"Training of any kind is better than no training at all"

SPORTS TRAINING

Sports training is a systematic process extending over a long period. For best result the system of training has to be based and conducted on scientific facts and lines where it is not possible to do that, the training has to be based on the results Successful practice which has withstood the test of time sport. Sports training aims at improving the performance of a sports person. The sports performance depends on several factors. The performance of sports primarily depends on his performance capacity, such as speed, strength and endurance. All these factors therefore are the principle aims of physical training.

Sports training is a physical, technical, moral and intellectual participation of performance with the help of physical exercises. It is a planned process for the participation of player and players to achieve top-level performance. Training is much like constructing a multi storied building. One need the following to construct the building, such as aerobic, anaerobic running, comprehensive conditioning, flexibility, etc. Several kinds of materials like training intensities and modalities should be utilized in an on going process to complete the goal of finished buildings or competitively fit player.

Depending on the progress in the construction plan, the relative mix of all these materials will vary. As a training season develops, compressive conditioning work for
strength of endurance will gradually form a transition into an emphasis power with a substitution of intensity of volume in determining the total load.

CONCEPT OF SPORTS TRAINING

It must be understood on a wider sense that physical exercises undoubtedly are the principle means to improve performance. But the sports performance is improved by other means also which should be included in the concept of sports training. Such means, which are most commonly used along with physical exercise, are theoretical instructions, discussions, tasks of observations, physiotherapeutic measures for recovery from fatigue, psycho regulative procedures and so on. These means and the physical exercises, actual training process is used in a complex integrated manner. In reality, we cannot separate physical exercises from other means. Hence the concept of sports training must include all the means for the improvement of performance. The sports training therefore is the total process of preparation of a sportsman, through different means and forms for better performance. Sports performance is the result and expression of the total personality of the sportsman's physical fitness, technique and tactics. In addition to that, the sportsman must possess certain cognitive, volitional and perceptual activities, certain personality traits, habits and above all positive belief, values, attitude and interest of training and competition.

Therefore, sports training also aims at better education of the sportsman. The educational aspects of sports training is unfortunately often overlooked by the coaches and physical education teachers in India. Performance improvement is stressed more at the cost of education of a sportsman.

The pedagogical aspect of sports training comes into sharp focus, when we consider that in performance sports, the systematic training in almost all the sports has to start from
childhood. Therefore, it becomes all the more important to educate the child and youth along with improving their performance through sports training. Training involves periodic assessment of the player's status and progress. Training usually varies regular increase in the difficulty of task performance. Training suggests some form of gradual increase in performance output over an extended period of time. Most kind of training needs regular repeated and collected trait repetition of some of the original movements. Any invariable training implies hard work. Training should be associated with good health.

Sports participation and appreciation have become integral part of lives. Competitive sports make tremendous demands on the physical conditioning, vitality, endurance and mental powers of the participants. Only the fitness can play to the best of their ability. Each sport has its own patterns, muscle, tempo and duration. Today the people of every country are more concerned with physical fitness than ever before as it has become the vital part of winning sports competitions.

THE FOUNDATION OF SPORTS TRAINING

Though many player participate in sports and games, only a few reach the highest performance levels. Why is happen? Certainly not everyone has the same potential when beginning. Even so many players who seem only ordinary in their early years later blossom into national- or world-class performers. Why are they able to make it to the top when compared to the initially more talented players? The answer lies in their training.

The Three Cornerstones of Training

Training and competition are complex activities; many variables contribute to success. However, three very basic rules should always be followed in training. The cornerstones of any successful system of training are
a. Moderation

Moderation is the first cornerstone of training. It means not going to extremes in any aspect of training. Inexperienced distance runners should not run 100 miles a week in training because they may develop serious injuries that could end their running careers early. Extended hours of training are not necessary. Players at most levels of competition can compete successfully with 2 hours of daily training if it is well planned and seriously conducted. Only at the most advanced levels of sport (after 6 to 10 years of training) the need for more extensive training appear.

Players in some events have trained more than this, it is true. However, the long-term results of more extreme training programs are inconsistent, with more players failing than succeeding in reaching the top. Some players develop serious injuries, and many become burned out, psychologically drained by the heavy training loads.

