

CHAPTER-1

Yoga and Lifestyle

Revision Notes

Asanas as Preventive Measures

➤ **Asana:** The term asana means sitting in a particular posture, which is comfortable and which could be maintained steadily for a long time. Asana gives stability and comfort, both at physical and at mental level.

Some guidelines for the practice of Asanas are :

- (i) Generally, the asanas are practiced in the sequence of standing, sitting, prone-lying and supine-lying position.
- (ii) Asanas must not be practiced in haste or by applying any sort of undue force. Jerks should be avoided.
- (iii) Asanas should be performed with body and breath awareness. There should be co-ordination between breath and the movements of the body parts.
- (iv) As a general rule, inhale while raising any part of the body and exhale while bending down.
- (v) The practitioner has to follow instructions sincerely and practice them with optimal attention.
- (vi) Final position of asanas must be maintained for as long as one is comfortable.
- (vii) One should maintain the final posture according to one's own limitations and should not go beyond one's capacity.
- (viii) An utmost care must be taken in increasing the time for maintaining success.
- (ix) Regular practice is essential. Body starts listening to your command only after a regular and diligent training for a sufficient period of time.

➤ **Asanas as preventive measures:** Asanas play a vital role as being a preventive measure to many body related diseases and problems. These are some major asanas listed below which lead to avoid many problems.

1. Yoga for health (Asanas):

(a) **Surya Namaskar :** This is the practice of sun salutation which comprises of a series of different postures involving 12 steps in it.

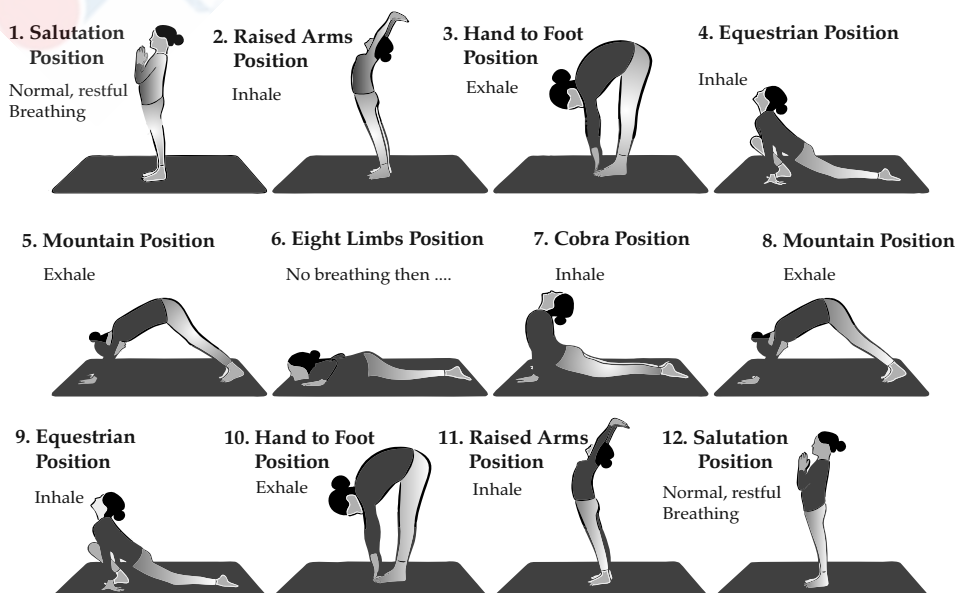
Benefits of Surya Namaskar:

- (i) It helps to reduce abdominal fat.
- (ii) It increases the flexibility of spine and limbs.
- (iii) It strengthens the breathing capacity.
- (iv) It reduces the effects of hypertension, diabetes, etc.
- (v) It penetrates and rejuvenate most of the vital organs of the human system.

The 12 steps are given below:

Surya Namaskar

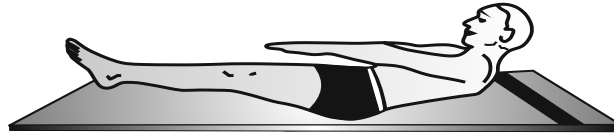
A Salute to the sun



- (b) **Naukasana (Boat Posture):** Nauka in Sanskrit means 'boat'. The final position of this asana resembles a boat, hence the name has been given Naukasana. This asana can be performed with both in supine and prone position.

Benefits:

- (i) It stimulates digestive system.
- (ii) It gives relief in gastric problems.
- (iii) It removes lethargy resulting into improved concentration.
- (iv) It removes nervous tension and brings relaxation.
- (v) It reduces fat around waist and abdomen.



Naukasana

- (c) **Padmasana:** Padmasana is made of two words: Padma and asana. Padma means 'lotus'. The legs in sitting position of this asana give the appearance of a lotus. This is a meditative asana.

Benefits:

- (i) It is good for concentration and memory.
- (ii) It brings calmness and peace.
- (iii) It is good for digestion.
- (iv) It stretches leg muscles and brings flexibility in legs.



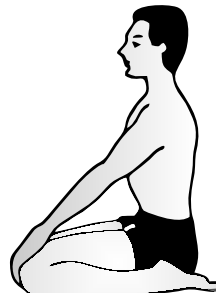
Padmasana

2. Asanas improving physical fitness/ flexibility:

- (a) **Hastottanasana:** Hastottanasana is made of three words: hasta, Uttana and asana. Hasta means 'arms', Uttana means 'stretch up' and asana means 'posture'. In this posture, the arms are stretched upwards, hence it is called 'Hastottanasana'.

Benefits:

- (i) It stretches muscles of back.
- (ii) It reduces pain in neck, shoulders and arms.
- (iii) It is beneficial for increasing height for growing children.
- (iv) It increases flexibility of spine.



Hastottanasana

- (b) **Katichakrasana (Lumber Twist Posture):** Katichakra is made of three words: kati, chakra and asana. Kati means 'waist', chakra means 'wheel' and asana means 'posture'. In this asana, the waist and arms move like a wheel.

Benefits:

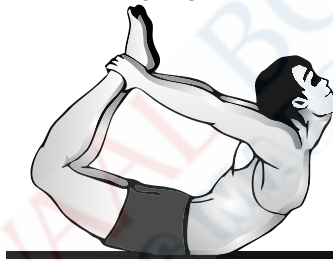
- (i) It stretches the waist region and makes the lower back strong.
- (ii) It strengthens shoulders, neck, arms, abdomen, back and thigh region.

**Katichakrasana**

- (c) **Dhanurasana (Bow Posture):** In Sanskrit Dhanur means 'Bow'. This is called the bow posture because in this posture the body resembles a bow with a string attached to it.

Benefits:

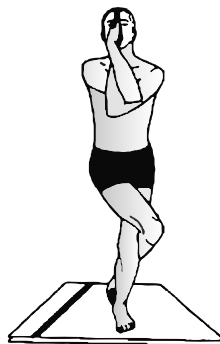
- (i) Dhanurasana is a good practice for joint of the shoulders, knees, ankles and entire backbone.
- (ii) It is beneficial for management of diabetes, mellitus as it massages the liver and pancreas.
- (iii) It helps to reduce excess fat around the belly, waist and hips.
- (iv) It removes stiffness of the ligaments, muscles and nerves in the back, arms, legs, neck, shoulders and abdomen.
- (v) It helps in reducing backache.
- (vi) It is good for the conditions of hunched back and dropping shoulders.
- (vii) It stimulates and regulates the functioning of glands.

**Dhanurasana****3. Asanas for concentration:**

- (a) **Garudasana:** This asana is named after the well-known bird Garud (eagle). In this asana, the hands with arms placed in front look like the beak of an eagle.

Benefits:

- (i) It enhances concentration.
- (ii) It stabilizes mind.
- (iii) It develops body balance.

**Garudasana**

- (b) **Baddha Padmasana:** Baddha means 'bind' and Padma means 'lotus'. In this asana, the hands go behind the back and hold the toes of the feet.

Benefits:

- (i) It creates an inner peace.
- (ii) It enhances blood supply to pelvic region.
- (iii) It improves concentration.
- (iv) It improves memory.



1. Taking the position



2. Releasing the position



3. Asana Position Baddha Padmasana

Obesity

- The body mass index (BMI) is a measure that uses your height and weight to work out if your weight is healthy.
- The BMI calculation divides an adult's weight in kilograms by their height in metres squared. For example, A BMI of 25 means 25kg/m².
- **BMI ranges**
For most adults, an ideal BMI is in the 18.5 to 24.9 range.
For children and young people aged 2 to 18, the BMI calculation takes into account age and gender as well as height and weight.
- **If your BMI is:**
below 18.5 – you're in the underweight range
between 18.5 and 24.9 – you're in the healthy weight range
between 25 and 29.9 – you're in the overweight range
between 30 and 39.9 – you're in the obese range
- The formula is $BMI = \frac{kg}{m^2}$ where kg is a person's weight in kilograms and m² is their height in metres squared
- **Obesity :** Obesity is a condition in which excess body fat accumulates to the extent that it may have a negative effect on health. People are generally considered obese when their body mass index (BMI) is more than 30.

Causes of obesity :

- (a) Increased calorie intake :
 - (i) Binge eating.
 - (ii) Frequent intake of sugary and fatty foods, fast food.
 - (iii) Emotional problems related to bulimia and other abnormal eating patterns.
- (b) Decreased energy expenditure, lack of exercise:
 - (i) Sedentary lifestyle, e. g., watching TV, playing computer games.
 - (ii) Heavy homework, use of leisure time for study.
 - (iii) Avoiding regular exercises, etc.

➤ Asanas to Cure Obesity:

- **Vajrasana :** This is a meditative posture. It is the only asana which can be practiced immediately after taking meals.

Procedure :

- (i) **Starting Position:** Sit with legs extended together, hands by the side of the body, resting on the ground.
- (ii) Fold the left leg at the knee and place the foot under the left buttock.
- (iii) Similarly fold the right leg and place the foot under the right buttock.
- (iv) Place both the heels in a position wherein both the toes overlap each other.
- (v) Position the buttocks in the space between the heels.
- (vi) Keep the hands on respective knees.
- (vii) Keep spine erect, gaze in front or close the eyes. Initially you can stay for 10-15 seconds.

Benefits:

- (i) It is a meditative posture and helps in concentration.
- (ii) It improves our digestive system.

Contraindications :

- (i) A person suffering from joint pain should avoid this asana.
- (ii) People who have any spinal column ailments, especially on lower vertebrae should not attempt this asana.

➤ **Hastasana:** It is also known as salute pose.

Procedure:

- (i) Stand with your arms at your sides. Then, gently raise them to the ceiling.
- (ii) Make sure that your arms are parallel to each other. You can also bring your palms together over your head. While you do this, make sure your shoulders are not hunched.
- (iii) Now join your palms and stretch upward, the thigh and the hands both must be stretched.

Benefits :

- (i) It gives a good belly stretch.
- (ii) It relieves stress and anxiety.
- (iii) It helps enhance body posture.
- (iv) It helps in increasing capacity of lungs.
- (v) It improves blood circulation in the body.

Contraindications :

You must avoid practicing this asana with your arms raised if you had an injury in your neck or shoulders.

➤ **Trikonasana (Triangle posture):** Trikona, a Sanskrit word means 'Triangle'. In this asana, the body makes the shape of a triangle hence, it is called Trikonasana.

Procedure :

- (i) Move your leg 1-2 feet apart.
- (ii) Stretch the arms sideways and raise them to shoulder level. The arms should be parallel to the floor in one straight line.
- (iii) Bend to the left side from the waist.
- (iv) Place the left hand on the left foot.
- (v) Stretch the arm up. Here, the two arms will be at 180°. Maintain this position with normal breathing comfortable for 5-10 seconds. Optimally, the right arm can be further bent towards left side, keeping arms at 90° angle.

Benefits :

- (i) It stretches up the muscles of trunk, legs and hips.
- (ii) It improves the flexibility of spine.
- (iii) It helps to increase the height of growing children.
- (iv) It relieves back pain.

Contraindications :

- (i) Avoid doing this pose if you are suffering from migraine, diarrhoea and low or high blood pressure.
- (ii) Avoid this asana, if you have back pain problem.

➤ **Ardha-Matsyendrasana :**

Procedure:

- (i) Bend the right leg and place right foot near the buttock. The outer edge of the foot should touch the ground.
- (ii) Bend the left leg at the knee and place left foot flat on the floor near outside of the right knee.
- (iii) Bring the right arm over the left knee and hold the left foot with right hand. Slowly twist the trunk to the left side and take the left arm behind the back and wrap it around the waist.
- (iv) Turn the head towards the left and look back. Maintain the position for 5-10 seconds.

Benefits :

- (i) It improves concentration.
- (ii) Every vertebra of the spine gets fully stretched.
- (iii) It reduces digestive problems.
- (iv) It brings the trunk muscle in proper tone.

Contraindications :

Person suffering from peptic ulcer, hernia, enlarged liver, or having any surgery in abdominal region should not practice this asana.

Diabetes

- Diabetes is a defect in the body's ability to convert glucose (sugar) into energy. Glucose is the main source of fuel for our body. When food is digested it is changed into fats, proteins or carbohydrates. Foods that affect blood sugar are called carbohydrates.

Types of diabetes :

There are two main types of diabetes:

- (a) **Type -1 Diabetes** : It occurs most frequently in children and young adults, although it can occur at any age. It is caused due to genetic reasons.
- (b) **Type -2 Diabetes** : This is much more common and accounts for 90-95 % of all diabetes. Type – 2 diabetes primarily affects adults. Main causes are physical inactivity and obesity.

