

INTRODUCTION:

TRAINING:

Some definitions of sports training as given by the experts of this area are as under: According to Hardial Singh (1993), Sports training is a pedagogical process, based on scientific principles, aiming at preparing sportsmen for higher performances in sports competitions. Harre (1986) said, Sports training, based on scientific knowledge, is a pedagogical process of sports perfection which through systematic effect on psycho-physical performance ability and performance readiness aim at leading the sportsman to high and the highest performance. Through active and conscious interaction with the given demands in sports training, the sportsman's personality develops according to the norms and standards of socialist society. According to Matveyew (1981) sports training is the basic form of an athlete's training. It is the preparation systematically organized with the help of exercises, which in fact is a pedagogically organized process of controlling an athlete's development (his sporting perfection). Martin (1979) said, Sports training is planned and controlled process in which, for achieving a goal, changes in complex sports motor performance, ability to act and behaviour are made through measures of content, methods and organization. In the broad sense sports training is the entire systematic process of preparation of athletes for highest levels of athletic performance. It comprises all those learning influences and processes, including self tuition by the athlete, which are aimed at improving performance.

ENDURANCE:

The objective of endurance training is to develop the energy production system(s) to meet the demands of the event. Endurance can be developed using continuous and interval training.

Anaerobic Endurance: Anaerobic means 'without oxygen'. During anaerobic work, involving maximum effort, the body is working so hard that the demands for oxygen and fuel go above the rate of supply and the muscles have to rely on the stored reserves of fuel. In this case waste products gather, the main one being lactic acid. The muscles, being hungry of oxygen, take the body into a state known as oxygen debt. The body's stored fuel soon runs out and activity ceases – painfully. Activity will not be resumed until the lactic acid is removed and the oxygen debt repaid. Fortunately the body can resume limited activity after even only a small amount of the oxygen debt has been repaid. Since lactic acid is produced the correct term for this pathway is lactic anaerobic energy pathway. The lactic anaerobic pathway is the one in which the body is working anaerobic but without the production of lactic acid. This pathway can exist only so long as the fuel actually stored in the muscle lasts, approximately 4 seconds at maximum effort.

Aerobic Endurance: a sound basis of aerobic endurance is fundamental for all events. Aerobic means 'with oxygen'. During aerobic work the body is working at a level that the demands for oxygen and fuel can be met by the body's intake. The only waste products formed are carbon dioxide and water. These are removed as sweat and by breathing out. Aerobic endurance is developed through the use of continuous running training method (duration runs) to improve maximum oxygen uptake (VO_2 max) and interval training to improve the heart as muscular pump. This can be achieved through different aerobic activities or exercises details of which are given later in this section.

Continuous Training Method: Dr. Ernst Van Aaken, a German physician and coach, is credited with introducing and popularizing this system of training. Dr. Van Aaken's work in this area started in 1920's but received widespread support at the later. Continuous training became extremely popular during the latter part of the 1960 years. Continuous training, as the name implies, involves continuous activity, without rest intervals. This has varied from high intensity, continuous activity of moderate duration to low intensity activity of an extended duration. i. e., long, slow distance, or LSD training. The long-distance runner maintains a pace that is just below his running pace, although this will depend on the competition distance and the distance of the training runs. This has been a very effective way of training endurance athletes without requiring high levels of work that are stressful and uncomfortable for the athlete. One advantage of this type of training for the competitive runner is the constant pace at near competition levels. Running at an even pace during a race appears to be the most efficient way, physiologically to attain the runner's best time. Therefore, this type of training greatly aids the runner in preparing himself for actual competition. It is suggested by the sports training experts that slower-paced variations, such as LSD or Fartlek, be introduced periodically, eg., twice per week, to give the athlete some relief from the exhaustive, high-intensity, continuous training.

Interval Training Methods: Woldemar Gerschler a professor at the University of Freiburg in Germany and his athletes worked closely with Dr. Hans Reindell, a Physiologist, and developed Interval Training Methods. Gerschler's great contribution was his understanding of the importance of cardiovascular conditioning and his devising a training scheme that would maximize cardiovascular fitness. That is, he realized that strong legs alone do not make a great runner. He sought a system that would increase the heart's stroke volume, and hence its ability to deliver blood and oxygen to the legs. With Reindell's help, he devised interval training-relatively fast runs over relatively short distances repeated a number of times. The name of the system comes from the 'interval', or rest period, between the fast runs. Gerschler and Reindell considered this the most important part of the workout, and they controlled it carefully. Believing that the heart adapted and grew stronger during the interval, they would not allow runners to begin the next repeat until their pulse rate had returned to 120 beats per minute. If this did not occur within 90 seconds of the end of the previous repeat, the workout was too difficult and had to be adjusted. Otherwise, the heart would be overworked, leading to fatigue and exhaustion, rather than to the desired training effect. Interval training involves alternating short bursts of intense activity with what is called active recovery, which is typically a less – intense form of the original activity.

Track and field (also known as **track and field sports**, **track and field athletics**, or commonly just **track**) is a [sport](#) comprising various [competitive](#) athletic contests based around the activities of [running](#), [jumping](#) and throwing. The name of the sport derives from the venue for the competitions: a [stadium](#) which features an oval running track surrounding a grassy area. The throwing and jumping events generally take place within the central enclosed area.

