UNIT II CHILDREN AND WOMEN IN SPORTS

Overview

- Exercise guidelines of WHO for different age groups
- Common postural deformities-knock knees, flat foot, round shoulders, Lordosis, Kyphosis, Scoliosis and bow legs and their respective corrective measures.
- Women participation in Sports – Physical, Psychological and Social benefits
- Special consideration (menarche and menstrual dysfunction)
- Female athlete triad (osteoporosis, amenorrhea, eating disorders)

LEARNING OUTCOMES

At the end of the chapter, children will be able to:

- discuss exercise guidelines for different stages of growth and development.
- classify common postural deformities and identify corrective measures.
- recognize the role and importance of sports participation of women in India.
- identify special consideration relate to menarche and menstrual dysfunction.
- express female athlete triad according to eating disorders.

Discussion

Given below is a list of some common postural deformities children may suffer from. What do you know about them? Complete the first two columns of the KWL (Know-Want-Learned) Chart given below. Fill in the last column after completing your research by reading more about them.

Word	What I Know	What I Want to Know	What I Learned

Knock knees			
Flat foot			
Round shoulders			
Lordosis			
Kyphosis			
Scoliosis			
Bow legs			

Do You Know?

A UNICEF South Asia blog "How sports help girls overcome barriers and bias" had a big message sent by our legendry player of Indian cricket *Sachin Tendulkar, UNICEF Regional Goodwill Ambassador for South Asia* "Let every child, girl and boy, play a sport". The legendary cricketer mentioned that every child must have the right to play, it is the best medium to help them channel their energy and teach them some of life's most valuable lessons—on strength and determination, humility and mutual respect, on resilience and sportsmanship. Opportunity to play with an open mind encourages children to push their limits, and in the process, discover their own potential. Sports participation provides a common platform to perform and learn to win with dignity and accept defeat with humility. Sport does not differentiate between gender, it respects hard work and values of an athlete. Sport and play is not confined to children nor does it creates impact only on children, rather sports is a big wagon wheel for the upliftment of the status of women in our society. Sports field provides an opportunity for women to showcase their talent and help them grow as an individuals, living a life of dignity and self-respect.

The Indian Women's Hockey team played brilliantly in the Tokyo 2020 Olympics and produced many such examples. The captain, Rani Rampal's father could not afford to buy her a hockey stick when she was growing up, so she would play with a broken one; Salima Tete from Jharkhand would play with wooden sticks for the same reason. Deep Grace Ekka's family was criticized because she was 'allowed' to play the game despite being a girl.

2.1 Exercise Guidelines of WHO for Different Age Groups

World Health Organisation (WHO) has identified lack of physical activity, or physical inactivity, as the fourth leading risk factor for global mortality (6% of deaths globally). Regular participation in physical activities and sports provides ample opportunities to maintain physical, mental and social health. Participation in sports and physical

activity results in benefits like an increase in self-confidence and self-esteem, a better control over emotions, reduction in levels of stress, anxiety and depression, maintenance of healthy weight, social interaction and achieving high performance in academics. Regular physical activities help in not just physical, but also social, emotional and mental growth and development of infants, children, adolescents and adults. Physical activities should be encouraged among children to ensure strong muscles and bones. Children and young people should not be allowed to sit for long hours watching TV, playing computer games and travelling by car.

WHO has developed certain guidelines – Global Recommendations on Physical Activity for Health – with the overall aim of providing national and regional level policy makers with guidance on the frequency, duration, intensity, type and total amount of physical activity needed for the prevention of Non-Communicable Diseases or Lifestyle Diseases.

2.1.1 Recommendations for Children Under 5 Years of Age

"Achieving health for all means doing what is best for health right from the beginning of people's lives," says WHO Director-General Dr Tedros Adhanom Ghebreyesus. "Early childhood is a period of rapid development and a time when family lifestyle patterns can be adapted to boost health gains." If they are to grow up healthy, children under five must spend less time sitting watching screens, or restrained in prams and seats, so that they get better quality sleep and have more time for active play.

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The following guidelines are recommended for healthy children aged Under 5 years, irrespective of gender, race, ethnicity, cultural background, and the socio-economic status of the family.

These are also relevant for children with different abilities. Children with a medical

condition or disability should consult with health professionals before undertaking these activities. The goals of these guidelines are to recommend time spent on physical activities, and on sleep and sedentary activities to get health benefits. The age group is further divided in to three groups namely Less than 1 year, 1 to 2 years, 3 to 4 years.

Age	Sedentary Behaviour	Physical Activity	Sleep
Less than 1 year	Not be restrained for more than 1 hour at a time. Encourage reading and storytelling when sedentary. Screen time is not recommended.	Physically active several times a day through interactive floor-based play including 30 minutes of tummy time.	14-17 hours (0-3 months of age), 12-16h (4-11 months of age) of good quality sleep, including naps.
1-2 years	Not restrained for more than 1 hour at a time or sit for extended periods of time. No screen time for 1-year-olds. For 2 years, sedentary screen time should be no more than 1 hour. Encourage reading and storytelling.	At least 180 minutes in a variety of types of physical activities including moderate-to vigorous- intensity physical activity, spreadthroughout the day.	11-14 hours of good quality sleep, including naps, with regular sleep and wake-up times.
3-4 years	Not restrained for more than 1 hour at a time or sit for extended periods of time. Sedentary screen time should be no more than 1 hour; less is better. Encourage reading and storytelling.	At least 180 minutes in a variety of types of physical activities at any intensity, of which at least 60 minutes is moderate-to vigorous intensity physical ctivity, spread throughout the day.	10-13h of good quality sleep, which may include a nap, with regular sleep and wake-up times.

Infants (Less than 1 year)

Infants should be provided enough space and open environment to promote movement and minimize restrictive or sedentary behaviour so that they may explore their surroundings. Babies should be encouraged to be active throughout the day, every day. Before your baby begins to crawl, encourage her/him to be physically active by reaching and grasping, pulling and pushing, moving her/his head, body and limbs during daily routines, and during supervised floor play. This includes giving the baby 30 minutes in prone position (tummy time). Playing equipment should be carefully chosen and must not be so small that it can be swallowed or have sharp edges or be prepared with toxic material. Activities like crawling and rolling should be performed on mat or sheet that is at least 7 feet by 4 feet in size. Once babies can move around, encourage them to be as active as possible in a safe, supervised and nurturing play environment. During sedentary timing, the child must be engaged in reading and storytelling for encouragement. For 0-3 months of age 14-17 hours and for 4-11 months of age baby should have 12-16 hours of good quality sleep that includes naps.

Toddlers (1-2 years of age)

During this period, the child should not be involved in any sedentary activity which is more than one-hour long including being restrained in prams/strollers, high chairs, or strapped on a caregiver's back, or sitting for extended periods of time. Once they learn to sit and stand, toddlers should be encouraged to undertake fundamental physical activity like walking, running, jumping, catching, throwing, leaping etc. In this group sedentary screen time like involvement with computer games, watching TV or video is not recommended. Engagement in reading and storytelling should not be for more than one hour. It is recommended toddlers get 11-14 hours of good quality sleep, including naps, with regular sleep and wake-up times.

