

## UNIT 12

### TRAINING IN SPORTS

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#### **Key Points :**

- Strength—Definition, Types and Methods of Improving Strength—Isometric, Isotonic and isokinetic.
- Endurance—Definition, Types and Methods of Develop Endurance— Continuous Training, Interval Training and Fartlek Training.
- Speed—Definition, Types and Methods of Develop Speed—Acceleration Run and Pace Run.
- Flexibility—Definition, Types and Methods to Improve Flexibility.
- Coordinative Abilities—Definition and Types.

#### **Strength , its types and method of development**

Strength is the ability to overcome resistance or to act against resistance.

a) Maximum Strength:- It is the ability to overcome or to act against resistance. It is the maximum force which is applied by the muscles to perform any certain activity. For developing maximum strength intensity is high and repetitions are less.

b) Explosive Strength: It is a combination of strength and speed abilities. It is the ability to overcome resistance with high speed. For developing explosive strength, intensity is sub maximum and repetitions are performed as fast as possible.

c) Strength Endurance: It is the ability to overcome resistance or to act against resistance under conditions of fatigue.

#### **Method of development**

##### **ISOMETRIC EXERCISE –**

Isometric exercises are those exercises, which are not visible. In fact there are no direct movements, hence they can't be observed. In these exercises, work is performed but is not

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seen directly. In these exercises, a group of muscles carry out tension against the other group of muscles. For example, pushing against a sturdy wall.

### **ISOTONIC EXERCISE**

The literal meaning of the word isotonic is constant tension i.e., iso means constant and tonic means tension. In this exercise the length of muscles changes (shortens or lengthens) during action along with tension in them. Isotonic exercise is a form of active exercise in which muscles contract and cause movement. There is no significant change in resistance throughout the movement, so the force of contraction remains constant. Such exercise greatly enhances joint mobility and helps improve muscle strength and tone.

### **Isokinetic exercise**

These exercises are performed on specially designed machines. These exercises are developed by Perrine in 1968. In these exercises, contraction of muscles applies maximum force only at a particular angle of its range of movement, whereas, in isokinetic exercise contraction of force throughout the complete range of movement. These exercises involve a specific type of muscle contraction which is not involved in games and sports like rowing and swimming.

### **Speed, its types and method of development**

**Speed** is the rate of motion, or the rate of change of position. It is expressed as distance moved per unit of time. Speed is measured in the same physical units of measurement as velocity. Speed is defined as the ability of an individual to perform similar movements consecutively at the fastest rate, e.g., short distance races like 100 metres and 200 metres. Speed is the capacity of an individual to perform successive movements of the same pattern at a fast rate.

#### **Types of Speed:**

- 1) **Movement speed:** It is the ability to do a movement in minimum time. It depends upon technique, explosive strength, flexibility and coordinative abilities.
- 2) **Locomotor ability:** It is the ability to maintain maximum speed for a maximum time or distance. Events like 100m, 200 m, 400m require this ability.
- 3) **Speed Endurance:** Speed endurance is the ability to perform movements with high speed under conditions of fatigue. This depends upon technique, local muscular endurance and

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lactic acid tolerance ability.

### **Methods for improving speed.**

1) Acceleration runs- It is the ability to increase speed from jogging to running and finally sprinting. It depends on explosive strength, frequency of movement & technique. To attain maximum speed from a stationary position this is practised after learning proper technique.

2) pace run or races- A competitive pace race is a timed race in which the objective is not to finish in the least time, but to finish within the prescribed time and in the best physical condition. In some races, the prescribed time is very narrowly defined and the winner is the competitor who finishes closest to the prescribed time. Complete recovery is ensured between two repetitions. This means to running the whole distance of a race at a constant speed. In this the athlete runs the race with uniform speed.

### **Flexibility, its types and method of development**

Following are the stretching ways for flexibility development:

**Active stretching** is where you are taking the muscle beyond its normal range of motion with assistance (PNF or with the help of a partner)

**Passive stretching** allows the muscles and tendons to stretch naturally without the use of additional forces acting on the muscle/tendon. The flexibility gains are not as great with passive stretching as it is with active stretching.