The human body can take far more stress than we generally give it. However, it needs to adapt to heavier stresses gradually. Moderation means a carefully planned training program that avoids extremes in physical or psychological stress. Training and competing can be a beautiful, exciting part of life, but they are not all there is to life. The principle of moderation permits the player to enjoy the other parts of life as much as sport.
b. Consistency

Consistency is the second cornerstone of training. One way to avoid extremes in training is to train at a reasonable level every day. This does not mean using the same training load each day. When an player trains consistently, the body has more time to adapt to the stress of training, easing its way to higher levels of fitness. If a few days of training are missed, the body loses tone and endurance. A day or two of extra-hard training does not make up for that loss. In fact, the player may overstretch the body, resulting in an injury or an illness. Extra physical strain does more than simply tire the body, so the consistency of training is critical. The player who trains daily at a moderate level will outperform the equally talented player who trains extremely hard at times and skips training at other times.

Consistency has another reward for the player. As training continues, a solid fitness base develops. The longer the time used to develop the base, the less effect an interruption of training has. Although any player loses conditioning when training is interrupted, the player with a long-term base loses condition more slowly and regains it more quickly.

c. Rest

Rest is the third cornerstone of training, perhaps the most important one for the young players. A player must get enough rest. This may be the training rule least followed by the young players. A simple rule of training getting more rest. Players feeling tired or weak shouldn't try to have hard training sessions. Instead, they should have very light training sessions or simply skip sessions. Players must be aware of how much sleep they are getting. Players in training need more rest and sleep than non-players.
Why do they need more rest? First, the extra work creates extra physical stress, which calls for more recovery time. Second, the body makes its adaptations to stress when the body is at rest rather than during the stress. This is part of the overload aspect of training. If the body does not have enough rest, it cannot recover and adapt fully, so it does not benefit fully from the training.

The body is like a massive computer, with many complex working parts. When it worked very hard, occasionally it gets tired or overloads, becoming less efficient. With a computer, a problem requires "down time," a "rest" period while the operators repair the problem. The body repairs its own problems (unless they are extreme), but it requires its own down time every day. The amount varies from one person to another, but most players need at least 8 to 10 hours of sleep each night.

Generally speaking, the younger player needs more rest. A player must learn to be "tuned in" to his or her body; it tells when it needs more rest and when it is enough. The body runs on rest, just as it runs on fuel. If it has too little rest, it begins to run poorly.

These three cornerstones are critical to any training plan that a coach or an player may use. If player trained consistently at a moderate level while getting enough rest, his or her performance should continue to improve for years.

**BASIC PRINCIPLES OF TRAINING PROGRAM**

A number of basic training principles apply to all types of exercise programs, whether they are designed to improve cardiorespiratory fitness, musculoskeletal fitness, body composition, flexibility, or balance.
a. Specificity-of-training principle:

The specificity principle states that the body's physiological and metabolic responses and adaptations to exercise training are specific to the type of exercise and the muscle groups involved. For example, physical activities requiring continuous, dynamic, and rhythmical contractions of large muscle groups are best suited for stimulating improvements in cardio respiratory endurance; stretching exercises develop range of joint motion and flexibility; and resistance exercises are effective for improving muscular strength and muscular endurance. Furthermore, the gains in muscular fitness are specific to the exercised muscle groups, type and speed of contraction, and training intensity.

b. Overload training principle

To promote improvements in physical fitness components, the physiological systems of the body must be taxed using loads that are greater (overload principle) than those to which the individual is accustomed. Overload can be achieved through increases in the frequency, intensity, and duration of aerobic exercise. Muscle groups can be effectively overloaded through increases in the number of repetitions, sets, or exercises in programs designed to improve muscular fitness and flexibility.

c. Principle of progression

Throughout the training program, you must progressively increase the training volume, or overload, to stimulate further improvements (i.e., progression principle). The progression needs to be gradual because "doing too much, too soon" may cause musculoskeletal injuries and is a major reason why some individuals drop out of exercise programs.
d. Principle of initial values

