can see is the steadfastness of the regulatory rules-be it in Persia or Greece. Whereas the sports activities started as means to food and survival then became regulated activities they pose to be means of competition and entertainment. Fishing, hunting horticulture were some among them. With the outbreak of industrial revolution, People became free to find leisure time. This trend gained spectators for sports. It also helped to reduce elitism in the field and thereby ensured accessibility to common men common people accessibility to sports turned out as a factor which gained popularity for them. Centuries ahead the common man has still access to sports through mass media and global communication. Sports are seen as mean to reduce stress and a relief from the hectic life of human beings today **(Sing, H 1984)**

1.2 Game of Football

People have been kicking a ball around for thousands of years, according to history texts, but not all of those activities would be recognized as what we call football today. However, the many periods of football, or more precisely, sports requiring kicking a ball, were all vital to the game's growth. We might never have had football by today's standards if it hadn't been for the variety we've seen over the years.

While wandering through the jungles, man's favourite sport was to knock down the target by throwing or rolling stones to hit a target. Man, later refined the notion by rolling a circular ball on grass to hit a target. It had evolved in many forms and under various names in various parts of the world. When the same concept was created and spread in Britain, it eventually led to the birth of football.

In various places of the world, sports comparable to football were played, such as Mesoamerican ball games, Ullama, Ollamalizti, Pelota, Phaininda, Ba, Balloon, and Calcio Florentino. The first trace of football was found in China during the Han dynasty. Tsu' Chu was a Han Dynasty game in which players kicked a ball through a thirty-four-centimeter aperture into a goal made of canes with a net attached These games were played with a leather ball that had hair and feathers stuffed inside.

The game of 'Tsu-Chu' was recognised and recognised by FIFA as the first form of Association Football with regular regulations due to the right documentation available. 'Kemari' was influenced by the game 'Tsu Chu' and was brought to Japan from China during the Asuka period. 'Tsu Chu,' on the other hand, was a violent and competitive game, whereas the game of Kemari is not. The ancient recordical and approved versions

of Football were the 'Tsu Chu' in China, 'Kemari' in Japan, 'Episkyrose' in Greece, and 'Harpastum' in Rome, according to historical data.

The Greeks created 'Harpastum,' a game that used a smaller ball than football but followed the same principles as the contemporary game. The goal was for one team to get the ball across their opponent's boundary line on a rectangular field with boundaries and a centre line.

Eduardo Galeano observes that soccer's history is a sorrowful journey from beauty to duty. The beauty that develops from the joy of play was plucked away by the sport's fundamental roots when it became an industry. Professional soccer condemns all that is useless in this late-nineteenth-century world, and useless means not profitable. Nobody gets anything out of that insane emotion that turns a man into a kid playing with a balloon like a cat playing with a ball of yarn, a ballet dancer romping with a ball as light as a balloon or a ball of yarn, playing without even realizing he's playing, with no purpose, time, or referee.

With few protagonists and a large audience, soccer has become a spectator sport. And that spectacle has grown into one of the world's most profitable industries, organized not for fun but to obstruct it. Professional sport's technocracy has managed to impose a soccer of lightning speed and brutal power, a soccer that is devoid of joy, devoid of fantasy, and devoid of bravery. Fortunately, on the field, you can still watch some brazen rogue who ignores the script and makes the blunder of dribbling past the entire opposition side, the referee, and the audience in the stands, all for the carnal pleasure of embracing the forbidden adventure of freedom, even if just once in a while.

We can plainly observe the impact of different cultures and variants on the game we play today based on what we know about the history of ball sports where the use of feet prevails. According to records, the Lord Mayor of London outlawed football in the city in 1314 because it was producing 'chaos.' You may face jail time if you were found playing the game in London. This was built on during the 100 years of war between England and France, when Kings Edward II, Richard II, Henry IV, and Henry V ruled the game banned across the UK because it 'distracted attention from the practice of military skills,' which were judged more helpful.

Despite objections, football flourished in Britain from the eight through the nineteenth centuries; yet, a uniform version of the game was still uncommon, as regional variants were often preferred. These many variants of the game were eventually grouped together to form association football, rugby football, and Gaelic football, which all lead to the current version of the game.

Football is a universal sport since it is played in every country, big or small. It's also a terrific relaxer, stress reliever, and discipline and teamwork instructor. It is broadcast in almost every country, and millions around the world enjoy it. It is thought to be one of the oldest sports, and it is the direct predecessor of American Football, Canadian Football, Rugby, and a number of other sports.

It wasn’t until the start of the 19th century that playing football in schools became the norm, starting in public schools. While rules did not differ greatly to the standard, many schools would come up with their own variation of the game depending on the grounds they had available. For example, if a school only had a concrete playground,

which was true of many schools, they had to work with what they had and would adapt the boundaries accordingly.

The formation of the first football club in Northern England, in Sheffield, in 1855, was a watershed moment in the history of the sport. It was founded by factory workers in Northern England who enjoyed spending their free time playing the classic form of football. Notts County, the world's oldest league club, was originally established in 1862. Football was sometimes referred to as "soccer." The name ‘soccer' was thought to be originated from the word 'association.' It was due to the formation of the Football Association in 1863. There were no clear regulations to the game at the start. Each team had its own set of regulations to follow. People from schools and clubs all throughout England gathered in London to establish a set of fourteen football rules. Thring and Dewinton attempted to establish a common set of rules, and the first set of football rules was established in 1862 and amended in 1863. In 1864, the Football Association of England was established, and new regulations for the game were established.

Similarly, in 1872, the mass and dimensions of the ball and pitch were standardised. Shin guards were adopted in 1874, whistles were introduced in 1878, and tapes in 1875 to replace the crossbar. Furthermore, football referees have been in use since 1840, while the use of yellow and red cards has been in use since 1978. In regard to this, Sheffield FC and Nottingham FC played the first game under the Football Association rules in 1865. Fifty football clubs had joined the Football Association by 1873, which was later divided into association football and rugby football.

The evolution of football balls followed a similar long-term timeline to that of the game itself. Swine heads and soldiers' skulls, as well as inflated pig bladders tied together at the ends, were used to make the first football balls. Because it was difficult to play football in England's humid climate, Charles Good Year came up with the idea of vulcanised football balls in 1855.

The Football Association possessed 50 member clubs eight years after it was founded. The FA Cup was born in 1872, and the first championship was in the works by 1888. At the time, Europe had yet to embrace the modern variation of football, which contributed to characterize football as a "particularly British sport." Nonetheless, the first "international" football match between England and Scotland took place in 1872, and it drew massive audiences, similar to today's games.

Football's growth outside of the United Kingdom was sluggish initially, but it soon reached every corner of the globe. In 1889, the Netherlands and Denmark became the first countries to establish their own football associations, followed by New Zealand in 1891, Argentina in 1893, and Chile, Switzerland, and Belgium in 1895. The following country to form an organization was Italy, which did so in 1898. In 1900, Germany and Uruguay were in second and third place, respectively. Hungary and Finland would also form associations in the next decade.

FIFA was founded in 1904 in Paris. Belgium, France, Denmark, the Netherlands, Spain, Sweden, and Switzerland were among the group's core members. In 1886, Stanley Rous, who later became its President, created the regulations of football and rationalised

them. In 1997, they were rewritten. After World War II, there were more than 73 FIFA members in the 1950s.

For the first time, England and Scotland played an international football match. On May 21, 1904, delegates from seven countries met to form the Federation International de Football Association, in response to the game's expanding popularity. The inaugural global football championship was held in Montevideo, Uruguay, in 1930. Football has grown in popularity around the world, with more than 200 countries currently connected with this global association.