Symptoms of Diabetes :

- (i) Blurred vision
 - (ii) Unusual thirst
 - (iii) Slow healing cuts
 - (iv) Erectile dysfunction
 - (v) Unexplained tiredness
 - (vi) Frequent urination
 - (vii) Rapid weight loss
 - (viii) Numbness or tingling in hands or feet
- **Asanas to Cure Diabetes:**

Bhujangasana : Bhujanga in Sanskrit means 'Cobra'. In Bhujangasana, one imitates a cobra with its hood fully expanded.

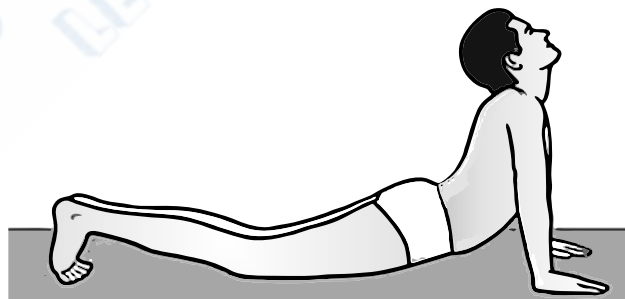
Procedure :

- (i) Bend the arms at the elbow, place the palms by sides of the shoulders on the floor.
- (ii) Inhaling slowly, raise the head, neck and shoulders. Raise the trunk up to navel and arch the back. Maintain the posture for 10-15 seconds.

Benefits :

- (i) This asana makes spine flexible.
- (ii) It solves many digestive problems.
- (iii) It helps in enhancing focus.

Contra indications : Person suffering from peptic ulcer, hernia and intestinal tuberculosis should not practice this asana.



Bhujangasana

- **Paschimottanasana** : Paschimottanasana means stretching the posterior region. In this posture, posterior muscles of the body get stretched hence, it is called Paschimottanasana.

Procedure :

- (i) Bend the elbows, make hoops with the index fingers.
- (ii) Bend the body forward and catch hold of the toes with the hooks of the fingers.
- (iii) Place the head between the arms.
- (iv) Keeping a little bend in the elbows and without bending knees, maintain the position for 5-10 seconds.

Benefits:

- (i) It gives a good posterior stretch to the spinal column.
- (ii) It helps to increase the flexibility of the spinal and abdominal muscles.
- (iii) It helps to improve the blood circulation in organs situated in the abdominal region.
- (iv) It helps to correct postural deformities.

Contra indications :

- (i) Those suffering from heart diseases, ulcer in abdomen should not practice it.
- (ii) People with lower back problems or slipped disc should not do this asana.



Step 1

Step 2

Step 3

Paschimottasana

- **Pawanmuktasana :** The Sanskrit word Pawan means 'air' or 'wind', mukta means 'freedom' and asana means 'posture'. This is called as the wind relieving posture as it assists in releasing trapped digestive gas from the stomach and the intestines.

Procedure:

- (i) Inhaling, fold both the legs at the knees over the belly.
- (ii) Hold the knees with the interlocked arms and press them on the belly.
- (iii) While exhaling, raise the head and let the chin touch the knees.

Benefits:

- (i) It increases digestive power.
- (ii) It helps to release trapped gas from the stomach.
- (iii) It helps to dissolve extra fat deposited in the abdominal region.

Contraindications : Do not practice, if suffering from severe back pain or abdominal injuries.

**Pawanmuktasana**

- **Ardha Matsyendrasana :** Refer Revision Notes, pg. 53

Asthma

- **Asthma :** A chronic inflammatory disorder of the airways in which many cells and cellular elements play a role. The chronic inflammation is associated with airway hyper responsiveness that leads to recurrent episodes of wheezing, breathlessness, chest tightness and coughing particularly at night to early morning.

Causes of Asthma :

- (i) Occurs when exposed to a trigger.
- (ii) Muscles surrounding bronchiole contract and produce excess mucus.
- (iii) Airways become red, inflamed (swollen) and narrow.

Symptoms of Asthma:

- (i) Coughing or wheezing.

- (ii) Difficulty in breathing, shortness of breath.
- (iii) Chest tightness.
- (iv) Excessive fatigue.
- (v) Difficulty in talking, while walking due to shortness of breath.

➤ **Asanas to Cure Asthma:**

- **Sukhasana:** The term 'sukhasana' is derived from the Sanskrit word 'sukham' which signifies 'delight' or 'bliss' and asana signifies "posture". This is meditative and relaxive pose, very easy to perform.

Procedure:

- (i) Sit down normally on the floor. Stretch out your legs ahead in front.
- (ii) Now cross your legs and broaden your knees in order that you can slip your both foot under the opposite knee.
- (iii) After that bend your knees and fold your legs.
- (iv) Keep your feet loose, in order that the external edges lay on the floor and the inner curves are settled beneath the inverse leg.
- (v) Now sit with your buttock in a neutral position. Attempt to hold for a breath or two and after that gradually bring down yourself on the floor.
- (vi) Keep your hands on your knees with palms facing down and expand your tailbone against the floor.

Benefits:

- (i) It stretches and lengthens your spine.
- (ii) It strengthens your collarbone and chest.
- (iii) It calms your mind.
- (iv) It enhances your condition of peacefulness and serenity.
- (v) It helps in reducing fatigue.
- (vi) It strengthens your back.
- (vii) It kicks out anxiety, stress and mental tiredness.

Contra indications:

- (i) Individuals having backache should not practice this.
- (ii) Someone with severe arthritis should avoid this.
- (iii) Sukhasana should be avoided by individuals who have undergone knee replacement surgery.
- (iv) An individual with any issue related to spine should avoid this pose.

- **Chakrasana :** Chakra means 'wheel'. In this asana, the body assumes the shape of a wheel, hence it is called chakrasana.

Procedure :

- (i) Raise the arms up, bend them at the elbows, take them behind over the head. Place the palms on the floor besides the head, fingers pointing towards the shoulder.
- (ii) Slowly raise the body and arch the back.
- (iii) Straighten the arms and legs. Move the hands further towards the feet as far as possible. Maintain the position comfortably for 5-10 seconds.

Benefits :

- (i) It makes spine flexible.
- (ii) It is good for digestion.
- (iii) It improves functioning of heart.

Contra indications : Person suffering from weak wrist, high B.P., hernia, abdominal problems, etc. should not practice this asana.

- **Gomukhasana :** Go means 'Cow' and mukh means 'face'. In this asana, the position of legs looks like the face of a cow, hence, it is called Gomukhasana.

Procedure :

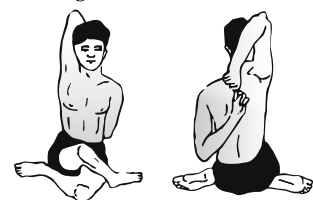
- (i) Bend the right leg at the knee, bring the right foot to the left side and place it close to the left buttock.
- (ii) Fold the left leg at the knee. Bring the left foot to the right side and place it close to the right buttock.
- (iii) Take the left arm over the left shoulder and right behind the back. Clasp the fingers of both hands at the back.
- (iv) Sit in the position for 10-15 seconds.

Benefits :

- (i) It increases concentration and induces inner peace.
- (ii) It is beneficial for improving lung capacity.



Chakrasana



Gomukhasana

(iii) It is useful in arthritis.

(iv) It relieves backache.

Contraindication : Those who are suffering from bleeding piles should not practice this asana.

➤ **Parvatasana (Mountain Pose)**

Procedure :

- (i) Sit in Vajrasana or Padmasana, keep the spine and neck straight, close your eyes gently and inhale raising both the hands above the head.
- (ii) Join the two palms in namaskara mudra.
- (iii) Elbow should be straight and hands stretched upward, stay in this position for some seconds.

Benefits :

- (i) It gives natural massage to the heart.
- (ii) It is very useful in relieving the lumbar pain, back pain, shoulder pain.
- (iii) It helps to strengthen the thighs and legs.

Contra indications : Person suffering from hip, back and/or shoulder injury should not practice this asana.

➤ **Matsyasana :** Matsya means 'fish'. In this asana, body takes the posture of a floating fish.

Procedure:

- (i) Sit in Padmasana in a comfortable position.
- (ii) Bend backward, supporting the body with arms and elbow. Lift the chest, take the head back and lower the crown of the head on the ground.
- (iii) Place middle part of the head on the ground. Hold the big toes. Elbow should touch the ground.

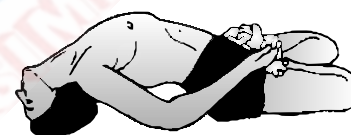
Benefits:

- (i) This posture has therapeutic value for mild backache and fatigue.
- (ii) This is useful in throat problems like tonsils.
- (iii) Good massager for the spine.

Contraindications : Avoid practicing the asana in case of peptic ulcer, heart disease, hernia and back problems.



Parvatasana



Matsyasana

Hypertension

➤ Hypertension is a long term condition in which the blood pressure in the arteries is persistently elevated.

Causes of Hypertension :

- (i) Smoking
- (ii) Obesity
- (iii) Too much salt in diet
- (iv) Stress
- (v) Genetics
- (vi) Too much alcohol consumption

Symptoms of Hypertension : There are only rare symptoms for this:

- (i) Dizzy spells
- (ii) Headaches
- (iii) Nose bleeds
- (iv) Sweating

When symptoms do occur, it is usually when blood pressure spikes suddenly and extremely enough to be considered a medical emergency.

➤ **Asanas to Cure Hypertension:**

➤ **Tadasana :** In this asana, body imitates like a palm tree known as Tada in Sanskrit.

Procedure :

- (i) Stand erect, legs together, hands by the side of the thighs.
- (ii) Stretch the arms upward, over the head and parallel with each other, with palms facing each other.
- (iii) Slowly raise the heels and stand on the toes. Stay for a few seconds in this final position.

Benefits :

- (i) It strengthens thighs, knees and ankles.
- (ii) It helps in improving height of growing children.
- (iii) It helps to remove laziness.

Contraindication : Those who have complaints of reeling sensation should not practice this.



Tadasana

➤ **Ardha-Chakrasana :**

Procedure :

- (i) Stand straight with feet together and arms alongside the body.
- (ii) Balance your weight equally on both feet.
- (iii) Breathing in ,extend your arms overhead, palms facing each other.
- (iv) Breathing out, gently bend backwards pushing the pelvis forward, keeping the arms in line with ears, elbows and knees straight, head up and lifting your chest towards the ceiling.

Benefits :

- (i) It stretches the front upper torso.
- (ii) It tones the arms and shoulder muscles.

Contraindications :

- (i) Pregnant women should avoid this pose.
- (ii) Hernia patient should avoid this pose.
- **Bhujangasana :** Refer to Revision Notes pg. 7
- **Vajrasana:** Refer to Revision Notes, pg. 6
- **Pawanmuktasana:** Refer to Revision Notes, pg. 8

➤ **Shavasana :** It is also known as "Corpse Pose". It calms the mind and reduces stress.

Procedure :

- (i) Lie comfortably on your back.
- (ii) Relax your neck and shoulders.
- (iii) Rest your arm on each side of your body and have a gap as wide as mat between your legs.
- (iv) Hands should face in upward direction and eyes should be closed.
- (v) Feel each part of your body and try to synchronise it with your breathing.

Benefits:

- (i) It calms the body and mind.
- (ii) It normalises blood pressure, relaxes heart and reduces anxiety.

Contraindications:

- (i) Those who are not advised to lie on their back should avoid this pose.
- (ii) Person suffering from severe acidity should avoid this pose.



Ardha-Chakrasana

CHAPTER-2

Physical education and sports for CWSN (Children With Special Needs - Divyang)

Revision Notes

Concept of Disabilities and Types of Disabilities, their Causes and Nature

- Disability is an impairment that may be cognitive, developmental, intellectual, sensory, physical, mental or source combination of these. It substantially affects a person's life activities and may be present from birth or occur during a person's lifetime. Disability is a contested concept, with different meaning for different communities. It may be used to refer to physical or mental attributes that some of the institutions, particularly medicine view as needing to be fixed.

- **Types of disabilities are:**

- (i) Cognitive disability
- (ii) Intellectual disability
- (iii) Physical disability

These disabilities are explained below:

- (i) **Cognitive disabilities:** It refers to anyone with lower-than-average intellectual functioning. A person who has cognitive disability has trouble performing mental tasks that the average person would be able to do easily. The term cognitive disability can be used to describe other various disabilities such as mental retardation, dyslexia, autism, and other learning disabilities. The severity of the cognitive disability has an affect on how independently the person can function.

Nature of cognitive disability: Cognitive disabilities do not include the category of physical disabilities. A person may have both cognitive and physical disabilities but these are separate entities. The term cognitive refers to the brain, so another way to think of cognitive disability is a brain disability. Cognitive disabilities can affect a person's performance in any of the following areas: memory, attention, problem solving, math calculation and reading comprehension. These are source characteristics of having a cognitive disability, here are few examples -

- (a) Problem in remembering
- (b) Difficulty in processing emergencies
- (c) Problem in processing information
- (d) Problem in accessing information

Causes of cognitive disability:

- Cognitive impairment may be present at birth and may be genetic or chromosomal or result from complications of pregnancy.
- Chromosomal abnormalities such as Down syndrome, fragile X syndrome.
- Genetic abnormalities such as phenylketonuria, Hunter syndrome etc.
- Prenatal drug and infections and exposure to alcohol.
- Lack of oxygen during labour pain or birth.

- (ii) **Intellectual disabilities:** Intellectual disability once called mental retardation, is characterized by below average intelligence or mental ability and a lack of skills necessary for day-to-day living. People with intellectual disabilities can and do learn new skills, but they learn them very slowly. There are varying degrees of intellectual disability from mild to profound. Someone with intellectual disability has limitation in two areas. These areas are:

- (a) **Intellectual functioning:** Also known as IQ, this refers to a person's ability to learn, reason, make decisions and solve problems.
- (b) **Adaptive behaviours:** These are skills necessary for day-to-day life, such as being able to communicate effectively, interact with others and take care of oneself.

