Chapter II

REVIEW OF RELATED LITERATURE

Research scholar has made sincere efforts to locate both critical and allied literature pertaining to the present study. Relevant studies reviewed from various sources have been cited below.

Uppal and Singh (1983) conducted a research study on comparative effects of Harness running, weight jacket running on leg strength, length of the stride and sprinting speed. The subjects for the study were 45 male students of classes tenth and eleventh. The average of the subjects was sixteen years. During the experimental period of six weeks, the group A trained using Harness running, the group B. performed running with weight jacket, group C did not performed any activity. Training was carried out thrice a week for both harness running and weight jacket running. The subject run over a distance of 80 metres. After the six weeks experimental period of following conclusions were drawn.

1. Leg length can be effectively improved by administering a systematic resistance training programme comprising of Harness running and weight jacket running.
2. Harness running contributes to a significant increase in length of the stride.

3. Sprinting speed can be effectively improved by administering a systematic programme comprising of Harness running and weight jacket running.

4. Weight jacket running was not formed effective in improving length of the stride.

5. No significant change in leg strength, length of the stride and sprinting speed in case of control group is obviously a reflection of their inactivity.

Paradisis, Looke and Bissas (1999) conducted a study with the objective of identifying the posture characteristics associated with running on uphill (3°) down hill (3°) and horizontal surfaces. The analysed data included maximal stride velocity, stride, length, stride frequency, several joint angles, and the distance of the centre of mass to the contact point and touch down and take off.

As expected maximal velocity was significantly greater down hill or horizontal running. This was the result of changes in stride length, while stride frequency showed no significant differences.
Dintiman (1984) conducted a study to measure the stride length during maximum sprinting speed on a track. Two markers are placed 25 yards apart on a cinder track or other soft surface that will leave a foot imprint. You should now move back approximately 50 years from the first mark. After a thorough warm-up period, begin running from this point, accelerate to maximum speed just prior to reaching the 25, yards area, with a tape measure, determine the exact length of two separate strides from the tip of the rear toe to the tip of the front toe. Use the average of these two measures as an indicator of your stride length.

Gregory (1975) conducted a study to analyse the comparative effect of down hill versus level training circuits on the running speed, stride length, Stride frequency and leg strength. The subjects were randomly assigned to each of the groups and were varsity soccer players. Each group consisted nine players. The treatment period lasted five weeks during which the subjects ran 15-40 yards sprint at the beginning of each practice session. The finding of the studies were (a) The down hill method of training significantly improved the stride length, but down hill method of training did not significantly increase the running speed. (b) Stride frequency and leg strength did not prove significantly through some improvement were observed.
Pande (1988) studied to determine the effect of treadmill training on 100 m running performance. A total of 40 subjects between the age group of 13 to 15 years were selected from Shri Ram Krishna sports school and divided into two equal groups. The experimental group were given a training programme of six weeks. The subject performed a training for five days per week. On the training day a 40 minutes programme was conducted consisting a warm up exercise for seven minutes and treadmill running for 20 seconds, five times with an interval of five minutes. After the second, training on treadmill running period was increased to 25 seconds and after the fourth week it was increased 30 seconds. After 6 weeks post test on running 100 m was taken for both the group. It was concluded that the experimental group improved significantly on the performance of 100m running than the control group.

Hamak (1968) conducted a study to determine the effect of a selected progressive resistance running performance on circulatory-respiratory efficiency, power and face running speed. Forty five male subjects were divided into three equated groups: interval running, resistance running (employing an exergonic) and control group. The effects of a six week training programmes were determined by a pre-test, initial post test and final post-test for oxygen debt rapid, power developed by the legs, free
running speed and elapsed time for a 600 yard run. Significant improvement was formed in oxygen debt rapid (.05 level) and elapsed time for a 600 yard run (.01 level) between the interval and control groups.

Bosen (1989) conducted and experiment with four sprinters, using a motorcycle with an attached handle behind it for the athlete to hold. They were pulled at speed more than they were accustomed to in normal sprinting. Athlete has six weeks of conditioning training and six weeks of pre-competitive speed training before the experiment training method was used. After six week of experimental period, the following conclusions were drawn.

1. The use of outside agent like a motor cycle does help in developing faster times over the short sprint distances.

2. Starting practice from block must force a part of the total training in order to over came the imbalance from the forward lean body position and extra leg speed gained by the sprinters using this method.