As a result of industrialization and globalization, football has flourished all over the world. People all over the world cheered as the game was broadcast on television. The United Kingdom was the first country to establish what we now refer to as professional football, which is defined as disciplined, structured, and commercialized sport. England had a high level of life thanks to its industrial and capitalist economy, which allowed people to make money from sports. Women were interested in sports like football in the 19th and 20th centuries as a result of feminist movements, women's rights, and pressure from sports financing agencies.

Since its inception, football has come a long way. The event that drew the greatest crowd in human history was a simple game, a football match, rather than a major political event or a particular commemoration of some significant artistic or scientific achievement.

If we look at each football match more closely, we can see that it is a complicated symbolic event. The game's simplicity is one of its most appealing features. A ball and an

open space with something to act as a goal post are all that's required at the most basic level. There is no other sport that is as accessible and motivating as soccer.

Football's most thrilling feature is that it is a fast-paced, fluid sport. The rules are simple, and the tactical actions are well-known, therefore every moment of play is unpredictable to the onlookers. Regardless, no one can predict what will occur next. The gamer is unable to unwind for even a moment. Everything can change in a split second.

Football has come a long way and shows no signs of retiring to the safety of its number zones. Football will have a place in the world as long as humans are capable of caring about more than just survival. **(Morries, 1981).**

By dribbling, kicking, striking, or pushing a spherical inflatable ball between the opponent's goal posts and under the cross bar, a team of eleven men or women seeks to advance the ball between the opponent's goal posts and under the cross bar in football.

Various sports are practiced in India. One of them is football. Although it does not have the same level of popularity as other sports, people are becoming more interested in it. Malayalees, Goans, West Bengalis, Manipuris, Mizoramis, Sikkimis, and others have begun to play football. The game of football was brought to India by the British. The game was first played between army teams. When Indian footballers won the IFA-Shield Trophy in 1911, the game became famous. This is the first time an Indian team has won a tournament match; previously, only British teams had won.

India has progressed from a motorsport to a multisport nation. Nevertheless, additional resources and sports infrastructure are required to increase people's

participation in sports such as football. People should be encouraged to play football by providing appropriate instruction, mentoring, and support. The government could reward players who excel at the state level by providing them with a stable employment or financial assistance, allowing them to devote more time to sports.

Football's origins in India may be connected back to the pre-independence period, when the British introduced the sport to the country. Football matches were first held amongst army teams. During the British Empire, a number of football clubs were formed in India. These clubs, in fact, predate the most well-known football clubs and organizations, such as FIFA. In 1854, the 'Calcutta Club of Civilians' and the 'Gentlemen of Barrackpore' played the first football match in India. Calcutta FC, India's first football club, was established in 1872. In the years that followed, the Dalhousie Club, the Traders Club, and the Naval Volunteers Club were all founded.

Calcutta (modern-day Kolkata) is considered India's football capital. This is most likely why the state produced a number of football clubs, including the Mohun Bagan Athletic Club (later known as the National Club of India), which was founded in 1889. In 1893, the Indian Football Association (IFA) was formed after a few years. The oldest football event in India (and the third oldest in the world) began in Shimla in 1898. The tournament is known as the Durand Cup, and it was inaugurated by Sir Mortimer Durand, India's then Foreign Secretary.

When Mohun Bagan Club won the IFA-Shield Trophy in 1911, it was the first success for Indian footballers. Because the cup had previously been won by British teams located in India, this victory holds a particular position in Indian football history. As a

result of the increased number of football teams in India, the All-India Football Federation (AIFF) was formed in 1937.

The British organized the inaugural football competition in 1880. It was originally known as the Durand Football Tournament, but in 1893 it was renamed the Indian Football Association Shield. The Santhosh Trophy national football tournament began in 1941, and the competition was held in various locations around the country each year. The AIFF became a member of FIFA, the world football regulatory body, in 1948. AIFF was one of the founding members of the Asian Football Confederation in 1954. In 1977, the Federation Cup Football Tournament was established.

The era from 1951 to 1962 needs special attention because it is considered the golden age of Indian football. As a result of their outstanding accomplishments year after year, Indian football clubs qualified for a number of international championships and fought abroad. Indian footballers earned honor to their country by winning gold medals in the Asian Games in New Delhi and Jakarta, consecutively, in 1951 and 1962. In 1956, India set a new record by being the first Asian country to reach the Olympic football semi-finals at the Melbourne Olympics.

Durand Trophy, Rowers Cup, Delhi Cloth Mills Cup, Stafford Challenge Cup, Bangalore, G.V. Raja Memorial Cup, Trivandrum, Nehru Trophy, Santhosh Trophy, Junior National Championship, and Sub Junior National Championship competitions are some of the most popular tournaments in India. **(Thomas, 1964)**

Football is a really global sport. A football player's conditioning is similar to that of an athlete who competes in other contact sports that demand speed, agility,

neuromuscular coordination, and endurance. Leg muscular strength and power are more significant. Daily abdominal workouts, such as sit-ups with the soles of the feet flat on the ground, are essential for developing muscle endurance.

Strength training is important for football players because it affects the adaption process in a positive way. In football, the vertical leap is used as a measure of explosive leg power, which is linked to kick performance.

Speed is necessary for successful performance in a variety of motor activities. The lighter team wins in football because it is the speedier squad. Sprints account for 11% of a football player's overall mobility over the course of a game. Strikers and midfielders are more likely than backs to sprint. They have a proclivity for sprinting to retrieve or defend the ball.

Football players must use their feet to control both their body and the ball while moving at a variety of speeds and directions. Agility is inextricably linked to or dependent on speed, strength, balance, and coordination.

The Women's Football Federation of India (WFFI) was in charge of women's football in India until the early 1990s, when the AIFF took over. Women's soccer, like men's soccer, had its early pioneers from West Bengal. East Bengal and Mohun Bagan women's clubs were founded in the 2000-01 season. There are additional national championships for senior and junior girls. Manipur and West Bengal provide the majority of the players for the Indian women's national football squad. Women's football, on the other hand, has not garnered the same popularity as men's teams in India.

In addition, it hasn't had the same advantage over the rest of the world as men's football, and it hasn't had the same opportunity to spread across the country as its male counterpart. The team was created in 1948, when India became a FIFA member. India has continued to do well in the AFC Asian Cup and World Cup qualifiers after then. The team has never made it to a World Cup. This could be partly owing to the fact that they share a qualification bracket with such powerful teams as China and Japan. WFFI was in charge of the game from 1975 until it was incorporated with the AIFF in the early 1990s. However, complaints that women's football is treated as a second-class citizen to men's football have led to (failed) attempts to divide the WFFI. **(Pulasta Dhar, 2009)**.

Like the men's game, the women's game has its early pioneers from West Bengal. In the 2000/01 season, East Bengal and Mohun Bagan, two renowned Kolkata teams, formed women's club sides, which now compete in the Calcutta Women's Football League with other teams. Manipur players, on the other hand, have recently been claimed to have made tremendous improvement in the game. Players from these two states make up the majority of the Indian women's national football team.

The premier women's national championship is played on a state-by-state basis in the Senior Women National Championship. Two other national championships for junior teams are the Junior Girls National Championship (under 19s) and the Under-17 Girls National Championship.

1.2.1 Essential Skills in Football

In the game of football, there are various basic football skills and team tactics. Football is a fairly basic sport. We all need to know the fundamentals of the game. Basic

abilities aid in the development of a skilled player.