Nature of intellectual disability:

- An intellectual disability is characterized by a combination of deficit in both cognitive functioning and adaptive behaviour. The severity of the intellectual disability is determined by the discrepancy between the individual's capabilities in learning and in the expectations of the social environment.

- Mental retardation/ intellectual disability is a term used when a person has certain limitations in mental functioning and skills such as communication, taking care of himself/ herself and social skills.
- Intellectual Disability in DSM-IV-TR is an Axis II Disorder criteria that includes:
 - (i) **Intelligence test series**
 - (ii) **Adaptive Functioning**
 - (iii) **Age of onset**

Causes of intellectual disability:

- Genetic Conditions like Down syndrome and fragile X syndrome.
- Problems during Pregnancy can interfere with foetal brain development.
- Alcohol or Drug Use may also cause intellectual disability.
- Problems during Childbirth
- Illness or Injury Infection like meningitis, whooping cough or measles can lead to intellectual disability.
- Extreme malnutrition, infections in the brain, exposure to toxic substances such as lead, and severe neglect or abuse can also cause it.

(iii) **Physical Disabilities:** A Physical disability is a limitation on a person's physical functioning, mobility, dexterity or stamina. Other physical disabilities include impairments which limit other facts of daily living, such as respiratory disorders, blindness, sleep disorders, etc.

Nature of physical disability: People with a physical disability have an acquired or congenital physical and motor impairment such as cerebral palsy, muscular dystrophy, arthritis, developmental coordination disorder, amputations, genetic disorders, etc. The disability may interfere with the development of function of the bones, muscles, joints and central nervous system.

- Paralysis
- Altered muscles tone
- An unsteady walk
- Loss of muscle strength
- Difficulty with gross motor skills such as walking or running.
- Difficulty with fine motor skills such as buttoning, clothing or printing/ writing.

The impairment may range from mild to severe, may have minimal impact on the person or interfere subsequently with functional ability.

Types of Physical Disabilities:

1. **Locomotor Disabilities :** Disabilities that arise due to poor or non-development of muscular, skeletal and nervous systems.
2. **Leprosy cured person :** Disabilities that arise due to after-effects of leprosy, although leprosy might have completely cured.
3. **Cerebral Palsy :** Disabilities that cause due to damage to some parts of the brain due to which the brain has limited control over movement of some body parts.
4. **Dwarfism :** Disabilities that arise due to short height (not more than 4 feet 10 inches) of an adult individual.
5. **Muscular Dystrophy :** Disabilities that arise due to weak muscles as a cause of hereditary or genetic reasons.
6. **Acid attack victim :** Disabilities that arise due to assault by some one else by throwing acid or similar chemicals on the face or body of the victim.
7. **Visual impairment :** Disabilities that arise due to absence or loss of more than 90% of normal vision of a human being.
8. **Hearing impairment :** Disabilities that arise due to absence or loss of more than 90% of normal hearing sense of a human being.

Causes of physical disability:

- Illnesses like cancer, heart attack or diabetes cause the majority of long-term disabilities.
- Back pain, injuries and arthritis are also significant causes.
- Lifestyle choices and personal behaviour that lead to obesity are also becoming major contributing factors.
- Musculoskeletal disorders also cause disabilities. Examples include spine/joint disorders, fibromatoses.
- Genetic causes like gene inheritance can cause this disability.

Concept and Types of Disorder, Its Causes and Nature (ADHD, SPD, ASD, ODD, OCD)

➤ **Disorder:** A disturbance of function, structure, or both resulting from a genetic or embryonic failure in development or from exogenous factors such as poison, trauma, disease, etc.

➤ **Types of Disorders:**

(i) **ADHD (Attention Deficit Hyperactivity Disorder):** The nature of this disorder is related to behavioural changes or disorders. About 10% of school going kids suffer from ADHD. Boys are more susceptible to this disorder than girls. The common symptoms of this disorder are hyperactivity, trouble focusing on a task, very short span of attention and missing details. Children with ADHD may understand what's expected of them but have trouble following the instructions required to complete the task. Young children mostly act in this way when they are excited or anxious but the difference with ADHD is that these symptoms are present over a longer period of time and take place in different settings. The ADHD disorder affects a child's academic performance as well as social behaviour.

Causes of ADHD are

1. Genes and Heredity: Genetic inheritance and abnormalities in genes may cause this disorder.
2. Brain Injury and Epilepsy: Children who have had traumatic brain injuries or who have epilepsy can often have ADHD-like symptoms.
3. Environmental Causes: Prenatal exposure to smoke, exposure to high levels of lead as a toddler and preschooler are possible contributors.

(ii) **SPD (Sensory Processing Disorder):** This is a condition in which the brain has trouble in receiving and responding to information that comes in through the senses. The SPD is related to mental nature. There the sensory inputs are not organised by the brain in an appropriate manner. The common symptoms are showing heightened reactivity to sound, touch or movement. Under-reactive in certain situations, for example, not noticing when name is called, lethargic, disinterested, poor motor skills, lack of attention, impulsive behaviour, etc. The SPD interferes with the children's normal everyday functioning. They also have delayed communication and social skills. SPD also impacts on a person's ability to interact with different environments.

Causes of SPD are:

1. Genetic or hereditary factors such as having a family history of autism, SPD.
2. Have been under-stimulated during critical periods of neurological development.
3. Have been exposed to variety of environmental toxins.
4. Have food allergies.
5. Having developmental delays and other neurological disorders.

(iii) **ASD (Autism Spectrum Disorder):** The nature of this disorder is related to mental illness which then changes the behaviour. It is a complex, developmental disorder that affects normal brain development. The symptoms of ASD are difficulty in communication and interaction with people. They also have repetitive behaviour patterns like flicking a light switch repeatedly, smelling everything, flipping objects etc. Children with ASD also have sensory sensitivities such as not using eye contact, confused by language, repeating a word etc. Here the brain does not function in the typical way due to which they face developmental challenges. Children and adults with ASD do not acquire good social skills and face many behavioural problems. They often stare at a particular person or object, like a few foods, get over excited by certain sounds, etc.

Causes of ASD are:

1. ASD can be the result of heredity factors, genetic differences and genetic mutations.
2. It can also be caused through abnormal mechanisms of brain development and other neurobiological factors.
3. Environmental factors related to exposure to drugs, toxins like lead, insecticides, hydrocarbons and dietary factors may cause ASD.

(iv) **ODD (Oppositional Defiant Disorder):** The nature of this disorder is related to social behaviours. This behaviour disorder usually takes place in early teens. Apart from teens, ODD also affects young children especially boys. In children, it begins from the age of 8 years. About 2-16% of children are affected by ODD. The main symptoms of ODD are similar patterns of anger, irritable mood, saying hateful things, flaring up at trivial matters, seeking revenge, etc. Here children in their early teens try to defy authority every now and then, they express their defiance by arguing, disobeying, talking back to parents, teachers and other adults. Though this type of behaviour is normally seen among all the teenagers but the difference in ODD is that the behaviour lasts more than 6 months and is excessive in comparison to other children of the same age. This kind of behaviour often disrupts the child's normal daily activities and hampers academic performance.

Causes of ODD are:

1. A child's natural disposition or temperament and possible neurobiological differences in the way nerves and the brain function may cause ODD.

2. Environment Problems with parenting that may involve a lack of supervision, inconsistent or harsh discipline, or abuse or neglect also cause ODD.
- (v) **OCD (Obsessive Compulsive Disorder):** The nature of this disorder is related to mental illness. This usually takes place in people of middle age groups. Males and females both are equally affected by OCD. About 15-20% of the people experience OCD in mild forms. The symptoms of this disorder are people doing repetitive behaviours, performing routine tasks over and over again or having certain thoughts repeatedly. Some examples of this type of disorder are frequent or excessive hand washing, counting to things repeatedly, checking if a door is locked again and again. These activities occur to such a degree that it affects a person's life negatively. The OCD can become serious and may cause other problems related to mental illness.

Causes of OCD are:

1. **Familial Disorder:** The disorder may run in the family, therefore close relatives of people with OCD are likely to develop it.
2. **Behavioural Causes:** The behavioural theory suggests that people with OCD associate certain objects or situations with fear and learn to avoid those things or learn to perform rituals in order to help reduce the fear or the stress related to that situation.
3. **Cognitive Causes:** This happens when people misinterpret their thoughts like the feeling of dirty hands even when they are cleaned many times.
4. **Environmental Causes:** This means stressful situation present in the environment such as within the family or society that triggers OCD in people.

Disability Etiquettes and Advantages of Physical Activity for Children with Special Needs

- **Disability Etiquettes:** Disability etiquettes is a set of guidelines to deal with the people facing physical or mental disabilities. It was started as a clinical play on existing rule sheets, written for non-disabled audiences that were seen as demeaning by civil rights activists in 1970s. The term serves to communicate people with disabilities more respectfully in all types of situations. It refers to educate people regarding disabilities. It involves treating people with disabilities with respect and care, and try to bring them into a normal life.
- **Disability Etiquettes in general:**
 - Always respect the dignity of a disabled person, individuality and desire for independence.
 - When introduced to a person with disability, it is appropriate to offer to shake hands. People with limited hand use or who wear an artificial limb can usually shake hands.
 - When meeting a person who is visually impaired, always identify yourself and others who may be with you. When conversing in group, remember to identify the person to whom you are speaking.
 - Treat adults as adults. Address people who have disabilities by their first name only when extending the same familiarity to all others.
 - Never patronize people who use wheelchairs by patting them on the head or shoulder.
 - Treat a person with disability in the same manner and with the same respect and courtesy as with others.
 - Speak directly to the person rather than through the friend, attendant or sign-language interpreter who may also be present.
 - Don't put people with a disability on a pedestal or talk to them in demeaning terms.
- **Disability Etiquette Guidelines**
 - **Ill persons with speech difficulties**
 - (i) Give attention to the person who has difficulty in speaking.
 - (ii) Keep manner to encourage rather than correcting.
 - (iii) Give extra time for the conversation and be patient.
 - (iv) If you have difficulty in understanding, don't pretend that you do. Repeat as much as you do understand.
 - **Persons with hearing loss**
 - (i) Get the person's attention with a wave of the hand, or a tap on the shoulder.
 - (ii) Speak clearly and slowly, but without over-stressing your lip movements or shouting.
 - (iii) Many persons with hearing loss read lips. Place yourself facing the light source and keep hands, cigarettes and food away from your mouth when talking in order to provide a clear view of your face.
 - (iv) When an interpreter accompanies a person, direct your remarks to the person rather than to the interpreter.
 - (v) Look directly at the person and speak expressively.
 - (vi) Use sign language if you and the person are both familiar with it.
 - **Persons with vision loss**
 - (i) When enter the room, indicate who is there. Let the person know when leaving the room.

- (ii) When talking to a person with a visual impairment, begin by identifying yourself by name and that you are speaking to them.
- (iii) When offering your assistance, do not grab the person's cane or arm.
- (iv) If you are walking with a person who is blind, offer your arm for him/her to hold.
- (v) Walk at the normal pace. It is helpful to speak casually and naturally about the environment, objects and buildings you are passing as you walk.
- (vi) Not all visually impaired people read Braille. Ask the person what alternative format they prefer.
- **Persons with cognitive / language impairments**
 - (i) Use a calm voice and be comfortable.
 - (ii) Use simple and short sentences.
 - (iii) Do not argue with the person.
 - (iv) Treat each person as an individual with talents and abilities deserving of respect and dignity.
 - (v) Give extra time for the person to process what you are saying and to respond.
 - (vi) Look for signs of stress and/or confusion.
- **Strategies to Make Physical Activities Accessible for Children with Special Needs:** The various strategies or ways by which physical activities can be made accessible for children with special needs are as follows:
 - **Sensory Integration:** The first two things we always notice about physical education classes are the loud music and fluorescent lights in the gym. These are major barriers to students with some type of neurological differences. Many students are also sensitive to light like bright sunlight outdoors and the sound of squeaking sneakers on the gym floor. The music problem is easy to solve-lower the volume or turn it off. Sound proof headphones may also be used indoors and sunglasses can be used outdoors. Schools may find other indoor lighting options that are most cost effective, taking advantage of green energy incentives for LED light bulbs or simply shutting of some light and relying more on natural lighting.
 - **Positive Behaviour:** Behaviour is always a concern in physical education classes where there's plenty of movement and incidents can happen in rapid succession. Positive Behaviour Interventions or Support (PBIS) is a systematically proven method to prevent negative behaviours and increase healthy interactions. Behavioural expressions are explained from the beginning with support such as picture scheduler. Then the class material is taught through positive interactions.
 - **Team building:** Physical Education is the perfect opportunity for team building exercises. Instead of competitive games, the class can focus on creative games that only succeed when a whole team works together.
 - **Accessibility:** Hard surfaces such as concrete and asphalt may be dangerous for individuals with dyspraxia and softer such as sand or wood chips make it difficult to manoeuvre a wheelchair. Gym surfaces and outdoor mats can be used to make physical activity more accessible for the children with special needs. Another way is to level the playing field by having the whole class play a game such as sitting volleyball or scooter soccer.
 - **Inclusive Classrooms:** It means development of education laws in such a way that children with special needs get education within the normal classrooms along with other children so that they are well accepted in society.
 - **Assistive Technology:** It refers to creating devices, tools or equipment that help children with special needs to participate in learning activities like bigger balls, balls with bells, balls attached to strings to bring it back to the students etc.
 - **Adaptive Physical Education:** Depending on student's disability, a separate, adaptive class or modifications within a game, changing the rules of the game or sport to some extent can help the students in a big way.
 - **Creating Specific Environment:** Students with special needs can be provided with specific play area with special requirements as needed by them. Loud music, glaring lights often cannot be tolerated by these children, so a lot of natural lighting should be there.
 - **Focus on Creative Games:** Instead of competitive games and physical activities, the strategy is to develop creative games. This helps in team building and cooperation and prevents unnecessary competition and boosts the confidence of these children.
 - **Accommodations and Modification:** Since the individual needs of the children with special needs are different, it is essential for the teachers to modify the teaching strategies in order to accommodate the children with disabilities. Therefore, constant modification and accommodation is required.
 - **Professional Courses:** Developing more professional courses and teacher certification programs for teaching physical education to children with special needs is essential to popularise the adaptive physical education programme.