1. **Static stretching** is a technique where the muscle is slowly stretched and then held in the stretched position for several seconds. This type of stretching allows the muscle to be relaxed so that a greater length can be achieved. It is the most frequently.

2. Used and most recommended type of stretching. There is a low risk of injury with this technique.

3. **PNF stretching** is much longer stretching session when compared to the other types. It requires a partner's help to utilize this technique. The use of a partner is so that there can be a contraction and relaxation phase. This type of stretching is actually the most effective form of stretching, but it is also considered the most painful type of stretching,

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4. **Dynamic stretching** is a technique that many athletes should be accustomed to. This type of stretching can be in the form of leg swing walks or carioca just to name a few. This is a great way for teens to work on their flexibility in a fun way. It allows them to be active and it can be done with groups and teas. This type of stretching goes for more than two seconds and is done without stopping the movement.

5. **Ballistic stretching** is a type of stretching, but it is not recommended for improving flexibility. This type of stretching could lead to muscle soreness and injury because it is possible that this technique could cause small tears in soft tissue due to the bouncing movements that force the muscle to lengthen. Ballistic stretching due to the bouncing, could stretch ligaments too far if the movement is not controlled.

### **Endurance its types and method of development**

Endurance- Endurance (also called Stamina, or Durability) is the ability of an organism to exert itself and remain active for a long period of time, as well as its ability to resist, withstand, recover from, and have immunity to wounds, or fatigue. In humans, it is usually used in aerobic or anaerobic exercise. endurance. Endurance training which is designed to improve stamina, endurance, and overall performance. Athletes use it while they prepare for both long and short events. People who are not athletes may utilize endurance training as a method to get fit. It is the ability to withstand fatigue.

#### **Types of Endurance:**

1. **Basic Endurance:** Basis endurance is the ability to perform movements in which large number of body muscles are involved and the activity is performed at slow pace for long duration such as jogging, walking, slow running and swimming.
2. **Speed Endurance:** It is the ability to resist fatigue in activities lasting up to 45 seconds. The event of 400 mts sprint is the most suitable example of speed endurance. This is mainly dependent upon the power and capacity of energy production.
3. **General Endurance:** It is the ability to resist fatigue satisfactorily cause by different types of activities. Activities may be aerobic or anaerobic in nature. These activities may be low or high intensity but for longer duration.

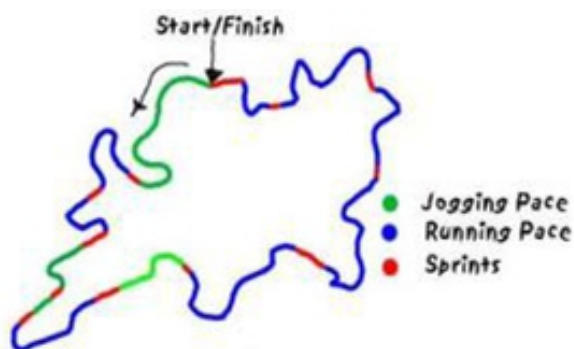
#### **Various methods to develop Endurance ability-**

a) Continuous method- The load administered for a prolonged period of time. As the loads are continued for a long time the intensity of running is low. It may be slow continuous, fast continuous and varied pace method.

b) Interval type of training involves repeated efforts at are relatively faster pace, separated by measured intervals of incomplete recovery. It is based on the principle of effort & recovery. It can be classified into short time interval, middle time interval and long time interval.

c) Fartlek training- Fartlek, developed in the 1930,s which means "speed play" in Swedish, is a training method that blends continuous training with interval training. The variable intensity and continuous nature of the exercise places stress on both the aerobic and anaerobic systems .Intensity and speed can be varied whenever the athlete wishes. Fartlek training allows the athlete to run freely over varying distances and at varying speeds. Fartlek allows the athlete to run at varying intensity levels over distances of their choice. This type of training stresses both the aerobic and anaerobic energy pathways.

Diagram- 1. Warm up with a steady jog for approximately 7-10 minutes, 2. High intensity sprint, for aproximately 60-75 seconds, 3. Light Jog for approximately 130-150 seconds, 4. Cool down with a steady jog for 7-10 minutes, 5. Run hill or stairs, 6. Vertical jump from crouch position, 15-20 times, 7. Push-ups, 8. Sit-ups, 9. Lunges



## Coordinative abilities and its types

**Coordination** is the ability to repeatedly execute a sequence of movements smoothly and accurately. This may involve the senses, muscular contractions and joint movements.