Footballers who do not know how to pass, kick, or handle the ball are unfit to participate in the game. They would not be good or effective football players if they do not know how to pass and receive the ball. A few key talents include shooting, controlling, and dribbling. We must recognize and remember that in order to learn and master these talents, we must practice them on a regular basis.

Skills have become increasingly crucial in the pursuit of victory as football has evolved. Top-level teams refine and refine their talents into a refined and sophisticated art form, and they are constantly looking for new ways to better their training. Perfecting these skills and properly executing them has a direct effect on overall game performance.

1. Passing
2. Dribbling
3. Shooting
4. Heading
5. Trapping
6. Chipping
7. Throw-in
8. Goal keeping
9. Defending
10. kicking

1.2.2 Football in Kerala

Hundreds of thousands of Malayalees have been passionate about football for decades, long before the tiny state of Kerala was founded on November 1, 1956. From the 1930s to the 1960s, amateur clubs and popular and skilled football players from the erstwhile Malabar, the princely states of Kochi and Travancore carved a niche for themselves by entertaining millions of football fans from Thiruvananthapuram to Kasaragod with their fighting qualities and brilliant craft.

In the provinces of Travancore and Malabar, football clubs began to form in 1890. Previously, teams from Karachi and Bengal were invited to compete in competitions organised by the football clubs of Travancore, Malabar, and Cochin. The oldest football club in South India is the R B Ferguson football club in Trissur, Kerala, which was founded in 1899. It was named after FB Ferguson, the Kochi Police Superintendent. Young Men's Football Club was its previous name. This club was instrumental in the promotion of football in Kerala. Afterwards, in 1940, the Aurora football club was founded in Ollur, Kerala's Trissur district. It was founded by a group of 21 Ollur football fans. It was labeled the second-oldest football club in the state of Tamil Nadu.

FC Cochin, Kerala's first professional football team, was born in the early 1900s. It was a Kerala football club that had competed in the National Football League. It won the Durand Cup in New Delhi in 1997 and competed in the National Football League till 2002. HMC Kottayam, Calicut Young Challengers, Brothers, Lucky Star, Gymkhana Kannur, Pattath Young Challengers, and St Joseph were among the first football clubs to be created. KSRTC (Kerala State Road Transport), Kundara Alinds, Premier tyres,

Kannur Keltron, FACT, Titanium, and Kalamassery were among the sponsors of the Kerala teams.

Kerala Football Team is affiliated to Kerala Football Association which represents the state at the state level in India. It was founded in 1948. Under the stewardship of T.K.S Mani, it achieved the Santhosh trophy title for the first time in 1973, defeating Railways. They made into the Santhosh Trophy finals thirteen times and won the championship six times.

Kerala's police team played an important role to football in the 1990s. In 1990 and 1991, the Kerala police team has won the Federation Cup. In addition, I M Vijayan had the sixth-best goal-scoring record in the Federation Cup, with 17 goals. In 1997, Cochin FC won the Durand Cup. Ailind Kundara, FACT, Premier Tyres, and the Kerala Police have all won events, bringing Kerala to prominence.

The G V Raja Trophy, Sait Nagjee Trophy, and Chakola Trophy were among the biggest football events held in Kerala. Kerala has produced a number of national and international footballers. T A Rahaman, V.P Sathyan, CV Pappachan, U Sharafali, KT Chacko, Kurikesh Mathew, Mathew Varghese, Jo Paul Ancheri, I M Vijayan, CA Liston, and so on are amongst some of the names on the list. Kerala had a lot of Olympians in the sport of football. Thomas Varghese (Thiruvalla Pappan), P B Abdul Saleh, S.S. Narayanan, T. Abdul Rahaman, O Chandra shekharan, and M Devdas are the members of the team. Meanwhile in 2003, the renowned footballer I M Vijayan received the Arjuna Award**. (Wikipedia)**

1.3. SPORTS TRAINING

Training for sports is the total preparation of sports person by the dint of different method and form. These training are meant to attain higher level of performance. Most coaches and physical education professionals in India are found to be overlooking the importance and role of educational aspects of sports training **(Sing.H,1984)**

The word training has been found a part of human language since ancient time to denote the activities or process of preparation for so task which in variably as long as days or months or years. **(Sing.H, 1984)**

In the broader sense ‘training’ denotes to a process which is systematic organized and instructional which aims at enhancing a sports ability with regard physical, psychological and intellectual aspects. When it comes to sports the word refers the preparation of sports person gradually increase and achieve the highest level of performance. In order to attain this level of performance the person concerned has to resort to regular and systematic exercise of various kinds. The effect of exercise is dependent on various factors. They are training load, assessment of loading and performance ability, means of recovery, sports equipment, nutrition and psychological characteristics method adopted for teaching theoretical instruction also matters during the training any act of compromise of these factors will reward with futility. The person involved in training will never realize the optimal benefit. **(Uppal, A.K., 2001) .**

Any method or any mode of training has always to be revised and updated according to the performance and attainment of targets. Modification will help the person improve his qualities. As a discipline, sports science always discovers most befitting modification according to the item which professional trainees can make use of latter-day

training comprise of scientific observation, methodologies experimentation, analysis and synthesis. Thus, sports training is rather a continues and ever improving process **(Uppal, A.K., 2001) .**

Sports training is comparable with any other form of training that human being usually undertakes. Whereas of training may involve only out of two systems of human beings, sports training involves the total personality of the person concerned. These systems have multi-dimensional bearing on the development of sports person. These training influence the physical psychological and social aspect of a person. Therefore, bring about improvement in a person from the sports field is to focus on all the personality traits. Thus, we can call sports training as education and thereby pedagogical **(Roberts and Roberts, 2004) .**

Another term generally used to interchangeably with training is coaching. It refers to extending assistance to a person so that he can execute his task without flaw. When it comes to sports education the term coaching is rather technical skill which can coordinate time sequence. movement and speed these skills also help the sports person to achieve the desired efficiency **(Clarke and Clarke, 1978)**

In a worldwide scenario sport gained a momentum nowadays as it has never been before. The third world countries still lag behind in terms of achievement for their lack of training. On the other hand, countries like US, China, North Korea, Japan and Russia care to provide training as early as possible, these countries provide general education and at the same time sports training in various discipline also by identifying the inborn talent the children are endowed with providing sports training and education to children helps them develop shape focus in the field. **(Clayne and Garth, 1970)**

As mentioned before sports performance is the result of bringing together the person efforts together it is not only physical. Additionally, a sports person has to develop good cognitive skill, perceptional skill, volition, positive beliefs and attitude. In a general term we can say that sports education helps the individual become a better person. The crisis that the field of sports and games are facing is the lack of emphasis on education from the part of coaches and trainers. The educational part of sports also has to be equally stressed. Pupils have a burden of performance improvement. It is made possible by them on a greater level of stress and also at the cost of proper sports education. A disciplined method of implementing sports education should be ensured child hood itself without compromising on training. It will help the children realise the desired performance as well **(Cowell and France, 1963) .**

Physical abilities are the prime focus in sports. Improvement of motor abilities should also be the major aim of the training. The muscular skeletal system plays a major role. The sports person should focus on improving general health, hygiene and organic function strength and ability of muscular skeletal system should also be ensured **(Clayne and Garth, 1970).**