CHAPTER-3

Physiology and Injuries in Sports

Revision Notes

Physiological Factors Determining the Components of Physical Fitness

- The components of Physical Fitness like strength, speed, endurance, flexibility, etc., can be determined with the help of various physiological factors.

I. Physiological Factors Determining Strength:

- (i) **Muscle Size:** The size of the muscle is largely responsible to the strength of the muscle. It is an acknowledged actuality that more force can be produced by bigger and larger muscles. In males and females, the similar size of muscle produces the similar force even though males are found to be stronger in comparison to females for the reason that they have larger and bigger muscles.
- (ii) **Body Weight:** Body weight determines the strength of an individual as well. It is known that the heavier individuals are stronger in comparison to the lighter individuals. Among international weight lifters, there is a positive correlation involving body weight and strength as because of this, the heavier weight lifters lift heavy weight.
- (iii) **Muscle Composition:** It can be said that the proportion of the fibres determines the strength. Fundamentally, each muscle consists of two types of muscle fibres i.e., white fibres (fast twitch fibres) and red fibres (slow twitch fibres). The fast twitch fibres produce more force as they can contract faster. On the other hand, the slow twitch fibres are capable to contract for a longer duration as they do not contract faster. The muscles which can produce more strength have more percentage of fast twitch fibres.

II. Physiological Factors Determining Speed:

- (i) **Explosive Strength:** Explosive strength is essential for all rapid and explosive movements. Explosive strength depends on the muscle composition, size, co-ordination and on the metabolic process as well. Apart from muscle composition, the left behind factors can be developed in the course of training which eventually increases the speed up to limited extent.
- (ii) **Flexibility:** Flexibility enables complete utilization of explosive strength as well. To some point, flexibility determines the speed as well. Actually, flexibility allows utmost range of movement with not much of internal resistance.
- (iii) **Bio-Chemical Reserves and Metabolic Power:** The muscles need more quantity of energy at an extremely high rate of utilization for maximum speed performance and for this reason the phosphagen ATP and CP stores in the muscles should be sufficient. The muscles contraction due to inadequate energy supply turnout to be slow after a short time, if ATP and CP are less in contracting muscles. The energy supply depends on definite enzymes which increase the metabolic power. Training can enhance the amount of ATP and CP.

III. Physiological Factors Determining Endurance:

- (i) **Aerobic Capacity:** The muscles require energy to perform an activity continuously which can be supplied in the presence of oxygen. Therefore, for endurance performance, the ability to uphold the sufficient supply of oxygen to the working muscles for energy liberation is vital.
- (ii) **Lactic Acid Tolerance:** The ability to tolerate higher concentration of lactic acid can help in improving endurance performance and is a vital factor in determining anaerobic capacity. For activities that last for about 40 seconds or more, the lactic acid tolerance is important.
- (iii) **Movement Economy:** For significant endurance performance, the movements performed should be economical. With less energy expenditure, a runner can run at a set speed for longer duration. In endurance sports, a good technique can save energy.

IV. Physiological Factors Determining Flexibility:

- (i) **Muscle strength:** To make the movement possible especially against gravity or external force, the muscles should have a bare minimum level of strength. In reality, for achieving the higher range of movement feeble muscles can become a limiting factor. Strength of muscles is extremely trainable, hence, it can improve the flexibility.

- (ii) **Joint structure:** In human body, there are numerous types of joints. A number of joints intrinsically have a larger range of motion in comparison to others. For instance, the ball and socket joint of the shoulder has the maximum range of motion in contrast to knee joint.
- (iii) **Previous Injury:** Thickening or fibrosing on the affected spot may result in injuries to connective tissues and muscles. Since, fibrous tissues are less elastic, it can direct to limb shortening and eventually reduce flexibility.

Effect of Exercise on Cardio Vascular System

➤ Immediate Effects of Exercises:

1. **Heart Rate:** In healthy adults, resting heart rate ranges from 60-80 beats per minute. It may be high as 100 beats per minute in sedentary middle-aged individuals. It has been recorded that in elite endurance athletes, the heart rate is as low as 20-40 beats per minute. The heart rate increases in expectancy even before exercise begins, this is acknowledged as the anticipatory response which occurs through the release of neurotransmitter called epinephrine and norepinephrine. Subsequently to the early anticipatory response, until the maximum heart rate is reached, heart rate increases in the direct amount to intensity of the exercise. Maximum heart rate is calculated with method of deducting age from the beats at the time of birth (220 - Age). The only direct method is to exercise at increasing intensities for determining maximum heart rate until a plateau in heart rate is found in spite of the increasing rate of work.
2. **Cardiac Output:** Cardiac output increases if either heart rate or stroke volume increases. With the response of heart rate and stroke volume to activity, cardiac output increases proportionately with intensity of exercise as well. At resting condition, the cardiac output is about 5 liters/min whereas, during intense exercise it may increase to 20-40 litres/min.
3. **Blood Flow:** The vascular system is capable of redistributing blood to the tissues where the maximum instant demand for oxygen increases and safely divert away the blood flow from the areas that have less demand. During rest, skeletal muscles are supplied with 15-20% of the circulating blood. Through dynamic or vigorous exercise, it increases up to 80-85% of cardiac output. Blood is carried away from major organs i.e., kidneys, liver, stomach and intestines.
4. **Stroke Volume:** With exercise intensity there is proportionate increase in the stroke volume. At rest, stroke volume in untrained individuals ranges from 50-70 ml/beat rising up to 110-130 ml/beat in intense physical activity. Resting stroke volume ranges from 90-110 ml/beat rising to the extent of 150-220 ml/beat in elite athletes. With the onset of exercise, the stroke volume increases because the left ventricle fills up totally, stretching it more, producing a more forceful contraction with the elastic recoil, this phenomenon is known as the Frank Starling Mechanism.

➤ Long Term Effects of Exercises:

1. **Heart Size:** The size of the heart and the strength of the cardiac muscle increases due to regular exercises as to the maximum extent the left ventricle adapts. The walls of the heart become stronger and thicker as shown in recent studies and the thickness of myocardial wall increases as well.
2. **Resting Heart Rate:** The resting heart rate decreases due to regular exercises. After duration of 10-weeks training programme, the resting heart rate may reduce up to 10 beats per minute from the normal of 72 beats per minute. The heart becomes more efficient due to regular exercises. In highly conditioned athletes, the resting heart rate decreases to 30 beats/minute.
3. **Blood Flow:** The body increases its number of capillaries to the requirement of supplying more oxygen during exercise to the muscles. The existing capillaries open wider as well. Further, the redistribution of blood becomes efficient and effectual. As a matter of fact, blood circulation in the body increases.
4. **Cardiac Output:** The cardiac output tends to increase as a result of regular exercise. At resting conditions in untrained individuals, the cardiac output can possibly be 14 to 20 litres/minute, in trained individuals 25 to 35 litres/minute and cardiac output can be as high as 40 litres/minute in elite athletes.
5. **Risk of Heart Disease:** Stress related hormones progressively get reduced from circulating blood due to regular exercises. This increases the blood vessel pathway, which consecutively reduces the risk for the increase of plaque that leads to coronary heart disease. Therefore, the risk of heart diseases reduces due to exercises.
6. **Blood Volume:** The blood volume increases due to the regular exercise. Actually, as the blood volume enhances, there is an increase in plasma volume. Additionally, during heavy exercise, in order to keep the muscle supplied with oxygen, the body produces a greater number of red blood cells.

Effect of Exercise on Respiratory System

- **Lung Volume:** The lungs' volume and the capacity increase with endurance training. After endurance training, vital capacity is increased i.e., maximal volume of air forcefully expired out subsequent to a maximal inspiration. The trained athlete may have vital capacity of 5-6 litres but, vital capacity of untrained individual is of 3-4 litres.
- **Breathing frequency:** Breathing rate is the number of breaths per minute. Breathing frequency decreases after training. In resting condition, normal untrained individual's breathing frequency is about 12-20 breaths/minute. In trained athletes or individuals, it reduces down to 7-8 breaths/minute. Exercise reduces respiratory rate that reflects superior respiratory efficiency.
- **Maximum minute ventilation:** The amount of air which is inhaled or exhaled in one minute is called minute ventilation. Maximum minute ventilation increases subsequent to training. In untrained individual, maximum minute ventilation is about 100 litres/minute, while it increases to more than 150-160 litres/minute in trained athlete.
- **Pulmonary Diffusion:** The exchange of gases that takes place in small air sacks of lungs (alveoli) is called pulmonary diffusion. For diffusion, more alveoli become active at the time of maximal level of exercise. The alveoli size increases as well which gives more space to diffusion of oxygen (O₂) and carbon dioxide (CO₂).
- **Ventilatory Efficiency:** The trained person gets the similar amount of oxygen (O₂) from less amount of air. Generally, 15 litres of air is required to obtain one litre of oxygen, however, trained individual gets the similar quantity of oxygen from 12 litres of air. Training or physical exercises, especially endurance training, increases the ventilatory efficiency.

Effect of Exercise on Muscular System

- In our body, there are approx 650 muscles producing a particular movement. Muscles with the help of bones help our body to move. The cardiac muscles producing a particular movement help to pump blood throughout our body. These are important muscle contractions:
 - (i) Isotonic Contraction (ii) Isometric Contraction (iii) Isokinetic Contraction
- (i) **Isotonic contraction:** It is a type of muscle contraction in which while lifting a constant load the muscle shortens with different tensions.
- (ii) **Isometric contraction:** It is a muscle contraction in which there is no change in the length of the muscle though the tension is developed.
- (iii) **Isokinetic contraction:** It is a muscle contraction performed at an unvarying pace. Moreover, in such a way, that muscle tension develops while shortening in maximal more than the complete range of joint motion.
- **Muscle Hypertrophy:** Hypertrophy is an increase in width of individual muscle fibre. The size of the muscle fibre is usually responsible for gain in strength and muscular endurance. Weight training causes the hypertrophy of muscles.
- **Biochemical Changes in Muscles:**
 - **Alteration in Aerobic Capacity:**
 - (i) Amount of mitochondria increases consequently producing more muscular energy.
 - (ii) Breakdown of carbohydrates and fat increases.
 - (iii) Oxygen binding compound called Myoglobin content found in muscle tissue increases.
 - (iv) Quantity of glycogen store increases consequently because of training which is vital for energy production in the muscles.
 - **Alterations in Anaerobic Capacity:**
 - (i) ATP + CP System capacity increases in a way releasing more energy.
 - (ii) As a result of training, glycolytic capacity increases as well.
- **Body Composition Changes:**
 - (i) The body composition changes significantly whereas in case of majority of individual weight training produces little or no change in the total body weight.

- (ii) The muscle mass increases.
- (iii) Alteration in muscle and joint motion occurs.
- (iv) Flexibility increases subsequent to training, enhancing the performance and preventing serious muscle injury.
- (v) There can be noteworthy loss of relative and absolute body fat.

Sports Injuries: Classification, Causes and Prevention

➤ Classification of Sports Injuries

Injuries among athletes may be classified into two categories:

1. Acute injuries
2. Overuse injuries

1. **Acute Injuries:** Acute injuries are caused by an unexpected shock. Common acute injuries among young sports athletes include sprains i.e. an incomplete or absolute tear of ligament, strains i.e., a partial or complete tear of a muscle or tendon.
2. **Overuse Injuries:** Not all injuries are sourced by a single, sudden twist, fall or collision. A sequence of small injuries to undeveloped bodies can cause minor fractures, minimal muscle tears or progressive bone deformities which are known as overuse activities.

➤ Common Sports Injuries:

1. Sprain
2. Strain
3. Dislocation
4. Contusion
5. Fracture
6. Abrasion

Causes of Sports Injuries:

- (1) **Falls:** In addition to obvious breaks that can happen from a fall, wrist sprains are common. Any athlete can fall in the middle of an activity. To break the fall, the natural instinct is to put the hands down while falling.
- (2) **Poor Warm Up:** Warm up delivers blood and oxygen to various muscles allowing them to work more efficiently. Improper warm up initiates muscle cramping and pulls, which results from jumping into an activity without properly preparing the muscles for it.
- (3) **Improper Equipment:** Shoes that may not provide enough support may cause an injury to a runner. The inflammation of arch shock absorber called plantar is common when shoes do not fit suitably or gives proper support.
- (4) **Overuse:** Repetitive movements or overuse may be the most serious cause of sports injuries. Runners, swimmers and tennis players are chiefly prone to overuse injuries, including tennis elbow, shin splints, tendinitis, etc.
- (5) **Unilateral Movements:** Lower back pain threatens golfers and tennis players since these activities require certain movements by only one side of the body. This can result in weaker muscles on the less active side of the body.
- (6) **Fatigue:** Resting between activities is essential to prevent muscle pulls as tired muscles are a common cause of muscle pulls.
- (7) **Technique or Posture:** Spasms and pulls are often the product of something as easy as moving the head clumsily to see a ball or an opponent. After racing with racing handlebars, cyclists may experience neck pain. The position one must take to use the handlebars and still see where you're going tightens the neck muscles and causes a spasm.