3. This method not only increases speed which can result in fast times over a given resistance, but also results in an increase in stride length relaxation and general running form.
Roy (1980) compared the effect of acceleration, running, resistance running, and sand running on sprinting speed; explosive leg strength and length of stride. Sixty boys of Tripura were selected at random as subjects for the study. Age group of subjects for the study. Age group of subjects were fifteen to seventeen years. The subjects were divided at random in three experimental groups and one control group with fifteen subjects each. Group A trained with acceleration run, Group B with resistance run and Group C with sand running while control Group D did nothing. After six weeks experimental period the following conclusions drawn.

1. Sprinting speed and explosive leg strength can be improved by administering a training programme of acceleration running, resistance running and sand running.

2. Length of the stride can be improved by administering a programme of resistance running and sand running, where as acceleration running is not effective in improving the length of the stride.

3. Resistance running was superior to acceleration running and sand running in improving the length of the stride.

Law Man (1977) investigated the effect of tow training on the development of certain bio-mechanical factors of sprinting speed i.e. stride
length, stride frequency and dynamic range of motion of the femoral shaft. All subjects (N= 25) were divided randomly into experimental group and control group. Training programme was established thrice a week for a six week period. After six week post test was and result showed that.

1. Subjects who were engaged in tow training significantly increased speed.

2. Control group did not significantly increases in speed and the only identified variable which showed a significant positive change was flexion of the femoral shaft.

3. Total sample (N= 25) significantly increased in speed, dynamic range of notion and femoral flexion.

Chiodo (1976) conducted study with 48 male High school students between the ages of 14 and 16 years to ascertain what effects lengthened running has on strength, reaction time, movement time, flexibility, power, and the time it takes to run the forty yard dash. The relationship of the above factors to stride length was also studied.

The subjects were assigned to three treatment at groups by use of the table of random numbers. The sixteen subjects of the experimental group A engaged in a training programme of running with a lengthened stride. The
second experimental group B participated in a programme of running with a natural stride. The control group C participated in the regular physical education classes of volley ball.

Prior to and after the six weeks training session consisting of 25 minutes per day, five days per week, all subjects in the three groups were given tests on leg strength, flexibility, reaction time, leg movement time, hip strength, power, stride length, and ability to run the forty-yard dash against time no consideration was given to previous experience in physical education and athletics.

Results showed that the experimental group that trained with a natural running stride improved significantly from pre-test to post test in muscular power as measured by vertical jump. The experimental group that practised with a natural running stride decreased the stride length from pre-test to post test significant difference between groups.

The experimental groups that practiced with a natural lengthened stride showed no significant gain in any of the strength or flexibility measures. The experimental groups that practised with a natural and a lengthened stride showed no significant gain in speed, reaction time, or movement time.
Lin (1981) conducted a study on seven highly skilled male runners who attended the American Olympic Development clinic at the University of Illinois at Urbana Champaign in August, 1978, acted as subjects for the purpose of experimental study. Based on the experimental data, the stride lengths were adjusted within a reasonable range for each runner. Then, a detailed theoretical analysis was conducted for each assuming stride length. According to the construction of a mathematical model of the lower extremity for running, the equation of motion were derived to depict the kinematics and kinetic properties of the lower extremity. Lagrangian equations were applied to evaluate the resultant effective moments about the three joints of the leg for a fall cycle of running. The total mechanical energy expenditure of the total applied moments system was evaluated by the time integral of the instantaneous power, which is the product of the resultant effective moment about a joint and the angular velocity of the limb with respect to the joint. Then for each assuming stride length, the ratio of the energy expenditure to the time duration of a running cycle was obtained. The determinant of the optimal stride length for each runner at a given running velocity was dependent upon the assuming stride length which exhibited the minimum power output. In addition, the Euler-Lagrange Equation approach was applied to the condition for a minimum of
a performance measure. The optimal movement patterns were, then
determined for each runner at a given running velocity.

Atwater (1985) conducted a study of 23 sprinters with best 100m.
times of 9.9-10.4 seconds differed substantially from those reported by
either Hoffman or Rompotti. For two ground of 12 subjects the average
stride lengths recorded were 2.5 m. (recorded for one group at 50 m. mark)
and 2.34 m. (recorded for the other group at 60m). These values were,
respectively equivalent to 1.41 and 1.31 times the average height of the
subjects and 2.65 and 2.47 times their average leg length. The differences
between these results and those of the previous investigators are probably
due to two inter-related factors - differences in the track surfaces (cinders
versus synthetic surface) and in the calibre of the athletes involved.