1.3.1 TRAINING METHODS

When it comes to training, the major aim of any coach who wishes to improve the physical strength of players is to focus on their construction of individualize conditioning. It is possible only when the coach or trainer identifies the source of energy and attempt to employ the same to its possible extend in a given period of time. In order to achieve this, the trainer has to chart to out regimen. The regiment is usually customised in line with the physical and mental abilities that the trained is endowed with. In most of the cases, aerobic

and anaerobic capacities are focused while drawing the regimen. These regiments are also called as spring and endurance training programme. Annarion opinions that incorporation of education and information pertaining to energy system will help the trainer design better training method. Training method formulated thus will of course improve the performance of the student by assimilating knowledge of each sports activity, the trainer can specifically design a regimen for specific sports activity as well. For example, the regimen prescribed for a soccer player will be different from the regiment prescribed for a cricket player. Thus, we can infer an idea that a befitting training method is highly dependent up on knowledge of the trainer who have design it **(Annarino, A.A., 1970).**

A proper understanding of the ratio of fatigue and load also has major role in improving the efficiency and performance of a sports person. All physical activities will result in high fatigue. In other words, we can say that fatigue is proportionate with the load. A trainer has to administer load activities by knowing the fatigue a sports person might have. Fatigue has a potential to gradually increase the performance capacity. Therefore, a change in load directly affects the endurance of the players. The trainer should undertake exercise in order to exercise in order to improve performance. Load also helps stabilise and maintain physical capacity and thereby performance. On the other hand, stagnation of load will adversely affect the improvement and progress of in the performance. A good trainer is the one who knows the fatigue and the befitting load capacity his or her student can withstand. Load is administered judiciously by the trainer. It has influence on the state of homeostasis. Load has the ability to disturb the homeostatic. An experience trainer will have elasticity and contractibility of muscle tissue. The measurement of force tissue helps to identify improve training activities

which we call plyometric exercises. The plyometric method is considered an extension of the ‘shock’ method. Shock method was introduced by Verkhoshonki,a Russian jumping event trainer (1966). This method involves activities like rebounded jumps from heights. It is proved that shock method helps to develop the neuromuscular properties of the athlete. On the other hand, plyometric thoroughly influence the muscle-working; concentrically as well as eccentrically. An experiment regulation and control regimen for the trainees **(Annarino A.A., 1970).**

1.3.2 SOCCER TRAINING

A soccer player requires both aerobic and anaerobic training. The nature of the game involves continues, quick and agile movement. In order to affect short burst for these movements, combination of aerobic and anaerobic training should be ensured in order to ensure dominance over opponent players. Let us take the care of midfielder who has to cover a lot of ground during a game. Then he needs more aerobic training. Whereas, a striker’s case is entirely different. He is required to burst out repeatedly and thereby anaerobic is preferred and his case. When it comes to training in soccer different factors determine what type of training has to be applied. The determining factors are inherent physical capabilities of the person concerned, age and position played. Soccer is a team play and thereby all team members are to be trained equally, but this conditioning is not possible in soccer training as player have different role and position and then require different training. (**https://alvin-almazov.com/soccer-eng/training/)**

1.4 PLYOMETRIC EXERCISES

Plyometrics have been utilized in the preparation of Olympic style events such as

training of track and field athletes in Russia and Eastern Europe for quite a long time. The beginnings of plyometric preparing might be followed back to the 1950s, when Yuri Verkhoshansky, a Russian mentor cum analyst, started utilizing 'deep jumps' with Russian games jumpers. He has been named the "Father of Plyometrics." By exploring different avenues regarding exercises like the depth jump, he had the option to further develop his players' reaction ability. He is the most notable scientist and mentor related with the spread of plyometrics. Verkhoshansky is likewise known for developing the vast majority of the plyometric practices that are as yet performed as of now.

Legendary Purdue University women's track coach Fred Wilt, on the other hand, created the word plyometrics in 1975. Plyometrics is derived from the Greek terms *plythein* or *plyo*, which mean "to expand," and metric, which means "to measure." As a result, the goal of plyometrics might be described as "increasing the measurement." Athletic performance results showed in testing or competition, such as throwing, serving velocity, jump height, or sprint speed, is commonly measured.

It’s been noted that the etymology of the word ‘plyometrics’ is rooted in the Greek work ‘plethyoin’ denotes equal length. **(Will and Freeman, 1984)**. This term is a combination of two Greek words that denotes to expand the measurement in which plio means "more" and metric the "length". It's worth noting that plyometric activities are based on the idea that quickly extending a muscle immediately before a contraction would result in a and heavier contraction.

We begin our exploration into the word ‘plyometric’ and its practices. It was technically referred to as **“**jump training” which also includes depth jumping, bouncing

drills as well as hopping. It’s high time to note that, in order to expand the force of stress on related muscles, these are very active and vigorous measurements that make use of gravitational force body and the contractibility and elasticity of muscle tissue.

Plyometric training can also be taken as an extension of the ‘shock’ method which give strength to the muscles for athlete’s ambitious performance according to the Russian scientist and jumping event coach, **Yuri Verkhoshansky (1966).**

Verkhoshonki's shock method comprised of leaps from a specific height. The goal was to improve the athlete's reactive neuromuscular apparatus. The term plyometric appears to imply that muscles are worked both concentrically and eccentrically.

Russian athletes were the first to use plyometric training. In the 1960s, Yuri Verkoshansky devised jump training workouts for Russian track and field competitors. The exercises forced participants to jump frequently in order to improve their leg and core muscles' explosiveness, speed, and agility.

By 1966, Verkhoshansky had left the coaching sector and had begun his in-depth research into what would become known as "The Shock Method" and is today known as plyometrics. The Shock Method got its name from the sudden, forced muscular tension that occurs when the body collides with an external item (i.e., the ground).

A plyometric exercise is one that quickly stretches a muscle and then rapidly contracts it. This type of exercise is based on the belief that a rapid lengthening of a muscle just prior to the contraction will result in a much stronger contraction.

Jumps that entail repetitive, quick, and strong shortening and extending actions of major muscle groups are referred to as plyometrics. The stretch-shortening cycle describes the shortening and lengthening processes that take place when your muscles broaden upon contact and are followed by a concentric contraction. Many coaches have successfully included this form of training into their athletes' routines, resulting in increased power and strength.

The idea behind plyometric exercise is that quickly lengthening the muscles just before contracting will give a much stronger contraction. The increased contraction strength is thought to be related to muscular spindle strength comprising the reflex, which results in a higher frequency of motor unit discharge. A greater contraction strength is thought to be a result of stronger muscle spindles which involve the reflex and broaden the frequency of motor unit discharge.

Depth jump is one of the plyometric workouts that have been mentioned. The athlete stands on a shelf, usually 2 meters above the ground, and quickly jumps vertically or horizontally with full energy after stepping off the shelf. **(Will and Freeman, 1984).**

Plyometric training is one of the best techniques to increase explosive power in sports. Plyometrics, in essence, is a type of training that focuses on developing the best possible relationship between strength and speed, which expresses in the body as explosive power. Plyometric motions are now used in practically every sport. It is necessary to reach a basics strength level before beginning a plyometric training program. Selecting an exercise must be in accordance with age, sex and biological development of the athlete. The stress level of these exercises should be gradually increased during

a training cycle. When establishing the value of jumps in workouts, body weight should be utilized as the determining element. Plyometric training should be done twice or three times a week in general.