Individuals with low initial physical fitness levels will show greater relative (\%) gains and a faster rate of improvement in response to exercise training than individuals with average or high fitness levels (initial values principle). For example, during the first month of an aerobic exercise program, the $V_o_2$ max of a client with poor cardiorespiratory endurance capacity may improve 12\% or more, whereas a highly trained endurance athlete may improve only 1\% or less.

e. Principle of inter individual variability

Individual responses to a training stimulus are quite variable and depend on a number of factors such as age, initial fitness level, and health status (i.e., interindividual variability principle). We therefore must design exercise programs with the specific needs, interests, and abilities of each client in mind and develop personalized exercise prescriptions that take into account individual differences and preferences.

f. Principle of diminishing returns

Each person has a genetic ceiling that limits the extent of improvement that is possible due to exercise training. As individuals approach their genetic ceiling, the rate of improvement in physical fitness slows and eventually levels off (i.e., diminishing return principle).

g. Principle of reversibility

The positive physiological effects and health benefits of regular physical activity and exercise are reversible. When individuals discontinue their exercise programs (detraining), exercise capacity diminishes quickly; and within a few months most of the training improvements are lost (i.e., reversibility principle).
HOCKEY

Hockey is indeed said to be the oldest of all games played with a ball and stick. It has the thrill of a romantic journey travelling around the world in search of a home where it would be accorded the respect it deserves. It has become a reality in India; Hockey is one among the fastest team sports. The name of the game reflects the shape of the main implement used: the old French world "hoquet" meant a shepherd's crook and some experts believe that the game was simply named by making a few alterations to the spelling of the old French word. Hockey is a game of great skills which calls for keen eyes, physical fitness and speed of movements.

BASIC FITNESS AND SKILLS REQUIRED FOR HOCKEY

A hockey player must have speed, endurance, dexterity as well as the power and skills. Skill is the ability to use the correct muscle at the correct time with the exact force necessary to perform the desired movements in the proper sequence and timings. In hockey, there are many skills such as hitting, pushing, dribbling, passing, flicking, scooping, tackling, dodging, stopping etceteras.

Speed

Speed is a complex ability that is necessary to perform fast motor activities in the shortest possible time; it depends on control nervous motor programmes which are activated by intense with power. Speed is an important factor in almost all court and field games. It can make the differences whether a performer is able to gain an advantage over his opponent. Fast movements are performed by recruiting the fast twitch fibres, and because of their junction and metabolic qualities these fibres constitute the most favourable preconditions for speed performances; For instance, successful sprinters have more than 60 percent fast twitch fibres, as a result of their
genetic, aptitude. whereas de vries (1974) has stated that speed is the result of both positive forces and negative forces. Muscular contractions are positive forces, while air or water resistance gravity, friction, and inertia are some examples of negative forces. Increase in speed can result from decreasing the influence of the negative forces, or both. To improve basic speed, the development of strength, reaction time, neuro muscular coordination and flexibility would be equally important. In general the muscles must be prepared for speed performance by warming up and stretching exercise.

**Agility**

Agility is important in all activities that requires quick changes in positions of the body and its parts. Fast starts and stops and quick changes in direction are fundamental for good performance in practically all court games. Such as basketball, tennis, badminton, volleyball and many field games such as soccer, football, hockey and baseball. These games require running agility. In the majority of activities, performance will improve with increased agility McGee (2007). Agility enables an individual to rapidly and precisely alter the position and direction of the body is an important ingredient for successful participation in wide variety of sport. An agile person can quickly and efficiently mobilize the large muscle groups of the body in order to make rapid changes in direction of movement. One of the most important factors influencing movement is agility. This factor is revealed by the ability of the body or parts of the body to change directions rapidly and accurately the big muscles of the body in a particular activity. One’s level of agility is probably a result of both innate capacity and training and experiences. It is revealed to great intent in sports involving efficient footwork and quick in body position force Borrow and McGee, (1979).
Explosive Power

Successful sporting performance at elite levels of competition after depends heavily on the explosive leg power of the athletes involved. Vertical and horizontal jumping in its many different form, requires high levels of explosive muscular power. Power is the equivalent of explosive strength. “Speed -strength’ synonymous with power. The team sport require high levels of explosive power, such as hockey, volleyball, netball and the Rugby and football for success at elite levels of competition. Explosive power comes from the development of speed and strength.