Bosen (1987) conducted a study on 12 male sprinters to make a
comparative analysis of starting with and without starting blocks to
determine stride length and stride frequency in the acceleration phase.

All subjects were tested prior to the start of the study to establish
their performance capability. They were then put through three weeks of
familiarization in the use of the synthetic track and to get them used to
taking starts with and with out blocks on the same surface.
The sprinters run in pairs and had two trials each with a recovery period of 45 minutes between sprints. The total distance covered was 50 meters and sprinting time was recorded for every 10 meters that was covered. Stride length and stride frequency measured for the first 20 meters covered and for the remaining distance from 20 metres to 50 metres. The timings of sprinters were also recorded for the full 100 meters event, with and without blocks. These trials were conducted over a period of three weeks. Reaction time test under controlled conditions in the laboratory and electronic chronoscope was used to measure their reaction times.

The results showed that stride length and stride frequency were related to each other significantly for sprints with blocks up to 50 meters as compared to sprints with out blocks for the same distance. It was found that stride length and stride frequency with blocks is significantly correlated to a higher degree than sprinters with blocks for the distance between 20 to 50 meters.

Subramanyam (1975) conducted a study on 30 male subjects to determine the effect of determine the effect of “Two Hands snatch” (Split) on stride length in sprinting.

The subjects randomly assigned in to two groups. Group A was considered as experimental having eight week training programme with a
selected weight training exercises. Where as Group B served as control group. The two hands snatch exercise was chosen for its probable contribution to the improvement of flexibility of the hip, knee and ankle joints where as increasing stride length.

The average of four consecutive stride after crossing a distance of 45 feet was considered as the length of stride in this study. The measurement were taken with the help of steel tape graduated in centimetres and metres.

The mean gains in stride lengths made by Group A and Group B after experiment period were tested, and compared for significance by using ‘t’ test. Result showed that gain made by Group A was not found to be significant at .05 level of confidence for the given degrees of freedom and he came to conclusion that the weight training exercise “Two hand Santch” (Split) was not contributed to the increase of stride length.

Ecker (1975) expressed that speed is the product of two factors, stride length and stride frequency. Increasing either factor (without an off setting decrease in the other factor) automatically increase a runner’s sprinting speed. From a training stand point, it appears that the stride length is more important of the two factors. Stride length can be increased by increasing the leg strength. Stride frequency, however is largely an inborn characteristics. Although it might be possible to
improve stride frequency slightly through training, it appears that this improvement also brings about a corresponding shortening of stride length.

Rosen and Rosen (1986) says that sprinters should stride forward, but neither chop their stride nor overstride. Usually we concentrate on leg turn over—that is, trying to get the feet down as quickly as possible, since the more steps you take at a given stride over a given time, the faster will go stride length, which is defined as the distance between the touch down of foot to the touch down of the other, will vary the size of each athlete and during the various phases of race. The stride cadence, which is the number of stride per seconds is usually 4.5 to 5.0 with all else being equal, the sprinters can pick up that cadence will win any race.

Winfried (1997) an analysis of the performance of elite 100 m sprinters reveals, in comparison to average performers, better pick-up and acceleration capacities as well as the level and duration of their maximal speed.

A “correct” sprinting techniques is the foundation for the development of acceleration and maximal speed. A variety of exercise and drills from sprint ABC’s are essential here to improve co-ordination to
speed up learning process of new motor skills and about all, to exploit more efficiently developed physical capacities.

A systematic sprint specific strength training must take into consideration the importance of the hip extensors and the Ischiatic musculature in the pick up and maximal speed phase.

Acceleration sprint should always be at least 30 m long in order to combine the necessary transfer from the crouch start to the pick up phase.

The length of sprinting distances especially with runs from a flying start are gradually increased during a training year up to 100 m. The aim is to systematically lengthen the maintenance of high speed reached in 30 m flying starts.

According to Donati (1997), the training of sprinters must, besides running and strength development, include specific exercise that reproduce and improve the different phases of the running stride.