➤ Prevention of Sports Injuries:

There are preventive aspects of some sports injuries:

- **Athlete's Medical Check-Up:** Prior to the start of the activity or seasonal practice, a pre-participation physical and medical check up should be done of all athletes, which must comprise:
 - (i) A meticulous medical history.
 - (ii) Few major lab tests should be done.
 - (iii) Medical check of Circulo-respiratory components, abdominal, pelvis check, etc.
 - (iv) Body Measurements such as height, weight and blood pressure, etc. should be checked.
 - (v) Orthopaedic examination comprising of body structure, posture, flexibility, fat percentage and maturation should be collected.
- **Stay Hydrated:** When we are active and exercising, water is essential to keep the body going. It is especially important to keep hydrated if we are exercising in heat or sunny weather, as dehydration can considerably decrease mental and physical fitness.

- **Balanced Diet:** Balanced diet is also essential to prevent sports injuries because the lack of essential minerals and vitamins such as calcium, phosphorus and vitamin 'D', etc. makes bones weak. Weak bones usually lead to sports injuries.
- **Obeying the Rules:** During practice or competition, if the athletes obey the rules of games/sports properly, sports injuries such as tendinitis and stress fractures could be prevented.
- **Use of Protective Equipment:** It is an easy and the best way to prevent sports injuries. These protective equipment protect the sportsperson from getting injured. It is only due to this reason the protective equipment are essential in sports.
- **Proper cooling down:** Cooling down is basically lowering down the pace of workout by performing stretching exercise and deep breathing relaxation exercise. Cooling down exercises prevent the post soreness and stiffness which make exchange of blood easier.
- **Avoid Overtraining:** Doing overtraining i.e., allowing the body to work more than its normal resisting capacity, which may lead to overstretching of muscles and sprains in the muscles.

Management of Injuries

➤ It is observed that only a single type of injury does not occur in sports. The injuries that take place may be in muscles, bones, joints, etc.

Likewise, sports injuries may be divided into various types. They are:

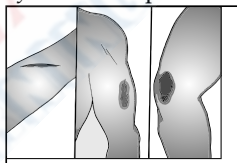
1. Soft tissue injury
2. Bone injury
3. Joint injury

➤ **Soft Tissue Injury:** The damage in the muscles, ligaments, tendons or nerves of the body is known as soft tissue injury. Some of soft tissue injuries are as follows:

- | | |
|----------------|---------------|
| (a) Abrasion | (b) Contusion |
| (c) Laceration | (d) Incision |
| (e) Sprain | (f) Strain |

(a) **Abrasion:** It is a wound caused by superficial damage to the skin, no deeper than the epidermis. It is less severe than a laceration and bleeding. Mild abrasion does not scar or bleed but, deep abrasion may lead to the formation of scar tissue.

Abrasion injuries most commonly occur when exposed skin comes into a moving contact with a surface, causing a grinding or rubbing away of the upper layers of the epidermis.



Management:

- A topical antibiotic (such as Neosporin) should be applied to prevent infection and to keep the wound moist.
 - Dressing the wound is optional but helps to keep the wound drying out which interferes with healing.
 - The abrasion should be cleaned and debris should be removed.
- (b) **Contusion:** Contusion is a medical name for a bruise that refers to an area of skin discolouration (typically black and blue) occurs when blood vessels are damaged or broken after the skin takes a hard hit or bumps. Bruises are classified as:

- **Subcutaneous:** A bruise beneath the skin
- **Intramuscular:** A bruise within a muscle
- **Periosteal:** A bruise to a bone.

Management:

- As soon as injury happens, follow RICE; Rest, Ice, Compression, and Elevation for the first 24 to 48 hours. Remember not to keep ice on the injury for more than 15 to 20 minutes at a time which may result in frostbite.
 - After the first day or two, switch from ice to heat (still no longer than 20 minutes at a time), continue to elevate the injury when convenient.
 - Take acetaminophen or ibuprofen. They are good for the pain.
- (c) **Laceration:** A laceration is a wound that occurs when skin, tissue and muscle are torn or cut open. These may be deep, shallow, wide or narrow. Most lacerations are the result of the skin hitting an object, or an object hitting the skin with force.

Management:

- Being the first step in most injuries to the skin, cleaning of the wound is of utmost importance to stave off infection.
- For mild laceration, the use of a topical ointment, such as Neosporin, is recommended, as the application of basic knowledge.
- For deeper wounds, as in those that affect the tissue beneath the skin and experience heavier bleeding, attention from medical professional should be required as the wound will likely need to be closed with stitches, staples or even sutures.

(d) **Incision:** It is a cut especially by a scalpel or similar medical tool in the context of surgical operation.

Management:

- While changing and removing the dressing of the wound, an aseptic, non-touch technique should be used.
- For cleaning of the wound sterile saline solution should be used up to 48 hours after surgery.
- If the wound has been separated or been surgically opened to drain pus, tap water can be used for cleaning after 48 hours.
- Patients can take shower safely after 48 hours of injury.

(e) **Sprain:** A type of injury that involves damage to one or more ligaments in a joint, often caused by trauma to a joint (the space between bones). Twisting or forces overstretch the ligaments and can cause mild or severe tears in the ligament tissue.

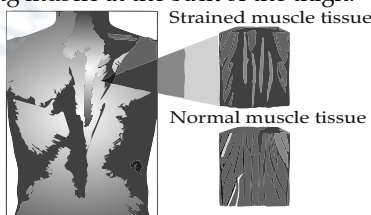


Sprain

Management: The acronym RICE is used in treating of sprain.

- **Rest:** The sprain should be rested. No additional force should be applied on site of the sprain.
- **Ice:** Ice should be applied immediately to the sprain to reduce swelling and pain. It can be 10-15 minutes longer and 3-4 times a day.
- **Compression:** Dressing or Bandages, should be used to immobilize the sprain and provide support. Compression should not cut off the circulation of the limb.
- **Elevation:** Sprained joint should be kept elevated as it helps in minimizing swelling.

(f) **Strain:** A strain involves stretching or tearing of muscle tendon that connects muscles to bones. Strains often occurs in the lower back and in the hamstring muscle at the back of the thigh.



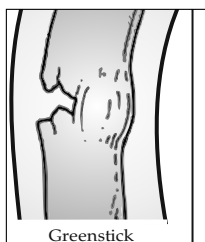
Strain

Management:

- Ice the injured area to reduce swelling.
- Rest the injured muscle.
- Compress the muscle with an elastic bandage.
- Elevate the injured area.

➤ **Bone Injuries and their Management:**

(a) **Greenstick fracture:** A greenstick fracture occurs due to the bending of bones and cracks, instead of breaking completely into separate pieces. This type of broken bone is in children because their bones are softer and more flexible than adults.

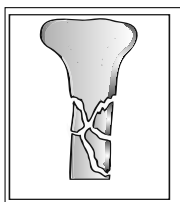


Greenstick

Management: Greenstick fractures management requires fracture reducing. This is done by:

- Slightly pulling the bone apart and putting it into place to straighten it. To make sure that fracture will heal correctly, it is needed to be immobilized.
- Physical therapy is also directed to regain mobility and movement of the affected limb. If there are some instances that these measures do not take effect, surgery is advised to correct the fracture.
- When surgery is done, post-operative traction may be used to straighten the hard fracture.
- In order to reduce swelling on the affected site, anti-inflammatory drugs can be given.

(b) **Comminuted Fracture:** A fracture in which the bone is broken into several pieces or is shattered, creating numerous fragments is called comminuted fracture.

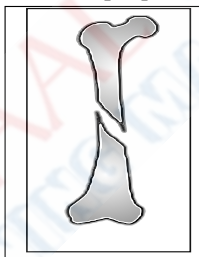


Comminuted

Management:

- The shattered pieces are lined up in a procedure labelled as reduction.
- Above and below the area fibre glass cast, plasters and splints are used to maintain the immobilization.
- For managing pain, ibuprofen can be used, which is as effective as the combined use of acetaminophen and codeine.
- If bone infection arises, meticulous antiseptic measures and antibiotics are mandatory.

(c) **Stress Fracture:** A small crack that takes place in the bone due to overusing of certain part of the body that commonly results due to increase in activity without proper recovery is called a stress fracture.

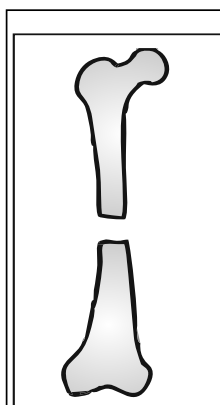


Stress

Management:

- The initial management for a stress fracture is to elevate the extremity and rest while the bone heals itself.
- Icing is recommended in the affected area for 24 to 48 hours and reducing the activity.
- When the swelling reduces, seeing the skin creases, partial weights can be applied to the area.
- Avoiding the activity that caused stress fracture till it is completely pain free.

(d) **Transverse fracture:** Type of fracture that involves breaking part of bone in a spine and the part gets extended from the main body of bone. Thoracic spine (the upper part and the middle part of the back) and lumbar spine is the part where this type of injury mainly occurs.



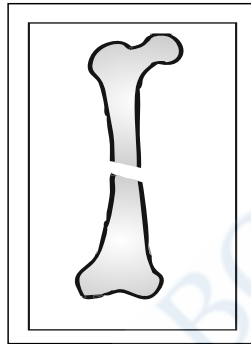
Transverse

Most of this type of injuries occurs as a result of a variety of accidents such as:

- (i) Falls
- (ii) Motor vehicle accidents
- (iii) Recreational activities
- (iv) Parachuting incidents
- (v) Gunshot wounds

Management:

- If the injury is not serious, then it is not necessary to have hospital care.
 - Bed rest, medications for relieving pain, back bracing, and avoidance in the activity is required until complete rehabilitation.
 - Operation may be required in case of severe cases like multiple fracture spine.
- (e) **Oblique fracture:** When the breaking of bone has a curved or sloped pattern, it is said to be oblique fracture. It mainly occurs when the bone gets trapped and another bone twists over it.



Oblique

Management:

- Anti-inflammatory medications and pain relief may be required for handling pains.
 - Reduction may be required to perform, which is the process of resetting the bone.
 - Mobility may be restricted for several weeks by placing the bone in a brace, sling or clyt.
 - Sometimes surgery is required to insert nails, screws, wires or other devices to help the bone to heal.
- (f) **Impacted Fracture:** It is a type of fracture in which the bones break into multiple fragments and get driven into each other. It mainly occurs when someone falls from height with a huge impact.



Impacted

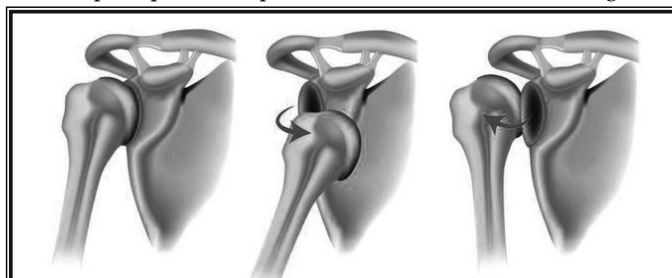
Management:

- It often requires the use of plates, rods and screws to realign the bone.
 - Severe impacted fracture may require surgery.
 - It is necessary to restrict movements while treatment is going on.
 - It is required to severely limit mobility until it is fully healed.
 - It is important to take good care of fractured part.
- **Joint Injuries:**

Dislocation: A type of injury to a joint, where bones in the joint get forced out from their normal positions resting with immobilization of joints. Dislocation takes place in different location of joints like:

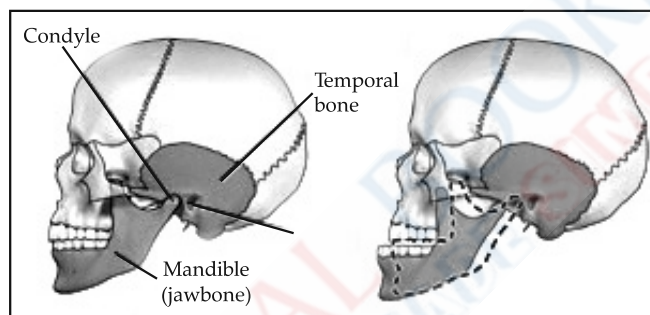
- (a) Dislocation of shoulder joint.
- (b) Dislocation of lower jaw.
- (c) Dislocation of hip joint.

- (a) **Dislocation of shoulder joint:** The shoulder joint is called a ball and socket joint as the rounded top of the bone in the upper arm (Humerus) gets fit into the socket. Shoulder joint is said to be dislocated when the top of the humerus moves out of the cup shaped outer part of the shoulder blade leading to immobilization of joint.

Normal
anatomyAnterior
dislocationPosterior
dislocation

Shoulder Dislocation

- (b) **Dislocation of lower jaw:** An injury to the jaw joints that join the lower jaw bone to the skull is called the temporomandibular joints, and when the bones of these joint lie out from the skull, results in dislocation of lower jaw.

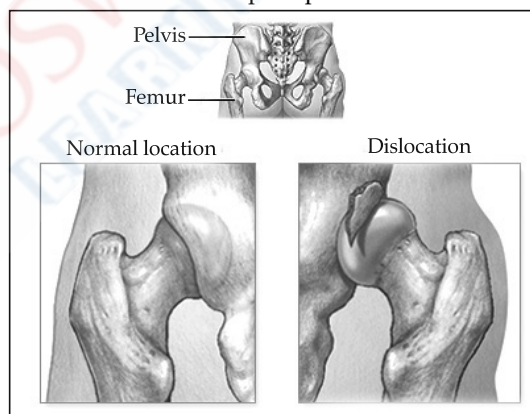


Normal

Dislocated

Dislocation of Jaw

- (c) **Dislocation of hip joint:** Dislocation of hip joint is a common injury to the hip joint. Dislocation occurs when the ball-shaped head of the femur comes out of the cup shaped acetabulum set in the pelvis.



