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**Unit : I**  
**PLANNING IN SPORTS**

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**Meaning and objectives of planning:**

Planning is an intellectual process of thinking in advance about setting of goals and developing strategies which are required to attain the goals efficiently.

**Meaning and objectives of planning :** “Planning is a way to systematize, direct and organize the events or competitions and extract the advantage and benefit of the available resources.”

“Planning is the process of making a sequence of work for a future line of action”

The success of Physical education programs depends upon efficient staffing, food, direction, proper control, well supervision, good co-ordination and minimize the chances of lapses.

**Objectives of planning:**

- a. To keep control over all activities which suggests that planning & control are connected with each other.
  - b. it also helps in keeping a good control in organizing a tournament.
  - c. b. Reduce the chances of mistake
  - d. It suggests programmes can be conducted with proper coordination with least mistakes rather focusing on success.
  - e. To promote innovative ideas.
  - f. To provide direction towards the goal
  - g. To reduce undue pressure
  - h. To provide proper co-ordination among the committees.
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i.To have good control over all the activities.j.To improve efficiency.

k.To reduce the chances of mistakes.

l.To increase the creativity.

m.To enhance the sports performance.

n.To protect existing facilities.

o.Provide new facilities to meet demand.

p.Helps in decision making.

### **Various committees and responsibilities:**

Different committees work together for the smooth conduct of the sports events.The various committees are:

(i) Technical Committee: This committee is responsible for the technical conduct of the events. This committee selects various officials such as referees, judges, starters, umpires, time keepers etc.

(ii) Transport Committee;This committee is responsible for providing the facilities regarding transportation of various teams at the venue of sports events.

(iii) Reception Committee: The members of this committee are responsible to welcome the Chief Guest and spectators at opening and closing ceremonies.

(iv) Boarding and Lodging Committee: This committee is responsible for making necessary arrangements for providing accommodation and serving meals to the sportspersons and other officials,

(v) Ground and Equipment Committee :This committee makes necessary arrangements of equipment related to events.

(vi) Medical and First Aid Committee: This committee is formed to provide medical assistance to participants round the clock

(vii) Protest Committee :it's protest against a judgment, the members of this committee

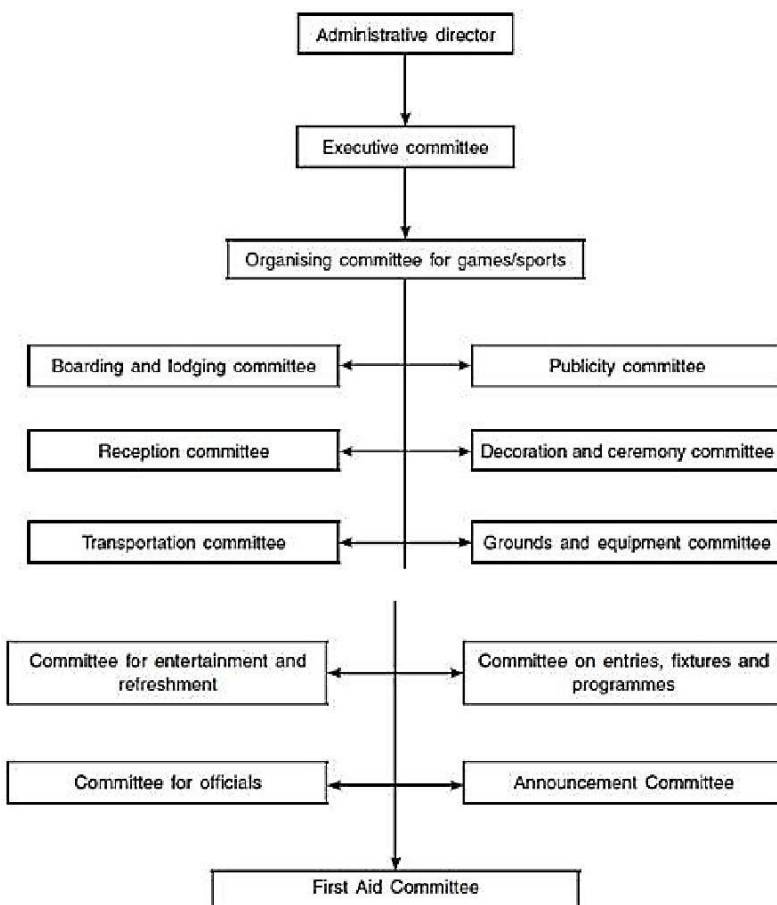
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decide about it.

(viii) Publicity Committee: All the press releases and press conferences are conducted by Who's committee.

(ix) Finance Committee: This committee is assigned to make the budget for the event and handle the expenses.

(x) Refreshment Committee :This committee is formed to provide refreshment to the participants.



## Tournaments:

A tournament is a competition involving relatively large number of competitors, all participating in a sports or game. It is a series of contests with several rounds in which many contestants compete, individually or as a team to decide the winner. In other words, tournament is a series of contests in which a number of contestants compete and the one

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that prevails through the final round or that finishes with the best record is declared the winner.

**1.3 Tournament:** A series of sports competitions, in which, a team finally wins and rest of the participating teams lose the matches. It depends on various factors i.e... - No. of participating teams, availability of grounds and equipment, No. of days and funds.

Importance of tournaments are -

Source of Recreation; A large number of people go to watch various games and sports for getting recreation. Sports tournaments provide ample recreation to the spectators. Development of Social Qualities: Social qualities such as cooperation, tolerance, sympathy, group cohesion, brotherhood and discipline are developed among participants through sports tournaments.

### **Importance of tournament**

- The sportsman learns the discipline by playing tournaments. The
- sportsman meets other sportsman at a single platform.
- He learns ethical values such as honesty, fair play, respect for others.
- Tournaments provides recreation to all, i.e... organizers, spectators, students.

### **Type of tournament:**

- **Knock out:** In this type of tournament, the team once defeated, gets eliminated from the tournament. Only the winning teams contest in the next rounds. Opportunities are given to the winning players/teams.
- **League:** In single league tournament all participating teams compete once, with each other, where as in double league, each team plays with every as in double league, each team plays with every other team twice, without any consideration of victory or defeat.
- **Combination Tournaments:** Combination tournaments are organized in group or zonal matches. Whenever there is a large number of teams, combination tournaments facilitate the Physical Education Teachers, job. It gives them elbow room to try out new experiments.

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- **There are mainly four types of combination tournaments:**

1. Knock out cum Knock out
2. League cum league
3. Knock out cum league
4. League cum Knock out

- **Challenge Tournament:** This type of tournament comes handy when there are one to one contests or there are two players on each side. One player challenges the other and the other player accepts the challenge. Games in which such tournaments are held are - Boxing, Tennis, Table Tennis, Badminton etc

Fixtures in such tournaments are decided according to :

1. Ladder Method
2. Physical Method
3. Cobweb Method

Various types of tournaments are

- (i) Knock-out tournament
- (ii) League tournament
- (iii) Combination tournament
- (iv) Challenge tournament

**Knock out tournaments:**

In knock out tournaments the teams which gets eliminated gets automatically eliminated from the tournament.

In this type of tournament , if a team is defeated once, it gets eliminated. Only the winners continue in the competition. It is the fastest method to know about the winner team in the tournament.

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**Seeding a Team:-** The sorting of the teams and fitting them in the fixtures so that the stronger teams do not meet each other in earlier rounds is known as Seeding. This method is good if we know the real strong teams. The organizers should find out the real strong teams from the previous tournaments or old records figure starting a new tournament.

**Bye:**

Bye is a privilege given to a team, given by drawing lots, exempting it from playing first round.

**Bye:-** The advantage given to a team usually by drawing a lot, and exempting it from playing a match in the first round is known as Bye. These are given to a specific number of teams in the first round. The number of byes are decided by subtracting the number of teams from the next higher number which is in power of two's.

Bye Next Higher No. of Team  $[2^n - \text{no. of teams}]$

The procedure of giving byes is as follows:

- The first bye is given to last team of lower half. The
- second bye is given to first team of upper half. The
- third bye is given to first team of lower half The fourth
- bye is given to last team of upper half.
- The next bye or byes will be given in the same order as described above.

Advantages of knock out tournament:

- These are less expensive.
- Helpful in enhancing standard of sports.
- It requires less time to complete the tournament.
- Minimum no. of officials are required.

Disadvantages of knock out tournament:

- There are many chances of elimination of good teams in preliminary rounds. There
  - are many chances of weak teams to enter in the final round. Spectators may not
  - have enough interest in the final round.
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## Methods of Preparing Fixtures for Knock-out Tournaments:-

1. Total number of teams participating in the tournament **2.**

Total number of matches to be played in the tournament

Formula for calculating number of matches= $n-1$ , where  $n$  is the total number of teams participating in the tournament.

**3. Total number of rounds played in the tournament depends upon two things:-a.**

The number of teams playing in the tournament

b. The higher nearest number from the total number of teams of power of two's =  $2^n$

4. Method of determining the number of teams in upper half and lower half:-

a. If the number of teams is even, then equal number of teams will be divided in both halves i.e...-  
 $n/2$ , where  $n$  is the total number of teams.

b. If the number of teams is odd, the following method is applied:

Number of teams in upper half= $(n+1)/2$ , where  $n$ =number of teams.

Number of teams in lower half= $(n-1)/2$ , where  $n$ =number of teams

5. The number of byes in a knock-out tournament are decided by subtracting total number of teams from the next higher nearest number in power of two's

### Draw a knock out fixture of 17 teams?

No. of teams = 17,

Total No. of matches =  $N-1 = 17-1 = 16$

No. of teams in upper half  $N+1/2 = 17+ 1 = 9$

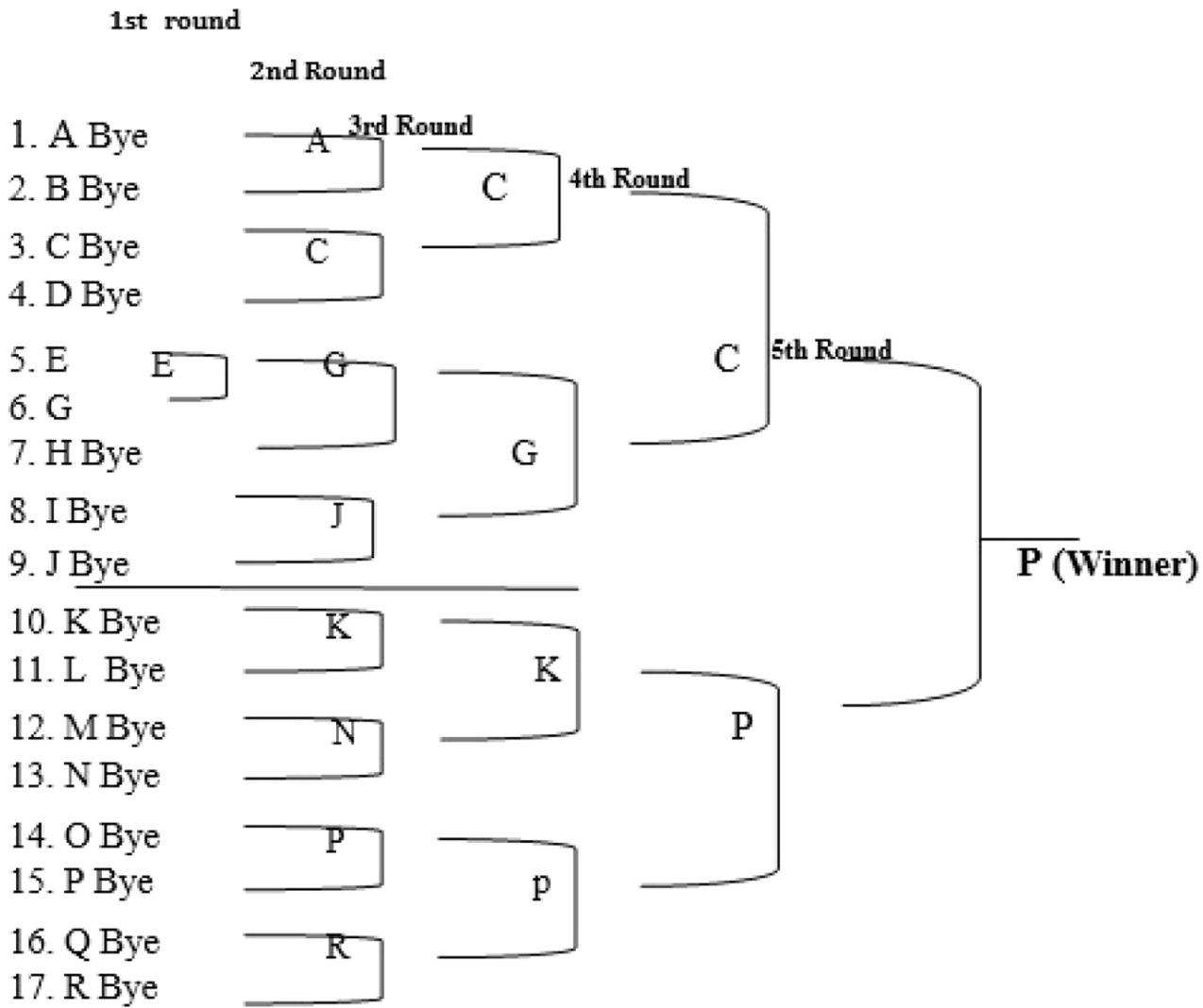
No. of teams in lower half  $N-1/2 = 17 - 1 = 8$

Total no. of byes =  $32- 17 = 15$  byes,

No. of byes in upper half =  $N-1/2 = 15 - 1 = 7$

No. of byes in lower half =  $N + 1/2 = 15 + 1 = 8$

Total rounds = 4



**League tournament:**

In this type each team plays with every other team once if it is a single league tournament and each team plays with every other team twice if it is a double league tournament.

**Cyclic method:**

In cyclic method, If the number of teams is in even number, the team number 1 is fixed on the top of right hand side and then other team numbers in ascending order consecutively downward and then upward on the left hand side and then from the next round teams will rotate in clockwise direction. If the number of teams is odd then the bye is fixed on the top of right hand side and rest of the procedure will remain same. If the number of team is even number than number of rounds will be (N-1). If the number of teams is odd number then number of rounds will be equal to number of teams.



Fixture- No of matches= $n(n-1)/2 = 8(8-1)/2 = 28$

No. of rounds= $N-1 = 8-1=7$

Fixture- Cyclic method

1st round	2nd round	3rd round	4th round	5th round	6th round	7th round
A-B	A-H	A-G	A-F	A-E	A-D	A-C
H-C	G-B	F-H	E-G	D-F	C-E	B-D
G-D	F-C	E-B	D-H	C-G	B-F	H-E
F-E	E-D	D-C	C-B	B-H	H-G	G-F

**(b) Cyclic Method** : In cyclic method, if the number of teams is even, the team number 1 is fixed on the top of right hand side and other teams in ascending order consecutively downward and then upward on the left side and rotate them clockwise. If the number of teams is odd, then bye is fixed on top right side and the rest procedure remains same. The number of rounds in case of even number of teams will be  $n - 1$ , where  $n =$  number of teams. The number of rounds in case of odd number of teams will be  $n$ , where  $n =$  number of teams.

**Example 1.** Draw a fixture of 6 teams on league basis according to cyclic method.

**Solution:** Total number of teams = 6

Total number of matches

$$\begin{aligned} \frac{n(n-1)}{2} &= \frac{6(6-1)}{2} \\ &= \frac{6 \times 5}{2} = \frac{30}{2} = 15 \end{aligned}$$

Number of rounds =  $n-1 = 6-1 = 5$  rounds.

**Fixtures**

I R	II R	III R	IV R	V R

5 ← 2	4 ← 6	3 ← 5	2 ← 4	6 ← 3
4 ← 3	3 ← 2	2 ← 6	6 ← 5	5 ← 4

**1.4 B. Method for draw of fixture in league tournament:-**

**(a) Stair-case Method:** In stair-case method, the fixtures are made just like a ladder or a stair-case. In this method, no bye is given to any team and there is no problem of even or odd number of teams.

**Example :** Draw a fixture of 9 teams on league basis according to stair-case method.

**Solution: Fixture**

1-2								
1-3	2-3							
1-4	2-4	3-4						
1-5	2-5	3-5	4-5					
1-6	2-6	3-6	4-6	5-6				
1-7	2-7	3-7	4-7	5-7	6-7			
1-8	2-8	3-8	4-8	5-8	6-8	7-8		
1-9	2-9	3-9	4-9	5-9	6-9	7-9	8-9	

**Combination tournament:**

**Combination tournaments** are conducted when the matches are to be played on group basis or zonal basis. These tournaments depend on the suitability of the activity, the number of participating teams and the areas and distance from which they come to participate. Depending upon the number of teams in each zone and the availability of time, the tournament can be organized on the basis of knockout or league and after that national level tournament can also be conducted either on knockout or league basis.

**1.5 A INTRAMURAL AND EXTRAMURAL:MEANING, OBJECTIVES AND ITS SIGNIFICANCE**

**Meaning of Intramural:-**

Intramural is derived from the Latin word 'Intra' and 'muralist'. 'Intra' means 'within' and 'Muralist' means 'Waif'. So we can say that the activities, which are performed within the

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walls or within the campus of an institution ,are called 'Intramural'.

The intramural sports means competitions within the walls or within the school, i.e. being or occurring within the limits usually of a community, organization, or institution. This programme offers the school community the opportunity to participate in organized sports competition. The rules of the games/ sports are modified accordingly, if needed.

### **Objectives of Intramural:-**

- To provide opportunity to every student to participate in Games and Sports To
- develop Leadership Qualities among students
- To develop Feeling of Cooperation
- To provide Recreation
- To develop the Feeling of Sportsmanship
- To provide opportunity to learn a variety of games and Skills
- To provide opportunity to get Experience of Organization of Competitions To
- find out talented Sport persons
- To provide opportunity to Develop personality

### **Extramurals:**

Extramural sports satisfy the need for structured sports activities between students from various schools, organizations, or institutions. Extramural means competitions outside walls or boundaries, as of a city or town or a university. These tournaments will be organized on a zonal, regional, state or national basis.eg. CBSE tournaments, SGFI tournaments etc.

### **B. EXTRAMURAL:-**

Extramural is derived from the Latin words "Extra" and "Waif". So, we can say that the activities which are performed outside the walls of an institution or school, are known as "extramural".

### **Objectives of extramural:**

- To provide Experience to Students
- To improve the Standard of Sports
- To broaden the Base of Sports

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- To develop Sportsmanship and Fraternity
  - To provide knowledge of New Rules and Advanced Techniques

### **Significance of intramurals and extramurals:**

- Helps in providing the ways and means for the development self esteem, citizenship, responsibility, sportsmanship, and skills in co-operative behavior.
- Helps in providing take part in activities that encourages active participation, enjoyment, and fun without external pressure or reward.
- Helps in providing to reinforce the concept that winning is less important than preparing to win. Losing should not be the same as failure, nor success the same as winning.
- Helps in providing to determine participation by interest rather than skill, not limiting activities to the gifted or early maturing athlete.
- Helps in providing opportunities for students and expose them to a wide variety of sports, skills and activities so that the may refine interest and make choices to suit their personal abilities and needs.
- Helps in providing opportunities for students, faculty, and staff to actively engage in activities involving sports, recreation, and play while providing structure for an experimental education.