Boris (1990) has a believe that there is no doubt that sprinting is a explosive power event. This applies particularly to the 100 m in which the elements of the start and the initial accelerative are most significant. Many specialists, including this author, therefore believe that there are sizable untapped reserves for better performances hidden in strength and power
development. It is a well known fact that speed can be improved by increasing the stride length and stride frequency. Sport science studies have demonstrated that improved strength in the leg and upper body extensor muscles influences stride length, while flexor muscle groups affect stride frequency. The combination of the two running speed components also depends on the idiosyncrasies of an athlete. These include anthropocentric indicators, the functioning of the nervous system, the level of physical and technical capacities that influence the dynamics of speed and the optimal combination of stride length and stride frequency.

Erwin (1999) written an article that the various phases of a sprint race can be improved by the speedy system, a device made up of two harnesses, a rope and a pulley including means to regulate the amount of assistance or resistance as required. The speedy system has the advantage of stimulating down hill or uphill runs on the flat track surface, which is essential for quality sprinting. In addition an automatic release from the harness permits the pulled athlete to attempt to convert the assisted speed into unaided speed.

While in the most simple format of the system one athlete pulls another, it is also is possible to employ weight plates to regulates the pulling force, or to combine both in different types of exercise. If a weight
plate is used in acceleration, it again is automatically disconnected from the runner after a predetermined distance to convert external stimuli.

Bosen (1973) noted that the effectiveness of this forceful thrust is manifest by the fact that one sprinter achieves a faster time than his opponent over the same racing distance. Leg speed is related to the Athletes reaction time, stride frequency as related to stride length. As inherited quality commanding a sense of balance in the interplay of forces involved in the maintenance of sprint form. Body angle, stride length, stride speed, starting technique arm action, finishing technique arm action, finishing technique, are some of the many important requirement that aid the sprinter to achieve his potential by way of better performance in sprinting.

Bosen (1973) in his views says that the better class sprinter can cover a greater distance as compared to a slow sprinter. Improvement in sprinting technique and ability involves the strengthening and refining of the total movement. A fine balance between stride length and stride frequency is required for good sprinting. Improvement either factor will result in increased speed, but one must strive to maintain a uniform improvement of both factors to really gain top class sprinting ability.

Fedrick (1986) Athletic speed is influenced by several factors: stride, stroke or pedal frequency; stride length or arm reach; reaction
movement time; maximum velocity; acceleration; leverage; strength; flexibility; aerobic or anaerobic capacity; speed endurance; mechanical efficiency; control; good technique; agility. The relative importance of each of these factors depends of course, on the specific sports, the event and in team sports, the position. For example in running, speed is determined by stride length and frequency.

Fredrick (1986) made a suggestion that all of the factors affecting speed are determined to some extend by heredity, each can be achieved through training. Your Athletics speed can be increased. Some speed factors, however, respond better to training than others. Stride frequency or stroke is the rate of leg or arm movement. It responds well to practice. Stride length can be more difficult to improve though improvement is possible.

Collins (1984) is given an understanding that when all is said and done there are only two factors that can make an individual run faster: 1) how fast he or she picks them up and lays them down, and 2) how much ground each stride covers. The great challenge for all sprint coaches is to determine the ideal stride for each runner that will give him the most efficient combination of the two factors.
Jacoby (1983) has given his view that quickness and stride frequency alone will not guarantee a great sprinter. We also understand that a long stride is important in gaining speed in running. However, a giant stride alone will not prepare the athlete for a record time. But by placing the two ingredients together we have the makings for an effective sprinter. An additional factor, that of power development, will unite the stride frequency and the long stride.

Jacoby (1983) strongly recommended that experiences demonstrated that stride length and frequency can very well be improved upon with repetition training by the athlete. Drills are easily incorporated in to the warm up activity that precedes each day’s training session.

Hasco (1986) stride length is important at all distances because by improving stride length, a runner takes fewer steps to finish the race, thus improving his or her time.

Dintiman (1974) clearly says that there is no magic formula that will make you faster runner. Speed improvement is complicated and involves an individualised approach that identifies your specific strength and weaknesses through careful testing, identifies the factors that are critical to your sport and position, and identifies the training programmes needed to improve the time. Inadequate leg strength, for example, may limit the speed
of athletes; lack of explosive power, fast muscle contraction or improper stride length may restrict others. Many athletes will have a combination of several areas needing improvement.