Paavolainen et.al., (1999) suggested that muscle power is the ability of neuromuscular system to produce power during maximal exercise when glycolytic and oxidation energy production is high and muscle contractility may be limited. As for as its importance in Hockey is concerned to excel in the performance of rebounding and shooting, a player is in need of good explosive power since to jump vertically.

Dribbling

Dribbling is moving with the ball under control and the control over the ball will be lost unless otherwise blade and ball are kept closely together while dribbling the ball. Singer, (1972). Dribbling is the most important skill to gain the distance and to keep the ball to proceed further having fall control over the ball in a required speed and towards some direction preferred towards the opponents goal line. Gian Singh, (1979). Dribbling may be define as a method of advancing the ball with a good control in front or besides the player by a series of gentle and controlled taps with the stick (blade) while the player is on the move or run.
Pushing

The quickest and easiest method of passing the ball to the partner. It is most important skill or action that the stick is on contact with the back of the ball, when the stroke is made. Clerk, (1976). Pushing is the act of propelling the ball for a particular distance with quicker action and with limited movements towards required direction with speed and accuracy. Pushing is a very essential skill, which helps greatly to play a good hockey in many situations. Pushing is used for giving any type of passes, to restart the game, to take the penalty corners and penalty strokes and to score goals. One cannot become a good player without using the skill, "pushing". Therefore this skill also has to be improved to the maximal for better efficiency during the game as player.

Hitting

The hit is the most powerful of all. It's advantage lie in speed at which it can be made to travel. The ball should be made to travel faster and towards the target using any type of hitting for the success in the game of any player either an attacker or defender. Hitting is a skill used when it is important that the ball is made to travel at high speed. Perhaps to reach a colleague at some distance away, to penetrate a gap before it can be intercepted or to beat the goal keeper. Hitting is a process of propelling the ball far a longer distance by adopting any kind of stroke towards the required direction at the required speed with accuracy. Hitting may be used for long passes and for shooting towards the goal for scoring a goal.

INTERVAL TRIANING

One method of training that allows appropriate metabolic systems to be stressed is interval training. Interval training is based on the concept of more work which can be performed at higher exercise intensities with the same or less fatigue
compared to continuous training. The theoretical metabolic profile for exercise and rest intervals stressing aerobic metabolism, fast glycolysis, and the phosphagen system is based on the knowledge of which energy system predominates during exercise and time of substrate recovery.

By choosing appropriate exercise intensities, exercise durations, and rest intervals, the appropriate energy system(s) can be trained. It should be noted that exercise-rest intervals may change as physiological adaptations are made during a training program or as a result of changes in extended programming of training (i.e., periodization).

Weight training, sprint training, and other forms of anaerobic training can increase storage of phosphagens and glycogen, enhance the myokinase reaction and generally enhance anaerobic metabolism especially considering the faster hypertrophy rates of fast-twitch fibers.

Interval training involves a repeated series of exercise work bouts interspersed with rest or relief periods. This method is popular among athletes because it allows the athlete to exercise at higher relative intensities during the work interval they are possible with training. Programs also can be designed to improve speed and anaerobic endurance, as well as aerobic endurance, simply by means of modification in the exercise intensity and length of the work and relief intervals.

Each work interval consist of running at a pace such that a distance of 1100 yd (1005 m) is covered in 3 to 4 min. The work interval is followed by a rest relief interval of 1.5 to 2 min. This sequence is repeated three times. During the rest–relief interval, the individual usually walks or jogs while recovering from the work to rest relief if usually 1:1 or 1:0.5. Each work interval is 3 to 5 min and is repeated 5 to 7
The exercise intensity usually ranges between 70% and 85% \( \text{Vo}_2 \text{ max} \). Apply the overload principal by increasing the exercise intensity or length of the work interval, or increasing the number of work interval per exercise session. For a discussion of interval training and sample programs, including programs for developing speed and anaerobic endurance. \textbf{Vivan H. Heyward, (2010)}

**AN INTERVAL TRAINING PRESCRIPTION TO DEVELOP AEROBIC ENDURANCE**

- **Sets**: One
- **Repetition**: Three
- **Distance**: 1100yd (1105m)
- **Time**: 3 to 4 min
- **Rest-relief intervals**: 1.5 to 2 min