The concept of plyometric training is considered to be new and it applies a specific theory related to the durable and stable conditions of a muscle before an explosive contraction occurs. It has been studied experimentally whether plyometric exercises can improve vertical jumping capacity, however, no attempt was made to determine whether they found to be much useful than kinetic exercises. **(Will and Freeman 1984)**

1.4.1 PLYOMETRIC TRAINING: MUSCLE MECHANISMS

` Plyometric exercises are a collection of exercises that are common to many organized sports teams and players. Drills, or plyometrics, are commonly used to apply plyometrics. Box jumping, jump roping, line hops, and other exercises fall into this category. Plyometrics are used to simulate conditions that an athlete would encounter throughout a professional game. Jumping over a would-be tackler, executing a rapid spin to dodge an opponent, or jumping over a hurdle are all examples of this. Various coaches use a variety of plyometric drills, and new drills may be devised simply by deciding on the exact movements that are used in the activity that they are involved with.

Researchers discovered that certain sets or groups of workouts can efficiently train both slow and fast twitch muscle fibers, as well as various muscle groups, all at the same time. The term "plyometric exercises" refers to a collection of exercises. The word plyometric has the same meaning as its roots. These are workouts that use diverse

movements to train numerous (plyo-) muscles at the same time (-metrics). Plyometric exercises are comprised of a variety of different types of training. All non-isolationistic movement, or any workout or movement that trains over than single muscle or muscle group at a time, is included in these workouts.

Plyometrics are excellent for training fast twitch muscle fibers to react more efficiently and at a faster rate than in their natural state. Despite the fact that most plyometric muscles are effective at training both types of muscle fibers, plyometric activities in generally would not adequately train slow - twitch fibers and are therefore classified as a lower level of exercise advancement than many of the other advanced plyometric workouts.

Plyometric training is based on the premise of "getting the greatest bang for your money." Exercise kinesiologists have devised strategies for achieving maximum muscular fatigue and recuperation in the least amount of time and energy. This is the most technologically advanced era since the Industrial Revolution, and it does not appear to be slowing down any time soon. As a result, today's athletes must be able to exercise as many muscle groups as possible in a single session while maintaining a high level of performance. This is achievable using plyometric exercises, which have been proved in some situations to provide the highest suitable training for the sports competition for which they are designed.

When used appropriately, plyometric workouts have been demonstrated to boost the ability of numerous sports teams and athletes to compete at incredibly high levels. The activities that are carried out are really vital and should be unique to that sport.

Soccer players, for example, have been demonstrated to require the recruitment of both rapid and slow twitch muscle fibers. Soccer is a sport that involves both stamina and brief bursts of speed and energy to outdistance your rival or save the ball (Reilly 2005). In soccer, it is therefore critical to prepare not just for endurance or speed, but also for a mix of the two. It is feasible to train both slow and rapid twitch muscle groups using plyometrics, and this can be done at the same time. According to Reilly, the best conditioning programme is one that incorporates a comprehensive training approach.

While the sorts of exercises are critical, another facet of training that is frequently forgotten is the amount of time spent training. This does not refer to the time of day, but instead the time spent in the workout. It's thought that the order in which the exercises are performed has an impact on the participant's overall performance in a competitive event. It is feasible to establish a few generalizations about training using the notions of strength and endurance as potential outcomes.

Firstly, an athlete would have the most energy and be able to produce the most power during the early stages of an exercise or training regimen. We might argue that this is the point in the routine when his or her strength is at its peak. Furthermore, if an athlete wants to improve his or her strength to its maximum potential, he or she should work out their bodies at the peak of their strength, when the level of stress on the muscles is greatest, resulting in the most growth.

It seems logical to think that an athlete would conduct some type of plyometric training early in their workout programme in order to get the biggest strength improvements. Because plyometrics engage many muscle groups and the athlete engages

these muscles early in the workout, the greatest improvement in athletic ability would be in strength rather than endurance.

If we think that an athlete's muscles are at their weakest point or are the most energy draining at the end of a workout period, it is logical to conclude that if plyometric activities are performed at the end of a workout session, the opposite is true. Plyometric drills, when done at the end of an exercise session, will boost an individual's endurance because the muscles will not be exerting the maximum force (i.e., strength) that they are susceptible of, but instead will be conserving the body's long-term energy reserves.

It goes without saying that the spatial aspect of exercise is critical in deciding which muscles are taxed and how they are stressed. This study will provide an insight at the idea that plyometric drills should be performed at the start of an exercise routine to enhance strength, and plyometric drills should be performed at the end of a practise or exercise time to increase stamina or endurance. This claim is noteworthy because it signals that plyometrics may become more essential to athletes as they develop their baseline fitness and strive for higher performance levels in order to perform at their peak.

Plyometric exercises involve the rapid slowing down and speeding up of muscles to make a stretch shortening cycle. The stretch – shortening cycle is successfully carried out by the muscles, connective tissue, and neurological system during this workout, which improves an athlete's performance.

A quick eccentric contraction produces the utmost force that a muscle can produce. Muscles rarely perform one type of contraction in isolation during sports motions, so keep that in mind. A quick eccentric contraction produces the utmost force

that a muscle can produce. Muscles rarely perform one type of contraction in isolation during sports motions, so keep that in mind. The force created can be considerably increased when a concentric contraction (muscle shortening) happens soon after an eccentric contraction (muscle lengthening). Almost all of the energy required to stretch a muscle is lost as heat, but the elastic components of the muscle can store some of this energy during a future contraction. It's vital to remember that if the eccentric contraction isn't immediately preceded by a concentric effort, the energy gain will be lost. To covey this grown force, the muscle should contract as quickly as possible. The basic mechanism of plyometric training is this entire process. **(Will and Freeman ,1984).**

1.5 AEROBIC EXERCISES

Aerobics is a system of endurance activities that develop cardiovascular fitness by creating and sustaining a higher heart rate for an extended length of time, so pushing more oxygen-rich blood flow to the muscles being used. The term "aerobic" refers to the use of oxygen to express a notion. Besides that, the concept's mechanics are more complex than the word suggests. Aerobic exercise can be viewed as a complicated system of supply and demand in the body. Such that, the body need energy to perform any action, and this energy is obtained by burning the food consumed. Regardless of whether aerobics is the term in use, oxygen provides the spark that the fuel requires to burn. Cooper (1969), in fact, formalized and arranged what fitness meant to many people. He is widely acknowledged as one of the driving reasons behind the current fitness craze. Aerobic programmes, according to the majority of medical opinion, strengthen heart muscle, improve lung efficiency, and provide other fantastic benefits.

According to the definition of Concise Oxford English Dictionary, Aerobic exercise is any activity that increases or enhances the body's oxygen consumption. The term "aerobic" means to the usage of oxygen in the metabolic or energy-producing action of the organism.

Aerobic exercise is also can be defined as any physical activity that causes you to sweat, causes you to breathe harder, and makes your heart to beat quicker than it would at rest. It stimulates the heart and lungs, as well as the cardiovascular system, to better manage and supply oxygen around the body. Our bodies use glycogen and fat as fuel when we exercise aerobically. This mild to medium degree of effort can be maintained for extended periods of time. We're trying to get as much oxygen into the bloodstream as possible. Blood flow to the muscles and back to the lungs increases when the heart rate rises. Carbon dioxide is exhaled from the body as one breath more deeply during workout.

Aerobic exercise is a great technique to reduce weight; performing it three to four times a week will help you not only look but also feel better. You will burn stored fat and calories if you do aerobic activity this many times per week. Maintaining your fitness with these routines lowers your risk of developing diseases such as diabetes. Nothing quite likes a good workout to make you feel good the rest of the day, and aerobic workouts can help you acquire confidence in your physique and in yourself.