Gam betta (1981). It is often been written that sprinters are “born not made”. Although training effects may be less pronounced in the sprints when compared to other events, there is no doubt that sprinting can be increased through proper training. Sprint speed is the product of stride length and stride frequency. In order to increase speed, one or both of these variables must be changed. The stride length is probably the most easily affected through training. Improvement in efficiency through better movement mechanics can result in a more fluid motion with a greater range of motion of the two limbs. This more efficient movement can add several inches to each stride taken.

Stride frequency is less easily affected through training and is probably more related to genetic limitations. It appears that the ability to oscillate the limbs is largely inherited and is related to factors which are not easily affected by training. The muscle fiber ratios, which are fixed at birth, correlate, closely with speed. Also recent research indicates that speed of nerve conduction is also related to speed and is affected little by training.
Whitehead (1976) suggested that a number of features of sprinting can be improved. For instance, if the arms are tight and limited in the range through which they drive, then automatically, the legs will be synchronised in to a jerky, patterning style, where as if the arms are relaxed and driven through a wide range, the legs will be driving through great range and the greater stride length will normally produce a faster sprint.

Dintiman(1974) speed can be improved by increasing stride length and maintaining the same stride rate (steps per seconds). Increased stride length requires additional strength, power and flexibility. Of these three, strength and power are far more important. Sprinting is merely a series of jumps from one foot to the other. Stride length is increased by increasing the power of the push off and jumping further. Stride should be lengthened in conjunction with continuous form analysis to detect possible slowing due to the introduction of a resistance phase by the foot touching the ground ahead of the centre of gravity.

Howard & Rosemary (1981) explains that sprinting speed is a function of the product of stride length and cadence (ie number of strides per seconds) and go on to explain that the cadence, which is dependent on the rate of movement of the legs, can only be marginally improved, but the length of the stride can be increased by training. If the same cadence is
maintained while the stride length is increased, more ground is covered in
the same time. Strength can be developed some 20-30 percent, but it is
unusual for speed to develop more than 10 percent over years of training.

Dintiman (1974) says that maximum speed is determined by the
length of your stride and your stride rate. Maximum speed can little to do
with the length of the legs. A long stride from longer legs does not
guarantee faster movement rates; nor do shorter legs condemn you to
slower movement rates. Short strides move more rapidly and cover a much
ground as long strides and fewer steps per seconds. To improve speed, an
increase in one or both of these areas must occur without a comparable
reduction in the other. One can sprint faster by taking longer steps without
changing the number of steps you take per seconds by taking faster steps
without shortening your stride length, or by taking both longer and faster
steps.

Dyson (1985). Expressed that running speed is the product of length
and frequency of stride, their ratio ranging from one phase of a race to
another and from athlete to athlete. Yet these factors are always
interdependent, and maximum running efficiency exists only when they
are in correct proportion, depending, mainly on the weight, build, strength,
flexibility and co-ordination of the runner.
Payne (1985) clearly suggested that sprinters improve their speed in a most effective way when they simultaneously increase stride frequency and stride length. There is no ideal starting position that can be used by all types of sprinters; there is also no single formula of stride length. In most cases where beginner athletes are concerned, very short and strong athletes will win 60 m to 100 m races against tall and skinny ones.

Dintiman (1975) says speed can be improved by taking a longer step without reducing stride rate. Your first task in lengthening your stride is to measure your steps during maximum speed and compare this length to the standards provided for your height or leg length. Unless your measured stride length is at the extreme range, stride lengthening is indicated. You improve the stride length mainly by increasing the force of the push-off each time the foot strikes the ground; this is accomplished through weight training and plyometric training. Flexibility training may also be needed if you score low on the sit-and-reach test. For the inflexible athlete, increased flexibility will allow the ideal stride length to be taken without undue muscle resistance.

Disney (1986) brought his views that sprinters are said to be born rather than made. But you can improve your speed. And this is important for the distance runner as well as the sprinters.
Speed depends on two things—the length of your stride and your leg speed. Leg speed can’t be improved very much. But it is possible to increase your stride length by strengthening the correct leg muscle, you will produce that extra ‘drive’ needed to cover more ground.

Cureton (1981) suggested that flexibility aids in gaining a long stride in running. Great flexibility in the ankle, hip and trunk may overcome some of the disadvantages of possessing leg which are not extremely long. Short legs and inflexible joints are a poor combination for running performance keeping the role of one leg movement constant. The speed of running can be increased by lengthening the stride.