Everything that we participate in requires the ability to coordinate our limbs to achieve a

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successful outcome – from walking to the more complex movements of athletic events like the pole vault.

### **Basic coordination abilities:**

**Adaptive ability** enables modifications of motor activity on the basis of comparison or anticipation of new or changing conditions during performing motor activity.

**Balance ability** is understood as an ability to keep body or its parts in a relatively stable position.

**Combinatory ability** is understood as an ability to simultaneously put partial movements together into more complex movement structures.

**Orientation ability** is an ability to realize position of the body or its parts in space and time.

Rhythm ability enables to grasp and meteorically express rhythm which is externally determined or contained in the motor activity it self.

### **Circuit training**

In this training method in which certain exercise of various kind are performed with or without apparatus with given dosage. It was developed by —Adamson and Morgon|| in 1957. This is considered for the development of —strength & Endurance. Circuit training method is a scientific method which is based on over coming various exercises at once. It is meant for to develop strength & endurance. It is an off-season training method. It is a form of body conditioning or resistance training using high-intensity aerobics. It targets strength building and muscular endurance. An exercise "circuit" is one completion of all prescribed exercises in the program. When one circuit is complete, one begins the first exercise again for the next circuit.

### **DIAGRAM OF STATIONS Benefits of circuit training.**

- 1) It is easy and interesting method.
- 2) It requires short duration
- 3) It can be performed indoor and as well as outdoor
- 4) It involves the all organs of body
- 5) It can be easily supervised by the coach.
- 6) It provides an interesting atmosphere.

### **Importance:**

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1. It is the best method for beginners as it develops strength and endurance. Maximum functioning of muscles can be gained in a single circuit.
  2. It gives relief from any kind of tension. The trainee gains good result in a short period. It doesn't create boredom as lot variety of exercise can be included etc.
  3. It is a workout routine that combines cardiovascular fitness and resistance training.
  4. The initial routines were arranged in a circle, alternating between different muscle groups.
  5. Circuit training plays an integral role in the offseason workouts of many professional athletes.

### **Beneficial & negative impacts of high altitude training.**

Running or exercising at high altitudes in the beginning decreases the amount of oxygen getting to the muscles. At low atmospheric pressure in the thin air makes the blood less oxygen rich as it passes to the muscles. A number of physiological changes that occur with acclimatization enhance the supply of oxygen to muscles and the more amount of oxygen definitely help in improving the sports performance.

At high altitudes body produces a hormone known as erythropoietin which stimulates the production of red blood cells which carry oxygen to the muscles of the body. If you have more red blood cells, more amount of oxygen can be supplied to your muscles. Many other changes occur in the body during acclimatization which help in enhancing sports performance.

#### **Negative impacts**

The acclimatisation to the high altitudes is not easy. The increase in red blood cells, makes the blood thicker which can make the blood flow slow. It makes difficult for the heart to pump blood flow throughout the body and can actually reduce the amount of oxygen getting to where it is required. If we perform weight training at high altitude, we cannot avoid weight loss. Our body will consume our muscles in order to provide energy for training that will weak body's immune system, it may lead to further infections which lead to decrease sports performance.

**12.1 A.** Sports performance are to be achieved in sports competition.

**B.** When we take part in games and sports we try to perform our best and our performance

directly depends upon many factors.

**C.** Basically, the performance of the sportsman depends upon strength, endurance, speed flexibility and coordination abilities.

**D.** Sports training is done for improving these factors and ultimately our performance.

**12.2** When an individual exerts muscular force against resistance in games and sports, it is called his or her strength.

**12.3** When an individual perform under the condition of fatigue for a long time, it is called his or her endurance.

**12.4** In games and sports, when an individual performs a movements quickly, it is called his or her speed.

**12.5** Flexibility is the range of movement of the joints of a sports person.

**12.6** The ability of an individual to do various related activities smoothly and efficiently is known as coordinative ability.