Many types of exercise are aerobic, which means they are done at a moderate intensity for long periods of time. An aerobic workout should begin with a warm-up, including at least 20 minutes of moderate to strenuous exercise utilizing large muscle

groups, and ending with a cool-down time. Kenneth H. Cooper, M.D., an exercise physiologist, and Col. Pauline Potts, a physical therapist, both of the United States Air Force, came up with the phrase and the specific exercise program. Dr. Cooper, a self-proclaimed exercise aficionado, was perplexed as to why some people with a lot of muscle power had such bad performance in activities like long-distance running, swimming, and bicycling. He started with a bicycle ergometer to measure systematic human performance, and then moved on to evaluating sustained performance in terms of a person's ability to utilize oxygen. In 1968, he published Aerobics, a pioneering book that incorporated scientific exercise plans involving running, walking, swimming, and bicycling. The book was published at a fortunate historical time, when the general public's growing frailty and inactivity was producing a perceived need for more exercise. It went on to become a best-seller. Cooper's research served as the scientific foundation for nearly all modern aerobics regimens, the majority of which are based on oxygen consumption equivalency. Short, intense bursts of physical activity are referred to as anaerobic exercises.

These activities are anaerobic in nature since they do not promote oxygen absorption or transportation. The body breaks down glucose stores in the absence of oxygen during anaerobic exercise, resulting in lactic acid accumulation in the muscles.

Anaerobic exercises include such as High-intensity interval training (HIIT), sprinting and weightlifting etc. The following are the main distinctions between aerobic and anaerobic exercise. That are the intensity of the activity, the amount of time a person can maintain the exercise and how the body consumes stored energy. Aerobic

activities are usually more rhythmic, soft, and last longer. Short bursts of high intensity action are common in anaerobic activities. Aerobic exercise, on the other hand, helps to develop endurance while anaerobic workouts help to increase muscular mass and strength.

Aerobic workouts and fitness can be compared with anaerobic activity, the most prominent examples of which are strength training and weight training. Between two types of exercise, the time and strength of muscular contractions, as well as how energy is generated within the muscle, change. Glycogen is broken down to make glucose, which is subsequently dissolved using oxygen to provide energy during aerobic exercise. Fat metabolism takes over in the absence of these carbs. The latter is a long and painful procedure that is followed with a drop in performance. This natural shift to fat as an energy source is a crucial contributor to what marathon runners denote to as "hitting the wall." Anaerobic exercise, on the other hand, corresponds to the first stage of workout or any brief burst of high exertion during which glycogen or sugar is used without the use of oxygen, and is a far less productive process. An unfit 400-meter sprinter may "hit the wall" before completing the entire distance if they are operating anaerobically. (**Bouchard, et.al. 1999)**

Numerous kinds of aerobic exercise are noted. In general, it is done at a moderate intensity for a long period of time. Running a wide area at a reasonable speed, for example, is an aerobic activity, whereas sprinting is just not. Singles tennis, which involves near-constant motion, is normally regarded aerobic activity, although golf or two-person team tennis, which involves brief bursts of activity interspersed by more

frequent rests, may not be. Some sports are naturally "aerobic," while others, like fartlek training or aerobic dance classes, are explicitly designed to promote aerobic capacity and fitness. (**Kolata, Gina 2002)**

1.5.1 BENEFITS OF AEROBIC EXERCISES

Aerobic activities provide a number of advantages, including a stronger and more efficient heart and lungs, increased energy, physical flexibility, strengthened muscles, appropriate fat use, and efficient calorie burning. Aerobics re-energizes through increasing oxygen flow, providing everyone more energy and a "re-awakening" of their senses. (**Kolata, Gina 2002)**

In other sense, the physiological systems are in sync as the heart pumps more blood with fewer beats, enables individuals to take in more oxygen. The nucleus of this entire system is the heart, which can properly transport and utilise oxygen with no obstacles when everything is running smoothly. Each heartbeat is in charge of delivering oxygenated blood to the appropriate blood arteries. Aerobic workout will boost your capacity for pumping greater quantities of blood to meet your increasing energy and oxygen needs. (**Kolata, Gina 2002)**

Aside from running and aerobic dance, aerobic workouts include jumping rope, cycling, swimming, cross-country skiing, stationary cycling, walking, and other activities. Any activity that can be sustained for at least 20 minutes at your goal heart rate is considered an aerobic workout. Large muscles in your arms, legs, and hips are repeatedly moved during aerobic activity. You'll rapidly see how your body reacts. You'll be able to breathe more quickly and profoundly. The amount of oxygen in your

blood is increased as a result of this. Blood flow to your muscles and back to your lungs will increase when your heart beats quicker. Your capillaries will dilate to allow more oxygen to reach your muscles and to transport waste products like carbon dioxide and lactic acid away. Endorphins, natural painkillers that produce a sense of well-being, will also be released by your body.

The following are some of the well-known advantages of regular aerobic exercise:

- Improving the flow of air into and out of the lungs by strengthening the muscles involved in respiration
- Aerobic conditioning, which involves strengthening and expanding the heart muscle to increase pumping efficiency and lower resting pulse rate.
- Muscle toning all throughout the body
- Improving blood circulation and lowering blood pressure
- • Increasing the total amount of red blood cells in the body, allowing for easier oxygen transfer
- Reduced stress and the prevalence of depression, as well as improved mental health (**Kolata, Gina 2002)**

As an outcome, aerobic exercise has the potential to lower the risk of death from cardiovascular disease. High-impact aerobic exercises (such as jogging or jumping rope) can also stimulate bone formation while lowering the risk of osteoporosis in both men and women. Furthermore, it helps regulating blood sugar and reduce blood pressure. In those with arthritis, it can help to relieve pain and enhance function. It can also enable cancer survivors enhance their quality of

life and fitness. This workout may allow you to manage your coronary artery disease if you have it. It raises high-density lipoprotein (HDL), or "good" cholesterol, while lowering low-density lipoprotein (LDL), or "bad" cholesterol. Plaques in your arteries may be less likely to form as a result of this. This could be beneficial to mitigate depression's darkness, reduce anxiety's tension, and encourage relaxation. It can also make you sleep better. In addition, these practices strengthen your muscles, which might help you keep your mobility as you grow.

Aside from the health advantages of aerobic exercise, there are various performance advantages:

- Enlarged storage of energy molecules in the muscles, such as lipids and carbs, allowing for greater endurance
- Increased blood flow to the muscles through neovascularizing the muscle sarcomeres
- Increasing the pace at which aerobic metabolism is engaged within muscles, enabling more energy to be created aerobically for severe exercise
- Enhancing muscles' ability to utilize fats throughout exercise while maintaining intramuscular glycogen
- Increasing the time and speed it takes for muscles to recover from high-intensity exercise (**Kolata, Gina 2002)**

The term "aerobics" refers to a certain type of aerobic exercise. Aerobics sessions usually consist of quick stepping patterns set to music and guided by an instructor.

Following the publication of Dr. Kenneth H. Cooper's, The New Aerobics in 1970, this type of aerobic activity became quite popular in the United States, and it experienced a brief period of intense popularity in the 1980s, when many celebrities (such as Jane Fonda and Richard Simmons) produced videos or created television shows promoting this type of aerobic exercise. Freestyle aerobics and pre-choreographed aerobics are the two main styles of group exercise aerobics.