Children 3-4 years

Children should spend at least 180 minutes in a variety of types of physical activities at any intensity, of which at least one hour is spent in moderate to vigorous intensity physical activity. This should be spread throughout the day, indoors or outside. In the 180 minutes of physical activity, we can include light activity such as standing up, moving around, rolling and playing, as well as more energetic activities like skipping, hopping, running and jumping. Active play, such as using a climbing frame, riding a bike, playing in water, chasing games and ball games, is the best way for

this age group to get moving. Sedentary time should not be more than one hour, and during this period engagement in reading and storytelling should be encouraged. Quality sleep between 10-13 hours is recommended which includes a nap, with regular sleep and wake-up times.

All these recommendations are divided into three components Physical activity, sedentary behaviour and sleep. Lesser sedentary time and more moderate to vigorous intensity physical activity with sufficient sleep can provide additional health benefits.

2.1.2 Children and Youth 5-17 Years

These recommendations are relevant to healthy children and youth between 5 to 17 of age irrespective of gender, race, ethnicity or socio-economic status.

Children and youth with a specific medical condition or disability may follow these recommendations under advice of a medical official or with the help of the school special education teacher. Activities should be done in a progressive manner, for example starting the session with simple exercises to complex, gradually increasing the frequency, duration and intensity of the activities. There are various stages of growth in this age group, wherein at every stage the type of activities changes. The chief aim of activities during this age group is to improve cardiorespiratory and muscular fitness, bone health, cardiovascular and metabolic health biomarkers and to reduce symptoms of anxiety and depression.

Intensity	Moderate to Vigorous.
Volume/ Duration	At least one hour in a day; more than 60 minutes will provide additional health benefits.
Frequency	One session of 1 hour or two sessions of 30 minutes each.
Types of Activities	Aerobic, basic exercises for strengthening of muscles, Fundamental activities (Jumping, running, throwing, turning twisting etc.)
Benefits	Regular exercise helps to develop Musculo-skeletal system (Bones, muscles and joints), cardiovascular system (heart and lunges), neuromuscular system (coordination, movement control, motor learning) and maintain healthy body composition. Physical activities also help to develop psychological (control over emotions, anxiety, depression, and manage stress) and sociological aspects (interaction, integration, leadership), result in healthy behaviour (avoidance of tobacco, alcohol, drugs) and promote academic performance.
Activities	Play, Games, Sports, recreation, physical education, unplanned to planned exercises with or within family, school and Community.

2.1.3 Adults 18-64 Years

These recommendations are relevant to healthy adults aged between 18 to 64 irrespective of gender, race, ethnicity or socio-economic status. Adults/youth with disabilities may follow these recommendations with adjustment as per capacity or limitations. An adult having any medical condition should follow the advice of medical official. Activities should be done in a progressive manner, for example, start the session with simple exercises and move to complex, gradually increasing frequency, duration and intensity of the activities.

Intensity	Moderate to Vigorous.
Types of Activities	Muscular strengthening (strength) and Aerobic physical activities
Aerobic activities	150 to 300 minutes per week with moderate intensity or 75 to 150 minutes per week with vigorous intensity; One aerobic activity bout should be at least 10 minutes
Muscle strengthening activities	Activities involving major muscles two or more days in a week
Benefits	Regular physical activity helps to lower the risk of all causes of mortality, (For example heart diseases, blood pressure, stroke, Type 2 diabetes, metabolic syndrome, colon and breast cancers and depression) hip or vertebral fractures, and to develop higher level of cardiorespiratory muscular fitness and maintain healthy weight with healthy body composition and bone health. It lowers the risk of Non-Communicable Diseases and depression.
Activities	Physical activities (walking jogging, swimming, weight training, dancing etc.), occupational work, household work (car wash, gardening, etc.) Games, Sports, recreation, transportation (walking, cycling), planned exercises with or within family and community.

2.1.4 Older Adults 65 Years and Above

These recommendations are relevant to healthy older adults aged above 65 years, irrespective of gender, race, ethnicity or socio-economic status. These recommendations are also relevant for individuals suffering from chronic NCD conditions. Adults, youth with disabilities may follow these recommendations with adjustment as per capacity or limitations. Individuals with specific health conditions, such as cardiovascular disease and diabetes, may need to take extra precautions and seek medical advice before trying to achieve the recommended levels of physical activity for older adults. Activities should be done in progressive manner, for example, starting the session with simple exercises and moving to complex, gradually increasing frequency, duration and intensity of the activities as per their ability and as conditions allow.

Intensity	Moderate to Vigorous.
Types of Activities	Muscular strengthening (strength) and Aerobic physical activities and Balance-enhancing exercises.
Aerobic activities	150 to 300 minutes per week with moderate intensity or 75 to 150 minutes per week with vigorous intensity; One aerobic activity bout should be at least 10 minutes.
Muscle strengthening activities	Activities involving major muscles involved activity, two or more days in a week
Balance-enhancing Activities	Older adults, with poor mobility, should perform physical activity to enhance balance and prevent falls on 3 or more days per week.
Benefits	Regular physical activity helps to lower the risk of all causes of mortality, (For example, heart disease, blood pressure, stroke, Type 2 diabetes, metabolic syndrome, colon and breast cancers and depression) hip or vertebral fractures, and to develop higher level of cardiorespiratory muscular fitness and maintain healthy weight with healthy body composition and bone health. It lowers the risk of Non-Communicable Diseases, depression and cognitive decline.
Activities	Physical activities (walking jogging, swimming, weight training, dancing etc.), occupational work, household work (car wash, gardening, etc.) Games, Sports, recreation, transportation (walking, cycling), planned exercises with or within family and community.

Do you Know?

Type of physical activity: includes aerobic, strength, flexibility, balance.

Duration: is the length of time in which an activity or exercise is performed. Duration is generally expressed in minutes.

Frequency: is the number of times an exercise or activity is performed. Frequency is generally expressed in sessions, episodes, or bouts per week.

Intensity: refers to the rate at which the activity is being performed or the magnitude of the effort required to perform an activity or exercise.

Volume: Aerobic exercise exposures can be characterized by an interaction between bout intensity, frequency, duration, and longevity of the programme. The product of these characteristics can be thought of as volume.

Moderate-intensity physical activity: On an absolute scale, moderate intensity refers to activity that is performed at 3.0–5.9 times the intensity of rest. On a scale relative to an individual's personal capacity, moderate-intensity physical activity is usually a 5 or 6 on a scale of 0–10.

Vigorous-intensity physical activity: On an absolute scale, vigorous intensity refers to activity that is performed at 6.0 or more times the intensity of rest for adults and typically 7.0 or more times for children and youth. On a scale relative to an individual's personal capacity, vigorous intensity physical activity is usually a 7 or 8 on a scale of 0–10.

Aerobic activity: also called endurance activity, improves cardiorespiratory fitness. Examples of aerobic activity include: brisk walking, running, bicycling, jumping rope, and swimming.

Sedentary behaviour: is characterized by a very low energy expenditure, such as sitting, reclining or lying down

Sleep behaviour: Duration and timing of sleep. For children under 5 years of age includes both at night and daytime naps.

Toddler: Child aged 1 to under 3 years (12.0–35.9 months).

Tummy time: Time an infant spends lying on her/his stomach (in prone position) while awake with unrestricted movement of limbs.

Nap: Period of sleep, usually during the daytime in addition to usual night time sleep.

Reference: www.who.int

I. Tick the correct options

1. Minimum duration of activity should be_____per week at vigorous intensity in adults above 65 years of age.
   a. 75 minutes
   b. 150 minutes
   c. 300 minutes
   d. 450 minutes
2. Rate at which the activity is being performed is known as _
   a. Volume
   b. Intensity
   c. Type of Activity
   d. Frequency

II. Answer the following questions briefly

1. Write down Physical activities exercise guideline for under 5 of age.
2. Briefly write about physical activities/exercises guidelines for adults above 65 of age.