Dislocation of Hip Joint

Management of Dislocation:

- Apply cold pack around the dislocated area to relieve the pain.
 - Do not apply ice or cold packs directly to the skin. It may result in damage to the skin.
 - Splint the injured area to keep it immobilized until professional dislocation treatment is given.
 - In case of severe pain, the patient can be given ibuprofen or acetaminophen to get relief.
 - Once the doctor has placed the bones back into proper alignment, the joint needs to be immobilized for a number of days or weeks to allow time to the joint for healing.
- **First Aid:** It is an immediate and temporary help and care given to a wounded person or victim of an accident before a doctor arrives.

- **Mouth-to-Mouth Artificial Respiration:** It is a life-saving technique in which air is blown into the mouth of victim keeping his nostrils closed to pump air into the lungs.
- **Cardio Pulmonary-Resuscitation (CPR):** It is an emergency life-saving technique performed with the combination of mouth-to-mouth artificial respiration and chest compressions.
- **The main aims of First-Aid are:**
 - To give necessary aid before medical help arrives
 - Reduce infections
 - Try to save lives
 - To reduce recovery time
 - Prevent a severe injury from becoming a chronic problem
 - Prevent excessive blood loss
 - Emergency Medical Supply within the home
 - Provide help in emergency situations.
- The objectives of First Aid vary depending on so many factors for example, if the patient is bleeding, dehydrated, or has been bitten by an insect, to name a few of the many possibilities, but it can be summarized as CARE.
 - Check if they are OK.
 - Provide Aid if they are unconscious or risk dying if no action is taken.
 - Help them to Relax if they are conscious, or shift them into a Recovery position if non-responsive.
 - Allow emergency specialists to Escort them to the hospital, or if capable, take the patient to the hospital by any means possible.

First Aid-First Aid is an immediate and temporary help and care given to a wounded person or victim of an accident before a doctor arrives.

1. Preservation of life:

Providing CPR or attending to a choking person are two examples of life preservation in a first aid course. Maintaining air circulation in the body and clearing blocked airways while waiting for medics prevents other severe conditions, like brain damage and even a heart attack, which can happen within minutes.

2. Prevention of illness or injury from escalating:

As part of first aid training, you'll learn how to contain wounds and attend to injuries to prevent further spread or damage. For example, if the patient is bleeding profusely, the first aider's goal is to do their best to stop the bleeding until professional medical care arrives.

3. Promoting recovery:

Promotion of recovery includes using a first aid kit to help the person in need. This can involve washing, disinfecting, and bandaging a wound. In some cases, an antibiotic ointment can be used to promote healing.

4. Relieving pain:

Offering pain relief should only be done if it doesn't present a risk to the patient. If the person is bleeding, some pain relief medication is not advisable. It's better to ask a medical expert first before offering any sort of medication.

5. Protect the unconscious:

Protecting an unconscious person includes safely removing them from a dangerous environment like a fire or busy road to safer conditions nearby. In a first aid course, participants learn how to position an unconscious person so that breathing airways aren't obstructed. The goal of protecting an unconscious person is to ensure their safety before medical help arrives.

CHAPTER-4 Psychology and Sports

Revision Notes

Personality, Its Definition and Types; Role of Sports in Personality Development

- **Meaning of Personality:** The word personality has been derived from the Latin word PERSONA. In the beginning, the word PERSONA was used as the mask worn by the actors to change their appearance but later on, it began to be used for the actors themselves. This common notion of personality is very much the same as the concept of psychology. Personality includes the totality of one's behaviour that should be taken into consideration.

- **Definitions of Personality:** According to Crow and Crow, "Psychology is the study of the human behaviour and human relationship"
 - (i) **According to Allport,** "Personality is a dynamic organization within the individual of those psychophysical systems that determine his unique adjustments to his environment."
 - (ii) **According to Morton Prince,** "Personality is the sum total of activities, tendencies, appetites, instincts of the individuals and the dispositions and tendency required by experience."
 - (iii) **According to Watson,** "Personality is the sum of activities that can be discovered by actual observation over a long enough period of time to give reliable information."
- **Dimensions of Personality:**
 - (i) **Physical Dimension :** The primary feature or dimension of human personality is the physical body structure or the physique and all other dimensions are gentle to it. For the development of this aspect of personality, heredity has a very significant role. A proper environment is necessary for the development of physical aspects of personality. A lone environment cannot take the credit for moulding a personality, as genetic support forms the base of personality development. The individuals who have frail, pale, and malformed physique are not confident of themselves in comparison to individuals who have tall, healthy, and muscularly built personalities. There is a positive relationship between a good physique and health.
 - (ii) **Mental and intellectual dimension :** A well-built individual, lacking in mental and intellectual abilities, is just similar to a statue without life. Human beings have been bestowed with higher mental and intellectual abilities. Human personality loses its significance without mind and intellect. Well-known psychologists, scientists, philosophers, and leaders are known for their mental and intellectual abilities.
The mental and intellectual capabilities of an individual facilitate him in adjusting to circumstances and life in a more suitable way.
 - (iii) **Social Dimension :** Naturally, by nature man is a social being. He has learned from the society in which he lives. He will not be able to survive for long if he is completely isolated from society. Human beings have an innate tendency to get them noticed favourably. Besides fulfilment of his biological needs and values, man fulfils emergent social values such as status, power, affection, and goodwill. Each individual is psychologically born with precise innate attitudes, interests, tendencies, and capacities. He moulds and modifies his behaviour, learns etiquettes, follows the rules, customs, and traditions of the society to be an acceptable member of the society.
 - (iv) **Emotional Dimension :** Emotion occupies a very high-flying place in our everyday life. Life without emotions is dull and unappealing. Our life is made worth living by emotions like love, affection, etc. Our life becomes exciting as well as boring, cheerful as well as miserable due to emotions. In all the stages of development and in the life of each and every living organism, emotions play a very dominant role. Emotions differ from individual to individual. A child learns to show different emotions by learning from experiences. As a result of emotions, every person responds to situations differently. Our body involves many physical and physiological changes in every emotional experience, as the energy mobilization in our body increases due to emotions. The outcome of emotions on our body may be positive or negative.
- According to Charak Samhita, individuals can be classified into three types - vat, pitta and kapha on the basis of three humoral elements.
- It refers to personality typology based on trigunas meaning three qualities:
 - **Sattva Guna:** Relates to qualities related to spirituality, such persons are good, clean, truthful, disciplined, constructive and caring.
 - **Rajas Guna:** Relates to qualities related to passion and desire, such persons are greedy, active, restless, dissatisfied and envious.
 - **Tamas Guna:** Relates to relaxation and luxury, such persons are lazy, inactive, destructive, arrogant and angry.
- **Types of Personality :** Personalities of individuals can be classified based on the universal factors that are found as the central part of each type. Human behaviour is a complex issue to understand and often unpredictable. The general classification of personality types is given below:
 - (i) **Type 'A' personality :** Individuals of this type are extremely independent, competitive, ambitious, and optimistic in nature. They are self-driven and know the significance of positive thinking, motivation, and goal setting. These individuals are impatient and tend to be rude and aggressive. Type A personality individuals are adventurous and risk-takers and possess the problem-solving ability.

- (ii) **Type 'B' personality** : Type B personalities are the literal contradictory of type A personalities. Even in stressful situations, they are almost not stressed out. They can be described as being happy - go - lucky, who are particularly undisturbed in any circumstance. They are by and large cheerful, light-hearted and fun to be around. It is usually entertaining to be with them. They love to relax and accept things as they approach. Individuals under this type are considered by their lack of urgency, as they do the work at their own pace.
- (iii) **Type 'C' personality** : This personality type typically includes introverts and those concerned with facts. To find a fact they are interested in, they may perhaps spin heaven and hell upside down or inside out. They are engrossed in finding out how things work precisely. They are extremely sensitive and thoughtful. Type C personalities are reserved in nature and alert as well.
- (iv) **Type 'D' personality** : These individuals deem in apathy. They have a preference to join the trampled ways and establish routines over the ambiguity of alteration. These are executors of the direct instructions and supporters of the used-up Action. When it comes to taking risks and responsibility, they tend to back out of the situations. These individuals are afflicted by pessimism such as gloom, worry, irritability, and barely self-confidence. They avoid sharing their negative emotions to avoid rejection.
- **Jung has classified personality on the basis of sociability character as:**
- **Introverts:**
 - (i) People who have characteristics like shyness, social withdrawal, and tendency to talk less.
 - (ii) People appear to be self-centered.
 - (iii) They are not easily approachable.
 - (iv) They are future-oriented, very sensible, and rigid in ideas.
 - **Extroverts:**
 - (i) People who tend to be outgoing, friendly, talkative, and social in nature.
 - (ii) They prefer social contacts. They are generous, supportive, and courageous.
 - (iii) They are happy-go-lucky persons and show more interest in present reality than the future.
 - (iv) They express their feelings openly.
 - (v) Take decisions quickly and act upon them quickly.
 - (vi) They are not affected easily by difficulties.
 - **Ambiverts:**
 - (i) People who possess both the qualities of introverts and extroverts.
- **William Sheldon's Classification:**
He has divided people into three types:
- **Endomorph:**
 - (i) These people have soft, fat, and round body, having a predominance of the abdominal region.
 - (ii) They are sociable and relaxed.
 - **Ectomorph:**
 - (i) These are the people who are tall, thin, and flat-chested, having the skin, bones, and neural structure predominantly.
 - (ii) They are shy, reserved, and self-conscious.
 - **Mesomorph:**
 - (i) These people are well-built with heavy and strong muscles that appear predominantly.
 - (ii) They are physically active, noisy, and adventurous by nature.
- **Big Five Theory of Personality Traits:**
The "big five" are broad categories of personality traits.
- **Openness:**
 - (i) This trait features characteristics such as imagination and insight.
 - (ii) People who are high in this trait tend to be more adventurous and creative.
 - (iii) People who are low in this trait are traditional and abstract thinkers.
 - **Conscientiousness:**
 - (i) Standard features of this dimension include high levels of thoughtfulness, good impulse control, and goal-directed behaviours.
 - (ii) Highly conscientious people tend to be organized and mindful of details.
 - **Extraversion:**
 - (i) This is characterized by excitability, sociability, talkativeness, and assertiveness.

- (ii) People who are high in extraversion are outgoing and tend to gain energy in social situations.
- (iii) People who are low in extraversion tend to be more reserved and have less energy to expend in social settings.
- **Agreeableness:**
 - (i) This personality dimension includes attributes such as trust, kindness, affection, etc.
 - (ii) People who are high in agreeableness tend to be more cooperative.
 - (iii) People who are low in this trait tend to be more competitive and manipulative.
- **Neuroticism:**
 - (i) This trait is characterized by sadness, moodiness, and emotional instability.
 - (ii) Individuals who are high in this trait tend to experience mood swings, anxiety, irritability, and sadness.
 - (iii) Those low in this trait tend to be more stable and emotionally resilient.

Motivation, Its Types and Techniques

- **Meaning :** The word motivation is derived from the Latin word 'movere', meaning 'to change, 'to move'. When we say that one is motivated, it means that he is driven or moved by an inner urge or force to achieve the goal. We may refer to motivation as a process through which an individual is inspired, stimulated, provoke or gently and persistently persuade (someone) to do something to act in a particular fashion or manner towards particular direction.

Definitions :

- (i) **According to Morgan and King**, "Motivation refers to a state within a person or an animal that drives behaviour towards some goal".
- (ii) **According to Murray**, "Motivation is an internal factor that arouses, directs and integrates a person's behaviour".
- (iii) **According to Elizabeth Duffy**, "Motivation is the direction and intensity of behaviour".

Types of Motivation : Motivation is classified into two categories :

- (i) Intrinsic Motivation
- (ii) Extrinsic Motivation
- (i) **Intrinsic Motivation :** This category of motivation is straightforwardly connected with the innate instincts, wages and desires of the individual. The individual who is intrinsically motivated performs any work he finds interesting or beneficial for him. He is occupied with learning something as he derives pleasure within the learning of that particular activity.
- (ii) **Extrinsic Motivation :** In this kind of motivation, the basis of contentment does not stretch out within the assignment or task. The individual for obtaining a desired goal or for receiving some external reward does or learn something and not for his own sake.

Techniques of Motivation :

- (i) **Teacher as a motivation :** A highly skilled coach or teacher who has himself participated in the sports, capable of demonstrating and explaining the skill more precisely and who can plan the subsequent competition sensibly is a big plus point in motivating the athletes.
- (ii) **Length of Practice :** The length of practice must be designed very choicely for motivating young athletes to any activity. As the major reason at this phase is to persuade them for voluntary and informal practice for arousing their interest, the formal practice should be comparatively short and led-up games at early stages should be involved.
- (iii) **Environmental Factors :** The sport environment provided to the athletes, certainly has a very vital role in motivating them. A well-ventilated, equipped, and decorated gymnasium or swimming pool can draw even a reluctant individual. Likewise, well maintained grounds and fields inspire an athlete to carry out his exercises.
- (iv) **Freedom to beginner :** A greater level of freedom should be allowable in order to motivate beginners in the early attempts. They enjoy the experience more when given freedom on their own, they will knock upon minute adjustments which fit more to their physical personality.
- (v) **Social Pressure :** It is currently a well-known reality that the presence of others has an influence on performance and motivational level. Planned sport and physical activity are carried out in the presence of others such as spectators, teammates, coaches, officials. Through competitions in diverse social settings, social exposure to the athletes increases their level of motivation.
- (vi) **Goal setting :** Achieving performance goals is a symbol of competency that affects motivation positively, hence it is essential to set realistic goals based on an individual's own ability. The level of motivation gets adversely affected when goals are set up too high or too low. Goal setting has been acknowledged as an influential motivational technique as it mobilizes an athlete's hard work and extends his determination.
- (vii) **Reinforcement :** Reinforcement is a vital motivational technique, which means it refers to some kind of occurrence that increases or decreases the possibility of a similar reaction taking place in the future. Positive reinforcement enlightens the athlete at what time he is doing something accurate and supports the

continuance of the activity in the precise direction. Negative reinforcement is in general of slight importance since it simply indicates that the actions are inaccurate devoid of providing information with respect to the accurate reaction or behaviour.