### **1.6 SPECIFIC SPORTS PROGRAM MME**

Sports and games programs *are arranged* in the world as well as in our country to promote the games and *sports for a specific cause*. Every country in the world has some *or other* cause for promoting specific sports programs.

The programs motivate and *create* the feeling to take part in these sports programs. People become health-conscious and try to remain fit and stay healthy for as long as possible. These specific sports programs are usually organized by the federations, state government, NGO etc. to create health consciousness among the people and take part in health-related sports programs.

More and more people of all age groups should take part in such sports programs. Specific sports programmes are such programmes of sports which are not usually related to competitions. These programmes have various objectives such as creating awareness among peoples regarding unity, health & diseases etc.

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The *various* important specific programs are:-

**I. SPORTS DAY-**

A. School–Annual Sports Day

B. NATIONAL SPORTS DAY

2. HEALTH RUN: these are organised by health departments to ameliorate the standard of health in a country along with raising funds for charity.

3. RUN FOR FUN: It is also organised to spread the message among masses to remain healthy and fit. It may be organised to motivate the people to remain fit.

4. RUN FOR UNITY: It is organised to show unity and peace among the people of different religions. Its purpose may be national and international integration and brotherhood.

5. RUN FOR SPECIFIC CAUSE: This is the run related to specific or noble cause. Most of the social non- profit organisations organises these runs for creating awareness about AIDS, Educating the girl child, Cancer, etc. Mumbai and Chennai Marathons are organised for such noble purpose.

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## UNIT - 2

### SPORTS AND NUTRITION

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#### **Key Points:**

- Balanced Diet and Nutrition: Macro and Micro Nutrients.
- Nutritive and Non-nutritive components of diet
- Eating for weight control - A healthy weight, the Pitfall of dieting, Food Intolerance and Food Myths.
- Sports Nutrition & its Effects on performance (Fluid & Meal intake, pre, during and post Competition).
- Food Supplements for children

#### **Balanced diet**

A diet which contains the proper amount of each nutrient, i.e. like carbohydrate, fat, protein etc is called Balanced Diet. A diet which consists of all the essential food constituents viz. protein, carbohydrates, fats, vitamins, minerals and water in correct proportion is called balanced diet. A balanced diet contains sufficient amounts of fiber and the various nutrients (carbohydrates, fats, proteins, vitamins, and minerals) to ensure good health. Food should also provide the appropriate amount of energy and adequate amounts of water.

**3.1 A. Balanced Diet:** - A complete food, a diet contains adequate amounts of all the necessary nutrients required for proper growth & maintenance of body.

#### **Nutrition**

Nutrition is a dynamic process in which the body is made healthy by the consumption of food.

**B. Nutrition:** - It is the process of obtaining & consuming food or breaking down food & substances taken in by the mouth to use for energy in the body.

**C. Nutrients:** - The energetic food in our diet consists of various types of essential chemicals

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for our body termed as nutrients: - e.g. Protein, fat, carbohydrates, vitamins & minerals.

### **Goals of nutrition**

- (i) stay hydrated
- (ii) provide immediate fuel
- (iii) boost performance (iv)

preserve muscle and

- (v) improve recovery.

### **Sports nutrition**

It is the study and practice of nutrition and diet as it relates to athletic performance. It is concerned with the type and quantity of fluid and food taken by an athlete, and deals with nutrients such as vitamins, minerals, and organic substances such as carbohydrates, proteins and fats.

### **Macro nutrients**

Macronutrients mainly include carbohydrates, proteins and fats and also water which are required in large quantities and their main function being the release of energy in body.

Macronutrients include Carbon, Oxygen, Hydrogen, and Nitrogen.

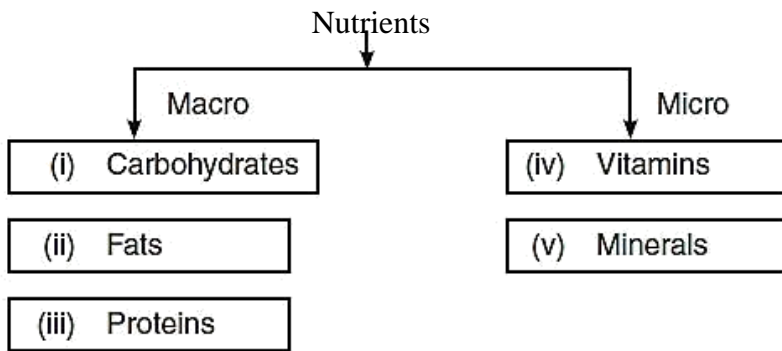
### **Micro nutrients**

Micronutrients mainly comprise vitamins and minerals which are required in minute quantities.

However, both macro nutrients as well as micro nutrients are essential. Micro nutrients are chlorine, iron, manganese, zinc, boron, sodium, copper, molybdenum and nickel.

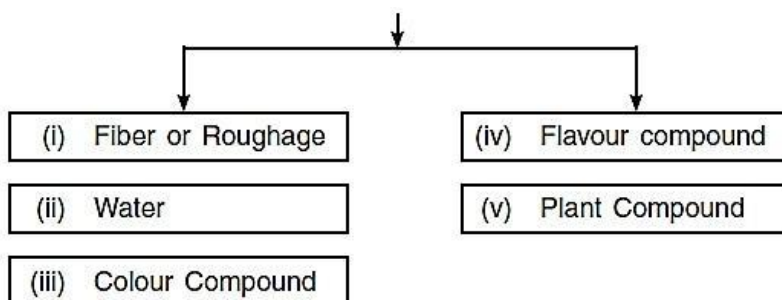
### **Components of Diet (Nutrients)**

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### 3.2 Non-Nutritive Components of Diet

#### Non-Nutritive



### 3.5 Eating for weight control :-

(i) A healthy weight is a weight that lowers your risk for health problems, generally body mass index (BMI) and waist size are good ways to achieve healthy weight.

Methods to calculate BMI = Weight in Kg/(Height in m)<sup>2</sup>

Category	BMI
Under Weight	
Normal Weight	18.5 – 24.9
Over Weight	25 – 29.9
Obesity Class I	30-34.9
Obesity Class II	35-39.9
Obesity class III	> 40

### Nutritive components of diet



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**CARBOHYDRATES-** Carbohydrates are needed to provide energy during exercise. Carbohydrates are stored mostly in the muscles and liver. Complex carbohydrates are found in foods such as pasta, bagels, whole grain breads, and rice. They provide energy, fiber, vitamins, and minerals. These foods are low in fat. Simple sugars, such as soft drinks, jams and jellies, and candy provide a lot of calories, but they do not provide vitamins, minerals, and other nutrients.

**PROTEIN-**Protein is important for muscle growth and to repair body tissues. Protein can also be used by the body for energy, but only after carbohydrate stores have been used up. Only strength training and exercise will change muscle. Athletes, even body builders, need only a little bit of extra protein to support muscle growth. Athletes can easily meet this increased need by eating more total calories (eating more food).

**Fat-**It provides the highest concentration of energy of all the nutrients. One gram of fat equals nine calories. One pound of stored fat provides approximately 3,600 calories of energy. **Saturated fats** are found primarily in animal sources like meat, egg yolks, yogurt, cheese, butter, milk. This type of fat is often solid at room temperature. **Unsaturated fats** include monounsaturated and polyunsaturated fats, which are typically found in plant food sources and are usually liquid at room temperature.

**Vitamin-**A well-planned and nutritionally adequate diet should meet an athlete's vitamin and mineral needs. Supplements will only be of any benefit if your diet is inadequate or you have a diagnosed deficiency, such as an iron or calcium deficiency. Use of vitamin and mineral supplements is potentially dangerous and they should not be taken without the advice of a qualified health professional.

**Minerals:** - Minerals are very essential in our diet. Four percent of our body weight is made up of minerals. These are required for healthy teeth, bones and muscles. It is also used by the body for various activities such as transmission of nerve impulses, formation of hormones and maintenance of heart beat etc.

**Macro Minerals: - a) Calcium:** Calcium is among the top macro-minerals in terms of growth and development of our bones and teeth. It helps in blood clotting. Its deficiency may cause rickets. The sources are cheese, milk, orange juice, eggs, green leafy vegetables and cereals.

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**b) Potassium:** Potassium is one of the most required minerals in diet. It is helpful in keeping the nervous system and muscular system firm and active all the time. It helps in maintaining the amount of water in blood and tissues. Its main sources are banana, tomatoes, green leafy vegetables, beans etc.

**c) Sodium:** It helps in muscular activities. It also helps in transmission of nerve impulses. The sources are table salts, pickles and butter etc.

**d) Magnesium:** It repairs and maintains body cells. It is found in meat, brown rice, beans and whole grains etc.

**Phosphorus:** Phosphorus helps in the formation of bone and teeth. It keeps the muscles and nerve activities normal. The sources are egg, fish, liver, milk, and unpolished rice etc.

**Micro Minerals: a) Iodine:** It produces the hormones for the thyroid gland. It is also significant for proper growth and development. Lack of iodine can cause goiter (swollen thyroid gland) and mental retardation. The sources are iodized salt, fish and sea food.

**b) Iron:** It is essential in the production of hemoglobin. Its deficiency causes anemia. The sources are meat, egg, dry fruits, spinach, banana and green leaf vegetables.

**c) Chromium:** It is essential in the production of hemoglobin. Its deficiency may cause diabetes. The sources are soya beans, black gram, carrot, tomato, groundnuts, bajra and barley.

### **Non nutritive components of diet**

a) Water

b) Roughage

c) Artificial sweeteners

d) Preservatives

e) Plant products

**Fibre or roughage** has no nutritive value. It is undigested part of the food or it can be said that it cannot be digested by human intestinal tract. It consists of water and improves

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intestinal function by adding bulk to the food. It helps the individual to satisfy the appetite. It prevents constipation.

### **Eating for weight control**

A healthy weight is considered to be one that is between 19-25 BMI. If the BMI is between 25-29 an adult is considered overweight and if it is above 30, the person is considered to be obese.

Since, 3500 calories equals both one equals about one pound of fat, if you cut 500 calories from your typical diet each day, you will lose one pound weight a week.

Here are some useful tips for weight control with proper eating:

**a. Avoid common pitfalls:** diet, especially fat diets or quick fix pills and plans, often set you up for failure. Prepare a plan that is more realistic.

**b. Put a stop to emotional eating:** We don't always eat simply to satisfy hunger. All too often, we turn to food for comfort and stress relief. When this happens, we frequently pack on pounds.

**c. Tune in what you eat :** Do not eat while at your desk or working, and in front of the TV screen. The result is that we consume much more than we need, often without realizing it. Counter this tendency by practicing "mindful" eating: pay attention to what you eat, savor each bite, and choose foods that are both nourishing and enjoyable

**d. Fill up with fruit, veggies and fibre:** to lose weight, you have to eat fewer calories. But that doesn't necessarily mean you have to eat less food. You can fill up while on a diet, as long as you choose your foods wisely.

**e. Indulge without overindulging:** Do not avoid some type of food (ice cream or cookies or chips) completely. Instead of denying yourself the unhealthy foods you love, simply eat them less often.

**f. Take charge of your food environment:** Set yourself up for success by taking charge of your off environment: when you eat and what foods are available.

**g. Make healthy lifestyle changes:** You can support your dieting efforts by making healthy

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lifestyle choices .

### **Eating for weight control :- Factors to control body weight**

- Balanced diet
- Drinks lots of water
- Eating lot of fibrous food
- Regular Medical Checkup
- Avoid Fats
- Medicine only by doctors advice
- Physical Activity
- Avoid Drinking
- Avoid junk food
- Meals in small shifts
- Follow Hygenic Habits
- Do not Dieting
- Never try sliming pills
- Avoid over eating
- Balancing the intakes of calories and expenditure of calories.

### **Food myths:**

a. Eggs increases cholesterol level so avoid them: There is no doubt that eggs are good source of health. An egg provides you various nutrients. It is as per daily requirements of cholesterol by our bodies. So, if you take one egg daily there is no problem of cholesterol level.

b. Drinking while eating makes you fat: The actual fact behind this misconception is that enzymes and their digestive juices will be diluted by drinking water while eating which slows down your digestion which may lead to excess body fat.

**(i) Myth:** Low fat or No fat diet are good.

**Fact:** Body needs fats for energy, tissue repair and to transport vitamin A,D, E,K. Just cut down on saturated fat eating un saturated fats.

**(ii) Myth Crash:** Dieting or Fasting may loose weight.

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**Fact:** It may be true in short term but ultimately it hinder weight loss. Loosing over the long term burns off fat whereas crash dieting or fasting not only removes fat but who leans muscles.

**(iii) Myth:** Food eaten late night is more fattening.

**Fact:** It doesn't make much change.

**(iv) Myth:** Low fat milk has less calcium that full fat milk.

**Fact :-** Skimmed and semi skimmed actually have more calcium because it is in watery part and not in creamy part of milk.

**(v) Myth:** Vegetarian cannot build muscles.

**Fact:** Vegetarian can built muscles as meat eaters by getting their proteins from vegetables such as cheese nuts pulses. Etc.

**(vi) Myth:** Healthy food is expensive.

**Fact:** Tinned, stored, packed food is expensive. Whereas local & seasonal food is inexpensive.

## . PITFALL OF DIETING

An individual who is overweight wants to reduce weight they starve for reducing weight many times skip meals to lose weight, sometimes take slimming pills.

- Extreme Reduction of Calories.
- Restriction on some nutrients
- Skipping meals
- Intake of calories through drinking
- Under estimating the calories. Intake
- of labelled foods.
- Not preferring physical activities.
- low energy diet.
- Taking less liquids
- Starving

## C. Food Intolerance

Food intolerance is that when a person has difficulty in digesting a particular food.

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Symptoms : Nausea, Vomiting, Pain in joints, headache and rashes on skin, Diarrhoea, sweating, palpitations, burning sensations on the skin stomach.

**Food Intolerance** means the individual elements of certain foods that can not be properly processed and absorbed by our digestive system. The main cause of food intolerance is the complete absence of enzymes responsible for breaking down or absorbing the food elements. Food intolerance can cause nausea, stomach pain, diarrhoea, vomiting, gas cramps, heartburn, headaches, irritability, etc.

**Causes** : Absence of activity of enzymes responsible for breaking down the food elements. These are usually innate sometimes diet related or due to illness.

**Management** : Change in diet causing reaction some therapies like fructose intolerance therapy, lactose intolerance therapy, histamine intolerance therapy can be applied.

## **Food Myths/Dieting Myths**

### **3.6 Sports Nutrition (Fluid & Meal intake, pre, during the post Competition)**

**Nutrition before competition:** At least a week before the competition sportsperson should take complex carbohydrate food which usually helps in increasing glycogen store. The fuel for the muscle is usually provided in meals 3-4 days prior to the competition. The diet should depend on the intensity of the activity. The diet should be rich carbohydrate, low in fat and protein. Two hours before the competition a high carbohydrate energy drink can be considered sufficient.

**Nutrition during competition:** It is important to stay hydrated and maintain sugar level so that sportsperson may not undergo fatigue. If the duration of the competition is more than 60 mins then ½ to 1 cup carbohydrate drink after 10-20 mins and if the duration is less than 60 mins then carbohydrate drink after every 20-30 mins.

**Nutrition after competition:** After competition it is important to recover properly, so the first preference should be given to replacement of fluid loss and this can be easily done by the intake of water or replacement drink. Meals after competition should be taken within 2 hours. For best glycogen restoration 100-200 grams of carbohydrate along with lean protein like meat or chicken should be taken. It will help in building, maintaining, and repairing of muscles. At least 20 gms of protein is required after completion for complete recovery.

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## Food Supplement

Food Supplement means a nutrient that is added to your diet to nourish your body as you are not taking this nutrient in adequate amount in your regular diet. Food supplements generally include vitamins, fibres, minerals, fatty acids among other substances.

### **Advantages of Food Supplements**

- (a) Supplements can contribute to improve muscular strength, endurance and overall physical performance.
- (b) Some supplements are used in combination with drugs as a method of complementary or alternative treatment of health conditions.
- (c) Food supplements give vitamins and minerals which protect the body from disease.

**Disadvantages of Food supplements** (a) Food supplements can cause adverse side effects also, if they are not consumed in the right quantity. They can damage liver and reduce bone strength.

(b) Weight-loss supplements may contain numerous untested ingredients that have not been examined for safety or effectiveness in children. The possibility of product contamination is the main safety concern about dietary supplements for both children and adults, but the danger may be greater for children.

### Precautions for food supplements

Do not pay heed to the words of salesmen or advertisements which claim that these supplements will improve child's brain.

First of all ensure that there is a lack of essential nutrients in a child needs to take food supplements or not.

Before purchasing an individual should ensure that it is free from preservatives, contains no fillers and does not contain any added sugar.

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## UNIT - 3

### Yoga & Lifestyle

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#### Meaning of asana

To sit in a comfortable position for everlasting period of time is called asana.

#### Asanas as preventive measure

Asana can be preventive measures as they provide following physiological benefits which ultimately helps in avoiding various lifestyle disease. The following are the benefits of asana for prevention of diseases:

- a) Bones and joints become strong:** By performing regular asana, the bones, cartilages, and ligaments become strong. Along with this, height of children is enhanced.
  - b) Circulation of blood becomes normal:** By performing asana regularly, the stroke volume as well as cardiac output increases because cardiac muscles start working more strongly and efficiently. Blood circulation becomes proper and blood pressure normalizes and stabilizes.
  - c) Immune system is strengthened:** By regular practice of asana, our immune system is strengthened. As a result, our body becomes less prone to diseases.
  - d) Respiratory organs become efficient:** By performing asana regularly, the respiratory organs become efficient. The vital air capacity increases up to 6000cc. The size of lungs and chest also enhances.
  - e) Efficiency of excretory system enhances:** By regularly performing asana the efficiency of excretory system enhances. As a result, the waste products such as lactic acid, acid phosphate, urea, uric acid etc. are excreted quickly and properly which in turn help in delaying fatigue.
  - f) Muscles become strong:** by performing asana regularly, muscles of the body become strong. The efficiency of the muscles increases. Fat does not accumulate in the body. In fact,
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the appearance the body enhances. The size of the muscles also increases.

## **Obesity**

Obesity is that condition of the body in which the amount of fat increases to extreme levels.

## **Procedure, benefits and contraindications for Vajrasana**

### **Procedure**

It is a meditative asana. Kneel down on the ground with your knees, ankle and toes touching the ground. Your toes should be stretched backwards. Now place your palms of both hands on the knees. The upper body should be straight. At this time, the breathing should be deep, even and slow.