1.6 RESISTANCE TRAINING

Rather than using gravity, resistance training includes applying elastic or hydraulic resistance to muscle contraction. When the muscle must overcome the inertia of the weight's mass, weight training offers the majority of the resistance at the beginning, initiation joint angle of the action. After this, the overall resistance varies based on the joint angle. Hydraulic resistance, on the other hand, provides a constant amount of resistance throughout the range of motion, regardless of movement speed. When the elastic part is stretched to its maximum extent, elastic resistance produces the most resistance at the end of the motion.

There are numerous exercises in which a sportsman's body weight acts as resistance to improve strength, such as all forms of jumps, wall bar strength exercises, pull-ups, rope climbing, sit-ups, and so on. These workouts can help you improve explosive power and strength endurance if you do them correctly. These workouts are the most common way to enhance relative strength in sports where it matters. Strength can be developed in a variety of sports by using one's own weight as resistance.

Resistance training is one of the most effective ways to achieve peak fitness. Because resistance can be provided by weights, machines, rubber stands, and a variety of other devices that resist the movements of the exercise, it is a broader phrase than weight training. Resistance training is defined as a method of training for various sports that involves the use of a weight or comparable gear.

A sedentary lifestyle as a child might translate to a sedentary adult lifestyle. A number of personal trainers are now constructing resistance training programs for preadolescent youngsters and teenagers as an alternative to sports, games, and cardiorespiratory activities in an effort to entice more children to exercise. Resistance training regimens for preadolescents and adolescents, according to the American Academy of Pediatrics, do not disrupt linear development patterns or have any long-term negative effects on cardiovascular health. Further studies have shown that personal trainers can best serve youth populations by incorporating both cardiorespiratory and resistance training interventions into exercise programs designs for overall health, cardiovascular fitness, muscular strength, and the prevention of obesity, diabetes, and cardiovascular disease.

1.7 MOTOR FITNESS

Fitness is essential for living a happy and healthy life. Exercise is an essential component of a comprehensive fitness plan. Frequent exercise is required to create and maintain an optimum level of health, performance, and attractiveness. Modern living has taken all the exercise out of our lives, thus in order to get healthy and keep it, regular exercise is required. Physically and intellectually, it makes you feel fantastic. It boosts

one's mood and boosts one's self-esteem. It's a sign of good health to appear young. Regular physical activity improves joint function, builds a sense of well-being, improves physical working capacity by enhancing cardiorespiratory fitness, muscle strength, and endurance, and lowers the risk of major diseases that can lead to early disability and death.

According to **Ukoho (1988)**, exercise has been found to boost health prospects in a variety of ways. It aids in the reduction of body fat and total weight, as well as the reduction of blood pressure. Exercise promotes healthy digestion, breathing, and blood circulation. An effective exercise programme can help to lower the risk of injury in older adults as well as back injuries in certain occupational groups. Training and diet can improve exercise tolerance, control risk variables, and potentially impact the progression and regression of coronary artery disease. Depression and anxiety are reduced as a result of the psychological consequences.

Regular physical activity is beneficial to one's health and can improve one's quality of life. A minimum of two to three hours of training per week in at least three sessions at an intensity comparable to 60 to 85 percent of maximum heart rate achieved in a symptom limited maximum exercise test is required. High-risk cardiac patients should exercise at a lower pace and reduced intensity. Exercise has a crucial part in keeping people in shape and fit. Without regular exercise, adjusting one's life in terms of stress, diet, sleep, and other factors will be tough. Exercising entails putting the body to work and fine-tuning it. Physical fitness is improved and maintained through exercise. **(H.U. Niederhauser, 1996)**

Everyone should be aware of the importance of physical activity. In other words, at least a basic understanding of anatomy and physiology is required. Physical fitness can be comprehended with this foundational knowledge. When a scenario emerges, physical fitness refers to a person's ability to work consistently and effectively.

Physical activities sharpen one's mind, make one physically fit and at comfortable with one's body, and make one better prepared to deal with the pressures of everyday life.

Physical fitness enhances not only one's health but also one's work performance. Plenty of American businesses have backed this approach financially by hiring full-time fitness directors.

Physical activity aids an athlete's ability to maintain a high level of physical fitness. All girls and boys in schools must participate in a mandatory activities programme. It would be fascinating to learn which aspects of physical fitness have had a substantial impact on the runners' athletic ability. For this study, the following motor fitness characteristics were investigated, as they were more closely linked to football playing skill:

1. Speed
2. Explosive Power
3. Cardiorespiratory Endurance

1.8 PHYSIOLOGY

Physiology is a branch of science that deals with the regular functioning of the human body. The term physiology comes from the Greek word physiologikos, which

means "discussion on natural knowledge." (**Shamal Kaloy, 2007**)

The scientific study of physiological changes in athletes as a result of long- or short-term exercise is known as activity physiology. Altitude, climate, temperature, humidity, nutritional state, and other environmental factors all have a tight relationship with an athlete's best performance. (**Shamal Kaloy, 2007**)

To be fit, the body's physiological systems must be able to endorse the scientific activity that the individual is engaged in. Furthermore, multiple activities place different demands on the organism in terms of circulatory, respiratory, metabolic, and neurologic processes that are particular to the activity. **(Bangsbo, J. 1996)**.

1.8.1 PHYSIOLOGY AND IT'S IMPORTANCE

High-level performance in sports and games may be influenced by physiological makeup, and it has long been recognised that physiological proficiency is required for high-level performance. (**Gianetti, G et.al. 2008**)

According to Gianetti, in order to be fit certain physiological systems in the body must function well enough to support the specific game that the player is playing.

Physiological fitness is specific to the activity since different games place varied demands on the organism in terms of neurological, respiratory, circulatory, and temperature regulating processes. Exercise adapts physiological systems very well. (**Gianetti, G et.al. 2008**)

Resting heart rate and breathe holding time were chosen as physiological variables to determine the impact of plyometric, aerobic, and resistance training on Kerala football players.

1.9 BIOCHEMICAL VARIABLES

The study of chemical reactions in living beings is known as biochemistry. Proteins, carbohydrates, lipids, nucleic acids, and other biomolecules are studied for their structure and function in cells.

Exercise causes biochemical changes in the cardiovascular system as well as other significant changes in body composition such as proteins, carbs, lipids, and triglyceride levels. **(Scharhag. 2008)**

Biochemical variables, serum albumin, and blood cholesterol were used to determine the effect of plyometric, aerobic, and resistance training in Kerala football players.

1.10 REASONS FOR TOPIC AND VARIABLE SELECTION

The researcher is a fantastic football coach who is absorbed in the game of football. He was interested in discussing the findings of this study and sharing his thoughts on professional football. Football training and coaching must assist in the targeting of the appropriate muscles for fitness. Football is a recreation that calls for an extensive variety of athletic abilities, which includes explosive strength acceleration and brief dash overall performance speed; muscular persistence and energy withinside the decrease frame; muscular stability and excessive tiers of neuromuscular co-ordination, body

consciousness and agility, the cap potential to realize in which the frame is and circulate it; properly stretchability and versatility to keep away from injury; and accurate stability among the quadriceps and hamstrings, in addition to the cap potential to apprehend in which the body is and circulate it. As a result, every football player wants to increase their motor abilities, physiological, and biochemical variables that influence the talents they do.

The goal of this study was to evaluate motor abilities such as speed, explosive power, and cardiorespiratory endurance, as well as physiological and biochemical factors such as resting pulse rate and breath holding time. And to see how plyometric, aerobic, and resistance training affected selected motor fitness, physiological, and biochemical variables in Kerala college football players. This research also looks into which training method is superior to the other in this regard whether plyometrics, aerobics, or resistance training that are more effective in improving motor fitness, physiological, and biochemical variables. As a result, the current study examines the effects of plyometric, aerobic, and resistance training on selected motor fitness, physiological, and biochemical variables in Kerala college football players.