(viii) **Role of Media** : In motivating athletes, media plays an important role as well. News coverage of their performance and of training session gives them the feeling of pride, prestige and recognition. Such reporting heightens their self-confidence and competency and in addition motivates other young athletes to follow their achievement.

1. **Cognitive Approach**: Based on the view that motivation can be achieved by an individual through active participation and interpretation of information. Expectancy theory and Goal Setting theory follow cognitive approach for motivation.

(a) According to the Expectancy theory, people are motivated for the task where the probability of success is higher as compared to failure.

(b) According to the Goal Setting theory, a stronger drive for actions and behaviour is driven by the quality of information.

The characteristics of this approach are

(a) **Time Bound**: The task should be time bound

(b) **Set Complexity level of task**: Task should be neither too difficult nor too easy

(c) **Make task Specific**: Task instructions should be precise about what is to be done

(d) **Define Purpose of task**: Outcome of the task should be clear and defined.

2. **Pedagogical Approach**: Making training enjoyable, engaging athletes in decision making and providing valuable feedback to athletes are essential components to motivation.

(a) **Guided Discovery Method**: Athletes are highly motivated if allowed to find solutions to the problems on their own rather than as per instruction.

(b) **Valuable Feedback System**: Assisting athletes with feedback which can provide them with specific direction to move in is an effective means towards effective motivation.

(c) **Fun-based Training**: Training methods should involve fun and enjoyment for athletes.

(d) **Individualized Training Program (ITP/IEP)**: Each athlete is a unique individual and should have a training programme designed for their abilities and capabilities and which is within attainable limits of the athletes.

3. **Social Support Strategy**: Positive social support from peer group, family members, and friends helps in developing healthy habits and motivation to maintain the act of exercising.

4. **Facilitation Approach**: Awards and rewards work effectively as a motivation force for athletes to pursue sports with consistency and continuity. External factors like prize money or medals do motivate athletes, but the most important aspect is to understand the need and expectation of the individual athlete. It encourages them to plan their directions and actions. Regular appraisal of performance should be provided to athletes.

Meaning, Concept and Types of Aggression in Sports

➤ **Meaning of Aggression** : Terry and Jackson in 1985 defined aggression in sports as “ harm – inducing behaviours bearing no direct relationship to the competitive goals of sports, and therefore relates, to incidents of uncontrolled aggression outside the rules of the sport, rather than highly competitive behaviours within the rule boundaries.

➤ **Concept of Aggression** : Aggression is an interpersonal behaviour intended to cause physical harm or mental distress to a person or persons. In the context of sports, aggression can be defined as an unprovoked physical or verbal assault, and aggressiveness is the intent to commit such an assault. Aggression today is part of any contemporary sport. Over the past twenty years, most sports have been going under drastic changes, and several problem areas have been located and addressed.

➤ **Types of Aggression** :

● **Direct Aggression** : Where the athlete can abuse face to face directly or hurt somebody by actions or words.

● **Indirect Aggression** : Hurting others by gossips, rumours, Internal murmuring, etc.

● **Instrumental Aggression**: In instrumental aggression, the main aim is to achieve a goal by using aggression. It is a positive form of aggression. Here the aim of the player is to excel in the sport that he is playing through high intensity output and competitive spirit. For example, a football player using aggression to tackle his opponent and win the ball. He is not harming any player but only using his aggressiveness to gain the ball. Experienced players show instrumental aggression on the field as they have greater self-control to manage their aggression.

● **Hostile Aggression**: In hostile aggression, the main aim is to cause harm or injury to your opponent. It is usually an unplanned, impulsive reaction towards a player who may have become a threat in achieving the goal. However, it may also be planned to cause injury to intended player on the field. This kind of aggression often arises from insult, hurt, bad feelings, jealousy and threat. For example, a bowler throwing a bouncer to

deliberately injure the batsman or to shake up his concentration. In some extreme cases, hitting an opponent or deliberately obstructing his path leads to his fall on the ground. This kind of aggression is usually seen in new players who want to achieve success quickly. The difference between the two is that instrumental aggression is positive where the aim is to excel by own efforts while hostile aggression is negative. Here the aim is to excel by causing harm to others.

- **Emotional Aggression:** It is also called impulsive aggression refers to aggression that occurs with only a small amount of forethought or intent.

CHAPTER-5

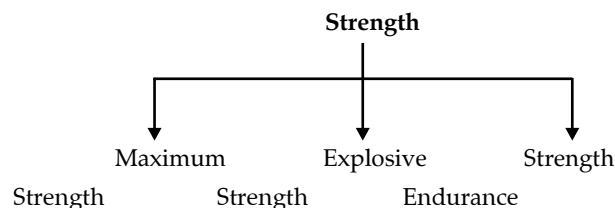
Training in Sports

Revision Notes

Strength

- Training is a process of preparing an individual for any event, activity or job.
- According to Mathew (1981), "Sports training is the basic form of preparation of a sportsman."
- **Objectives of sports training:**
 1. Personality development
 2. Physical fitness and development
 3. Skill/Technique development
 4. Tactical development
 5. Mental Training
- **Meaning of strength :** Strength is possibly the essential motor ability in sports because it is a direct result of muscle contractions. Strength is a conditional capability that depends mainly on the energy liberation process in the muscles.
For good posture, general health, and for prevention of injuries, the role of strength training if habitually ignored may prove harmful in the long run.
- **Definition :** "Strength is the ability to overcome resistance or to act against resistance". Strength must not be considered as a result of muscular contraction only. It is actually a result of contraction of voluntary muscle caused by stimulus of the neuromuscular system.
- **Types of Strength :**
Strength has divided in to two types:
 1. **Dynamic strength:** Dynamic strength is the ability to apply a force repeatedly over a period of time. It is essential for highly explosive activities such as sprinting and is similar to elastic strength.
 - (a) Maximum strength (b) Explosive strength. (c) Strength Endurance.
 2. **Static strength-**Static strength is the ability to apply a force where the length of the muscle does not change and there is no visible movement at a joint.

Experts have classified strength into three types :



- (i) **Maximum Strength :** In a single muscle contraction, the muscle contract over the resistance of utmost intensity or stimulus. The most excellent examples are weight lifting and throwing events in track and field.
- (ii) **Explosive Strength :** It can be stated as the ability to prevail over resistance through high speed. It combines strength and speed abilities and based on the nature of the blend of strength and speed, the explosive strength can be subdivided further into start strength, power, and speed strength.
 - **Start Strength :** The ability to build up maximal muscle force is the start strength. For instance, starting a sprint, weight lifting, etc.

- **Power** : It is the strength generated during the starting of any muscle contraction activity.
- **Speed Strength** : It is the ability to prevail over lesser resistance by high speed like team games and lower weight categories of combative sports.

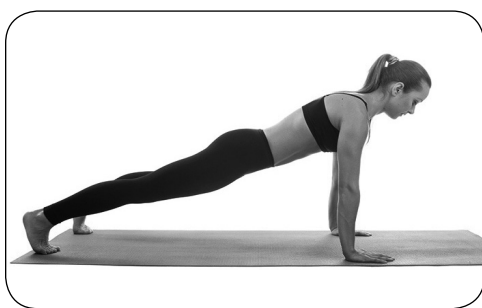
(iii) **Strength Endurance** : It is the result of two motor abilities. Under conditions of fatigue, it is the ability to work against resistance. Depending on the actuality of whether the movement is static or dynamic, the strength endurance can be there in the form of static or dynamic strength.

➤ **Methods of Improving Strength :**

1. **Isometric Exercise** : Since there are no movements, so these are not visible. In Isometric exercises, an activity performed is not visible directly. In these exercises, joint angle and muscle length do not change during contraction. The muscles remain stable even though these do not entirely stay constant. For instance, while pushing a wall, the force is generated in our muscles, but the wall does not move from its place, so we consider that work done is zero. As work is done when the point of application of a force moves, *i.e.*,

Work Performed = Force × Distance moved in the course of force

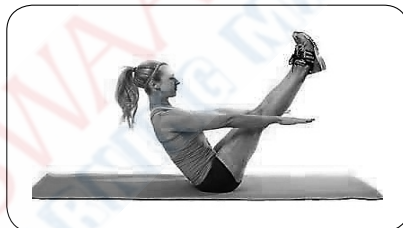
Some isometric exercises are :



(i)



(ii)



(iii)

➤ **Advantages of isometric exercises:**

- Develop static strength.
- Need less time.
- Can be performed anywhere because no equipment is required.

➤ **Disadvantages of isometric exercises:**

- Muscles gain most strength at the angle used in exercise.
- Avoid if you have heart problems as they cause a rise in blood pressure due to a drop in blood flow to the muscle during the contraction.
- Do not develop dynamic strength.

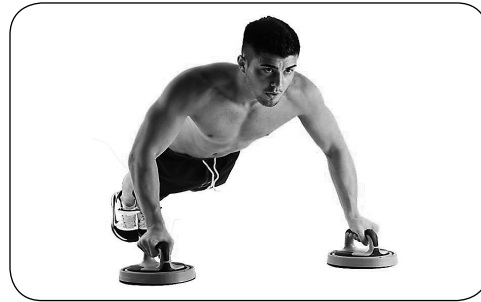
2. **Isotonic exercises** : Isotonic exercises tone up the muscles. Movements can be seen directly and work is done in isotonic exercises. By isotonic exercises, the length of muscle can be improved and muscles become flexible. In the field of sports, these exercises have numerous values.

Exercises with a medicine ball, calisthenics exercises, weight training exercises, running and jumping on the spot are the most appropriate examples of isotonic exercises.

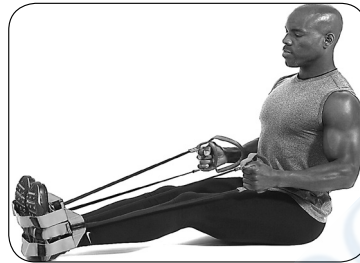
Some isotonic exercises are :



(i)



(ii)



(iii)

➤ **Advantages of isotonic exercises:**

- (a) Strengthen the muscle throughout the range of motion.
- (b) Can be adapted easily to suit different sports.

➤ **Disadvantages of isotonic exercises:**

- (a) Muscle soreness after exercise because of the high stress level.
- (b) Muscles gain the dynamic strength when they are at their weakest point of action.

3. **Isokinetic Exercises** : These exercises were developed in the year 1968 by Perrine. Isokinetic exercises are done on particularly designed machinery. These exercises engage a definite kind of muscle contraction that is generally not pertinent in sports and games apart from water sports like swimming and rowing. In isokinetic exercises, throughout the full range of movement, contraction of muscle applies maximal force at a particular position of its range of movement only. The speed of contraction can be adjusted according to the individual's capacity. Explosive strength and strength endurance can also be enhanced with the help of these exercises.



(i)



(ii)



(iii)

• **Advantages of isokinetic exercises:**

- (a) They develop a high level of dynamic as well as explosive strength.
- (b) These are effective for almost every game.

• **Disadvantages of isokinetic exercises:**

- (a) They require special types of equipment.
- (b) They must be performed under observation of a coach.

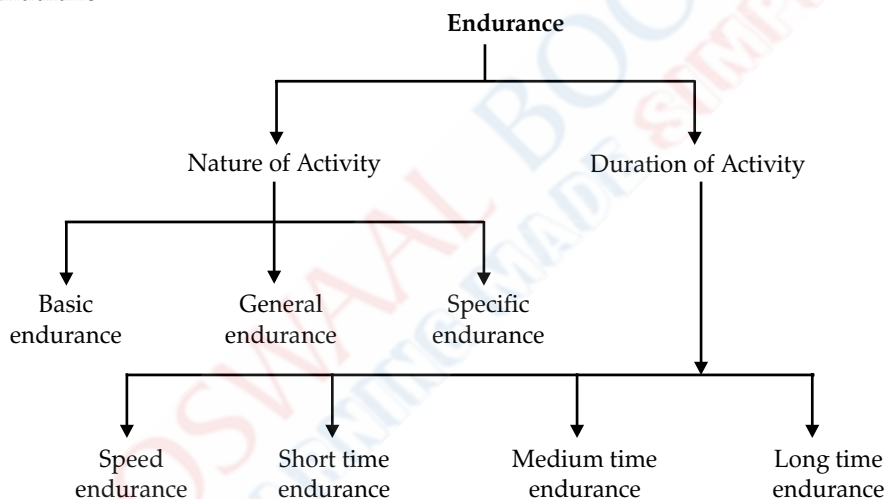
➤ **Precautions taken during Strength Training**

- Proper warming up must be done beforehand.
- Ensure the strength and stability of musculoskeletal system by starting strength training with low intensity exercises.

- Correct technique must be applied while exercising with heavy weights.
- A strength training programme includes a variety of exercises. Strength training exercises must be done in a proper sequence according to the strength training programme.
- There should be gradual increase in load in accordance with the strength and ability of the athlete.
- Proper and effective recovery periods must be there.
- Breathe continuously and hold the breath, only if needed as a part of the training and that must also be for the minimum possible time.
- Proper safety gear and equipment must be used.