### **Benefits:**

- a) It is helpful for concentration.
- b) It is helpful in curing dysentery, back pain and chest diseases.
- c) It enhances memory.
- d) It cures problems related to menstruation.
- e) It cures mental stress.
- f) It strengthens the pelvic muscles.
- g) It removes postural defects.
- h) It prevents hernia and gives relief from piles.

### **Contraindications**

- a) A person suffering from joint pain should not perform vajrasana.
  - b) The individuals who have any spinal column problem should not perform vajrasana.
  - c) The individuals who have some difficulty in movement should practice vajrasana with a lot of care.
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## **Procedure, benefits and contraindications for padahastasana**

### **Procedure**

Bend forward until the fingers or palms of the hands touch the floor on either side of the feet. Try to touch the knees with the forehead. Do not strain. Keep the knees straight. Exhale while bending forward. Try to contract the abdomen in the final position to expel the maximum amount of air from the lungs.

### **Benefits of Pada Hastasana:**

- a) It makes the body very flexible.
- b) It stretches the leg and back muscles.
- c) It helps to eliminate excess belly fat.
- d) It makes the spine flexible and tones the nerves.
- e) It improves blood circulation.
- f) It improves digestion and removes constipation.

**Contraindications:** The individuals who have back pain should avoid this asana. At least, they should not bend forward fully. They can bend themselves only as far as comfortable.

## **Procedure, benefits and contraindications for Ardh Matseyendrasana**

### **Procedure**

the left heel is kept under right thigh and the right leg is crossed over the left thigh. After that hold the right toe with left hand and turn your head and back to the right side. In this position move the trunk sideways. Then Perform the same sasna in the reverse position.

### **Benefits of Ardh Matseyendrasana.:**

- a. It keeps gall bladder and prostate gland healthy.
  - b. It enhances the stretch ability of back muscles.
  - c. It alleviates digestive ailments.
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d. It regulates the secretion of adrenaline and bile and thus is recommended in yogic management of diabetes.

e. It is also helpful in treating sinusitis, bronchitis, constipation, menstrual disorder, urinary tract disorder and cervical spondylitis.

**Contraindications:**

a. Women, who are two or three months pregnant, should avoid practicing this

b. The individuals who suffer from peptic ulcers, hernia, and hypothyroidism should practice this asana under expert guidance.

c. The individuals who have the problem of sciatica or sleep disc may benefit from asana but they need to take great care while doing this asana.

**Procedure, benefits and contraindications for Trikonasana**

First of all stand with your legs apart. Then raise the arm sideways up to the shoulder level. Bend the trunk sideways and raise the right hand upward. Touch the ground with left hand behind left foot. After sometime, do the same asana with opposite arm in the same way.

**Benefits**

a) It strengthens the legs, knees, arms and chest.

b) It helps in improving digestion and stimulates all body organs.

c) It increases mental and physical equilibrium.

d) It reduces stress, anxiety, back pain and sciatica.

e) It helps in increasing height.

f) It helps in reducing obesity.

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g) It enhances blood circulation.

h) It is also helpful in reducing extra fat around the waistline.

### **Contraindications of Trikonasana:**

a) If you are suffering from diarrhea, low or high blood pressure, back injury or migraine, avoid the practice of trikonasana.

b) The individuals having cervical spondylosis should not perform this asana.

### **Diabetes**

Diabetes is such a disorder that it causes sugar to build up in our blood stream instead of being used by the cells in the body.

### **Procedure, benefits and contraindications for Pawanmuktasana**

#### **Procedure**

lie down on you back on a plain surface. Keep your feet together and place your arms beside your body. Take a deep breath. When you exhale bring your knees towards your chest. At the same time press your thighs on your abdomen. Clasp your hands around your legs. Hold the asana when you breathe normally. Every time you inhale, ensure that you loosen the grip. Exhale and release the pose after you rock and roll from side to side three times.

#### **Benefits of Pawanmuktasana:**

a) It eases the tension in lower back.

b) It enhances the blood circulation in pelvic area.

c) It stimulates the reproductive organs.

d) It helps to cure menstrual disorders.

e) It helps in reducing the fats of the thighs, buttocks and abdominal area.

f) It strengthens the abdominal muscles.

g) It also massages the intestines and organs of digestive system which helps in releasing the

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gas and thus improves digestion.

h) Relieves constipation.

### **Procedure, benefits and contraindications for Bhujangasana:**

Procedure of Bhujangasana: In this asana the shape of the body remains like a snake that is why it is called Bhujangasana. In order to perform this asana, lie down on the belly on the ground. Keep your hands near the shoulders. Keep your legs close together. Now straiten up your arms slowly, raise the chest. Your head should turn backwards. Keep the position for sometime. Then get back to the former position. For good results, perform this asana for 4 to 5 times.

Benefits of Bhujangasana:

- a) It alleviates obesity.
- b) It provides strength and agility.
- c) It cures the disorders of urinary bladder.
- d) It cures the disease of liver.
- e) It improves blood circulation.
- f) It makes the vertebral column flexible and thin.
- g) It cures gas disorders, constipation and indigestion.
- h) It strengthens the muscles of hands.

Contraindications of Bhujangasana:

- a) People suffering from hernia, back injuries, headaches, and recent abdominal surgeries should not perform this asana.
- b) Pregnant women should not perform this asana.

### **Procedure, benefits and contraindications for Shalabhasana**

**Procedure of Shalabhasana:** Lie down in prostate position. Spread the thigh backwards.

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Hold your fists and extend arms. Keep your fists under the thigh and then raise your legs slowly as high as you can. For best results hold this position for 2 to 3 minutes and then lower your legs slowly. Repeat the same action for 3 to 5 times.

**Benefits of Shalabhasana:**

- a. It improves posture.
- b. It stimulates the body organs.
- c. It helps in relieving stress.
- d. It alleviates lower back pain.
- e. It helps in removing constipation.
- f. It provides relief to persons who have mild sciatica and slip disc problem.
- g. It strengthens the muscles of the spine, buttocks and back of the arms and legs.

**Back Pain**

The pain which is felt in the back usually originates from the bones, joints, muscles and nerves etc is called back pain. It may be in the cervical, thoracic or lumbar region.

**Procedure of Tadasana:** Stand up in attention position. Lift your arms upwards. Stretch your hands upwards. Raise your heels, and come on your toes. Also pull up your body upwards. After some time breathe out slowly and come to the previous position. Repeat the same exercise for 10 to 15 times.

**Benefits of Tadasana:**

- a) It is helpful in developing physical and mental balance.
- b) It reduces obesity.
- c) It cures constipation.
- d) It cures digestive problems.
- e) It improves body posture.

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f) It alleviates sciatica.

g) It is an excellent asana for those who want to enhance their height.

h) It is beneficial in treating hypertension.

Contraindication of Vajrasana:

a. A person suffering from joint pain should not perform vajrasana.

b. The individuals who have any spinal column problem should not perform vajrasana.

c. The individuals who have some difficulty in movement should practice vajrasana with a lot of care.

### **Asthma**

Asthma is a disease of lungs in which the airways become blocked or narrowed causing difficulty in breathing. The airways also swells up and pruce extra mucus. It usually triggers coughing, wheezing or whistling or shortness of breath. The coughing usually occurs at night or early in the morning.

**Procedure of Matsyasana:** For performing this asana, sit in padamasana. Then lie down in supine position and make an arch behind. Hold youe toes with the fingers of your hands. Stay for some time in this position.

### **Benefits:**

a) It is helpful in curing back pain, knee pain and tonsillitis.

b) It also cures the defects of eyes.

c) Skin diseases can be cured, if we practice this asana regularly.

d) This asanais helpful for the treatment of diabetes.

e) It helps in relieving tension in the neck and shoulders.

f) It improves posture.

g) It is the best asana to get relief from asthma.

h) It provides relief from respiratory disorders by encouraging deep breathing.

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## UNIT - 4

### Physical Education & Sports for Differently-Abled

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**Concept of Disability:** Disability is an impairment that may be cognitive, developmental, intellectual, mental, physical etc. It affects the everyday activities of the individual to a considerable amount. It may be present in an individual from birth or occur during one's lifetime. Disability has different meanings in different societies of the world. Disability is an injury that restricts the functions or movements of an individual. It is the consequence of an impairment caused to an individual. Disability is a medical condition which does not permit an individual to perform any activity or movement in a normal way.

**Concept of Disorder:** Disorder is usually used for mental disabilities. Disorder is any ailment that disturbs the health of an individual. Disorder creates hindrance in an individual's performance and reduces his efficiency. In the beginning disorder seems to be ordinary but they usually grow or spread in a harmful manner in an individual. Most probably, a disorder can not be detected on time, as a result of which, a simple disorder is changed into a disability. A disorder disrupts the normal functioning of an individual.

Types of disability

**Cognitive Disability:** It is a neurological disorder that creates hindrances or obstruction for an individual to store, process and produce information. This ability can affect an individual's ability or capability to read, compute, speak and write.

The individual's, who have this type of disability, usually have following symptoms:

- i) Memory disorder: An individual who has auditory problems or difficulty in remembering something that he heard, said or saw before sometime.
- ii) Hyperactivity: An individual with cognitive disability may not have attention for a long period. He finds it difficult to stay at one place.
- iii) Dyslexia: An individual with cognitive disability may exhibit dyslexia. It means he may



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have difficulty in writing, reading, speaking, etc.

**Intellectual disability:** It is a disability characterized by significant limitations both in intellectual functioning (reasoning, learning, problem solving) and in adaptive behavior, which covers a range of everyday social and practical skills. Indeed, this disability is related to the individual's thought process, communication, memory, learning, problem solving and judgment.

**Physical disability:** it is a limitation on individual's physical functioning, mobility, dexterity or stamina. Other impairments such as respiratory disorders, blindness, epilepsy and steep disorders, which limit other facets of daily living are also included in physical disabilities.

Physical disability may either be motor deficiency or sensory impairment.

### **Causes of disability**

a) **Genetic cause:** Abnormalities in genes and genetic inheritance cause intellectual disability in children. Sometimes, diseases, illness and over exposure to x-rays may cause genetic disorder.

b) **Mental health problems:** problems such as depression, bipolar disorder etc. may lead to disability. They tend to be some of the most misunderstood disabilities.

c) **Accidents:** Accidents may occur anywhere, anytime and to anyone. These accidents may happen at workplace, on the roads or in the air. These accidents may lead to disability.

### **Types of disorders**

a) Attention Deficit Hyperactivity Disorder (ADHD)

b) Sensory processing disorder (SPD)

c) Autism spectrum disorder (ASD)

d) Oppositional defiant disorder (ODD)

e) Obsessive compulsive disorder (OSD)

**Attention Deficit Hyperactivity Disorder (ADHD):** it is a group of behavioral symptoms that include inattentiveness, hyperactivity and impulsiveness. It is medical conditions that

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affects how well can someone sit still, focus and pay attention. The individual with ADHD have some problems focusing in some activities. This type of disorder is found more common in boys than in girls.

The various causes of ADHD are as follows:

- a) **Genetic factors:** It is not a disorder that passed socially. Studies shows that parents, siblings, and children of people with ADHD may be up to five times more likely to have the disorder than the people who are not related to someone with ADHD.
- b) **Brain injuries:** When a baby's brain is damaged before or after birth this could make the baby more likely to develop ADHD later on.
- c) **Low birth weight:** It is observed that children with low birth weight are more likely to develop ADHD.
- d) **Trauma and brain diseases:** Trauma during birth and brain diseases may lead to develop ADHD.
- e) **Diet:** There are a number of evidences which shows that taking a particular type of food or food additives play a significant role in causing ADHD.

**Sensory Processing Disorder** is a condition in which the brain has difficulty in receiving and responding to the information that comes in through senses. It refers to the way the nervous system receives messages from the senses and then turns them into proper motor and behavioral responses. Sensory Processing Disorder may affect one sense such as touch, sight, taste or movement. It may also affect multiple senses. In fact, the person may scream when touched or may vomit or dive under the table after hearing the sound of a leaf blower outside the window.

The various causes of SPD are as follows:

- a) **Genetic Factor:** Studies indicate that children born to adults who have Autism Spectrum Disorder (ASD) may be at a higher risk to develop SPD. Scientists allude that the cause of SPD are coded into child's genetic material.
  - b) **Low birth weight:** It is also considered one of the causes of sensory processing disorder.
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c) **Environmental factors:** Usually, children who are adopted often experience sensory processing disorder due to some restrictions in their early lives or poor parental care.

**Autism Spectrum Disorder** is a disorder that affects development. Here, the word spectrum refers to the range of symptoms and their severity. Generally, the young children with ASD have difficulties with communication, language, social skill and behavior. In other words, Autism Spectrum Disorder is characterized by social interaction difficulties, communication challenges and a tendency to engage in repetitive behavior.

The various causes of Autism Spectrum Disorder are as follows:

a) **Genetic factors:** It seems to play a very significant role. The first thing is that something happens at the time of fetal development that alters genes and secondly child inherits problematic genes from one or both the parents.

b) **Environmental factors:** It is not certain that environment causes ASD. But mothers exposed to high level of pesticides and air pollution may also be at a higher risk of having a child with ASD.

**Oppositional Defiant Disorder** is a set or group of behavioral disorders called disruptive behavior disorders. It is called by this name because children with such disorders always tend to disrupt those around them.

Physicians define this disorder as a pattern of disobedient, hostile and defiant behavior directed toward authority figures. The individuals affected by this disorder usually rebel, argue with adults, refuse to obey and are obstinate.

The various causes of Oppositional Defiant Disorder are as follows:

a) **Biological or Genetic factors:** Children are more susceptible of developing ODD if they have a parent with a history of ADHD or ODD.

b) **Physical factors:** the presence of ODD traits has been linked to the existence of abnormal amounts of some brain chemicals. These brain chemicals, known as neurotransmitters, keep the brain chemicals themselves balance properly.

c) **Psychological factors:** Children may develop ODD if they don't have good relation with parents or have neglectful parents or have inability to develop social relationship.

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d) **Social factors:** Oppositional Defiant Disorder may be due to inconsistent discipline, divorce, poverty, chaotic environment in the family and exposure to violence.

**Obsessive Compulsive Disorder** is a mental health disorder that affects people of all ages and walks of life. It occurs when an individual gets caught in a cycle of obsessions and compulsions. It can be said that persons with OCD are plagued to constant thoughts of fears that cause them to perform rituals or routines.

Obsessive Compulsive Disorder is a type of mental disorder that causes repeated unwanted thoughts. To get rid of unwanted thoughts, he/she performs the same task/activity again and again.

**Causes of Obsessive Compulsive Disorder:** The exact cause of Obsessive Compulsive Disorder is still unknown. Research studies suggest that there may be a problem with the way one part of the brain sends information to another part. Serotonin is the chemical in the brain that sends messages from one part to another. Insufficiency of serotonin may help in causing Obsessive Compulsive Disorder.

### **Advantages of physical activities for children with Special needs**

a) **Reduced level of anxiety, stress and depression:** physical activities may help in reducing the level of anxiety, stress and depression of children with disabilities.

b) **Improved social interaction:** physical activities provide ample opportunities for improving the social interaction among children with special needs. Social relations are developed during involvement in physical activities.

c) **Better emotional and psychological health:** physical activities are beneficial for children with special needs because such activities improve psychological and emotional health.

d) **Cognitive benefits:** physical activities lead to cognitive skill improvement in children with disabilities. These activities allow them to discover and access strengths that cannot be challenged in the classroom setting.

### **Strategies to make physical activities accessible for children with special needs**

a) Medical check-up: if we want to make physical activities accessible for the children with

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special needs, we need to understand the type of disabilities of children and for this purpose complete medical check-up of the children is required. Because without complete medical check-up, the teachers of physical education cannot come to know about the type of disability child is facing.

b) Activities based on interests: Physical activities must be based on interest, aptitudes, abilities, previous experience and limitations of children with special needs. The teachers of physical education should have deep knowledge of limitations, interest and aptitudes of children.

c) Different instructional strategies: A variety of different instructional strategies such as verbal, visual and peer teaching should be used for performing various types of physical activities. By this children get opportunity to learn by their own and become independent.

d) Modification of rules: Rules can be modified according to the needs of the children. They can be provided extra time or attempt to perform a physical activity.

e) Specific environment: For special needs children the area should be limited. In case of children who have autism, they must be provided specific area because they may need some time to relax.

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## UNIT - 5

### Children and sports

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#### Key Points:

- Motor Development in Children
- Factors affecting Motor Development
- Advantages and Disadvantages of Weight Training
- Concept & Advantages of Correct posture
- Causes of bad Posture
- Common postural deformities
- Corrective measures for postural deformities

**Motor development** refers to the development of general body control, fine motor skills and large muscle movements. There are three stages of motor development in children as given below infancy or infancy hood , early childhood & later childhood

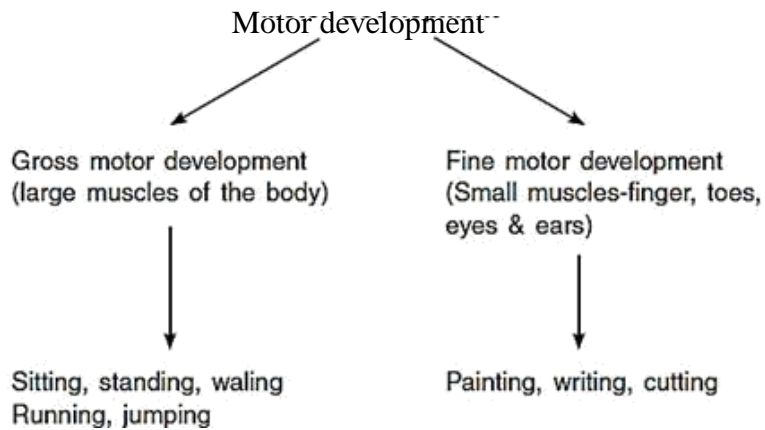
#### It is of two types:

1. **Gross motor development** involves the development of large muscles in the child's body such as sitting, walking, running etc.
2. **Fine motor development** involves development of small muscles of the body, especially during the small movements of the fingers and hands eg. Holding of javelin, discus and pole, catching a cricket ball etc.

**5.1 Motor Development-Motor Development refers to the development of a child's Bone, muscles and ability to move around and manipulate his/her environment.**

#### Motor Development

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### **Factors affecting motor development**

1. Nutrition: - Nutritious food promotes good motor development. Sensory motor development is dependent upon nutrition that the child gets to a great extent. Children get stronger and development is good if they get nutritious food.
2. Immunization: - If mother and child both are immunized at a proper time it leads to good sensory motor development.
3. Environment: - Encouragement, love and security help the child to take risk to explore fearlessly and to know more about environment which leads to a better sensory development.