III. Answer the following questions in 150-200 words

1. Describe Physical activities/exercise guidelines for all groups.

2.2 Posture

Posture is defined as the attitude assumed by the body either with support during the course of muscular activity, or as a result of the coordinated action performed by a group of muscles working to maintain the stability. Posture is classified into two categories.

1. Dynamic posture is how one holds oneself when moving, for example, walking, running, or bending over to pick up something. It is usually required to form an efficient basis for movement. Muscles and non-contractile structures have to work to adapt to changing circumstances.
2. Static posture is how one holds oneself when stationary or not moving, For example, sitting, standing, or sleeping. Body segments are aligned and maintained in fixed positions. This is usually achieved by co-ordination and

interaction of various muscle groups which are working statically to counteract gravity and other forces.

Extension Activity

Working in groups

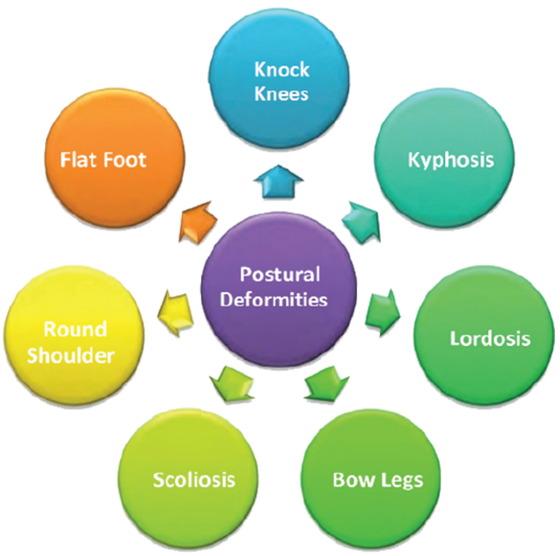
- Distinguish between poor posture and good posture.
- Describe good posture while sitting, studying, writing, standing, walking.
- Discuss the significance of having a good posture.

Design a poster to be put up on the school Notice Board urging students to maintain good posture. Highlight the ill effects of poor posture.

It is important to ensure maintaining of a good posture. This is possible where all body parts are aligned in such a way that least stress is put on joints and muscles and, thus, it helps to prevent fatigue. A good posture helps to give good productivity in work, and leads to a physically and mentally stress-free condition. Postural deformity may be caused by heredity, disease, injury, poor habits, improper clothing, unhygienic living conditions, improper diet, improper exercise, lack of exercise, obesity, socio-economic status, etc.

2.2.1 Common Postural Deformities

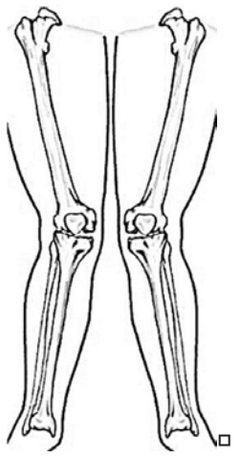
There are a number of postural deformities, some of which are given below along with corrective measures. Corrective exercises should be done under advice and supervision of a physician or a physiotherapist.



2.2.2 Knock Knees

Knock Knees, also known as **Genu valgum,** is a knee misalignment that turns the knees inward. As a result, both knees touch or knock against each other in a normal standing posture but there is a gap of 3-4 inches between the ankles. It is generally first noticed in early childhood, but in most cases, it usually corrects itself naturally by the time children are 7-8 years old. However, in some cases it continues till adolescence. In some cases Genu valgum can also develop due to an injury or infection in the knee or leg, rickets, severe lack of vitamin D and calcium, obesity, or arthritis in the knee.

It negatively effects walking and running and impedes other legs movement which hinder performance. In case Genu valgum persists beyond childhood, it may have other symptoms besides misaligned knees. They include stiff joints, knee pain and walking with a limp. Stressed ligaments and muscles can also cause pain in the hips, ankles, or feet. If only one knee is out of line, the stance may be unbalanced.



Do you know?

The man who discovered genes was an Austrian Gregor Mendel. Mendel was a scientist, Augustinian friar and abbot of St. Thomas' Abbey in Brno, Margraviate of Moravia. Though farmers had known for millennia that crossbreeding of animals and plants could favor certain desirable traits, Mendel's pea plant experiments conducted between 1856 and 1863 established many of the rules of heredity, now referred to as the laws of Mendelian inheritance.

Corrective Measures

Treatment for Genu valgum largely depends on the cause and severity of the problem. Exercises like horse-riding and keeping the pillow between the knees and standing erect for some time are the best. For most people with Genu valgum, Yoga and exercise can help realign and stabilize the knees. Performing padmasana and gomukhasana regularly can help strengthen muscles of the legs and realign the knees. Strengthening exercises can be simple, such as leg raises while seated or lying down. Using of walking callipers is also a big help at pre-puberty stage.

Excessive body weight can be a contributing factor to Genu valgum as extra weight puts additional strain on the legs and knees, and this can cause knock-knees to worsen. A person who is overweight should lose weight through a combination of diet and exercise.

2.2.3 Flat Foot

Flat foot is also known as pes planus or fallen arches. It is a condition that may be diagnosed by looking at the arch of the foot or by taking the water print test. As the name flat foot suggests, people suffering from this deformity have either no arch in their feet, or one that is very low, allowing the entire soles of the feet to touch the floor in standing position.

Normal Arch Flat Foot

This problem may be genetic or environmental. At times a foot or ankle injury, obesity, wearing improper shoes (tight shoes, high heels etc.), carrying heavy weight for long time, arthritis or rheumatoid may cause flat feet. It may be caused by a baby being forced to walk in an early stage, or it may be age related. Another condition that might cause flat feet is tarsal coalition. This condition causes the bones of the foot to fuse together unusually, resulting in stiff and flat feet. Tightness in calf muscles may lead to temporary flat feet.

Arches provide a spring to the step and help to distribute body weight across the feet and legs. The structure of the arches determines how a person walks. Arches need to be both sturdy and flexible to adapt to stress and a variety of surfaces. When people have flat feet, it affects their posture while standing, their walking, running, and other related performances. Flat feet can sometimes contribute to problems in the ankles and knees. Majority of babies are born with flat feet but as they grow or get involved in physical activities the arch in the foot develops.

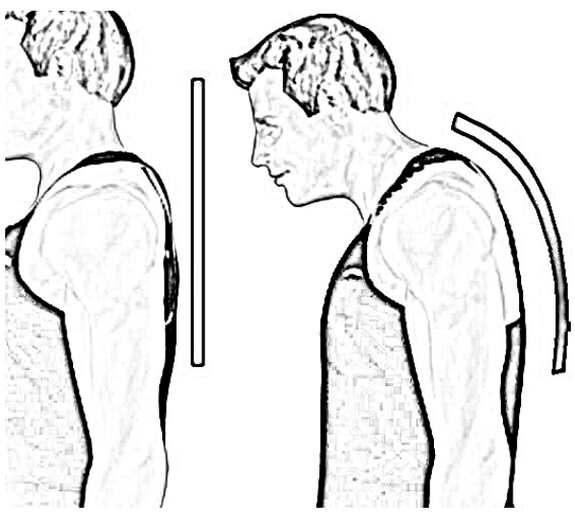
Corrective Measures

Exercises like walking, standing or jumping on toes and heels in all four directions, skipping rope, strengthens the muscles of foot which help to develop the arch in the foot. Activities like picking up marbles with toes, writing numbers in the sand with the toes will also help in developing the arch. Yoga asanas like Adhomukhsavasana performed in Surya Namaskar, Vajrasana and other therapeutic massages are also helpful in developing the arch.