Developing speed and anaerobic endurance, refer to the work of \textbf{janssen (2001)}. With the correct spacing of exercise and rest periods, an extraordinary amount of high-intensity exercise, normally not possible if the exercise were done continuously performed. The repeated exercise bouts with rest period or relief intervals can vary from a seconds to several minutes or more depending on the desired training outcome. The interval training prescription is based on the following:

- Intensity of exercise
- Duration of exercise
- Length of recovery and
- Number of repetition of the exercise – recovery interval.
The ability to perform a considerable volume of high intensity exercise during an training workout is illustrated in the following example. Few people can maintain a 4 minute mile pace for longer than 1 minute, yet one complete a mile within 4 minute.

If running intervals, however, were limited to only 10 seconds, followed by 30 sec of recovery, it would not be exceedingly difficult to maintain these exercise rest intervals and complete the mile in 4 minute of actual running, the point is that significant quantity of normally exhausting exercise can be achieved given the proper spacing of the exercise intervals.

Rational of interval training - Interval training has a sound basis in physiology and energy would be supply through anaerobic glycolysis, with in a minute or two lactate acid level would rise precipitously and the runner would became exhausted.

During interval training on the other hand repeated exercise bout of about 10 seconds’ duration would permit a severe load to be imposed without an appropriate building up of lactate acid because the primary energy sources for such brief exercise is the high energy phosphate.

Fatigue incurred during the predominantly a “lactic” exercise interval may be minor and recovery would be rapid. The exercise interval could then begin after only a brief rest period.

**EXERCISE INTERVAL**

Generally 1.5 to 5.0 second is added to the exerciser best time for training distance between 55 and 220 yd for running and 15 and 55 yd for swimming. If a person can run 60 yd from a running start in 8 second, the training time for each repeat would therefore be 8+1.5 or 9.5 seconds. For an interval training distance of
110 yd ,3 sec is added, and distance of 220 yd 5 sec of added to the best running times . This particular application of interval training is suited to training of the ATP-CP energy system.

For training distance of 440 yd running or 110 yd swimming ,the exercise rate is determined by subtracting 1 to 4 sec from the best 440 yd part of a mile run or 110 yd part of 440 yd swim. If a person runs a 7-min mile (avg 105 sec per 440 yd) , the interval time for each 440 yd repeat would be between 104 sec (105-1) and 101 sec (105-4) for training interval beyond 440 yard ,3 to 4 sec is added for each 440 yd position of the interval distance .It would thus run each interval at about 216 sec 

\[[(105+3)x(2)=216].

**RELIEF INTERVAL**

The relief interval can be either passive (rest –relief) or active (work-relief). The recommended duration of relief usually is expressed as a ratio of exercise duration of recovery duration .The ratio of 1 to 3 is generally recommended for training the immediate energy system .Thus ,for a sprinter who runs 10 –sec intervals, the relief interval is usually about 30 sec .For training the short term energy system of glycolysis, the relief interval is twice as long as the exercise interval or a ratio of 1 to 2. These specific work to relief ratio for anaerobic training supposedly ensure sufficient lactic acid removal to allow the next exercise bout to continue with minimal or no fatigue.

For the long term aerobic energy system the work recovery interval ratio is usually 1.1 or 1:1.5. During a 60 to 90 sec exercise interval, for example, oxygen uptake increased rapidly to a high level but this increasing is insufficient to meet the energy requirements of the exercise. The recommendation recovery interval is such
that the succeeding exercise interval begins before recovery is complete. (in other work, before her return of base line or resting oxygen uptake). This ensures that cardiovascular and aerobic metabolism stress reach near peak level with repeated but relatively short exercise intervals. The duration of the rest interval is not as crucial with longer period of intermittent exercise because there is sufficient time for adjustment in metabolic and circulatory parameters Mcardle, (1996).

THE BENEFITS OF INTERVAL TRAINING

Interval training adheres to the principle of adaptation. Interval training leads to many physiological changes including an increase in cardiovascular efficiency (the ability to deliver oxygen to the working muscles) as well as increased tolerance to the build-up of lactic acid. These changes result in improved performance, greater speed, and endurance.