### **5.2 Factors affecting Motor Development**

1. Heredity
2. Nutrition
3. Sleep
4. Immunization
5. Environment
6. Stimulation and Interaction
7. Opportunities
8. Training and Practice
9. Recreation
10. Education-Learning and Productivity
11. Gender
12. Posture Deformities

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13. Sensory Impairment

14. Obesity

15. Social Skills

16. Mental Health

### **5.3 Physical and Physiological benefits of Exercise on Children**

#### **Physical benefit of exercise**

1. Physical Health and Strength

2. Mental Health

3. Emotional Well being

4. Social Health

5. Positive School Environment

6. Motivating personality

7. Controls anti-social behavior

#### **Physiological benefits of Exercise**

1. Strengthening the heart

2. Strengthens bones and muscles

3. Controls Blood Sugar

4. Regulate Blood Pressure

5. Increases Energy level

6. Detoxification

7. Reduce Cholesterol level

#### **Advantages and disadvantages of weight training**

##### Advantages of weight training

a) Increase bone density: weight training helps in increasing bone density. The risk for osteoporosis is lower for the individuals who do weight training exercises at least 3 times a week.

b) Helps in getting good shape: Weight training is magical as it shape up all by involving appropriate schedule. Fat peoples can become slim and slim can gain weight and become

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strong.

**Disadvantages of weight training are:**

a) Risk on injuries: there is always a risk of injuries while performing weight training without any companion. In case you are alone and you are not able to do the required repetitions of exercise, you may be injured.

b) Less flexibility; weight training reduces flexibility, if flexibility exercises are not done along with weight training. If flexibility exercises are done continuously then such disadvantage can be ignored.

**5.4 Advantages and Dis-advantages of Weight training and food supplement for children**

**Weight training:**-Those exercise, that are designed to strengthen specific muscles. By causing them to overcome a fixed resistance, usually in the form of Bar bells or dumbbells.

**Advantages of Weight Training**

1. Improves Posture and range of motion
2. Increases muscles strength, bone density and endurance
3. Protection against injury
4. improve motor performance
5. Promote healthy Blood pressure and Cholesterol levels
6. Maintain Healthy Weight
7. Develop confidence and self esteem
8. Improve immune system functions
9. improve Psycho-socio well being
10. Promote and develops exercise habits

**Disadvantages of Weight Training**

1. Maturity
2. Introduce Injury
3. Safety
4. Loss of Flexibility

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## Concept of posture

The posture in which the body is so balanced as to produce least fatigue. It means balancing the body in accurate and proper manner while sitting, standing etc or during any other actions.

### Importance:-

- a) One's personality can be judged,
- b) Better balance, agility and overall physical performance.
- c) helps in maintaining proper manner of standing, sitting walking of one's body.
- d) it is a measure of one's alertness.
- e) has better alignment, which translates into less injury.
- f) recovers quicker from exercise or physical exertion, and feels more energetic

### Causes of poor posture

- (i) Injury when bone, ligament or muscle is injured, it weakens the support to that
- (ii) Disease causes the joints to lose their strength and mobility.
- (iii) Heredity Deformities like Kyphosis and flat foot are sometimes due to hereditary factors.
- (iv) Overload Over work or fatigue also results in poor posture.
- (v) Lack of Exercise The maintenance of erect posture requires strength and endurance.

### Common postural deformities

Postural deformities are the exaggerated curvature of the spine. The spine is naturally curved but various factors may give rise to the deformities. It reduce the efficiency of individual to great extent & cause more health problem.

**Knock Knee** - a postural deformity in which both the knees touch or overlap each other in normal standing position

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## **Causes of knock knee**

- (i) Weakness of muscles and ligaments
- (ii) Overweight body
- (iii) Lack of balanced diet
- (iv) Lack of vitamin-D

**Flat Foot** is a deformity of the feet. In this deformity, there is no arc in the foot and the foot is completely flat.

**Round Shoulder** It is a postural deformity in which the shoulders are drawn, the head is extended with the chin pointing forward.

## **Causes of round shoulders**

- (i) Due to poor posture while working
- (ii) Faulty furniture
- (iii) Wrong habit of sitting / standing
- (iv) Carrying heavy load on shoulders
- (V) By sleeping on one side

**Kyphosis** is a deformity of the spine in which there is an increase or exaggeration of a backward curve.

## *Corrective measures of kyphosis*

- (i) Perform Dhanurasana regularly
- (ii) Bend your head backward in standing position.
- (iii) Reverse sit-up
- (iv) Perform Bhujang Asana

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(v) Perform ushttt Asana

**Bow Legs** is a deformity opposite knock knee. In fact, if there is a wide gap between the knees, the deformity can be observed easily.

**Lordosis** is a common defect in deformity & posture. Here lumber curve becomes more pronounced and front central position of pelvic region is tilted forward.

Corrective measures of Lordosis

- (i) Forward bending
- (ii) Alternate toe touching
- (iii) Sloop walking
- (iv) Perform paschimotan Asana
- (v) Perform sit-ups regularly

Causes of scoliosis

(i) **Congenital scoliosis**, which is caused by a bone abnormality present at birth.

**Neuromuscular scoliosis**, which results due to abnormal muscles or nerves.

(ii) This is seen in people with cerebral palsy or having partial paralysis.

(iii) **Degenerative scoliosis**, which may result from traumatic (. i. e. Injury & illness) bone collapse, previous major back surgery, or osteoporosis.

(iv) **Idiopathic scoliosis**, which is the most common type. It has no specific identifiable cause.

**Preventive measures to avoid Scoliosis**

Corrective measures of scoliosis

- (i) Perform Ardh Chakra Asana
  - (ii) Chin-ups
  - (iii) Swim by using breast stroke technique
  - (iv) Perform Trikon Asana
  - (v) Perform Tarra Asana
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## CHAPTER-6

### WOMAN AND SPORTS

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#### **Key Points :**

- Sports participation of Women in India
- Special consideration (Menarche, Menstrual, Dysfunction)
- Female Athletes Triad ( Osteoporosis & Amenorrhoea & Eating Disorders)
- Psychological Aspects of Women Athlete
- Sociological Aspects of Sports Participation

#### **Sports participation of women in India**

For women's participation in sports we have a look at ancient period. Regarding participation in the first modern Olympic (1896 Athens), there was no participation of women.

-- Women participated first time in 1900 Olympics. (22 women participated in) -- In 1904 six women participated.

-- And after 100 years in 2000 Sydney Olympics 4069 women had participated.

-- In 2008 Beijing Olympics 4637 women participated.

#### Participation in India

-- In 2000 Karnam Malleshwari was the first woman who won bronze medal in Sydney Olympic from India.

-- In 1984 performance of P.T. Usha was very good in Athletics.

-- In 2012 London Olympics Saina Nehwal and M.C. Maricom got bronze medal.

In 2016, Rio Olympics, Sakshi Malik won bronze medal, P.V. Sandhu won silver medal where as Deepa Karmakar opened new dimensions in gymnastics. Over the past several decades the

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participation of women in sports in sports field has increased tremendously. But really, it is a matter of regret for all of us to know that sports is such a field where gender inequality is strongly evident. The general social environment has not only inhibited women from participation in sports but has also criticised them when they participate. Many people comment for women "Why don't they stay in the kitchen where they belong"?

But now time has changed. Women are capable of changing society. Now the ideology suggests that women are participating in every sphere of life and proving themselves globally.

## **6.1 Sports Participation of Women in India**

Reasons for the low rate of sports participation by women in India

### **1. Gender equity & social attitude**

- a. No parental encouragement
- b. Traditional society
- c. Less motivation and inspiration
- d. Women constraining other women

### **2. Lack of plans and initiatives for sports women by the Government a.**

Male dominant culture

- b. Less availability of women coaches
- c. No independent games facilities for women d.

More emphasis on study

- e. Less competition

### **3. Economic Factors**

### **4. Social Customs and Rights**

### **5. Low Health Consciousness**

### **6. Stress on Academics**

### **7. Media Coverage**

### **8. Lack of Incentives & Career**

### **Special consideration**

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**Menarche** is the first menstrual bleeding of the young girl (9-16 yrs.)

### **Menstrual dysfunction**

Menstrual dysfunction is a disorder or irregular menstrual cycle in women. It can also be defined as “An abnormal bleeding during the menstrual cycle”.

### **Factors/related problems**

1. Absence of menstrual periods :- This problem may be due to eating disorder, excessive exercise schedule, extreme level of stress and medications etc.
2. Premenstrual syndrome :- Many girls may have symptoms such as acne, backaches, Sore breasts, headaches, constipation, depression, irritability and feeling anxious etc.

These symptoms may be faced by female before their menstruation.

3. Abnormal Cramps :- These cramps are caused by a chemical in the body that makes the muscles in the uterus contract.
4. Heavy or prolonged period :- It is common for a girl's menstrual period to be heavier on some days than others.
5. Irregular menstrual period :- The regular menstrual cycle for a female is 28 days. However, it may vary from 21 to 35 days.
6. Delay in the first menstrual period.

### **6.2 Special consideration (Menarche, Menstrual, Dysfunction, Pregnancy, Menopause)**

1. **Menarche:-** “It is the first natural cycle and is a central event of female puberty”.
2. **Menstrual dis-function:-** Painful and irregular menstrual cycle of women to be on the rise with the decreasing involvement of the women in the physical fitness and endurance sports.

**Female athlete triad** is a syndrome in which eating disorders, osteoporosis and amenorrhea, eating disorders effect adversely on the body.

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**1. Osteoporosis** is a skeletal disorder in which reduction in bone mass may cause fracture.

### **Causes**

- a. Insufficient calcium in diet.
- b. Amenorrhoea
- c. Eating disorder
- d. Bad eating habits

**Osteoporosis:-** Low bone mass.

**2. Amenorrhea** refers to the absence of menstrual periods. It may be either primary (meaning a woman has never developed menstrual periods) or secondary (absence of menstrual periods in a woman who was previously menstruating). There are many reasons responsible for amenorrhea including extensive exercise and improper diet. Exercising intensively and not consuming enough calories can lead to decreases in hormones that result in a girl's periods becoming irregular or stopping altogether.

**Amenorrhoea:-** Absence of menstrual period for more than 6 months.

**Anemia:-** Resulting from the inadequate nutrition.

### **Eating disorders**

Anorexia nervosa

In this eating disorder the female athlete only think about food, dieting, and body weight all the time. They have distorted body structure. Other individuals usually feel them that are becoming thin but they do not believe this. In front of the mirror they see themselves obese.

Bulimia nervosa

In this eating disorder the female eats excessive amount of food and then vomits it in order not to gain weight. In this disorder, an individual binges on food and feels a loss of control. Then to prevent weight gain try to vomit the food.

## **6.4 Psychological aspects of women athlete**

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1. More goal oriented
  2. Psychological stronger
  3. Less aggressive
  4. Fast adaptation
  5. Image conscious
  6. Poise & confidence

### **Sociological aspects of women athlete**

1. Family - Family is a very significant social factor, which is generally responsible for early sports socialization. The socializing process at home for both sex is different. Males usually get more support and encouragement to get involved in sports activities. They are further provided with more facilities to encourage and support participation in sports and games. However female usually are not encouraged to get involved in sports activities.
  2. School - The culture of sports is generated in schools and reputation of school is dependent on the success of male and females as sports personalities. Lots of schools do not have girl teams as male teams (soccer/ wrestling/boxing etc/) They do not have proper arrangements for coaches and sports facilities for females.
  3. Culture - Cultural beliefs have great impact on the involvement of females in sports. Many cultures still firmly believe that women's place is in the kitchen. The participation in the sports masculinises females are viewed negatively.
  4. Attitude and prejudices - Attitude and prejudices of society play significant role in sports participation; some females avoid certain sports for fear of being perceived masculine. Due to such attitude and prejudices of society regarding sexuality inhibit females to participate.
  5. Religious faith discourages woman participation in sports
  6. Illiteracy in society
  7. Biological inferiority
  8. Male dominance
  9. Lesser concentration to develop woman sports equipment & facilities
  10. Less competitive spectators for woman sports
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## UNIT-7

### Test & Measurement in Sports

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#### Key Points :

- Measurement of Muscular strength-Kraus-Weber test
- Motor Fitness Test-AAPHER
- Measurement of Cardio-Vascular Fitness-Harward Step Test/Rock Port Test
- Measurement of flexibility-Sit & Reach Test
- Rikli & Jones Senior Citizen Fitness Test

**Muscular strength** is the amount of force the muscle or a group of muscle can exert against resistance for short duration as in aerobic activities

#### Kraus Weber Test

It is a test of minimum muscular fitness of the various muscles of the body.

The test consists of six items which indicate the level of muscular strength and flexibility of key muscle groups. Usually the scoring of each item is graded either on pass/fail basis or a range of scoring from zero to ten. A subject's grade of zero means that the subject has failed in a particular test item; score ranges from one to ten are for subjects who pass these test items. The six tests are

Test 1 tests the strength of the abdominal and poses muscles.

Test 2 tests the strength of the abdominal muscles.

Test 3 tests the strength of the poses muscles.

Test 4 tests the strength of the upper back.

Test 5 tests the strength of the lower back.

Test 6 tests the strength of the back and hamstring muscles.

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## **AAHPER Test**

The AAHPER (American Alliance for Health, Physical Education and Recreation) youth fitness test was formed in 1965 in United States, but was revised in 1976. This test was administered on school students of 17 years of age.

This test consists of the following six items : (a) Pull ups : In case of girls, the pull-ups are to be started from a flexed arm hang. This test item judges the arm and shoulder girdle strength.

(b) Flexed Leg situps : This test is meant to judge the efficiency of abdominal and hip flexor muscles.

(c) Shuttle Run : This test item is meant for judging the speed and change of direction.

(d) Standing Long Jump : For judging the explosive power of leg muscles.

(e) 50 yard Dash or Sprint : For judging speed.

(f) 600 yard Run : For judging endurance.

Administration of Tests : these tests can be conducted in a gymnasium or out-doors. The only apparatus required in these tests is a horizontal bar having a diameter of approximately 1½ inches for pull-ups and flexed arm hang for girls. However, arrangement has to be made for the timing and recording of all scores with the help of timers and recorders.

Item No.1—Pull ups : This item has to be done from a hanging position on the bar by using the overhead grasp (with palms facing outwards). The arms and legs of a subject should be fully extended. Form hanging position, the subject should raise his body with his arms until his chin is placed over the bar. Then, he should lower his body to a full hanging position. In doing so, the knees should not be bent and the pull should not be jerky or snap pull. (The number of completed pull-ups is the score of the subject.)

Item No. 1 (Girls)—Flexed-arms hung: In this test item for girls, the subject is required to hang from the bar with flexed arms and overhead grasp. She should raise her body to a position where the chin is above the bar, the elbows are flexed and the chest is close to the

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bar. The stopwatch is started as soon as a subject assumes such a hanging position and is stopped when the subject's chin falls below the level of the bar. (The time recorded in seconds for which a subject holds the hang position is her score)

Item No. 2—Sit-ups : For this test meant for boys and girls, the subject should lie on his or her back with knees flexed and kept not more than 12 inches from the buttocks. The hands of the subject should be placed at the back of the neck, fingers clasped and elbows touching the mat. From this position, the subject should raise his or her head and elbows forward upwards till the elbows touch the knees. This constitutes one sit-up. (The number of correctly performed sit ups in 60 seconds from the start of the first sit-up is the score of a subject).

Item No. 3—Shuttle Run : For this test item, two parallel lines are drawn at a distance of 30 feet from each other and two blocks of wood are placed behind one of the lines. The subject has to stand behind the other line and on the signal —Readyll, —Goll should run to pick up one block, run back to the starting line and place the block behind the line. He should again turn back to pick up the second block and bring it also behind the starting line. Two such trials are given. (The better time of the two trials to the nearest 10th of a second is the score of the subject).

Item No. 4—Standing Long Jump : In this test, a subject is required to stand behind a take-off line, with feet apart. He takes a jump forward by extending his bent knees and swinging the arms forward. The best jump recorded, out of the three trials given, is the score of the subject. (The jump should be recorded in feet and inches).

Item No. 5—50 Yard Dash : Two lines are drawn at a distance of 50 yards from each other. The subject is made to run from the start line to the finish line and his time taken is recorded in seconds (nearest to the tenth of a second.) This indicates his score.

Item No. 6—600 Yard Run : This run can be organized on a track, on a football field or an open area marked for this purpose. In this test item, a subject runs a distance of 600 yards. The subject takes a standing start from the start line. The subject may walk in between. However, the objective is to cover the distance in the shortest time. When he crosses the finish line, he is informed of his time. (The time taken to run the distance is recorded in minutes and seconds).

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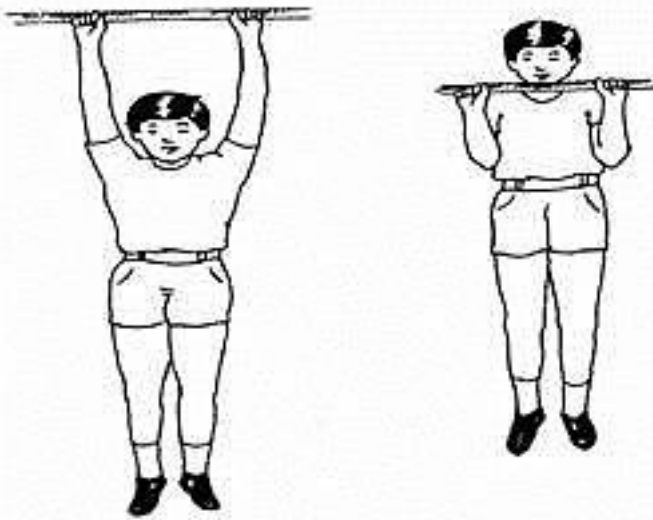
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**The Aapher**—Youth Physical Tests were created in 1957. During the years 1957- 58 these tests were applied to 8500 School Children of classes 5 to 8 in the United States of America. On the basis of this study standard rooms were created. Studies were conducted on 2200 College level students in 1960 and percentile rooms were created, Similarly Percentile rooms were created on the basis of studies belonging to 50 institutions. New percentile rooms were created again in 1965 on the basis of age. This study included 9200 boys and girls in the 10 to 17 years age group.

### 1. Pull Ups Boys is an activity meant only for boys:

**Equipment:** A metal or wooden bar approximately 1½ inches in diameter is preferred. A doorway gym bar can be used and if no regular equipment is available, a piece of pipe or even rungs of a ladder can serve the purpose.

**Description:** The bar should be high enough so that the pupil can hang with his arms and legs fully extended and feet free from the floor. He should use the overhand grasp. After coming in hanging position, the pupil raises his body by his arms until his chin can be placed over the bar. Then he lowers his body to a full hang as in starting position. The exercises is repeated as many times as possible.



### Rules

- (i) Each Student will be allowed one trial.
- (ii) The body must out swing during the execution of the movement.
- (iii) The knees must not be raised and the kicking of legs is not permitted.