2.2.4 Round Shoulders

Round shoulders is a postural deformity in which shoulders are bent forward from the ideal alignment, thereby giving a narrow curve to upper back. It leads to postural deviations such as hyperkyphosis, or hunch back and anterior head carriage, or forward head posture. Over time, these postural conditions can progress and lead to other conditions such as chronic neck pain, thoracic outlet syndrome and lack of shoulder mobility.

It may occur at any age due to poor posture habits, heredity, muscle imbalance, tight fitting clothes, injury, disease etc. Poor posture habits include using smartphone, tablet, computer, driving, carrying heavy weights and sitting for long periods.



Corrective Measures

Most important measure to correct rounded shoulders is strengthening and stretching of muscles and trying to correct the imbalance of muscles by doing chest stretches, T stretch, wall stretch, Handclasp stretch and planks, pull ups, reverse shoulder stretch, etc. Developing the habit of keeping the spine straight is also helpful in correcting rounded shoulders. Yoga asanas like *Chakrasana, Dhanurasana,* can be useful in correcting rounded shoulders.

2.2.5 Kyphosis

Kyphosis is also known as Hunch Back or round upper back. The word **Kyphosis** comes from the Greek term kyph and means ***bent or bowed***. It is a condition of the spine where the curvature of the upper back gets exaggerated or increases. It is an exaggerated, forward rounding of the back. Kyphosis can occur due to heredity, aging, disease (arthritis, osteoporosis), malnutrition, pulling of heavy weight over a period, unstable furniture, poor postural habit, weakness in muscles etc. Though it can occur at any age, but kyphosis is most common in older women. Age-related kyphosis is often due to weakness in the spinal bones that causes them to compress or crack. Kyphosis can appear in infants or teens due to malformation of the spine or wedging of the spinal bones over time.

While mild Kyphosis causes few problems, severe Kyphosis can cause pain and be disfiguring. This posture creates instability while walking, running etc. that may lead to fall or injury.

Corrective Measures

Exercises which help to strengthen back muscles, provide stability and make muscles more flexible should be performed. Physical therapy, swimming, exercise/ gym ball exercises, exercises with bands, and Yoga asanas like Dhanurasana, Chakrasana and Bhujangasana should be performed to get optimum benefits. Using a flat bed with a thin pillow while sleepingis also helpful .

2.2.6 Lordosis

The term Lordosis comes from the Greek lordos which means bent backward. The spine curves a little in the neck, upper back, and lower back. These curves, which create the spine's S shape, are called the kyphotic (upper back) and lordotic (neck and lower back). Lordosis is a spinal deformity in which the angle of arc of the lower back is reduced. This leads to an increase and exaggeration of normal concavity of the lumber region of the spine. It is also known as sway back. Chronic Lordosis may lead to pain and discomfort and become more serious if left untreated.

Lordosis is often caused by obesity, improper development of muscles, muscular or skeletal disease or accident, poor posture while standing, sitting and walking, malnutrition, etc. There are few cases where the cause was unknown. It is generally

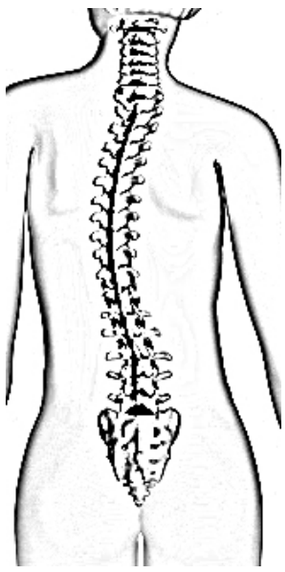
found in children because of weakening or tightening of muscles of the hip area, but they easily recover as they grow and muscles get strengthened.

Corrective Measures

Most people with Lordosis don't require medical treatment unless it's a severe case. In severe cases of Lordosis in children and teens, the individual may require use of braces, or even surgery. Largely, weight loss to help posture, and daily physical therapy to strengthen muscles and range of motion prove quite helpful. Exercises to develop strength in the pelvic region like sit-ups, sitting against the wall and pushing the trunk backward and lying on the back and raising upper extremities and legs together will give significant benefits. Yoga asanas including Dhanurasana and Halasana will be helpful. Use of braces, weight reduction, maintaining a good posture and taking a balanced diet are helpful in reducing the problem.

2.2.7 Scoliosis

The word Scoliosis comes from the Greek skolios which means bent. Scoliosis is a position in which the spine is tilted to either side of the body. It is a position of exaggerated lateral curvature or sideways curvature of the spine. In this disorder, the spine bends, twists or rotates in a way that it makes a C or an S shape. Scoliosis is found more commonly in girls than in boys and, though it can occur at any age, but it is more common during the growth spurt just before puberty. Most cases of scoliosis are mild, but some spinal deformities continue to get more severe as children grow. Severe scoliosis can be disabling. An especially severe spinal curve can reduce the amount of space within the chest, making it difficult for the lungs to function properly.



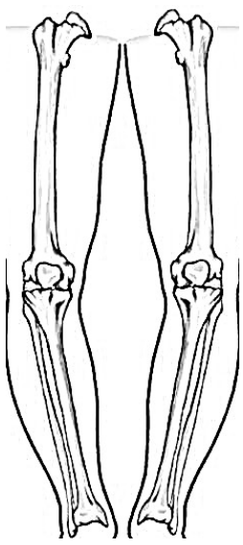
Scoliosis can be caused by conditions such as cerebral palsy and muscular dystrophy, or diseases like arthritis, paralysis, or rickets. It may result from lifting heavy weights, living in an unhealthy environment, and standing and sitting in a wrong posture. However, the cause of most scoliosis is unknown.

Corrective Measures

In cases of mild Scoliosis, no treatment is necessary. Some children may need to wear a brace to stop the curve from worsening. Others may need surgery to keep the problem from worsening and to straighten the spine. Exercises like hanging on the horizontal bars and swinging should be done on opposite side of the C-shaped curve. Aerobic activities with slow pace and breaststroke in swimming are helpful and also give good results. In yoga *Trikonasana and Adhomukhasana* should be performed to straighten the spine.

2.2.8 Bow Legs

Bow Legs, also known as Genu varum, is a position of knees in which legs look like a bow, when the legs curve outward at the knees while the feet and ankles touch. Infants and toddlers often have bow legs. It may be caused due to lack of Vitamin D, Phosphorus and Calcium and can be easily cured at an early stage. The condition doesn't cause pain or discomfort and is rarely serious. It does not affect running, standing, crawling etc. Bow legs is a condition that usually goes away without treatment, often by the time a child is 3–4 years old and does not affect a child's ability to crawl, walk, or run. However, parents might worry about the appearance of their child's legs, or an awkward walking pattern.



Sometimes, kids with bow legs may walk with the toes pointed inward, called pigeon-toes, or they may trip a lot and appear clumsy. Although in most cases the problem generally gets resolved on its own as the child grows, sometimes, it may lead to arthritis in the knees and hips. At times Bowlegs can be a sign of an underlying disease, such as Blount's disease, rickets, or arthritis.