Interval training also helps avoid injuries associated with repetitive over use, common in endurance athletes. Intervals also allow an athlete to increase training intensity without overtraining or burn-out. Adding intervals to a workout routine is also a great way to cross training of an exercise routine.

INTERVAL TRAINING BURNS MORE CALORIES

According to the American College of Sports Medicine, more calories are burned in short, high intensity exercise. If you are counting calories burned, high intensity exercise such as intervals are better than long and slow endurance exercise, but you have to pay a price. There are risks inherent in high intensity training, so it's important to know both the benefits and dangers of high intensity training.
INTERVAL TRAINING WORKOUT Routines

Designing the right interval training routine can be sophisticated or casual. Elite athletes may go to sports performance lab to have blood lactate and exercise metabolism testing performed to determine the best interval training routine. On the other end of the spectrum, you can use the casual "speed play" interval training (fartlek). With this routine, simply you need to pay attention to how you feel and set your intensity and duration accordingly.

If you want something a bit more structured, you can use a basic interval training workout routine. Keep in mind that interval training is extremely demanding on the heart, lungs and muscles, and it's important to have an concern from your physician before you start interval training. You should also have a solid base of overall aerobic fitness before performing high intensity training of any kind.

Beginners should start with short intervals (under 30 seconds), fewer repeats and more rest. Elite athletes can raise up the intensity, time and frequency of training. Few athletes benefit from performing intervals more than two times per week.

INTERVAL TRAINING SAFETY TIPS

- Warm Up before starting intervals
- Assess current conditioning and set training goals that are within your ability
- Start slowly. (for example: walk 2 minutes/ run 2 minutes) In general, longer intervals provide better results
- Keep a steady, but challenging pace throughout the interval
- Build the number of repetitions over time
- Bring your heart rate down to 100-110 bpm during the rest interval
• To improve, increase intensity or duration, but not both at the same time
• Make any changes slowly over a period of time
• Train on a smooth, flat surface to ensure even effort
• You can also use circuit training as a form of interval training

STAIRCASE TRAINING

Stair running is a great, high-intensity workout that helps to build speed, power and cardiovascular fitness. Stair running is also a great addition to any agility training program because it builds quickness and foot speed while getting an excellent sprint workout.

Running stairs provides a cardiovascular benefit similar to that of running and is a great way to build sprint power. Many athletes run stairs at a stadium, but you can also look for a local outdoor stairway or a stairwell in a building with about a hundred steps.

If you haven't done stair workouts before, you should plan to start slowly and gradually build up your time and intensity. Stair running uses muscles you may not have used before and overdoing your first workout will result in unnecessary muscle soreness.

STAIR RUNNING GUIDELINES

• Make sure you warm up prior to your stair running workout.

• Begin by walking one step at a time.

• Avoid running stairs on your first few workouts.

• Do no more than two stair workouts a week.

• By week three you can begin running, perhaps two steps at a time.
- Use the return to the bottom as your rest interval, and then do another set.
- Work up to about ten sets per workout.
- Add stair running into your workout routine on your high-intensity training days or as part of an interval training workout.

Always stop your workout if you notice any injury warning signs.

**OBJECTIVES OF THE STUDY**

- To impart and identify the effects of two different training among college men hockey players.
- To study the changes in the selected dependent variables of this study.

**STATEMENT OF THE PROBLEM**

The purpose of the study was to find out the “Influence of interval training and staircase training on selected physical, physiological and performance variables among men hockey players.”

**HYPOTHESIS**

On the basis of the literature gone through the research findings, expert opinion and the scholar’s own understanding of the problem, the following assumptions were formulated with regard to the present investigation.

- It was hypothesized that the interval training would have significant gains in selected physical (speed, leg explosive power, agility), physiological (resting pulse rate, \( \text{VO}_2 \text{ max} \), anaerobic power) and skill performance (dribbling, pushing, hitting) variables among college men Hockey players.
- It was hypothesized that the staircase training would have significant gains in selected physical (speed, leg explosive power, agility), physiological (resting pulse rate, Vo₂ max, anaerobic power) and skill performance (dribbling, pushing, hitting) variables among college men Hockey players.