Hooks (1962) has pointed out that weight training can improve strength and speed simultaneously. He suggested that weight training programme that over loads the muscle will enough weight to ensure strength gains, and at the same time enables the muscles to contract successfully with a burst of speed, will produced increased strength and speed.

Barnes (1964) studies the effect of weight training on speed 100 yard dash. Two groups of nine boys were acquainted initially on 100 yards dash time. One group had 14 weeks of physical education with basketball, tumbling, volley ball, didge ball and the other group spent on equal time in
progressive weight training with three sets of eight repetitions in half squats, curls and full knee bends. Both groups ran two 100-yard dashes for three per week, fifteen minutes rest between. The main gain of physical education group was from 13.3 to 13.1 sec and the mean gain of weight training group was 13.4 to 12.75 sec.

Sweeting (1964) conducted study on the effects of various running and weight training programmes on sprinting speed, running, weight training, combined weight training and no training were given to 100 college men for 30 yards. Analysis of various showed that a systematic running programme increases sprinting speed significantly more than weight training and weight or no training, with equal total training, with equal total training time, running alone was as effective as running plus weight training and weight training alone was not better than no training.

Dintiman (1965) notified the effects of various training programmes on running speed, the purpose of this study was to determine whether a flexibility training programme, a weight training programme or the combination of both would effect running speed when used as supplementary training programme in preference to the conventional method of training sprinters and 145 subjects randomly assigned to one of five training groups, were tested for flexibility by strength and running
speed, before and after an 8 week training period. Result showed that both weight training and flexibility training as supplement to sprint training increased running speed significantly more than un supplemented sprint training programme.

Butler (1996) has expressed his view that one method used to increase running speed is over speed training, which involves using some method of increasing speed beyond normal capabilities. Over speed methods include treadmill running, the use of a low rope or elastic device and down hill running. There have been indication that over speed training increases maximum running speed but little research in to the mechanism involved. This study investigated the relationship between stride length and stride frequency for one type of over speed training down hill sprinting. Twenty male and female college student volunteers from jogging classes were randomly assigned to two training groups. A control group participated in a sprint training programme as a level surface over a 4 week period. An experimental group participated in the same sprint training, but as down hill slop. Subjects were video taped and timed on a 50 m sprint pre-test and post test. The video tape was digitalised to determine stride length and stride frequency. Calculation of velocity based on stride length and stride frequency correlated highly with velocities based on record time
Result showed that the down hill training result in an increase in study frequency \((t = 2.891 \ P = .016)\). However there was also a decrease in study length \((t = 231, \ P = .043)\). The experimental group showed more important on the post-test in running speed than the control group.

Penny (1971) carried out a study to investigate the effects of Resistance running on speed, strength, power muscular endurance, and agility. The training programme was supplemented by Isotonic, Isometric and repetitive sprinting. Hundred and twenty students were divided in four groups. Groups- A, resistance running, supplemented by isotonic leg exercise; Group B, resistance running supplemented by repetitive sprinting, and Group D control group, resistance running only. The training programme consisted of four, fifty minutes sessions per week for six weeks.

Paisch (1976) has expressed that running upon short slopes, sand, hills, hardness running weight training etc. all of which will have the beneficial effect to the sprinters. By adopting a well balanced training programme including assisted speed activities, sprinting activities, specific strength training and pure strength training improved performance will result. Harness is likely to be more beneficial to the sprinters.
Summary of Reviews

From the literature cited in this chapter, it is quite understood that not much studies seems to have been done in India with regards to the present study. Most of the literature cited in the chapter pertains to chapter study conducted abroad and this study has been conducted to find out the importance of stride length, stride frequency, strength, leg length, flexibility etc., to the sprinting speed performance.

Since, speed is the equivalent of an athlete’s stride length multiplied by the athlete’s stride frequency, it is evident from the literature that very little efforts have been made to improve these factors to put the athlete’s in his best.

So far as the studies have been completed in India, are mainly related to find out the effects of various techniques and training methods to improve the stride length. The area of stride frequency was largely not been touched. Few studies are available on various training methods to improve speed but this study is to find out the effect of stick drills on stride frequency and stride length to the ultimate sprinting performance.

This study also gives us the best combination of training programme, which will in turn improve sprinting speed. Hence, the scholar under took the study keeping in view its implication in physical education.