**Scoring:** Record the number of completed Pull Ups.

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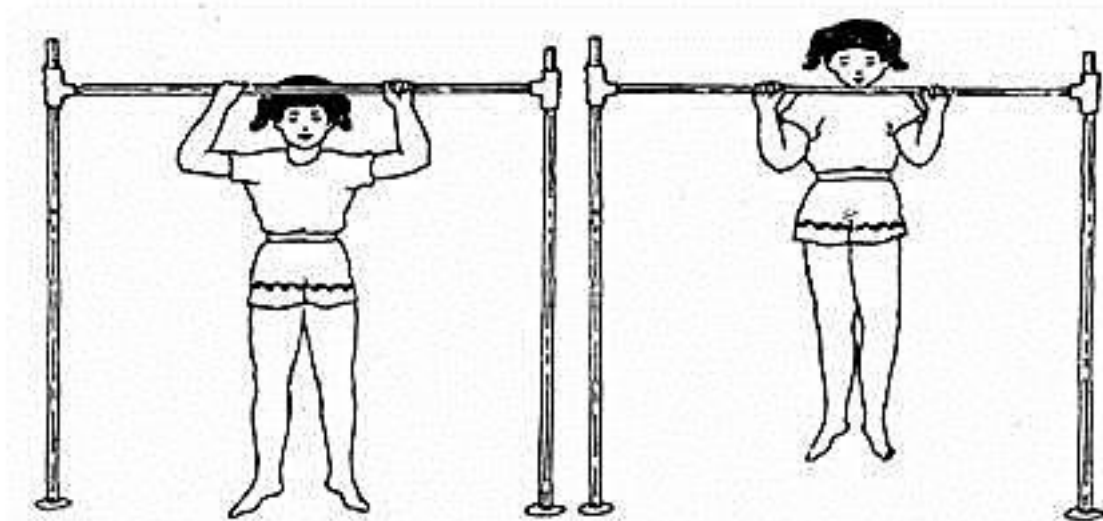
**2. Flexed Arm Hang:** This activity is meant only for girls.

**Equipment:** A horizontal bar is used. The diameter of the rod ought to be 1½ inches. A stop watch is needed to record time.

**Description:** The height of the bar should be adjusted so it is approximately equal to the pupil's standing height. The pupil should use an overhang grasp. With the assistance of two spotters, one in front and one in back of Pupil the Pupil raises her body off the floor to a position where the Chin is above the bar, the elbows are flexed and the Chest is close to the bar. The Pupil holds this position as long as possible.

**Rules:**

- (1) The Stopwatch to started as soon as the Subject takes the hanging position.
- (2) The watch is stopped when:
  - (i) Pupil's Chin touches the bar
  - (ii) Pupil's head hits backward to keep Chin above the bar.
  - (iii) Pupil's Chin falls below the level of the bar.



### 3. Sit-Ups (Flexed Leg), Boys and Girls

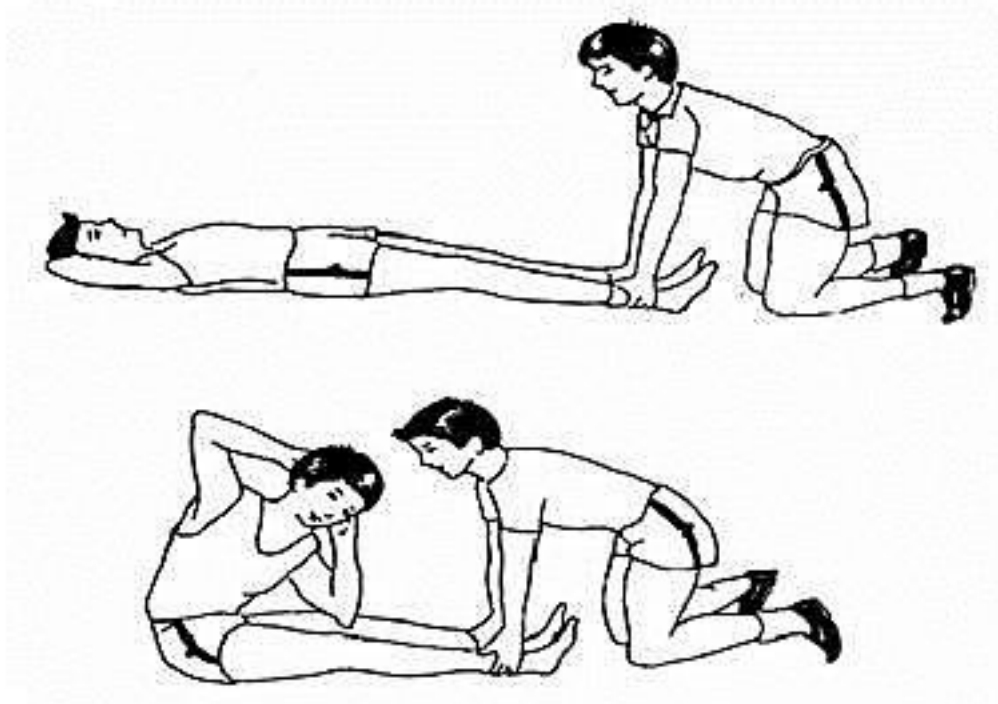
**Scoring:** The length of time the subject holds the hanging position will be recorded in seconds. Sit-ups (flexed leg)

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**Equipment:** Clean floor, Mat or Dry Turf and Stop-Watch.

**Description:** The Pupil lies on his back with his knees bent, feet on the floor and heels not more than 12 inches from the buttocks. The angle at the knees should be less than 90 degrees. The Pupil puts his hands in the back of his neck with fingers clasped and places his elbows squarely on the mat, floor and turf. His feet are held by his partner to keep them in touch with surface. The Pupil tightens his abdominal muscles and brings his head to knees. This action constitutes one sit up. The number of correctly extended Sit ups performed in 60 seconds shall be the score.



**Rules:**

- (1) No rest is permitted between sit ups.
  - (2) Keep the fingers clasped behind his neck.
    - (a) Keep the fingers clasped behind his neck.
    - (b) Bring both elbows forward in starting to sit up without pushing off the floor with an elbow.
    - (c) Return to starting position with elbows flat on the surface before sitting up again.
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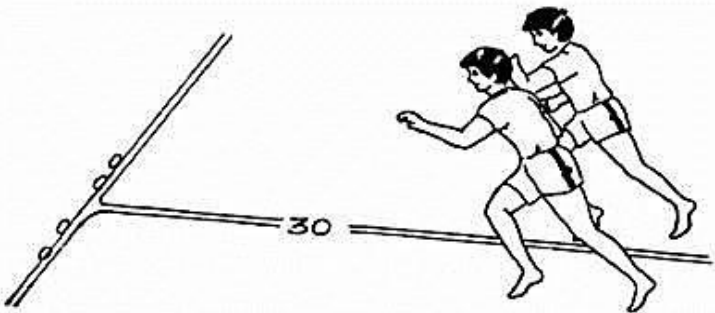
**Scoring:** Only the Sit ups a pupil is able to do in 60 Seconds are recorded.

#### **4. Shuttle Run (Boys and Girls):**

**Equipment:** Two blocks of wood, 2 inches x 2 inches x 4 inches and a stopwatch. Pupils must wear sneakers or run bare footed.

**Description:** Two parallel lines are marked on the floor 30 feet apart. The width of a regulation Volleyball Court serves as a suitable area. Place the blocks of wood behind one of the lines.

The pupil starts from behind one of the lines. On the signal "Ready" or "Go" the pupils runs to the blocks, picks one up runs back to the starting line and places the block behind the line. He then runs back and picks up the second block which he carries back across the Starting Line.



**Rules:** Allow two trials with some rest between.

**Scoring:** Record the time of the better of the two trials.

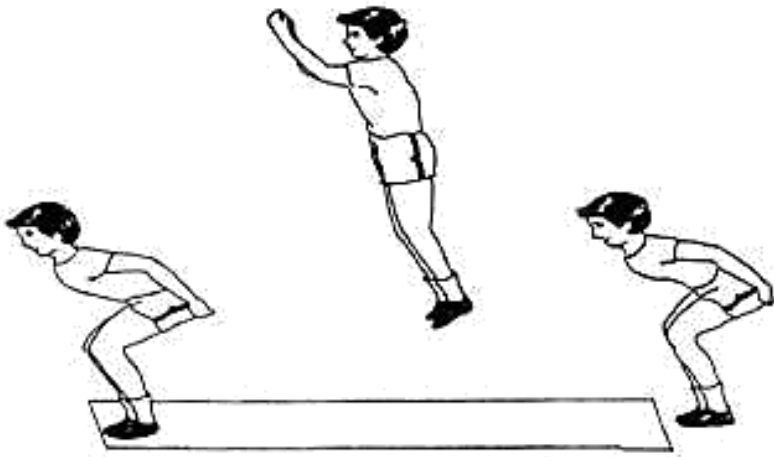
#### **5. Standing Broad (Long) Jump:**

**Equipment:** Mat, Floor or Outdoor Jumping pit and Tape Measure.

**Description:** Pupil stands with the feet several inches apart and the toes just behind the take off line. Preparatory to jumping, the pupil swings the arms backward and bends the knees. The jump is accomplished by simultaneously get bending the knees and swinging forward the arms.

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**Rules:**

(1) Allow three trials.

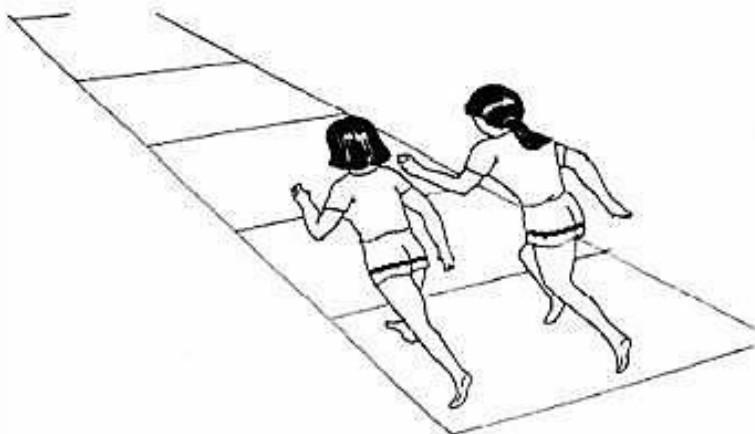
(2) Measure from the take off line to the feet or other part of the body that touches the floor nearest the take off line.

**Scoring:** Record the best of the three trials.

**6. 50 Yards Run (Boys and Girls):**

**Equipment:** Two stop watches or one with a split second times.

**Description:** It is preferable to administer this test to two pupils at a time. The starter will use the commands: "Ready" and "Go" the race comes to an end at the "Finishing Line", Rules, the stop watch is kept on from the word "Go" to the finishing line, a time is recorded to the one tenth of a second.

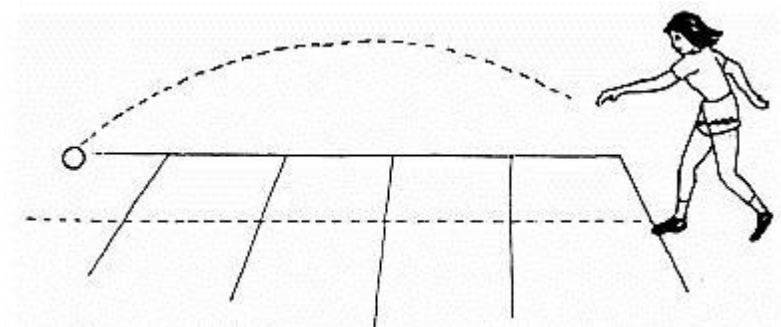


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## 7. Soft-Ball Throw (Boys and Girls):

**Equipment:** Soft Ball 12, Measure Tape.

**Description:** Game is played in a football field on a field of similar size. Lines are drawn at a distance of five yards each. The pupil who throws the ball can throw from a distance of 6 feet.



**Rules:**

- (1) It is necessary to have the ball in one hand.
- (2) Three chances are given to each player.

**Scoring:** Best of the three throws is counted.

## 8. 600 Yards Run or Walk (Boys and Girls)

**Equipment:**

1. A Track
2. A Stop Watch

**Description:** Pupils take their positions at the standing start. The race starts with command words: "Ready" and "Go". As many as Six Pupils can participate at a time.

**Rules:** Walking is permitted but the object is to cover the distance in shortest possible time.

**Scoring:** Record in Minutes and Seconds.

## 7.4 Measurement of Cardio-Vascular Fitness-Harward Step Test/Rock Port Test

**Cardiovascular fitness** is the ability of an individual to strengthen the heart muscles during continuous muscular activities in which numbers of muscles groups are used.

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## 1. Harvard Step Test-Aerobic Fitness (Recovery time)

$100 \times (\text{Total test time in seconds (the time for which the athlete was able to do the stepping up and down)})$

$2 \times (\text{the total number of heartbeats for all the three time intervals})$

## 2. Rockport Fitness Test-One mile Walking test

$\text{VO}_2\text{max} = 132.853 - (0.0769 \times \text{Weight}) - (0.3877 \times \text{Age}) + (6.315 \times \text{gender}) - (3.2649 \times \text{time}) - (0.1565 \times \text{Heart Rate})$

**Harvard step test**-This test requires the athlete to step up and down off a gym bench for 5 minutes at a rate 30 steps/minute which measures the Aerobic fitness test. The distance to be covered is 1 mile on normal track. After the workout, timing, heart rate, has to be measured. The athlete steps up and down onto a standard gym bench once every two seconds for five minutes (150 steps), The assistant stops the test after 5 minutes

The assistant measures the athlete's heart rate (bpm) one minute after finishing the test - Pulse1

The assistant measures the athlete's heart rate (bpm) two minutes after finishing the test - Pulse2

The assistant measures the athlete's heart rate (bpm) three minutes after finishing the test - Pulse3

b. Rock fort one mile test- Main objective to check the development of vo2 max.

Harvard step test fitness index score

Rating	Fitness Index	Rating	Fitness index
Excellent	>96	Below average	54-67
Good	83-96	Poor	<54
average	68-82		

In the **Harvard step test** for cardiovascular fitness, the physical efficiency index

$\text{PEI} = (\text{Duration or exercise in seconds} \times 100) \text{ divided by } 2 \times \text{Sum of pulse counts in recovery}$

## Rockport fitness walking test

Administration of Test :

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(i) Choose a windless day to conduct the test.

(ii) Record your weight in pounds (lbs) (iii) Walk

one mile (1609 mt) as fast as possible.

(iv) Record the time to complete the one mile walk.

(v) Immediately on finishing the walk record your heart rate (beats per minute).

(vi) Determine your Maximum Cardio-Respiratory ability (VO<sub>2</sub>) from the calculation given below

Calculation Procedure :

Analysis of the result is done by comparing it with the result of previous test. It is expected that, appropriate training between each test should be done to show improvement.

The formula used to calculate

VO<sub>2</sub> Max is :  $132.853 - (0.0769 \times \text{weight}) - (0.3877 \times \text{Age}) + (6.315 \times \text{Gender}) - (3.2649 \times \text{Time}) - (0.1565 \times \text{Heart rate})$

Where :- (a) Weight is in pounds (lbs),

(b) Gender : Male = 1 and Female = 0

(c) Time is expressed in minutes and seconds,

(d) Heart rate is in beats/minute

(e) Age in years.

### **Rikli and Jones senior citizen fitness test**

The Rikli and Jones Senior Citizen Fitness Test for assessing the functional fitness of older adults describes easy to understand and effective tests to measure aerobic fitness, strength and flexibility using minimal and inexpensive equipment. The Individual fitness test items involve common activities such as getting up from a chair, walking, lifting, bending and stretching.

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The tests were developed to be safe and enjoyable for older adults while still meeting scientific standards for reliability and validity. The tests are

(i) Chair Stand Test-testing lower body strength

(ii) Arm Curl Test-testing upper body strength

(iii) Chair sit and Reach Test-lower body flexibility test

(iv) Back Scratch Test-upper body flexibility test

(v) 8 Foot Up and Go Test-agility test

(vi) Walk Test (6 min) or Step in Place Test (2 min)-The Walk Test is used to assess aerobic fitness ;

however, if the person uses orthopedic devices when walking or has difficulty balancing, they do the Step in Place Test.

Fitness Index (F.I.)

**The Arm Curl Test** is a test of upper body strength. The purpose of this test is to measure upper body strength and endurance. The subject has to do as many arm curls as possible in 30 sec. This test is conducted on the dominant arm side (or stronger side), the procedure is (i) The subject sits on the chair holding the weight (8 pounds for men / 5 pounds for women) in the hand using a suitcase grip (palm facing towards the body) with the arm in a vertically down position beside the chair.

(ii) The upper arm is placed against the body so that only the lower arm is moving (the tester may assist to hold the upper arm steady).

(iii) The subject curls the arm up through a full range of motion, gradually turning the palm up (flexion with inspiration).

(iv) Then the arm is lowered through the full range of motion, gradually return to the starting position.

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The arm must be fully bent and then fully straightened at the elbow.

(V) Repeat this action as many times as possible within 30 sec.

(vi) score is the total number of controlled arm curls performed in 30 sec.

The **sit and reach test** is a common measure of flexibility, and specifically measures the flexibility of the lower back and hamstring muscles. This test is important as because tightness in this area is implicated in lumbar lordosis, and lower back pain. This test was first described by Wells and Dillon (1952) and is now widely used as a general test of flexibility.

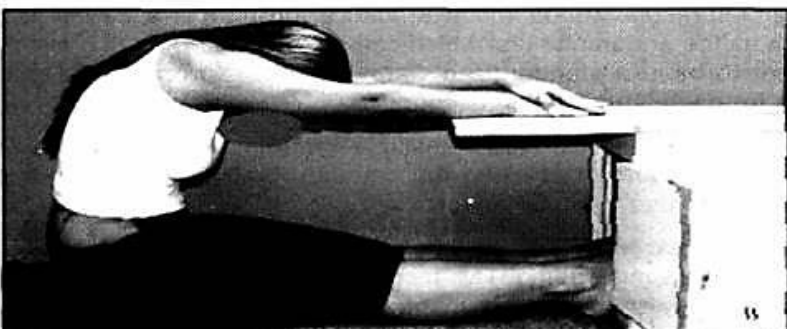
### 7.5 Measurement of flexibility-Sit & Reach Test

1. Test for absolute flexibility
2. Test of Relative flexibility
  - a. Measure of linear flexibility test
  - b. Rotary (Angular measure flexibility test)

**I. Sit and Reach Test:** This test is used to measure the flexibility of the back and leg (hamstring muscle) It is a kind of absolute and linear test of flexibility.

**Equipment:** A testing box or a flexomeasure and a yardstick.

**Procedure:** The subject is asked to remove shoes and place his/her feet against the testing box while sitting on the floor with straight knees. Now the subject is asked to place one hand on top of the other so that the middle finger of both hands are together at the same length. The subject is instructed to lean forwards and place his/her hands over the measuring scale lying on the top of the box with its 10 inch mark coinciding with the front edge of the testing box. Then, the subject is asked to slide his/her hands along the measuring scale as far as possible without bouncing and to hold the farthest position for at least one second.



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**Score:** Each subject is given three trials and the highest score nearest to an inch is recorded and 10 inches are subtracted from the recorded reading to obtain the flexibility score which is compared with the standards given in.