Corrective Measures

Use of braces and modified shoes can be along with sufficient intake of balanced diet can prove to be of help. Walking on the inner edge of the feet may also help.

I. Tick the correct options

1. Deformity of the legs is known as
   a. Scoliosis
   b. Lordosis
   c. Knock knees
   d. Kyphosis
2. Lordosis is a problem of the
   a. Lower Back
   b. Middle Back
   c. Upper Back
   d. Shoulders
3. Scoliosis is a postural deformity related to
   a. Muscles
   b. Shoulders
   c. Legs
   d. Spine
4. Kyphosis is a deformity found in
   a. Shoulders
   b. Lumber region
   c. Hips
   d. Thoracic region

II. Answer the following questions briefly

1. What is meant by Round Shoulders? Mention a few exercises to correct it.
2. What is the Lordosis? Write in brief.
3. Write in brief the causes and symptoms of Knock Knees.
4. Explain corrective measures for Flatfoot.

III. Answer the following questions in 150-200 words

1. Explain any five postural deformities with their corrective measures.
2. Describe corrective measures of some common spinal postural deformities.

2.3 Women participation in Sports – Physical, Psychological and Social benefits

Women's sports, both amateur and professional, have existed throughout the world for centuries in all varieties of sports. There is a rich record of participation of women in sports in India. In the days of Mahabharata, Shakuntala, Madhuri, Kunti all chose physical activities as recreation. As time passed, Indian women, despite having potential and talent, were deprived of participation in sports for a number of reasons. They were put in the back seat and were not allowed to participate in sports. However, female participation and popularity in sports increased dramatically in the last quarter of the 20th century, reflecting changes that emphasize gender parity. Although the level of participation and performance can still be improved, women's participation in sports is generally accepted and promoted today.

Despite the fact that women have shown a dramatic rise in sports participation, there is still a large disparity in participation rates between women and men. But to deal with this disparity many countries like India run programmes such as Khelo India scheme and National Sports Talent Search Scheme (NSTSS) to mainstream women's participation in sports in India. While in the past there were certain psychological constraints like low self-confidence and self-esteem, higher levels of stress and anxiety, and social causes like lack of support or positive reinforcement from family and a male-dominated social structure that affect women's participation in sports, or even, certain economic factors that played a negative role that affected women's participation in sports, these are all a thing of the past.

This trend of lower participation of women in sports exists not just in India but is a global phenomenon. Participation of women at all levels from regional to

international is limited. It affects all domains like participation in sports activities, administration of associations and federations, and participation in national and international level committees. Women who play sports continue to face many obstacles, such as lower pay, less media coverage, and different injuries compared to their male counterparts. Many female athletes have engaged in peaceful protests, such as playing strikes, social media campaigns, and even lawsuits to address these inequalities The International Olympic Committee (IOC) encourages participation not only in playing sports but in National Olympic Committees and International Federations and conducting regional seminars for female administrators, coaches, technical officials and journalists. In a recent announcement by IOC, 49% women will take part in next Olympic games. The Constitution of India also provides gender equality and ensures elimination of any type of gender bias or hindrance. Sports is a medium to get gender equity and empowerment.

As more women athletes are participating in sports, there is more positive attitude that is being inculcated. Sports is an important tool for social empowerment and helps to develop skills like communication, teamwork, leadership, respect, social interaction, sportsmanship etc. and can significantly contribute to develop society and community. Sports participation not only provides health benefits but also promotes overall development. Sport does not discriminate based on colour, caste, creed, sex, race etc.

2.3.1 Women participation in Sports – Physical, Psychological and Social benefits

Women participation in sports helps them to stay fit and reduces chances of diseases. These are some physical benefits for women participating in sports. These benefits are as true for women as for their male couterparts.

I. Phisical Benefits

Lifestyle Diseases

Sports participation helps women to stay active which, in turn, reduces chances of lifestyle diseases such as Diabetes, high blood pressure, obesity etc. and enables them to live a healthy life.

Bone Density

There is a higher chance of osteoporosis in female than males. Sports help them to increase their bone density and have stronger bones.

Toned Muscles

Regular exercise and participation in sports increases the muscle tone of women which helps them to stay strong.

Cardiovascular System

Regular exercise helps increase the number of capillaries, helping them in the intake of oxygen. This enables women to participate in sports for a longer period without getting fatigued.

Obesity

Obesity is one lifestyle disease which is found in every part of the world. Most of the India's population is also suffering from this disease. Women has more chances of being obese than men, regular participation in sports helps them to stay in shape and stay fit.

II. Psychological Benefits

Participation in sports has a great impact on women psychologically as it gives them confidence and enhances their self-esteem. It gives them that sense of achievement

which empowers them to achieve and overcome any obstacles that they may have faced. Some of the psychological benefits of participation in sports are:

Stress Management

Any physical activity releases lot of hormones in our body which helps us to stay happy and reduces stress levels. Sportspersons, men and women, who participate in sports can manage their stress better than those who don't participate in the sports.

Control Emotions

Women, like their male counterparts, who participate in sports are well equipped to manage their emotions as they face difficult situations in the game which take a toll on them, and regular participation makes them emotionally stronger.

Confidence

Every small win increases the confidence of the winner. Thus, when a woman participates in sports and wins, it gives not just her, but other women sportspersons a sense of achievement and really boosts their confidence. This renewed confidence in themselves they bring to all areas of their life.

Self - Esteem

Sports helps women to realise their self-worth and when they achieve or even participate in sports, they get a boost in their self-image and that helps them to realise their own worth, which is very important for an individual.

Leadership

one of the best quality about sports is that it inculcates or bring out the leadership skills or qualities of an individual. Those women, or men, who participate in sports better are able to lead people even outside the sports as well.

III. Social Benefits

Women participation in sports helps them to be more open towards society as it helps them to communicate with others and helps them to bond with their teammates and other officials. Some of the social benefits of sports are as follows:

Coordination

Sport helps in increasing and improving the coordination between team players and women who participate in sports learn the skill of working in coordination with others.

Communication

Communication is an integral part of sports as players must communicate with each other while playing. It helps women participants to be more vocal and expressive.

Inter-relationships

A sport is not played in isolation, it's a team effort, whether it is inside the team or as supporting staff, the player must maintain her relationship with everyone in the team. Women participants learn to maintain their relationships and respect each other whether it is on the field or off the field.

Cooperation

Women learn to cooperate with each other when they are playing on the field. This becomes a part of their life also as they learn to work and cooperate with others in total harmony and peace.

Because of the above discussed benefits women should participate in sports. Women's participation in sports should be encouraged in schools, colleges and in universities. Awareness programmes for women's participation in sports should be conducted on a regular basis and they should be encouraged to participate in competitive sports. Families should also be encouraged to support their girls to participate in sports. Media coverage and sponsorship can enhance sports participation of women in India. Sports equipment must be developed focusing on physiological aspects of women. Appointment of women coaches, providing opportunities for competitions, eliminating cultural and social negativity and proper facilities can ensure larger participation. States where social or other factors are a constraint should come up with some incentives so that their women can also participate in sports and live a better and healthy life.