1.11 OBJECTIVES OF THE RESEARCH

1. The purpose of this study was to see how plyometric aerobic and resistance training affected selected motor fitness components like as speed, explosive power, and cardiorespiratory endurance in Kerala college level male soccer players.

2. To examine how plyometric aerobic and resistance training affected chosen physiological characteristics such as resting pulse rate and breath holding time in male college soccer players from Kerala.
3. To check the influence of plyometric aerobic and resistance training on selected biochemical variables, serum albumin and blood cholesterol among college level male soccer players of Kerala.
4. To see if there were any differences in the effects of various training methods, such as plyometrics, aerobics, and resistance training, on various motor fitness, physiological, and biochemical variables among treatment groups.

1.12 STATEMENT OF THE PROBLEM

1. To determine the impact of plyometric aerobic and resistance training on chosen motor fitness components, speed, explosive power and cardiorespiratory endurance among college level male soccer players of Kerala.
2. To investigate the effects of plyometric aerobic and resistance training on selected physiological characteristics, such as resting pulse rate and breath holding duration, in Kerala college-level male soccer players.
3. To study the role of plyometric aerobic and resistance training on selected biochemical variables, serum albumin and blood cholesterol among college level male soccer players of Kerala.
4. To see if there were any differences in the effects of various training methods, such as plyometrics, aerobics, and resistance training, on various motor fitness, physiological, and biochemical variables among treatment groups.

1.13 HYPOTHESES

The following hypotheses were proposed in light of the preceding debate and for the purposes of this investigation:

1. Anticipated that plyometric aerobic and resistance training would have a substantial impact on selected motor fitness characteristics, speed, explosive power, and cardiorespiratory endurance in college level male soccer players from Kerala when related to a control group.
2. It has been predicted that plyometric aerobic and resistance training would have a substantial impact on selected physiological indicators, such as resting pulse rate and breath holding time, among college level male soccer players in Kerala, as compared to a control group.
3. It was estimated that plyometric aerobic and resistance training would have a substantial impact on selected biochemical indicators, serum albumin, and blood cholesterol among college level soccer players in Kerala when compared to a control group.
4. There would be substantial variations in chosen motor fitness, physiological, and biochemical variables of collegiate soccer players in Kerala between treatment groups.
5. It was anticipated that the treatment groups, such as plyometric aerobic and resistance groups, would not differ significantly from the control group in terms of chosen motor fitness, physiological, and biochemical characteristics among college level soccer players.

1.14 IMPORTANCE OF THE RESEARCH

In the following ways, the current study will make a significant contribution to the field of physical education and sports:

1. The research will assist researchers better understand the impact of aerobic exercise on motor fitness, physiological, and biochemical factors.
2. The study will benefit in the knowledge of resistance training's impact on motor fitness, physiological, and biochemical factors.
3. The research could help physical education teachers and coaches better grasp the nature of aerobic, plyometric, and resistance training.
4. The findings of the study would aid in the comparison of selected motor fitness physiological and biochemical characteristics among Kerala college-level male soccer players.
5. The impact of plyometric training, aerobic training, and resistance training on motor fitness, physiological, and biochemical variables in college-aged male soccer players will be studied.

1.15 DELIMITATION OF THE RESEARCH

During this research, the following delimitations are properly considered:

1. Aim of the research was to take 80 football players, chosen as subject. They were from NSS college of arts and science Manjeri, MES Mamapad, MIC college, and EMEA Kondotty
2. The subjects were restricted only college level male soccer players their age ranged from 17-25 years old**.**

3. The training schedule should be fixed 12 weeks training programme.
4. The study was delimited with training of three days per week (each day 60 minutes of training.
5. Selected plyometric aerobic and resistance training was given to the players.
6. The research went on to define some more parameters. Eighty people were placed into four groups, three experimental and one control.
7. The following variables were designed to satisfy the study's goal: motor fitness, physiological, and biochemical variables.

Dependent Variables

Motor Fitness Variables

1. Speed
2. Explosive power
3. Cardiorespiratory Endurance

Physiological Variables

1. Pulse rate at rest
2. Time spent holding a breath

Biochemical Variables

1. Serum Albumin ‘
2. Blood Cholesterol

Independent Variables

1. Plyometric training

2. Aerobic Training

3. Resistance Training.

1.16 LIMITATION OF THE RESEARCH

Unmanageable research-related elements will be acknowledged as limitations, and the following are considered research study constraints:

1. The study did not take into consideration some elements such as rational habits, living style, daily routine, food, or environmental condition.

2. During training and assessment, the influence of students' active academic activities may discourage or stimulate the topics.

3. The respondents' diverse personalities in terms of inherited and environmental factors were identified as limits.

4. The body type and socioeconomic level of the individual may not be taken into ac count.

5. During the training programme, unpredictable changes in climate and weather conditions such as atmosphere, temperature, humidity, and other meteorological phenomena were recognized as limits.

1.17 MEANING AND DEFINTION OF TERMS

Training

Training has been defined as an activity programme aiming to develop abilities and capacities such as heart rate at rest. **(Hardayal Singh, 1991).**

Speed

Speed refers to a person's ability to make a series of similar movements in the least amount of time.

Hardayal Singh (1984) defined speed as “ability to execute motor actions under given conditions in minimum possible time”.

Mackenzie (1999) defined that speed as “the quickness of movement of a limb, whether this is the legs of a runner or the arm of the shot putter”.

Explosive Power

It is a person's capacity to relax maximum force in the least amount of time. **(Mathews, 1981).**

Baungarther (1987) states that the capacity to relax maximum muscle force in a short test, such as executing a standing jump, is known as explosive power.

Cardiorespiratory Endurance

The ability to continue activities that tax the cardiac, circulatory, and respiratory systems is known as cardiorespiratory endurance. **(Frank, 1992) .**

Endurance refers to the capacity to perform athletic actions with the necessary quality and speed although fatigued. **(Hardayal Singh, 1991).**

Resting Pulse Rate

A complete heartbeat, pulse, or cardiac cycle is the period between the end of one contraction and the end of the following contraction. At rest, a normal adult's heart cycle takes less than one second (approximately 0.08 seconds), and it is lowered by exercise. (**Astrand, 1977)**

Breath Holding Time

Breath holding time is known as the amount of time it takes to hold one's breath without having to study all living things. (**Laurence E. Morehouse and Augustus T. Miller, 1967).**

Serum Albumin

Serum albumin, often known as blood albumin, is an albumin (a form of globular protein) found in the blood of vertebrates. (**Hawkins JW, Dugaiczyk A,1982**).

Blood Cholesterol

Cholesterol is a chemical found in the cells and fluids of animals. It's a lipid that's either a fat or a fat-like molecule. Cholesterol is a waxy substance with a soft consistency. Cholesterol is a steroid, which means it is a specific sort of lipid. Steroids are a type of lipid with a unique chemical composition. This structure is made up of four carbon atom rings. Cholesterol is primarily present in animal fats. Cholesterol is the most

common steroid produced by animals. Hormone steroids such as cortisol, estrogen, and testosterone are examples of other steroids. These and other steroid hormones are created by altering cholesterol's basic chemical structure. It is calculated using the erymatic calorimetric method and represented in milligrams per deciliter (mg/dl**). (Rahmati-Ahmadabad S, Broom DR, Ghanbari-Niaki A, Shirvani H.)**