**SIGNIFICANCE OF THE STUDY**

The present study may be considered significant because of the following benefits.

- Physical educationists and sports scientists have been constantly examining sports performance in relation to the individual skill and fitness standards. They try to discover which could be utilized in the practical aspects of coaching and training.

- The findings of the study provides an opportunity to find out the effects of two different training for the promotion of effective sports training programme.

- These findings may be of great help to suggest way and means in formulating two different training for college men hockey players to improve their selected dependent variables.

- This study may be helpful for the physical education professionals to adopt the interval training and staircase training as one of the training programme for men hockey players.

- Findings of this research study would give a basic knowledge to the trainers and fitness teachers to conduct further research in various training methods, training programmes and training intensity of college men hockey players.

- The result of this study would add to the quantum of knowledge in the areas of training methods, exercise physiology and exercise science.
DELIMITATIONS

The present study delimited in the following:

- The total number of subjects were delimited to forty five hockey players of M.S.University affiliated colleges each group consists of fifteen players.
- As far as physical variables concerned it was delimited to speed, explosive power and agility.
- As far as physiological variables concerned it was delimited to resting pulse rate, Vo$_2$ max, anaerobic power.
- As far as performance variables it was delimited to dribbling, pushing and hitting among college men hockey players.
- The period of training programme was delimited to twelve weeks.

LIMITATIONS

The study is limited in the following aspects and these limitations would not be taken into consideration of the result.

- The influence of certain factors like style, daily work, diet and other factors on the result of the study were not taken into consideration.
- No attempt has been made to control the factors like air resistance, intensity of light atmosphere and temperature during training and testing period.
- The knowledge of the subjects in exercise science and their previous experience in doing physical activities were not taken into consideration.
- Since the subjects were motivated verbally during testing and training periods no attempt was put to differentiate their level of motivation.
• The psychological stress and other factors, which affect the metabolic function were not taken into consideration.

• The hereditary of the subjects and its influence on the selected criterion variables were not taken into consideration.

DEFINITION OF TERMINOLOGY

The terminology anticipated to frequent this study is here under defined and explained to avoid misinterpretation and misapprehension.

INTERVAL TRAINING

One method of training that allows appropriate metabolic systems to be stressed is interval training.

STAIRCASE TRAINING

Method of physical training perform with the help of stairs, to improving selected fitness variables.

SPEED

Speed is the capacity of the individual to perform successive movement of the same pattern at a fast rate, Barrow (1973).

EXPLOSIVE POWER

Explosive power is defined as the capacity of the individual to release maximum force in the shortest period of time. Singh, (1991).

AGILITY

It is the ability to change direction of body or body parts swiftly and accurately.
RESTING PULSE RATE

Measurement of heart rate when an organism is under physical and mental rest can be termed as resting pulse rate, More house and Miller (1976).

Training has very pronounced effect on heart rate, even at rest. In highly trained athletes of either sex resting heart rate may be as low as or lower than 40 beats per minute. In contrast resting heart rates for untrained but healthy individuals may be as high as 90 beats per minute. A relatively slow heart rate, combined with a relatively large stroke volume indicates an efficient circulatory system, Fox (1982).

Vo2 MAX

Maximum rate of oxygen utilization of muscles during exercise.

ANAEROBIC POWER

Anaerobic Power is the ability to perform brief (<2 min) maximal muscular activity. A variety of tests measure anaerobic power in the upper and lower body. The strength and conditioning professional should be familiar with the vertical jump test using a wall scale or a vertical jump scale. A disadvantage encountered with using a wall scale is the tendency of the athlete to hit the wall by his or her body while performing the jump.

SKILL

According to Jensen and Fisher skill is the ability to use the correct muscles at the correct time with exact force necessary to perform the desired movements in the proper sequence and timing.
DRIBBLING

Dribbling is the basic skill in Hockey. The dribble is the one which can most often open up a game and create that all important goal scoring chance.

PUSHING

A push moves the ball along the ground by a pushing movement of the stick after has been placed close to a stationary (or) rolling ball. When a push is made, both the ball and a head of the stick are in contact with the ground.

HITTING

A Hit is a stroke with a swinging movement of stick in order to increase the ball’s speed.