Now times are changing, and society is accepting, and even encouraging, women's participation in sports at National and International levels. In recent years, it has been raining gold on Indian women athletes in the international arena proving women are no less of a powerhouse when it comes to winning medals and championships for the country. Women are coming out and participating in sports and physical activities in

large numbers. Karnam Malleswari was the first women who won a medal in Olympic Games in Sydney in 2000. In 2012, London Olympics, five times world champion Mary Kom won a medal in boxing and Saina Nehwal in Badminton. In 2016 Rio Olympics Sakshi Malik won medal in wrestling and P.V. Sindhu won the first ever women's silver medal in badminton. P.T Usha and Anju Bobby George were athletes who earned a name in Athletics at international level. Saina Nehwal has won 24 international titles, which includes ten Superseries titles. In 2015 that she was able to attain the world no. 1 ranking, thereby becoming the only female player from India to achieve this feat. Saikhom Mirabai Chanu, an Indian weightlifter, lifted a total of 201 kg to win the Gold Medal at the CWG 2022. Lovlina Borgohain is an Indian boxer who won a bronze medal at the 2020 Olympic Games in the women's welterweight event and the silver medal at the 2020 Tokyo Olympics in Women's 49 kg category. Our Indian women cricket team, wrestling, badminton, boxing are bringing glory to the country as they achieve new heights.

Do you know?

Some Indian women sportspersons who won medals in international events in 2019.

1. **Dutee Chand -** First Indian to win a 100m gold in a global event at the 30th Summer University Games in Napoli, Italy.
2. **Hima Das - Won 5 gold medals in 20 days**
   - July 2, Poznan: 200m gold (23.65 seconds)
   - July 7, Kunto: 200m gold (23.97 seconds)
   - July 13, Kladno: 200m gold (23.43 seconds)
   - July 17, Tabor: 200m gold (23.25 seconds)
   - July 20, Prague: 400m gold (52.09 seconds)
3. **PV Sindhu - First Indian to win World Championships**
   - 2013 - Bronze
   - 2014 - Bronze
   - 2017 - Silver
   - 2018 - Silver
   - 2019 – Gold
4. **Manasi Joshi - Won BWF Para-Badminton World Championship**

   Para-badminton player Manasi Joshi created history by securing gold at the BWF Para- Badminton World Championships, just a day before Sindhu.
5. **PU Chitra - Clinched gold in women's 1500m race**

   Won the Gold at the Asian Athletics Championship 2019 in Doha.

The International Olympic Committee (IOC) encourages participation not only in playing sports but in National Olympic Committees and International Federations and conducting regional seminars for female administrators, coaches, technical officials and journalists. In a recent announcement by IOC, 49% women will take part in next Olympic games. The Constitution of India also provides gender equality and ensures elimination of any type of gender bias or hindrance. Sports is a medium to get gender equity and empowerment.

Extension Activity

In recent years Indian women athletes have done India proud in International Sports events. Identify the following and match the pictures to their names. Mention their games in the blank.

Make a PPT about any one of them.

	P.V. SINDHU	
	MARY KOM	
	HIMA DAS	
	SAIKHOM MIRABAI CHANU	
	SAINA NEHWAL	

	SAKSHI MALIK	

I. Tick the correct options

1. Sports is a important tool for social empowerment for women as it develops the folowing:
   a. Aggression
   b. Isolation
   c. Stress
   d. **Leadership**
2. Psychological benefits of women particapation in sports includes:
   a. Coopration
   b. **Emotation Control**
   c. Physical Fitness
   d. Communication

II. Answer the following questions briefly

1. Write a short note on benefits of participation in sports.
2. Explain Physical benefits of Women participation in sports.

III. Answer the following questions in 150-200 words

1. Explain the various benefits of Women participation in Sports?

2.4 Special Consideration (Menarche & Menstrual Disfunction)

2.4.1 Menarche

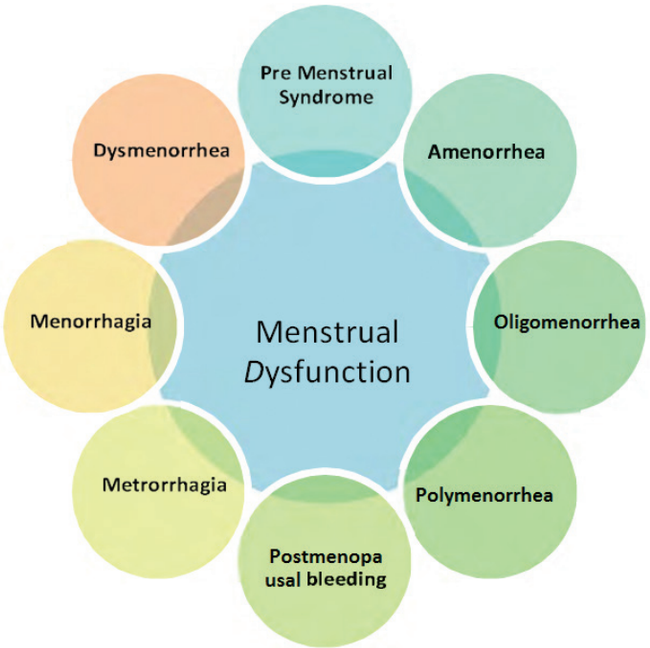
The period of adolescence is marked by certain universal physical and biological changes in the body which lead to the attainment of sexual maturity. The time when sexual maturity is reached is called puberty. Menarche (first menstruation) is usually considered the point of sexual maturity for girls. It is the process in which female reproduction system matures and the body prepares itself for potential pregnancy. It is associated with the development of secondary sexual characteristics. Menarche

is one of the most significant milestones in a woman's life. The average age for a girl to get her first period ranges from 8 to 15 years old. Although the precise determinants of menarcheal age remain to be understood, genetic influences, socio-economic conditions, general health and well-being, nutritional status, certain types of exercise, seasonality, and family size possibly play a role. Over the past century the age at menarche has fallen due to reasons still unknown.

Menstruation (also termed as period or bleeding) is the process in a woman of discharging (through the vagina) blood and other materials from the lining of the uterus at about a monthly interval from puberty until menopause, except during pregnancy. This discharging process lasts about 3-5 days. Women usually have periods until about ages 45 to 55 and have menopause usually around age of 50. Menopause means that a woman is no longer ovulating and can no longer get pregnant. Like menstruation, age of menopause can vary from woman to woman and these changes may occur over several years.

2.4.2 Menstrual Dysfunction

Menstrual dysfunction is an abnormal condition in a woman's menstrual cycle. Normal range of the menstruation cycle is 21 to 35 days. If it happens earlier than 21 days or after more than 35 days, then it's a problem. Other menstrual problems include missing three or more periods, menstrual flow heavier or lighter in comparison with usual, cycle happening longer than seven days, any pain, cramping or vomiting during period, bleeding after menopause etc.



Causes of abnormal menstrual cycles or menstrual order are: overweight, stress, dietary disorder, disease, sudden change in exercise schedule, travel, other medical complications etc.