**Table source:** Based on personal experience.

**Validity:** This test only measures the flexibility of the lower back and hamstrings, and is a valid measure of this.

**Reliability:** The reliability of this test will depend on the amount of warm-up that is allowed, and whether the same procedures are followed each time the test is conducted. Most sit and reach testing norms are based on no previous warm-up, though the best results will be achieved after a warm up or if the test is preceded by a test such as the endurance test which can act as a warm up. If a warm up is used, it is important to have a standardized warm up and test order and repeat the same conditions for each time the test is conducted.

**Advantages:** The sit and reach test is a common test of flexibility, and is an easy and quick test to perform. If using the standard testing procedure, there is a lot of published data to use for comparison.

**Disadvantages:** Variations in arm, leg and trunk length can make comparisons between individuals misleading. This test is specific to the range of motion and muscle and joints of the lower back and hamstrings, and may not be relevant to other parts of the body.

### **Back scratch test**

This test is performed in standing position. Keep one hand behind the head and back over the shoulder and reach as far as possible down middle of your back. Your palm should touch your body and the fingers should be downwards. Then carry other arm behind your back palm facing outward and fingers upward and reach up as far as possible trying to touch or overlap the middle fingers of both hands. Fingers should be aligned. Measure the distance between the tips of fingers. If the finger tips touch then score is zero, if they do not touch measure the distance between finger tips (negative), if they overlap then by how much (+ score).

### **Eight foot up and go test**

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This test is a coordination and agility test for senior citizens.

Purpose: To assess speed, agility and balance while moving.

Equipments required: A chair with straight back( about 44 cms high) a stopwatch, cone marker, measuring tape, and area without hinderance.

Procedure: Keep chair next to the wall and the marker, 8 feet in front of the chair. The participant starts completely seated, with hands resting on the knees and feet flat on the ground. On the command 'go' stopwatch is started and the participant stands and walk (on running at all) as quickly as possible to and around cone and returns to the chair to sit down. Time is noted as he sits down on the chair. Two trials are given to the participant.

Scoring: The best trial is recorded to the nearest 1/10<sup>th</sup> second.

### 7.6 Rikli Jones-Senior Citizen Fitness Test

Test Item	Parts of Body-Physical fitness Components
1. Chair stand test for lower body	1. Lower body strength, leg strength & strength Endurance
2. Arm curl test for upper body flexibility	2. The upper body strength, arm flexor, strength & endurance
3. Chair sit & reach test for lower body flexibility	3. The hemi string and lower back flexibility
4. Back-scratch test for lower body	4. The upper body flexibility of the body &Flexibility range of motion of the shoulders
5. Eight foot up & Go test for agility	5. The motor agility, speed & balance
6. Six minute walk test for aerobic endurance	6. Cardio-vascular endurance & recovery

#### (a) Chair Stand test for lower body strength

**Purpose and Daily Benefit:** The purpose of the Chair-Stand is to measure the strength of

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lower body of adults over 60 years of age. Lower body strength is important for activities such as getting out of a chair, on the bus, out of the car, and rising up from a kneeling position in the house or garden. The strength of your lower body can directly affect the ease with which you perform the activities you do every day.

**Equipment:** Chair without arms, Stopwatch.

**Procedure:** Place the chair against a wall where it will be stable. Sit in the middle of the chair with your feet flat on the floor, shoulder width apart, back straight. Cross your arms at the wrist and place them against your chest. The test partner will tell you when to begin and will time you for 30 seconds, using the stopwatch. You will rise up to a full stand and sit again as many times as you can during the 30 second interval.

- (a) Each time you stand during the test be sure you come to a full stand.
- (b) When you sit, make sure you sit all the way down. Do not just touch your backside to the chair. You must fully sit between each stand.
- (c) Do not push off your thighs, or off the seat of the chair with your hands to help you stand unless you have to.
- (d) Keep your arms against your chest crossed and do not allow the arms to swing up as you rise.
- (e) If you are on your way up to stand when time is called you will be given credit for that stand.



**Scoring:** The score is the number of completing correct chair stands in 30 minutes.

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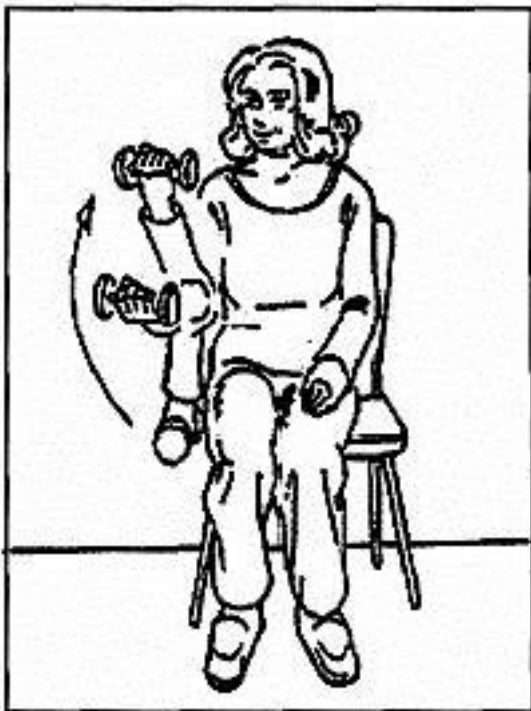
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**(b) Arm Curl test for upper body strength**

**Purpose:** This test measures upper body strength and endurance.

**Equipments Required:** 4 pound weight (women, AAHPERD), 5 pound weight (women, SFT), 8 pound weight (for men). A chair without armrests, stopwatch.

**Procedure:** The aim of this test is to do as many arm curls as possible in 30 seconds. This test is conducted on the dominant arm side (or strongest side). The subject sits on the chair, holding the weight in the hand using a suitcase grip (palm facing towards the body) with the arm in a vertically down position beside the chair. Brace the upper arm against the body so that only the lower arm is moving (tester may assist to hold the upper arm steady). Curl the arm up through a full range of motion, gradually turning the palm up (flexion with supination). As the arm is lowered through the full range of motion, gradually return to the starting position. The arm must be fully bent and then fully straightened at the elbow. The protocol for the AAHPERD test describes the administrator's hand being placed on the biceps, and the lower arm must touch the tester's hand for a full bicep curl to be counted. Repeat this action as many times as possible within 30 seconds.



**Scoring:** The score is given for the total number of controlled arm curls performed in 30 seconds.

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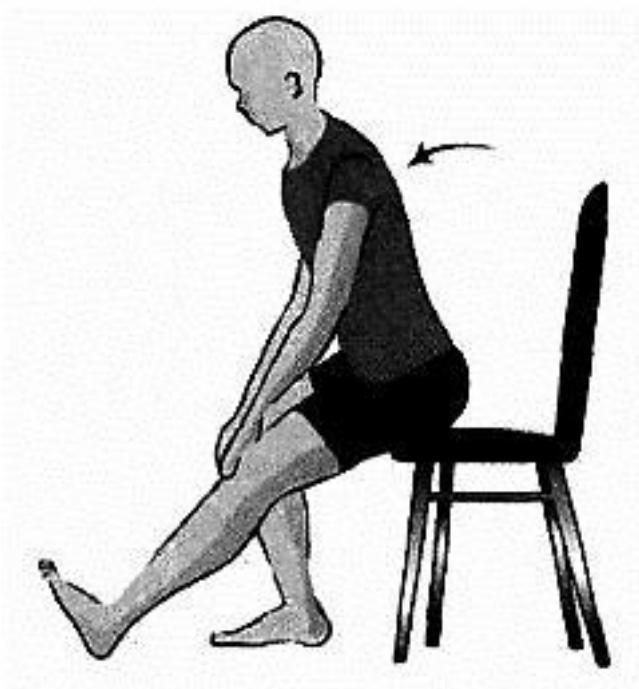
### (c) Chair Sit and Reach test for Lower Body Flexibility

The Chair Sit and Reach test is a part of the Senior Fitness Test Protocol, and is designed to test the functional fitness of seniors. It is a variation of the traditional sit and reach flexibility test.

**Purpose:** This test measures flexibility of lower body.

**Equipments Required:** Ruler, straight back or folding chair, (about 17 inches/44 cm high)

**Procedure:** The subject sits on the edge of a chair (placed against a wall for safety). One foot must remain flat on the floor. The other leg is extended forward with the knee straight, heel on the floor, the ankle bent at 90°. Place one hand on top of the other with tips of the middle fingers even. Instruct the subject to inhale, and then as they exhale, reach forward towards the toes by bending at the hip. Keep the back straight and head up. Avoid bouncing or quick movements, and never stretch to the point of pain. Keep the knee straight, and hold the reach for seconds. The distance is measured between the tip of the *Chair sit & reach test for lower body flexibility* fingertips and the toes. If the finger tips touch the toes then the score is zero. If they do not touch, measure the distance between the fingers and the toes (a negative score), if they overlap, measure by how much (a positive score).



**Scoring:** Perform two trials. A score is recorded to the nearest inch or 1 cm as the distance

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reached, either a negative or positive score. Record with leg was used for measurement.

#### **(d) Back Stretch for Upper Body Flexibility**

**Aim:** The Back Scratch Test measure flexibility of your upper body. Upper body's flexibility affects your ability to reach for items that may be high on a shelf, change a light bulb, or do any activity that requires arm and/or shoulder movement. Maintaining flexibility in your upper body will assist you in continuing to live independently.

**Equipment:** Ruler

**Procedure:** Place your left arm straight up in the air above your left shoulder. Bend your left arm at the elbow to reach toward your back, with your fingers extended. Your elbow pointed toward the ceiling. Place your right hand behind your back with your palm out and your fingers extended up. Reach up as far as possible and attempt to touch the fingers of your two hands together. Some people are not able to touch at all, while other's fingers may overlap. Take two practice stretches with each arm, determining which side is more flexible. You will be measuring and recording only your most flexible side. You are now ready to be measured. Perform the stretch as outlined above. Without shifting your hands your test partner will position your fingers so that they are pointing toward each other.



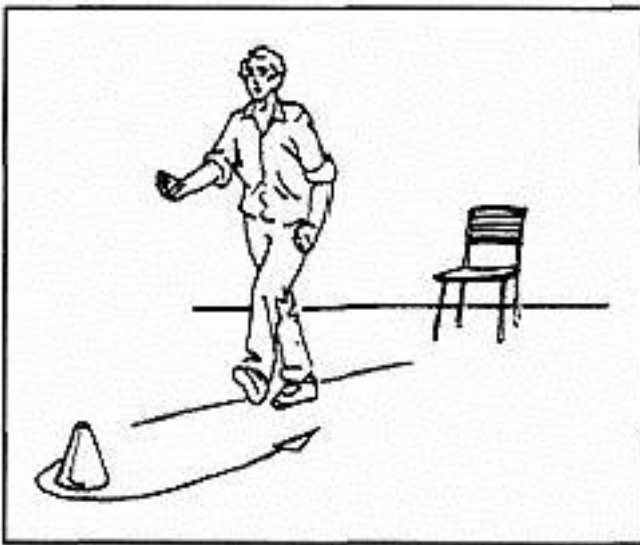
**Scoring:** The distance between the finger tips of one hand and the other is measured to the nearest half inch or centimeters. If your fingers overlap, the amount of the overlap will be measured. Fingertips just touching receive a score of "0". If your fingers do not touch, you receive a negative score of the distance between your fingers, measured to the nearest half inch or centimeters.

### (e) Eight Foot Up and Go Test for Agility

**Aim:** The '8 Foot Up and Go' is a coordination and agility test for the elderly, which is a part of the Senior Fitness Test. This test measures speed, agility and balance while moving.

**Equipments required:** Stopwatch, straight back or folding chair (about 17 inches/44 cm high), one marker, measuring tape, area clear of obstacles.

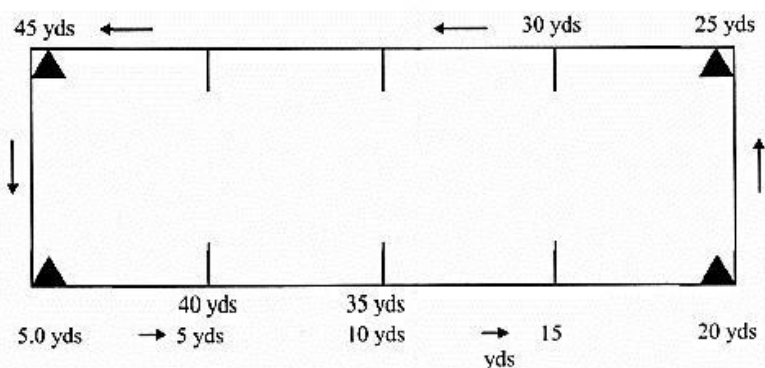
**Procedure:** Place the chair next to a wall (for safety) and the marker 8 feet of the chair. Clear the path between the chair and the marker. The subject starts fully seated, hands resting on the knees and feet flat on the ground. On the command, "Go," timing is started and the subject stands and walks (no running) as quickly as possible (and safely) to and around the cone, returning to the chair to sit down. Timing stops as they sit down.



**Purpose:** To assess aerobic fitness or aerobic endurance which is important for walking distances, stair climbing, shopping and sightseeing etc.

**Equipment:** Stop watch. \*

Rectangular ground measuring 20 x 5 yds.



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## Unit 8

### PHYSIOLOGY AND SPORTS

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#### key points

- gender differences on physical and physiological parameters Physiological
- factors for determining components of Physical Fitness Effects of exercise on
- Cardiovascular, Respiratory and muscular system Physiological changes
- due to ageing
- Role of exercise in slowing ageing process

#### **Gender differences between physical and physiological parameters**

There are following physical differences between males and females:

**Body size:** there is a lot of difference in body size of males and females. The size of body of males is larger in comparison to females.

**Body shape:** In males 'V' Shaped body is considered the best whereas in females slim constitution of body is considered the best.

**Vertebrae, legs and knees:** The vertebrae in females is long in comparison to hands and legs whereas in males the vertebra is small in comparison to hands and legs .

**Centre of gravity:** The height of female is usually found is less in comparison to males. The centre of gravity of females is less high and the height of centre of gravity of males is high. This is the reason why the stability in females is more than males.

**Abdomen:** females have larger abdominal cavity than males. This is due to the fact that females have additional organs of reproduction.

**Bones of shoulders:** The shoulder bones of females are found to be weak in comparison to shoulder bones of males. Due to this reason, females are provided low weight equipments in

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throwing events.

The physiological difference in females and males are follows:

**Muscular strength:** The muscular strength of females is less than males. The contraction and extension of muscles of females is less forceful whereas males have more forceful contraction and extension of muscles.

**Blood circulation:** The size of heart in females is smaller in comparison to males. and also there is less amount of blood in females than males. Generally the heart rate of females remain more than males.

**Respiratory organs:** Lungs of females are smaller in comparison to males. That's why, females have less endurance than males. In fact, lung capacity of normal healthy female is 10% less in comparison to male of similar shape and size.

**Menstrual cycle:** Females should not perform strenuous and vigorous works during menstrual cycle whereas in males there is no such type of cycle.

### **Physiological factors for determining strength.**

The following are the factors for determining strength:

- **Muscle composition:** There are two types of fibres in muscles i.e. fast twitch fibres and slow twitch fibres. The muscles which consist of more percentage of fast twitch fibres will produce more strength.
  - **Size of the muscle:** The strength of an individual depends on the size of muscle. As larger and bigger muscle produce more force and with the help of different methods of strength training , the size of the muscle can be increased.
  - **Body weight:** there is a positive relation between body weight and strength. The individuals who are heavier are stronger than the individuals who are lighter in weight.
  - **Intensity of nerve impulse:** A muscle is composed of no. of motor units. The total force of muscle depends upon the number of contracting motor units. Whenever, a stronger nerve impulse from central nervous system excite more number of motor units , the muscle will contract more strongly or it can be said that the muscle will produce more force or strength.
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## **Physiological factors for determining speed.**

The following are the factors for determining speed:

- **Muscle composition:** The muscles which consist of more percentage of fast twitch fibres contract with more speed and produce a greater speed. Different muscles of the body have different percentage of fast twitch fibres.
- **Explosive strength:** it depends on the shape, size and coordination of muscles. For very quick and explosive movement, explosive strength is required. The related proportion of fast twitch fibres and slow twitch fibres determines the maximum possible speed with which the muscle can contract.
- **Flexibility:** It also determines the speed. Good flexibility allows maximum range of movements and also enables complete utilization of explosive strength.
- **Biochemical reserves and metabolic power:** muscles require more amount of energy and high rate of consumption for maximum speed performance. For this purpose the stores of ATP & CP in the muscles should be enough. If the store is less, the working process of the muscles slows down after short time.

## **Physiological factors for determining flexibility.**

The physiological factors for determining flexibility are:

- **Muscle strength:** Flexibility depends on the level of strength. Weak muscles can become a limiting factor for achieving higher range of movement. Muscle strength is highly trainable therefore, it can enhance flexibility.
- **Joint structure:** There are several different types of joints in human body. Some of the joints intrinsically have a greater range of motion. eg. the ball and socket joint of the shoulder has the greatest range of motion.
- **Age and gender:** flexibility decreases with the advancement of age. It can be enhanced with the help of training. Gender also determines the flexibility as females tend to be more flexible than males.
- **Internal environment:** The internal environment of an athlete influences the flexibility. If internal temperature increases flexibility increases; if it decreases flexibility decreases.

**Previous injury:** Injuries to connective tissues and muscles ultimately lead to reduced



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flexibility

### **Physiological factors determining endurance.**

Aerobic capacity:-

(1) oxygen intake

(ii) oxygen transport

(iii) oxygen uptake

(a) Energy reserves,

(b) Lactic acid tolerance,

(c) Movement economy,

(d) Muscle composition

Oxygen Uptake:- It is highest rate at which oxygen can be taken up and consumed by the heart per minute.

Cardiac Output:- The cardiac output is simply the amount of blood pumped by the heart per minute.

Hydration and Endurance Exercise: - Sweating is normal physiological response to prolonged exercise, required for the dissipation of heat produced during energy metabolism

### **Effect of exercise on the cardiovascular system**

(i) Cardiac output is the amount of blood pumped by the heart in 1 min. This increases directly with increasing exercise intensity.

(ii) The heart rate increases from a resting rate of 72 beats / min to 150 beats / min or even more.

(iii) The stroke volume, meaning the amount of blood pumped into the Aorta with every heartbeat, increases from a resting volume of 70-90 mL to 100-120 mL per beat.

(iv) Exercise increases the plasma volume of blood by 12% ; but total blood volume may \_\_\_\_\_

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reduce slightly.

(V) Blood flow is redistributed with more blood going to the muscles, heart and skin, while blood in the kidneys and abdomen is reduced.

(vi) Blood pressure increases due to exercise because there is more blood flowing in the blood vessels.

### **Effects of exercise on muscular system.**

- Size and shape of muscle changes: Regular exercise changes the shape and size of the muscle. Cells of the muscles are enlarged which change the shape and size of the muscle.
- Correct body posture; regular exercise keeps the correct posture of the body by strengthening the muscles. The postural deformities do not occur. If there is any physical deformity, then it is removed.
- Food storage increases: the capacity of food storage in body can be enhanced by doing regular exercises. This stored food can be utilized immediately when required. Toned
- muscles: regular exercise helps in keeping the muscles in toned position. Muscles become firm and maintain a slight, a steady pull on the attachments. Efficient movement of muscles:
- The movement of muscles becomes efficient and smooth. The movements during different activities become attractive.
- Change in connective tissues: the connective tissues become powerful. These tissues can bear the stress of strenuous activity.