Endurance

- **Meaning:** Endurance is an imperative ability used in games and sports. Endurance is the result of the entire physical and mental organs and systems. To rapidly recover from training and competition load, it is essential to develop the capacity of endurance. It is the ability to continue prolonged workouts or resist fatigue for a longer duration. The aim of endurance training is to increase the energy production system to fulfil the demand of the event.
- **Definition:** “Endurance is the ability to do sports movement with the desired quality and speed, under the conditions of fatigue”.
- **Types of Endurance:**



Experts in this field classify the endurance based on two criteria i.e., on the nature of the activity and the duration of activity.

I. According to the Nature of the Activity :

1. **Basic Endurance :** The formation of all types of endurance. It is the ability to carry out movement at a reasonable pace for a duration of more than 30 minutes involving a large number of muscles. E.g., jogging, walking and swimming.
2. **General Endurance :** General Endurance helps a sportsman to perform different types of exercises without getting excessively fatigued. In general endurance exercises, the energy liberation depends on a combination of aerobic and anaerobic metabolism therefore, it can be done with high or low intensity. It is developed through general exercises and is not precise to one sport.
3. **Specific Endurance :** The specific endurance can be equated with basic endurance in endurance sports, in which movements are executed at a slower speed, for a lengthy duration, namely in cross-country and marathon. The specific endurance may be determined by aerobic or anaerobic metabolism or by a combination of both depending on the nature of the sport.

II. According to the Duration of Activity :

1. **Speed Endurance :** Speed Endurance is the capability to defend against fatigue in activities enduring up to 45 seconds, e.g., 400m sprint. This capability is extremely reliant on the power and glycolytic mechanism capacity of energy production.
2. **Short time endurance :** Short time endurance capability is desirable for cyclic activity enduring as of about 45 seconds to 2 minutes, for instance in an 800 m race. In endurance activities of a short time, the energy is created by a combination of oxidation and glycolysis.

3. **Medium time endurance** : Medium time endurance is requisite for cyclic activities enduring from 2-11 minutes, e.g., 1500 m and 3000 m run. It depends on strength endurance and speed endurance as well, however to a limited extent.
4. **Long-time endurance** : Long-time endurance is required for cyclic activities with a duration of more than 11 minutes, as in races of 5,000 meters and 10,000 meters.

➤ **Methods for Development of Endurance** : To develop endurance, the following methods are implemented-

Continuous training can be of two types:

- (a) **Slow Continuous Method**: In this method, the activity is performed at a certain speed without any break for a long duration. The speed of exercise depends upon the heart rate of the athlete. During a 30-minute activity, the heart rate of trained athlete should be between 140-160 beats per minute. The activities involved in this method are like walking, running, cycling etc.
- (b) **Fast Continuous Method**: In this method, the activity is performed at a comparatively faster speed but the speed remains uniform throughout the activity. During a 20-minute activity, the heart rate of trained athlete should be between 160-180 beats per minute.

1. **Continuous Training** : One of the most excellent methods for improving endurance is continuous training. In this method of training, an activity is carried out with no break for an extensive period with low intensity. A suitable example of the continuous method is cross-country race. The rate of the heart remains between 140-160 beats per minute in this method and the overall time length of the activity should not be less than 30 minutes.

Advantages of Continuous Training :

- (i) Glycogen in muscles and liver increases.
- (ii) Intensity can be increased for a better outcome.
- (iii) The number and size of mitochondria increase.
- (iv) The efficiency of the heart and lungs improves.
- (v) Under the condition of fatigue, it makes the individual strong-minded and improves determination and self-confidence.

2. **Interval Training** : It is training of the heart through endurance training. In it, you run your heartbeats at a faster rate. Pihkala, the famous athletic coach of Finland, introduced this training method in 1910. He stressed the importance of rhythm between work and rest in the method and called it the Terrace method. Actually, this training method is based upon "effort and recovery". But reducing the recovery period, the load can be increased. For a 400 meter athlete, the following examples can be related to this training :

- (a) 400 m race by 80% speed.
- (b) Until the heart rate approximately falls to 120 - 140 beats, walking or jogging till then.
- (c) 400 m race by 180% speed.

Advantages of Interval Training :

- (i) Both respiratory and circulatory systems can be improved.
- (ii) The athlete's improvement can be measured without difficulty.
- (iii) Coach can give suggestions regarding any fault during the recovery phase to an athlete.
- (iv) It helps an athlete to achieve peak performance in a short time.
- (v) In a short duration more workouts can be performed.

Continuous training can be of two types:

- (a) **Slow Continuous Method**: In this method, the activity is performed at a certain speed without any break for a long duration. The speed of exercise depends upon the heart rate of the athlete. During a 30-minute activity, the heart rate of trained athlete should be between 140-160 beats per minute. The activities involved in this method are like walking, running, cycling etc.
- (b) **Fast Continuous Method**: In this method, the activity is performed at a comparatively faster speed but the speed remains uniform throughout the activity. During a 20-minute activity, the heart rate of trained athlete should be between 160-180 beats per minute.

3. **Fartlek Training** : Fartlek is a Swedish term that means, 'speed play' and has been used by distance runners for years. Fartlek is a form of road running or cross-country running in which the runner usually changes the pace significantly during the run. This training is done to improve performance and lessen the chances of injury, hence proper warm-up should be done at the beginning and appropriate cooling down at the end of the training.

A pattern of the Fartlek training schedule is as follows :

- (i) Warm up by jogging for 5 to 10 minutes followed by a freehand exercise for diverse parts of the body for about 4 to 6 minutes.

- (ii) Run at speedy stable speed over a distance of 800 m to 1200 m.
- (iii) Fast walking for 5 minutes.
- (iv) Perform easy running, separated by 40- to 50- meter sprint, repeating until symptoms of fatigue become visible.
- (v) Slow jogging for about 3 to 5 minutes.
- (vi) Run up the hill at full speed over a distance of 80 to 100 meters. Run down the hill at a jogging speed after to every repetition.
- (vii) Walk for 5 minutes.
- (viii) Run at a quick speed for about one minute.
- (ix) Jog about 1 to 1.5 km, for cooling down.
- (x) Finish with a freehand and stretching exercises.

4. Advantages of Fartlek Training :

- (i) Fartlek training allows adding a variety of intervals to the aerobic workouts, which helps to keep one stimulated.
- (ii) Fartlek let runners enhance the aerobic and anaerobic training systems equally.
- (iii) Fartlek can be particularly modified and personalized to fit the requirements of diverse types of athletes and games.
- (iv) For people, Fartlek is a grand alternative because the fat-burning part makes it an extremely efficient exercise.
- (v) Implementing Fartlek regularly keeps the body physically powerful as much as necessary to uphold the technicalities of racing.

5. **High Altitude Training:** Athletes choose to train at high-altitude due to the underlying benefits of intermittent hypoxia training in essence with regular exposure to an environment where oxygen availability is reduced due to natural or artificial methods. At higher altitudes as atmospheric pressure decreases, the air has a reduced partial pressure of oxygen, meaning less oxygen is available in the environment to be used in the body. The consequence of this change in oxygen pressure is for the body to produce greater amounts of erythropoietin in the kidneys, which subsequently means an increase in Red Blood Cells produced.

Impact of High Altitude Training: By training at high-altitude, athletes aim to allow their bodies to produce extra red blood cells. Then, they head a competition at lower elevations to take advantage of their changed physiology, which lasts for approx. 10 to 20 days.

Speed

- **Meaning :** Speed ability is extremely movement-specific. It is the ability to perform motor actions in a minimum possible time under certain situations. Speed is a conditional ability as well, similar to strength and endurance, but to a considerable point, speed depends on the nervous system unlike the conditional abilities i.e., strength and endurance.
- **Definition :** "Speed is the capacity of an individual to perform successive movements of the same pattern at a fast rate".
- **Types of speed :** Speed is classified into five types :
 - (i) Reaction ability
 - (ii) Acceleration ability
 - (iii) Locomotor ability
 - (iv) Movement speed
 - (v) Speed endurance

These are explained below:

- (i) **Reaction Ability :** In sports, signals/stimulus can be of diverse form, e.g., visual, tactile, auditory. It is the ability to respond or react efficiently and promptly to a signal. The reaction ability depending on the degree of complexity can be further differentiated as simple or complex.
- (ii) **Acceleration Ability :** To a large extent, acceleration ability depends on technique, movement frequency, and explosive strength. From a slow-moving position, it is the ability to attain a high pace of locomotion as of a stationary position. In sprint events, performances are determined to a great extent by acceleration ability.
- (iii) **Locomotor Ability :** Capability to sustain the most speed of locomotion for the highest possible duration or distance is called locomotor ability. Locomotor ability is imperative in only some sports or events e.g., swimming, rowing, etc. In these sports, speed endurance is of high importance since all events last for more than 40 seconds, locomotor ability is not much of significance on the other hand.

- (iv) **Movement speed** : It is the ability to carry out a particular movement in least the amount of time. Movement speed is of high bearing in cyclic sports. In cyclic sports, technique and tactical action are very strongly bound with movement speed.
- (v) **Speed endurance** : It is the ability to carry out sports with high speed in the condition of fatigue. It is a growth of speed and endurance abilities. In cyclic and non-cyclic sports, it is of a diverse form. Instead of the rapid fatigue accumulation at some stage in the activity, the speed endurance in cyclic sports is requisite to carry on movements at high speed.

➤ **Methods to develop speed :**

- (i) **Acceleration Runs** : Accelerated runs are usually adopted to develop speed, especially to attain maximum speed from a stationary position. Before acceleration runs, a proper warm-up must be done. After every acceleration run, there should be a proper interval so that the athlete may start the next run without any fatigue.
- (ii) **Pace runs** : Pace runs mean running the whole distance of a race at a constant speed. In pace races, an athlete runs the race with uniform speed, generally 800 m and above. Very young children can maintain their maximum speed for 15 to 20 m, whereas a well-trained athlete can maintain speed for 40 m.

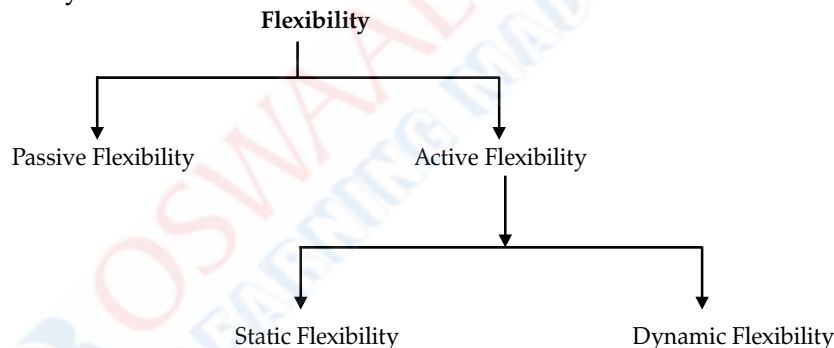
Flexibility

- **Meaning** : Flexibility is the ability to perform a joint action through a range of movement.

Importance of flexibility:

- It reduces stiffness in joints.
- It reduces the risk of injuries as muscles are more pliable.
- It helps in maintaining appropriate posture while performing.
- Greater range of motion ensures more force and speed developed by the muscles.
- Greater flexibility helps the sports person to perform movements with minimum muscular tension, thereby facilitating higher movement economy.

➤ **Types of Flexibility:**



1. **Passive Flexibility** : Passive flexibility is the base of active flexibility. Passive flexibility is the ability to do a movement with greater amplitude using external assistance e.g., helping partner doing stretching exercises .
2. **Active Flexibility** : Active flexibility is the ability to perform a movement with a greater range without external help e.g. : the sportsman stretches a joint with external help.

There are two types of active flexibility:

- (a) **Static flexibility** : The term static flexibility refers to an individual's absolute range of motion that can be achieved without movement. In other words, how far we can reach, bend or turn and then hold that position.
- (b) **Dynamic flexibility** : Dynamic flexibility is vital for performing movements when the sportsman is moving with superior amplitude.

➤ **Methods to Improve Flexibility:**

- (i) **Ballistic Method** : The name ballistic method means stretching movement is done with a swing. Ballistic means a joint is expanded steadily to its utmost range.
- (ii) **Slow stretch and fold method** : It is the extension of the slow stretching method. Here the muscle is stretched to its maximum limit and then the position is held for few seconds.
- (iii) **Post isometric stretching** : This method of flexibility development is based on the principle of proprioceptive neuromuscular facilitation. In this procedure, the muscle is first contracted maximally for 6-8 sec using isometric method.

Additional information for improving flexibility

- (i) Additional pressure on flexibility should be given in the period before puberty as it is the most excellent age for the improvement of flexibility.
- (ii) During adolescence, if there is a gap in stretching exercises, flexibility tends to deteriorate.
- (iii) Each muscle group must be stretched numerous times for good quality effect.

Co-ordinative Abilities

- **Meaning** : The ability of an individual which assists him to do a variety of interconnected activities correctly is called Coordinative ability.
- **Definition** : “Coordinative abilities are understood as relatively stabilized and generalized patterns of motor control and regulation process”. They enable the sportsman to do a group of movements with better quality and effect.
- **Coordination** is one of the main components of physical fitness. It is the ability to perform smooth and accurate movements involving different parts of the body. It requires good awareness of relative limb and body positions, and good integration between the senses and muscles involved in the movement.
- **Types of coordinative abilities are:**
 1. Differentiation ability
 2. Orientation ability
 3. Coupling ability
 4. Reaction ability
 5. Balance ability
 6. Rhythm ability
 7. Adaptation ability