There are different types of menstrual disorders which are given below:

1. **Pre-menstrual Syndrome:** Pre-menstrual Syndrome includes unpleasant or uncomfortable symptoms during the cycle. These may include depression, anxiety, irritation, headache, fainting, vertigo, infection etc. and may last from a few hours to few days. Such symptoms may be reduced through moderate exercise, taking a balanced diet, having a good sleep and rest.
2. **Amenorrhea:** Amenorrhea is known as missed periods or absence of a normal monthly period or menstrual cycle. There are two types of amenorrhea.
   (a) Primary amenorrhea: Menstruation cycle does not begin at puberty.
   (b) Secondary amenorrhea: It happens when menstruation is missed for three months or more. This is the most common type of amenorrhea.
3. **Dysmenorrhea:** When menstruation happens with severe pain or frequent menstrual cramps, the condition is called Dysmenorrhea. Symptoms associated with dysmenorrhea may be cramping in lower abdomen, low back pain, pain in legs, nausea, fatigue, weakness etc.
4. **Menorrhagia: Menorrhagia is characterized by heavy and long term or continuous menstrual bleeding.**
5. **Polymenorrhea: Polymenorrhea is a term used to describe a menstrual cycle that is shorter than 21 days.**
6. **Oligomenorrhea: Oligomenorrhea is infrequent menstruation. More strictly, it is menstrual periods occurring at intervals of greater than 35 days.**
7. **Metrorrhagia: Metrorrhagia refers to missed, delayed or erratic periods or abnormal bleeding patterns.**
8. **Postmenopausal bleeding:** Postmenopausal bleeding is bleeding that occurs after one year of menopause or after a woman has stopped having menstrual cycles due to menopause.

The female hormones oestrogen and progesterone are important for overall body health. These hormones also regulate a woman's periods. Intense exercise and extreme thinness can reduce the levels of these hormones to prevent or stop monthly menstrual cycles.

Extension Activity

Visit a nearby stadium and talk to women athletes. Collect a data of 5 such athletes in their teens. Are they facing any problem related to their health, diet etc? Discuss about it in the class.

I. Tick the correct options

1. Frequent menstruation is known as:
   a. Metrorrhagia
   b. Oligomenorrhea
   c. Polymenorrhea
   d. Menorrhagia
2. If the menstruation cycle does not begin at puberty, the condition is called
   a. Primary amenorrhea
   b. Secondary amenorrhea
   c. Oligomenorrhea
   d. Dysmenorrhea

II. Answer the following questions briefly

1. What is menstrual dysfunction? Write in brief.
2. Explain the term Menarche.
3. Write short note on Amenorrhea.

III. Answer the following questions in 150-200 words

1. Explain menstrual dysfunction.

2.5 Female Athlete Triad

Participation in sports and physical activities provides a lot of physical and social benefits like developing leadership qualities, competition, teamwork etc. Regular participation in such activities is associated with a longer and better quality of life, reduced risks of a variety of diseases and many psychological and emotional benefits. Evidence suggests a positive relationship between physical activity and a host of factors affecting girls' physical health, including diabetes, blood pressure

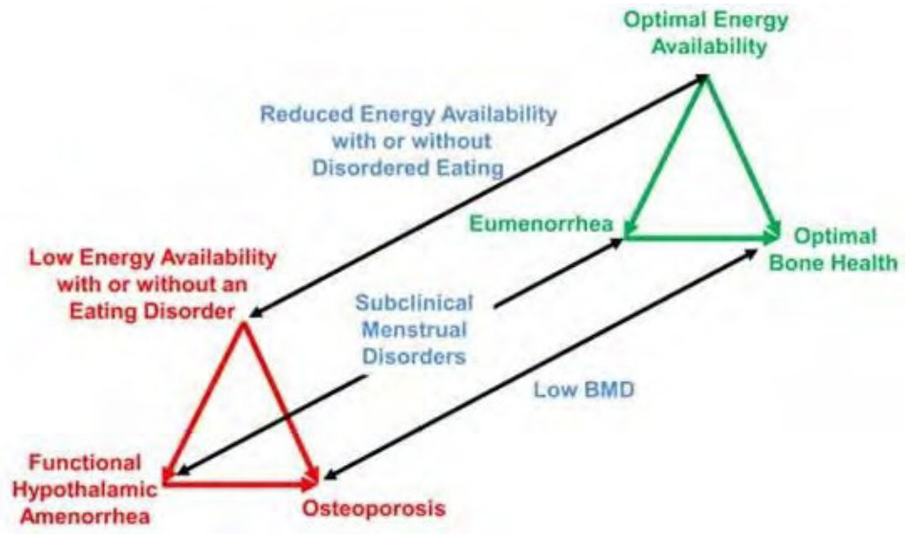
and the ability to use fat for energy, thus preventing obesity. Physical activity could reduce the risk of chronic diseases in later life. Conditions, such as cancer, diabetes and coronary heart disease, have their origins in childhood, and can be aided, in part, by regular physical activity in the early years. Also, regular activity beginning in childhood helps to improve bone health, thus preventing osteoporosis, which predominantly affects females.

However, participation in sports is not without certain health risks. Sports like Judo, boxing, wrestling, taekwondo etc. exert a lot of pressure on athletes to maintain their shape and weight. For participation in sports like distance running, cycling, cross country etc. athletes have to take a balanced diet since these demand high levels of energy and a good quantity of dietary intake. Such pressures put the athlete's health at risk and leads to *Female Athlete Triad*. The term 'triad' was first described by American college of sports medicine in 1992, and the three components to describe the triad were

(a) disordered eating,

(b) amenorrhoea and

(c) osteoporosis



The illustration above depicts the female athlete triad spectrum. The black lines represent the spectrums of each of the 3 components and the red and green triangles show both of the extremes. The top green triangle represents a healthy athlete who has a good balance between energy intake and expenditure. Because of this, they have a normal menstruation cycle and a bone mineral density that is above average for the athlete's age. The bottom left, red triangle represents an athlete who does not have an appropriate balance between energy intake and expenditure, which may be the result of restrictive dieting and/or clinical eating disorders.

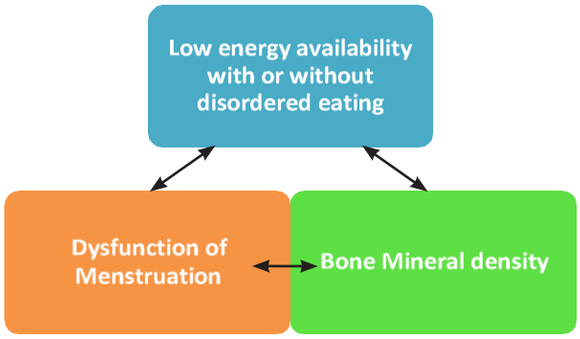
The terms to describe Female Athlete Triad have now been revised. The new terms to indicate problems are

(a) low energy availability with or without eating disorder,

(b) dysfunction of menstruation and

(c) low bone density.

This change was relevant because all these three revised components can be easily resolved by proper energy intake and expenditure and same may be used as effective strategy. Thus, if an individual takes optimum calories as required by body, including energy required for physical activity and energy required for body functions, the result is promotion of healthy bones and normal menstrual function. All three components are very much interlinked.



2.5.1 Low Energy Availability with or Without Disordered Eating

Disbalance of energy may occur due to eating disorder. The problem of female athlete triad originated from not balancing energy intake and energy expenditure. Consequently, an athlete must have knowledge of how to balance the energy intake.

Eating disorder is known as gross disturbance in eating behaviour. Disordered eating has wide range of harmful and often ineffective eating behaviours in the process of weight reduction.