### **Effects of exercise on respiratory system.**

- Increase in Tidal air capacity: by doing regular exercise it has been noted that there is an increase in the amount of tidal air capacity of an individual.
  - Decrease in rate of respiration: When a beginner starts exercising his rate of respiration increases. But when the same individual perform exercise daily, his rate of respiration decreases in comparison to the beginner at rest.
  - Strong will power: regular exercise increases the will power of an individual. As pranayama, the specific exercise for lungs increases the will power of the doer. Unused
  - alveolus becomes active : Regular exercise activates the unused alveolus because much amount of oxygen is required in vigorous activities of daily routine.
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The passive alveolus become active.

- Increase in vital air capacity: The capacity of vital air capacity varies from 3500cc to 4500cc in a normal adult. Due to regular exercise its capacity increases upto 5500cc.

**Ageing** is the process of becoming older. It represents the accumulation of changes in a person over time. Ageing in humans refers to a multidimensional process of physical, psychological, and social change.

### **Role of regular exercise on ageing process,**

Regular exercise keeps the human body livelier, fitter and In better condition, thus delaying the ageing processes. As Given below :

(I) exercise reduces the loss of elasticity from the lungs and chest wall agencies increase muscle strength and hypertrophy by increasing the cross-sectional area of the Slow Twitch Fibers (sm and Fast Twitch Fibers (FTF). This slows down ageing · The body composition changes due to exercise by reducing the fat content of the body, thus slowing down the ageing process. fu Exercise impel flexibility by strengthening the musculoskeletal systems, thereby preventing the bickering of joints. This also slows the ageing process.

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## UNIT - 9

### SPORTS MEDICINE

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#### **Key Points:**

- Concept, Aims & Scope of Sports Medicine
- Sports Injuries: -Classifications, Causes & Preventive Measures
- First Aid- Aims & Objectives
- Management of Injuries

#### **Sports medicine**

Sports medicine is a branch of healthcare. It deals with the diagnosis, treatment and prevention of Injuries related to participation in sports and / or exercise.

#### **Scope of sports medicine**

In the field of physical education and sports, the fields of various sub-disciplines of sports medicine are utilize. Without the knowledge of scope of sports medicine it is difficult to carry a sportsperson performance at apex level. There are following scope of sports medicine:

- a) Sports and first aid
- b) Human anatomy and physiology
- c) Female and sports
- d) Study of optimal load for different age groups
- e) Scientific promotion of games and sports
- f) Sports injury rehabilitation
- g) Fitness for games and sports.

#### **Aims of sports medicine**

- 
- a) To provide information to athletes about injuries.
  - b) To provide knowledge about the causes of injuries.
  - c) To provide means or treatment for sports injuries and for rehabilitation of injuries.
  - d) To provide knowledge about the preventive measures of sports injuries.
- d.** To aware the sports person & athlete about the different kinds of injury in respect of different games.
- e.** To concentrate on the causes of injury

### **Concept of Sports medicine**

- Bio-mechanics related to sports
- Effect of attitude on endurance performance
- Psychological aspect performance
- Nutrition & metabolism in relation to competition & performance Recommendations of
- FISM(the International Federation of Sports Medicine at world level)
  
- Cardio-respiratory function in relation to performance Exercise in
- Cardio-Vascular disease prevention & rehabilitation

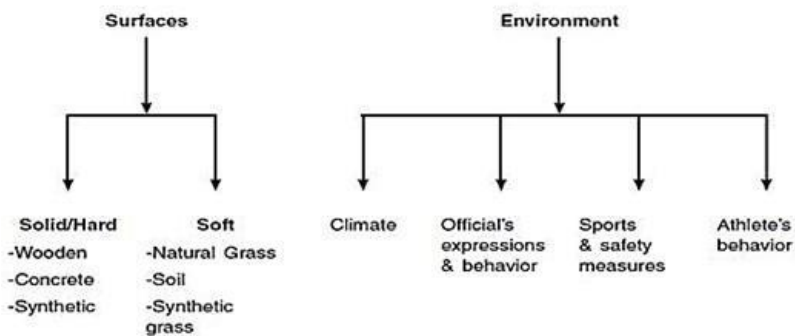
### **Prevention of Sports Injuries :**

- Pre-participation of medical check up
  - Proper conditioning
  - Avoid dehydration
  - Protective Sports equipment & Gears
  - Adequate & effectively maintained facilities
  - Sports person's psychological conditions & environment
  - Adequate rehabilitation/Injury management
  - Proper use of right techniques
  - Balanced diet & adequate rest
  - Use of proper skills
  - Warming up & cooling down
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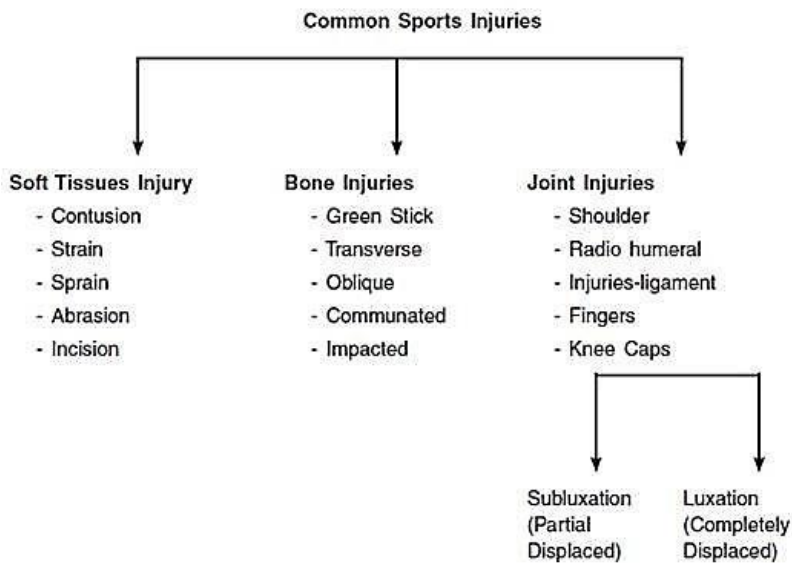
## Impact of surface on athletes

There are two types of surfaces used in any indoor or outdoor games. These are natural and artificial surfaces. Natural surfaces is the surfaces that are prepared through proper combination of natural elements like soil and grass. On the other hand, artificial surfaces are more like carpets which are made from artificial components like rubber, synthetic fiber etc. These surfaces impact performance of athletes differently. In many contact games like football, cricket, running and Kabaddi natural surfaces are preferred because they provide more familiarity, grip and avoid severe injuries. On the other hand, artificial surfaces provide more opportunities for practice because their use need not be stopped for maintenance. Also, with innovation in technology, artificial surfaces are becoming more user friendly. Risks of injuries are reducing in artificial surfaces also nowadays.

## 3 Impact of Surfaces and Environment on Athletes



## 9.4A. Sports Injury

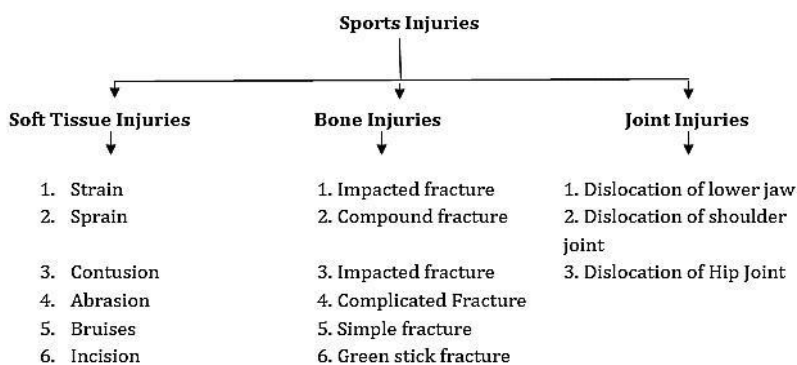


Intrinsic Risk Factor	Extrinsic Risk Factor	
Physical Preparation Lack of proper training Fitness label Improper warming up & cooling Down Over use of muscles Muscles imbalance <b>Individual variables:-</b> a. Gender and Age b. Nutrition c. Fatigue d. Posture deformities	<b>Coaching</b> a. Poor techniques b. Lack of knowledge  Skill Rules & Regulations Surrounding Environment Equipment Facilities	<b>Environmental</b> Factors a. Climate b. Playing Surface c. Preventive surfaces d. Medical facilities

**Climatic conditions affect the performance**

Environmental conditions, such as excessively high or low temperatures, have the potential to have a negative impact on an athlete’s well-being. An athlete’s ability to use a number of thermoregulation techniques helps in regulating body temperature.

Sports injuries are those which are common in the field of games and sports. During training, competition or practice, any player can be injured. Perhaps there will not be any player who has not been injured during his career.



**Strain** is also a muscle injury. A strain is caused by twisting or pulling a muscle or tendon. A sudden strain is caused by a recent injury, lifting heavy objects or rods in wrong way and over stressing the muscles. Chronic strain are usually caused by moving the muscles and tendons in repetition.

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**Sprain** is a ligament injury. It may occur due to overstretching or tearing of ligaments. Many things can cause sprain. Falling, twisting, or getting hit can force a point out of its normal position. This can cause ligaments around the joints to tear. Generally, Sprain occurs at wrist and ankle joints.

### **Prevention of sprain and strain**

- a) Conditioning should be performed during the preparatory period.
- b) Sports equipments must be of good quality.
- c) Play courts should be smooth and clean.
- d) The scientific knowledge of games should be must for preventing strain.
- e) Player should discontinue during the condition of fatigue.
- f) Good officiating is essential for preventing such injury.
- g) Players should be careful and alert during practice, training and competition.

**Abrasion** is a key injury generally occurs due to friction with certain equipments or a fall over the area where bone is very close to skin. It may be caused by a fall on hard surface. As someone falls or slides on the ground, friction causes layers of the skin to rub off.

**Bruises** are not clearly seen as upper skin remains undamaged and inner blood vessels are damaged and collect beneath the skin. A fresh bruise may actually be reddish and after a few hours it turns to blue or dark purple.

A **laceration** is a wound that is produced by tearing of soft body tissue.

**Contusion** is a muscle injury. A direct hit with or without any sports equipment can be the main cause of contusion. Contusion can also be due to minor accidents to the skin such as falling, bumping into something or being hit or kicked. In contusion blood vessels in muscles are broken and sometimes bleeding may occur in the muscles which may cause bruise. Stiffness and swelling are common features at the site of contusion.

### **Management:**

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- Cold compression should be used immediately. Ice or cold water should not be used for more than 40 minutes persistently.
- The cold compression should be performed 5 to 6 times daily.
- If there is more swelling at the sight of contusion, the anti-inflammatory medicine should be given.
- If the swelling persists, consult the Doctor immediately.
- For the purpose of rehabilitation, flexibility exercises should be performed.

### **Causes of sports injuries**

To effectively diagnose, rehabilitate and ultimately prevent subsequent injuries, a sport therapist

- Anatomical Factors: These are related to make up of the body. Leg length differences and cause injuries to ankle, hip and back.
- Age related causes As the body ages, it changes. It is less able to produce force, recovers slower and soft tissues lose the ability to stretch. Therefore it is more prone to injury.
- Training related cause's Excessive repetitive loading of the tissues is needed for successive adaptation. However without suitable recovery, tissues never have the chance to adapt and can fail.
- Equipment selection factors These are related to the suitability of equipment. An instance is incorrect footwear, which will not protect the foot and ankle adequately. It also will not distribute forces effectively. Thus it increases the risk of injury.
- Impact and contact causes Impact or contact can be with objects, surfaces or other people. These injuries are common in contact sports like football, rugby, hockey etc. Also they are common in more dangerous sports like motor racing, boxing and skiing.

### **Joint injuries & its types**

A hard blow to a joint, a fall, a forceful throwing, lifting or hitting may cause dislocation. Infact it is dislocation of surface of bones.

#### **Types of dislocation**

a) Dislocation of lower jaw: it occurs when the chin strikes to any other object. It may occur if

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mouth is opened excessively.

b) Dislocation of shoulder joint: dislocation of shoulder joint may occur due to a sudden jerk or a fall over a hard surface. The end of the humerus comes out from the socket. In fact when your shoulder dislocates, a strong force, such as a sudden blow to your shoulder. Pulls the bones in your shoulder out of place.

c) Dislocation of hip joint: By putting maximum strength spontaneously may cause dislocation of hip joint. The end of the femur is displaced from the socket.

d) Dislocation of wrist: A sportsperson who participates in a sports or game in which he may fall, runs the risk of getting a dislocated wrist. A miscalculated landing can also cause a dislocated wrist. In fact, it generally occurs to the person who uses his hand to break his fall.

### **Preventions:**

a) Adequate warming-up should be performed prior to any activity.

b) Proper conditioning should be performed during preparatory period.

c) Stretching exercises should be included in warm-up

d) Players should be careful during training and competition.

e) Protective equipments should be used

f) Players should have good anticipation and concentration power

g) Always obey the rules and regulations.

h) Perform regular exercise around your shoulder, hip, and wrist joints etc.

i) Avoid falls or hits as far as possible.

### **Causes of fracture**

Fracture usually occurs due to a high impact on the bone. It can be caused by overuse. The most common causes of fracture are:

a) In such sports event where there is a high impact.

- 
- b) Traumatic, forceful and unnatural movements.
  - c) Prolonged long distance walking or running.
  - d) Sudden fall on hard surface.
  - e) Direct strike or hit with any solid sports equipment.
  - f) Osteoporosis.

### **Management of Fracture**

- a) Elevate the extremity and rest while bone heals itself.
- b) Apply ice to the affected part for 24 to 48 hrs
- c) If pain persists, give painkillers.
- d) If there is any need of immobilization to the affected part, use a slint
- e) After removal of swelling begin to put partial weight on the affected area.
- f) Crutches or walking stick may be used in the beginning. After two weeks start putting normal weight.
- g) For 6 to 8 weeks, avoid the activity that caused stress fracture. Then start doing the activity slowly.

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## UNIT 10

### KINESIOLOGY, BIOMECHANICS & SPORTS

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#### **Key Points:**

- Projectile & factors affecting projectile trajectory
- Newton's laws of motion and their application in sports
- Aerodynamics principles
- Friction & Sports
- Introduction to Axes And Plane
- Types of movements( Flexion, Extension, Abduction, Adduction)
- Major muscle involved in Running , Jumping And Throwing

#### **Projectile**

Projectile: an object thrown into the space either horizontally or at acute angle under the action of gravity is called a projectile. In the field of games and sport there are many examples of projectiles such as putting the shot, throwing a hammer, discus and javelin in athletics.

#### **Factors affecting projectile trajectory**

Propelling Force : The propelling force produces certain effects depending upon its point and direction of application. If the application is directly through the projectile's centre of gravity, only linear motion results from the force. As the projecting force is moved further from the centre of gravity, rotator motion of the object increases at the expense of linear motion. If the force is below the object's centre of gravity, back spin is results. Forward spin results when the force is above the centre of gravity. When the force is off centre to the left, clockwise spin results and when it is off centre to right, counter clockwise spin occurs.

Force of Gravity: As soon as contact is broken with a projected object, the force of gravity begins to diminish the upward velocity of the object. Finally, gravity overcomes the

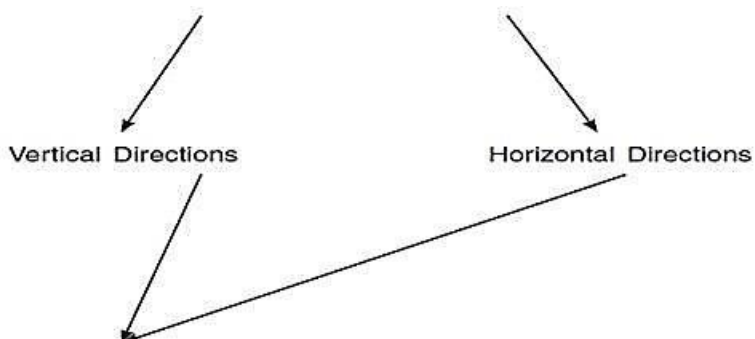
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effects of the upward component of the projectile's motion and the object begins to descend. The factors that determine how soon gravity will cause the object to descend are -

- (a) Weight (mass) of the object
- (b) amount of force driving it upward
- (C) the effect of air resistance on the object.

(iii) Effect of Air Resistance As the speed of an object increases, air resistance has a greater retarding effect. The more surface area an object presents in the direction of movement, the greater will be the effect of air resistance.

### **Projectile & factors affecting Projectile Trajectory**



- Speed of Release
- Angle of Release(Trajectory of Relax)
- Height of Release

### **Newton's laws of motion and their application in the field of sports.**

The three laws of motion formulated by Newton are described below

1.Law of inertia: According to this law a body at rest will remain at rest and a body in motion will remain in motion at the same speed and in the same direction unless acted upon by an external force. There are great examples of this law in sports such as starting in rowing, starting in sprinting, starting in throwing the hammer. Basically if an object is in motion, it remains in motion unless something or some external force stops it. The external force may be gravitational force, the surface of playing field or a defensive player etc.For Ex: Starting in sprinting, starting in rowing, starting in hammer throw.

2.Law of acceleration: According to this law, A change in motion is directly proportional to the force producing it and inversely proportional to its mass. If two unequal forces are

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applied to objects of equal mass, the object that has greater force applied will move faster. Conversely, if two equal forces are applied to objects of different masses, the lighter mass will travel at a faster speed. eg. in hammer throw, a thrower who is stronger will throw the hammer farther than a thrower who is less stronger.

**3. Law of reaction:** According to this law ' For every action there is an equal and opposite reaction.' There are so many examples in sports where this law is applied. e.g., In swimming a swimmer pushes the water backwards (action) and the water pushes the swimmer forward (reaction) with the same force. In swimming, a swimmer pushes the water backwards(action). The water pushes the swimmer forward( reaction) with the same force.

**Aerodynamics** is the study of properties of moving air and the interaction between the air and solid bodies moving between it.

**The basic forces of aerodynamics** are stated below:

**Lift:** lift is the force that pushes the object to move upward. It is the force that is the opposite of weight.

**Weight:** Weight is the force generated by the gravitational force of the earth. The weight of an object controls how strong the push has to be. A shot of 16 pounds requires more force (push) than a javelin.

**Drag:** Drag is a force that tries to slow the object down. It makes hard for an object to move. It is harder to walk through the water than through the air. It is because water causes more drag than air.

**Thrust:** Thrust is a force that is the opposite of drag. Thrust is the push that moves some objects forward.

### **Friction and its types**

The force acting along two surfaces in contact which oppose\ the motion of one body over the other is called the force of friction. It is very important in sports. That - lagged the area of contact between the surfaces, the greater is the force of friction. When both the surfaces are smooth, the force of friction reduces to almost zero.