Track and field is one of the sports which (along with [road running](#), [cross-country running](#) and [race walking](#)) make up the umbrella sport of [athletics](#). It is under the banner of athletics that the two most prestigious international track and field competitions are held: the [athletics competition at the Olympic Games](#) and the [IAAF World Championships in Athletics](#).

The [International Association of Athletics Federations](#) is the [international governing body](#) for track and field.

Track and field events are generally [individual sports](#) with athletes challenging each other to decide a single victor. The racing events are won by the athlete with the fastest time, while the jumping and throwing events are won by the athlete who has achieved the greatest distance or height in the contest. The running events are categorized as [sprints](#), [middle](#) and [long-distance events](#), [relays](#), and [hurdling](#). Regular jumping events include [long jump](#), [triple jump](#), [high jump](#) and [pole vault](#), while the most common throwing events are [shot put](#), [javelin](#), [discus](#) and [hammer](#). There are also "combined events", such as [heptathlon](#) and [decathlon](#), in which athletes compete in a number of the above events.

Track and field events are divided into three broad categories: track events, field events, and combined events. The majority of athletes tend to specialize in just one event (or event type) with the aim of perfecting their performances, although the aim of combined events athletes is to become proficient in a number of disciplines. Track events involve running on a track over a specified distance and – in the case of the [hurdling](#) and [steeplechase](#) events – obstacles may be placed on the track. There are also [relay races](#) in which teams of athletes run and pass on a [baton](#) to their team member at the end of a certain distance.

There are two types of field events: jumps, and throws. In jumping competitions, athletes are judged on either the length or height of their jumps. The performances of jumping events for distance are measured from a board or marker, and any athlete overstepping this mark is judged to have fouled. In the jumps for height, an athlete must clear their body over a crossbar without knocking the bar off the supporting standards. The majority of jumping events are unaided, although athletes propel themselves vertically with purpose-built sticks in the [pole vault](#).

The throwing events involve hurling an implement (such as a heavy weight, javelin or discus) from a set point, with athletes being judged on the distance that the object is thrown. Combined events involve the same group of athletes contesting a number of different track and field events – points are given for their performance in each event and the athlete with the greatest points total at the end of all events is the winner.

Official world championship track and field events							
Track					Field		Combined
Sprints	Middle-distance	Long-distance	Hurdles	Relays	Jumps	Throws	
60 m	800 m	5000 m	60 m hurdles	4×100 m	Long jump	Shot put	Pentathlon Heptathlon Decathlon
100 m	1500 m	10,000 m	100mhurdles	relay	Triple jump	Discus throw	
200 m	3000 m		110mhurdles	4×400 m	High jump	Hammer throw	
400 m			400mhurdles	relay	Pole vault	Javelin throw	
			3000m				
			steeplechase				

Pranayama: In simple terms pranayama may be called the control of the breath. Its essence lies in the modification of our normal process of breathing. Breathing is an act in which we take air from the atmosphere into our lungs, absorb the oxygen from it into our blood, and expel the air again into the atmosphere together with carbon dioxide and water vapors. This act of inhalation and exhalation is repeated every four to five seconds. Thus normally we breathe about fifteen times every minute. Every modification of this normal breathing process would not count as pranayama. Pranayama consists of modifications of the breathing process which we bring about deliberately and consciously. The process of breathing is modified in three different ways: (1) by inhaling and exhaling rapidly, taking shallow breaths, (2) By inhaling and exhaling slowly, taking long and deep breaths and (3) by stopping the act of breathing altogether. Many names are given to the variations to the breathing processes and are carried out along with two different endurance training methods for the development of endurance in athletes.

Any competitive sports demands results and the need to establish any innovative and fast developing ability is always invited in any field, sports being no exception to it. The researcher scholar is associated with the game of athletes and is always in pursuit to establish the best possible methods in developing the sport to its best. The latest trend of pranayama for health along with other benefits which are popular because of media has created the need to study the topic. Considering the research will enhance and establish a scientific based training methodology in development of certain motor ability which is a prerequisite and the ability dominated in athletic events.

I.2 - EMERGENCE OF THE PROBLEM:

The decision to carry out a physical training programme cannot be taken lightly. It requires a lifelong commitment of time and effort. Exercise must become one of those things that we do without question, like bathing and brushing teeth. Unless we are convinced of the benefits of fitness and training and the risks of unfitness there is no success. It has been realized that training adds not only adds development in performance, but can be enhanced through adding up the supplements to it. Hence the research scholar has designed a comparative study by implementing not only contemporary training methods but also the traditional yoga breathing practices of pranayama. Considering the effect of pranayama will enhance the endurance among the athletes, it may also establish a strong support to adding pranayama as one of the training means along with the other training means.

I.3 - STATEMENT OF THE PROBLEM:

Only contemporary training methods will definitely enhance the endurance performance of the athletes but adding up the supplements and giving a traditional touch to the research by inculcating yogic breathing techniques like pranayama will surely give an enhancing touch as per the research scholar hence the statement of the problem is **a comparative study of development of endurance in athletes by using latest training methods and pranayama** is considered for the study.