Three types of friction are

(i) Static Friction The opposing force that comes into plc when one body tends to move over the another surface but the actual motion has not yet red

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(ii) Limiting Friction Limiting friction is the maximum of friction force that comes into play when one body is just on the verge of moving over the surface of another body.

(iii) Kinetic Friction Kinetic friction is the opposing force that comes into play when one body is actually moving over the surface of another body.

## **Axes & Plane**

**Plane** is an imaginary, flat surface passing through the body organ or plane is the surface on which the movement occurs.

There are following types of planes:

a) Sagittal or Medial plane: The sagittal plane is a vertical plane passing from the rear to the front, dividing the body into left and right halves. It is also known as anteroposterior plane. Most of the sports and exercise movements that are two dimensional, such as running, long jumping and somersault take place in this plane.

b) Frontal or Coronal plane: the frontal plane is also vertical and passes from left to right dividing the body into posterior to anterior halves. It is also known as coronal plane. Frontal plane cuts the body into front and back. Movements along the frontal plane can include cartwheel and star jumps.

c) Transverse or Horizontal plane: The transverse plane divides the body into top and bottom halves. In fact, it divides the body into upper and lower sections. This plane lies horizontally that why it is also called horizontal plane. Movements along this plane can include an ice-skating spin or rotation to play a tennis shot.

**An axis** is a straight line around which an object rotates. Movements at the joints of human musculoskeletal system are mainly rotational and take place about a line perpendicular to the plane in which they occur. This line is known as axis of rotation.

There are following types of axes of rotation:

a) Sagittal axis: The sagittal axis passes horizontally from posterior to anterior. It is formed by the intersection of the sagittal and transverse plane. Sagittal axis passes from front to back.

b) Frontal axis: The frontal axis passes horizontally from left to right. It is formed by the \_\_\_\_\_

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intersection of frontal and horizontal plane. Frontal axis passes from side to side.

c) **Vertical axis:** The vertical axis passes vertically from inferior to superior. It passes straight through the top of the head down between feet. It is formed by the intersection of sagittal and frontal plane. It is also known as longitudinal axis. It is the longest axis.

### **Types of movements**

There are various types of movement in body parts which can be divided in four types i.e. gliding & angular movements, circumduction & rotation and few other movements.

**Gliding movements:** Gliding movements is the simplest kind of movement that can take place in a joint, one surface gliding or moving over another without any angular or rotator movement.

**Angular movement:** Angular movement occurs between long bones. By angular movement the angle between the two bones increased or decreased. The various movements which fall under angular movements are described below:

- a) **Flexion:** Bending parts at a joint so that the angle between them decreases and parts come closer together (bending the lower limb at the knee).
- b) **Extensions:** Straightening parts so that the angle between them increases and parts moves farther apart (straightening the lower limb at the knee).
- c) **Abduction** means moving a part away from the midline (lifting the upper limb horizontally to form a right angle with the side of the body))
- d) **Adduction** means moving a part towards the midline ( returning the upper limb from the horizontal position to the side of the body).

**Circumduction:** Circumduction is that movement which takes place between the head of a bone and its articular cavity. This kind of motion is best seen in the shoulder and hip joints.

**Rotation:** Rotation is a form of movement in which a bone moves around a central axis without undergoing any displacement from the axis. Moving a part around an axis is called rotation.eg. Twisting the head from side to side.

### **Major muscles involved in running**

The major muscles involved in running are described below: \_\_\_\_\_



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**Glutes:** these muscles stabilize your hips and legs. These muscles work with hamstring muscles and help in hip flexors.

**Quads:** Quads propel you forward and help straighten out the leg in front so that it can make a good contact with the surface of ground.

**Calves:** these muscles give you spring in your step and at the same time these muscles act as shock absorbers.

**Hamstrings:** As you move forward, the action switches to your hamstrings, the muscles at the back of your thigh muscles. These muscles help you in pulling the leg back behind and give you strength to propel your body forward.

**Core muscles:** Strong abs and back are really important because they keep your posture upright and overall form good. These muscles play a significant role in running.

**Biceps:** biceps also play a vital role in running. Biceps maintain a bent arm and help in swinging your arms back and forth while running.

### **Major muscles involved in jumping & throwing**

The leg, feet and gluteus muscle groups are used in jumping. Specific muscles which are involved in jumping are gluteus maximus, hamstrings, quadriceps and soleus. In fact, jumping occurs in three stages. The first stage is the preparatory stage where ankle muscles calf muscles and soleus tense to prepare launching. The second phase is the launch phase, where hip extensors, the hamstrings and gluteus maximus combine and the knee extensors extend the knees to allow the body to launch into the air. In the last stage is the landing phase where all the muscles embrace impact and allow the body to return to a resting position.

The major muscles are pectorials, major, latissimus dorsi, anterior deltoid and teres major are involved in throwing. These muscles are comparatively responsible for velocity during the throw. The pectorials major is the large muscle in the chest and latissimus dorsi are the large muscles on each side of the back. Deltoid, biceps, triceps are also involved in throwing a javelin in athletics.

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## UNIT 11

### PSYCHOLOGY AND SPORTS

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#### **Key Points :**

- Understanding stress, anxiety and its management.
- Coping strategies.
- Personality, its dimensions and types; Rule of sports in personality.
- Motivation, its type and technique.
- Self-esteem and body image.
- Psychological benefits of exercises.

#### **Psychology**

The word psychology is derived from a Greek word 'psyche' and 'logos'. 'Psyche' - soul or mind' and 'logos - study'. Generally it is accepted as study of behavior.

- Psychology is used in sport to enhance performance and to know the factors which affect our performance, like - anxiety, stress, personality, motivation, etc. Optimum level of
- anxiety is essential to perform in games and sports.

#### **Sports psychology and its importance in the field of sports.**

Sports psychology is the branch of applied psychology which deals with sports performance and the Behavior of a player during training or competitions.

Importance of Sports psychology is due to

(i) Learning of Motor Skills Sports psychology plays a major role in the learning of motor skills. Motor skills learning depends on the individual's level of readiness.

Analyzing the Behavior of Sportsmen Performance of a player depends upon the behaviors which are influenced by various factors such as sex differences, family conditions, personal

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background, heredity, growth, physical and mental maturity levels etc.

(iii) Identifying Talent for Specific Sports Every sports has specific psychological demands. e. g boxing requires more aggressiveness, whereas archery and shooting require more concentration.

(iv) Stabilizing the Performance for Longer Period It helps in stabilizing the performance of a player for a longer period. Then the performance of the player largely depends upon his psychological make up and anxiety level.

(V) Important from Research Point of View Sports psychologists works in very close proximity to coaches to uplift the performance of players. Research findings help in promotion of sports and games.

(vi) Encouraging the Players to Make a Comeback in Professional Sports Sports psychology

encourages the players, who, due to injury or some accident, are forced to take a long break from their professional career, to return to their sport.

### **Stress and its management techniques.**

A state of affair involving demand on physical or mental energy. The body's physiological response to demands place on it. In simple words stress is a condition or circumstance which can disturb the normal physical and mental health of a person.

Stress is nothing but response of body to an event or situation which are produced by physiological and psychological changes in the body stress is a body's method to react a challenge. It is fight or flight reaction.

**Coping** up is a technique which tells us how to handle anxiety or stress.

Techniques to manage Stress:-

- a) Participation in Physical activities,
  - b) Achieve a high level of physical fitness,
  - c) Building self confidence,
  - d) Relaxation techniques
  - e) Developing Hobbies
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- f) Staying cool and confident under pressure
  - g) Avoid the company of stressed persons
  - h) Don't think about stressful thoughts

### **Anxiety and its management**

**Anxiety :-** Anxiety is a psychological and physiological state of an individual. It is characterized by cognitive, emotional and behavioral components. These components combine to create an unpleasant feeling, which is associated with uneasiness, fear of worry.

**According to Levitt,** —Anxiety is a personal feeling of apprehension accompanied by an increased level of physiological arousal.

—Anxiety is a chronic fear that limits our ability to carry out normal functions.

**Anxiety** (also called **angst** or **worry**) is a psychological and physiological state characterized by somatic, emotional, cognitive, and behavioral components. It is the displeasing feeling of fear and concern. The root meaning of the word anxiety is 'to vex or trouble'; in either presence or absence of psychological stress, anxiety can create feelings of fear, worry, uneasiness, and dread.

**Anxiety in sports** is a natural reaction to threat in environment & part preparation of fight response. It is a psychological phenomenon.

**Management of Anxiety :-** Anxiety can be managed through various techniques such as (i) Deep breathing (ii) Drink water (iii) Follow advice (iv) Psychological balance (v) Warming-up (vi) No criticism (vii) Focus your target (viii) Sufficient practice (ix) Self confidence (x) Encouragement,

### **Personality its traits and types**

**Personality** is the dynamic organization within the individual of those psycho physical systems which determine his unique adjustment to his environment. Personality is not static but a dynamic concept. It is continuously changing and growing. Children may have identical environment. They may have similar experiences but they react to the same environment in different way.

Personality is a very important factor in games and sports as it influence the performance of \_\_\_\_\_

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individual by his/her level of cognition, motivation, traits and behavior.

**Types of Personality** Introverts:- Introverts are shy, self conscious quit retiring interested in the own thoughts and feelings, inclined to worry and easily upset.

**Extroverts:-** Extroverts are social, open frank, outgoing, eager to do thing adaptable, not easily worried or embarrassed and willing to work with others.

**Ambiverts:-** In ambiverts both the characteristics of introverts and extroverts are found. In every person mostly both the characteristics are found through one of them may be predominant. Sports play a very important role in personality development. They improve the following qualities. (a) Self concept (b) Mental toughness (c) Emotional stability (d) Quick Decision (e) Planning (Points to be explained) Sports and games play an important role in the development of human personality. They are no less important than food and fresh water. Games and sports help to combat anxiety, depression and stress. Sports train sportsmen to accept defeat gracefully and to move on.

### **Traits of personality**

Openness : persons wh like to lear new things, new concepts and enjoy new experiences usually remain on the top in openness. It inclues traits like being imaginative, insightful, and having a variety of interests.

a) Conscientiousness: Persons who have a high degree of conscientiousness are reliable and prompt. Such persons remain organized, systematic, laborious and complete in all respects.

b) Extroversion: Extroverts gets their energy from interacting with other individuals where as introverts get their energy from within themselves. Extroversion includes the traits of being energetic, talkative and assertive.

c) Agreeableness: Such individuals are friendly, cooperative, compatible, kind and gentle. Persons with too agreeableness may be more distant or aloof. They are usually kind, generous, affectionate and sympathetic.

d) Neuroticism: Neuroticism is also called emotional stability. This domain or dimension relates to one's emotional stability and the degree of negative emotions. Persons who have high neuroticism usually experiences emotional instability and negative emotions. Such

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individuals remain moody and tense.

### **Sheldon's classification of personality.**

**Endomorph:** Endomorphs have a pear shaped and a rounded physique. They have short arms and legs. The upper parts of arms and legs seem to be thicker than the lower parts. They have underdeveloped muscles. They are more inclined to become obese. Their excessive mass hinders their ability to compete in sports. These are most suitable for activities in which great strength is required.

**Mesomorph:** Mesomorphs have a rectangular shaped body with athletic physiques and a balanced body composition. They are able to increase their muscles size quickly and easily. They have thick bones and muscles. Their chest and shoulders are broader than the waistline. They can excel in sports which require great strength, short bursts of energy and lots of power because they have enough strength, agility and speed.

**Ectomorphs:** Ectomorphs are usually referred to as slim persons because their muscles and limbs are elongated. They have weak constitution of body and face great difficulty in gaining weight. They have flat chest and have less muscle mass. They do not have a lot of strength but they dominate the endurance sports as their body type is naturally suited to perform wonderfully in endurance sports. They are best suited for games and sports like gymnastics and long distance races.

### **Motivation and its types**

Motivation means to be inspired to do something. It is a kind of inner force which energizes a man to make constant efforts.

According to Crook and Stein, "Motivation is any condition that might energize and direct our action.]

Motivation energizes an individual to behave in particular way for attaining a specific goal.

#### Types of Motivation

There are two types of motivation

Intrinsic Motivation is within an individual and guides him/her to perform better. It is based upon needs, interest, nature, emotions, social need etc. It also depends upon knowledge of

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result, personal factor, competition zeal etc. He/she participates in sports for his/her own sake.

(ii) Extrinsic Motivation This motivation depends upon environmental factors. It has a great impact on an individual's performance. It is of various types like rewards, punishment, active participation, test evaluation, teaching methods, equipment and surroundings

(i) Healthy Sports Environment A healthy sports environment plays a vital role in motivating the sportsperson. Healthy sport environment consists of proper humidity and temperature, smooth and clean sports fields, good quality of sports equipment and other facilities. Positive Attitude For proper motivation, the coaches should try to encourage positive attitude among sportspersons. Players must think positively.

(ii) Cash Prizes, Certificates and Trophies These are good incentives to sportspersons.

Governments offer cash prizes to sportspersons who win.

### **Self Esteem**

What we think about the self, the total evaluation of negative or positive about oneself is called self esteem

### **Body Image**

Body image is how and what you think and feel about your body.

### **Factors influencing body image and self-esteem**

i) Media Images:- During teenage, the teenagers become more aware of celebrities and media images. They usually start to compare themselves with media images and celebrities.

ii) Family and school:- We do not develop our body image all on our own. The family, school and other members of society can influence our self-esteem and body image.

iii) Life experience and natural ageing process: Body image and self-esteem are also significant factors which influence the body image influence our body image and self-esteem.

### **Types of aggression**

Hostile aggression: Hostile aggression is inflicting or causing harm whether it is physical or psychological on someone else. It is sometimes referred as reactive aggression and can be accompanied by anger. In hostile aggression the main aim is to cause injury to other person.

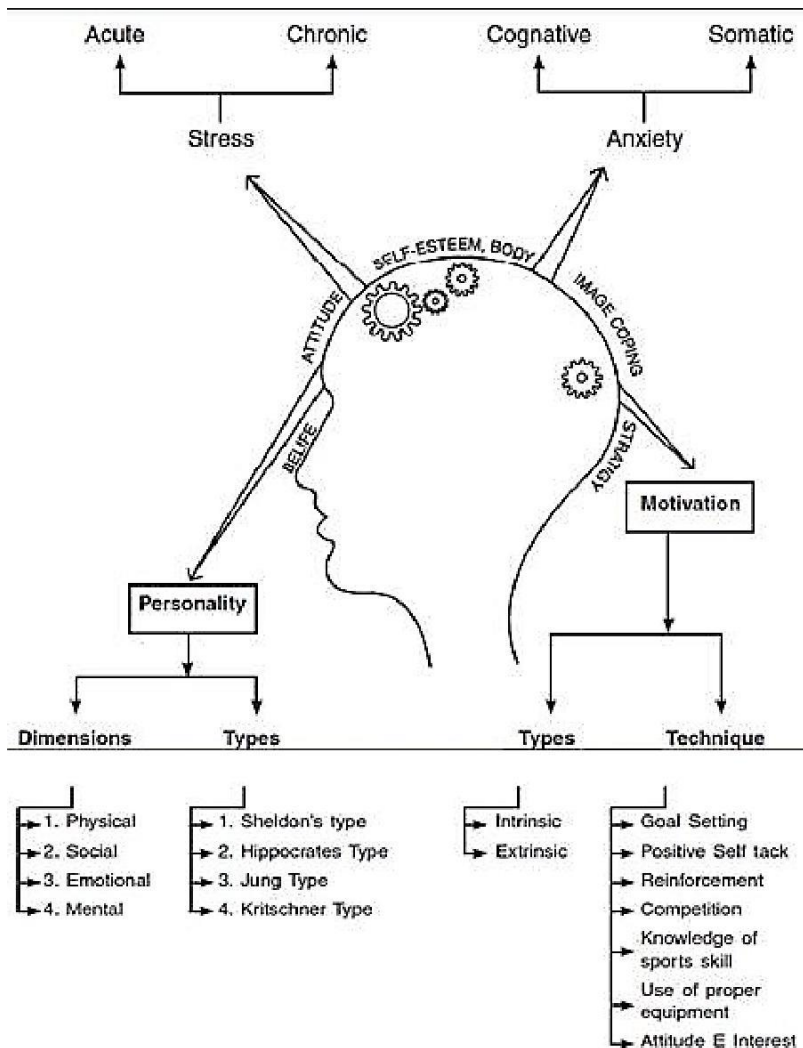
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The intention is on causing pain and suffering.

Instrumental aggression: Instrumental aggression is displaying aggressive behavior in pursuit of a non-aggressive goal. It is also known as channeled aggression is not accompanied by anger. Instrumental aggression is behavior that has intent to hurt in order to achieve money, praise or victory.

Assertive behavior: Assertive behavior is different type of aggression/aggressive behavior. This is defined as behavior that involves the use of legitimate physical or verbal force to achieve one's purpose. In Assertive behavior, the intention is to establish dominance rather than to harm the opponent.

Psychological benefits of exercise



MIND AND IT'S CONCEPTS



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## UNIT 12

### TRAINING IN SPORTS

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#### **Key Points :**

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

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

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

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

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

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

#### **Method of development**

##### **ISOMETRIC EXERCISE –**

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

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

## **ISOTONIC EXERCISE**

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

## **Isokinetic exercise**

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

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

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

Types of Speed:

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

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

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

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

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

Following are the stretching ways for flexibility development:

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

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

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

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

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

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

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

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

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

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

1. Basic Endurance: Basis endurance is the ability to perform movements in which large number of body muscles are involved and the activity is performed at slow pace for long duration such as jogging, walking, slow running and swimming.

2. Speed Endurance: It is the ability to resist fatigue in activities lasting up to 45 seconds. The event of 400 mts sprint is the most suitable example of speed endurance. This is mainly dependent upon the power and capacity of energy production.

3. General Endurance: It is the ability to resist fatigue satisfactorily cause by different types of activities. Activities may be aerobic or anaerobic in nature. These activities may be low or high intensity but for longer duration.

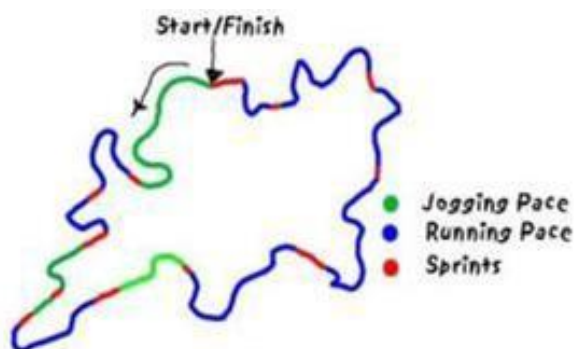
#### **Various methods to develop Endurance ability-**

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

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

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

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



## Coordinative abilities and its types

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

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

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

### **Basic coordination abilities:**

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

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

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

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

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

### **Circuit training**

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

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

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

### **Importance:**

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

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

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

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

#### **Negative impacts**

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

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

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

directly depends upon many factors.

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

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

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

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

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

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

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