These includes calorie restriction to clinical disorders of Anorexia nervosa and bulimia nervosa. Sportspersons participating in activities in which leanness or specific weight is required for performance are at higher risk of developing eating disorders. Coaches, team physicians, parents, and other supporting staff should know the symptom so that the problem can be treated on time, other-wise it leads to long term physiological, psychological effects or, in extreme cases, fatal results. **Anorexia nervosa** is an eating disorder where an individual tries to reduce body

weight abnormally, having an intense fear of gaining weight or misconception over his/her weight. Individuals with anorexia place a high value on controlling their weight and shape, using extreme efforts that tend to significantly interfere with their lives. To prevent weight gain or to continue losing weight, people with anorexia usually severely restrict the amount of food they eat. They may control calorie-intake by vomiting after eating or by misusing laxatives, diet aids, or diuretics. They may also try to lose weight by exercising excessively. No matter how much weight is lost, the person continues to fear weight gain. Symptoms may include menstrual dysfunction, constipation, diarrhoea, bloating, unexpected weight loss, muscle weakness, stress fracture, bone weakness, overuse injuries, anxiety etc.

Bulimia nervosa is an eating disorder in which an individual eats large amount of food with loss of control over eating and then adopts unhealthy ways to cut down calories like vomiting, taking laxatives, weight loss supplements, diuretics, excessive exercises etc. Symptoms of bulimia are dehydration, dental problems, oedema, electrolyte abnormalities, extreme weight fluctuation, menstrual irregularity, weakness, cramps, depression etc.

2.6 Menstrual Dysfunction

Menstrual irregularities is one of the components of Female Athlete Triad and it is a marker of quality health in female athletes. Menstrual dysfunction is common in sportswomen and is often ignored. It is important that young female athletes should be informed enough to understand the problem and must know the management of the menstruation disorder. If the problem is managed in time, then it may positively affect athletic performance. Ignored or untreated menstrual irregularities may have a prolonged effect on bone mineralization and the treatment may last months and years. Generally female sportspersons suffering from menstrual irregularities, self- select different sports in comparison with normal menstruating peers because in delayed puberty females develop strong bones and taller height than others. However, such dysfunction may affect sports performance in the long run and lead to complications. Recent research says weight training has lots of benefits including strengthening of the bones and may not affect adolescent menstrual irregularities. Studies show that more than 15% females participating in Olympics may be suffering from amenorrhea. Sometimes the skeletal health of a female athlete suffering from amenorrhea is much lower than that of a sedentary woman.

2.6.1 Low Bone Mineral Density

Low bone mineral density, previously termed osteoporosis, may be defined as a disease

marked by increased bone fragility, disturbance in bone structure including low bone mineral density (BMD) that may result in fractures, pain, deformity, disability etc. Low BMD is generally caused by improper diet and amenorrhoea. Due to low level of oestrogen and progesterone in female athletes, their bones become weaker and lose minerals. Effects of low bone mineral density include increased occurrence of injury, stress fractures, and risk of early osteoporosis after menopause. Deposition of bone increases during childhood and adolescence and peaks during the 20s and 30s. A large genetic component to BMD also exists, with heritability of BMD suggested to be 50–85%. Knowledge of family history or other medical conditions linked with BMD will help keep female athletes safe from risk of injury and fractures. Intensity, volume, frequency, type of activity should be determined by knowledge of genetic characteristics.

The female athlete triad is a result of energy imbalance; thus, adjusting the energy expenditure and energy availability is the main intervention. For this the main treatment is restoration of regular menstrual cycle for reestablishment of energy balance and enhancement of bone mineral density. The strongest predictor of recovery to normal menstrual function in young athletes is weight gain. Family-based therapy and cognitive behavioural therapy, also have been known to be effective interventions for disordered eating. A sports nutritionist can help the athlete and her family determine the quantity and quality of food consumption and dietary supplements required to meet her bodily functions, replace energy output due to athletic training, and enhance bone health. Additionally, weight gain may be necessary to increase BMD.

I. Tick the correct options.

1. Weakening of bones due to loss of bone density and improper bone formation is
   a. Amenorrhea
   b. Anorexia Nervosa
   c. Osteoporosis
   d. Lordosis
2. What is the cause of Osteoporosis in women?
   a. High blood pressure
   b. Menarche
   c. Excessive exercise
   d. Lack of calcium and vitamin D

3. Female athlete triad is a syndrome characterized by

   a. (a) Osteoporosis

   b. (b) Amenorrhea

   c. (c) Eating disorder

   d. (d) All of the above

4. In which type of Anorexia does an individual lose weight by taking laxatives or diuretics

   a. Bulimia Nervosa

   b. Purging type

   c. Restricting type

   d. Anorexia Nervosa

II. Answer the following questions briefly.

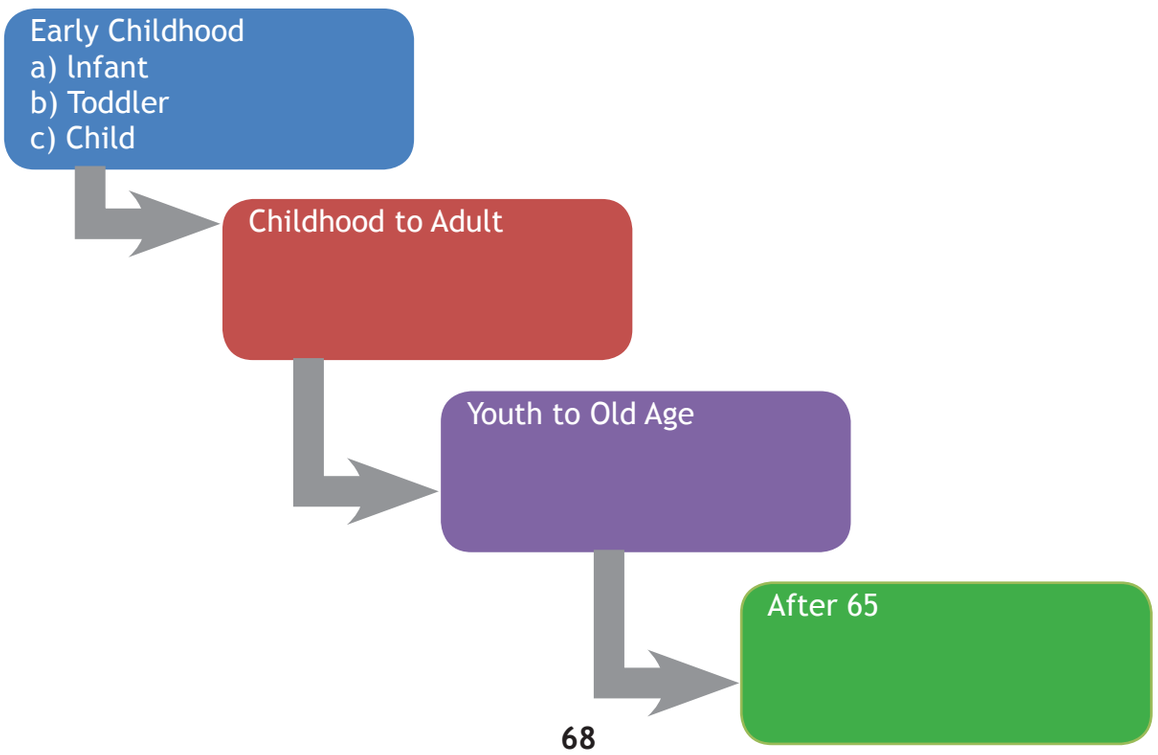
1. Explain eating disorder.

2. Write a short note on Bone Mineral density.

III. Answer the following questions in 150-200 words

1. What is Female Athlete Triad? Explain.

IV. Complete the given diagram listing suitable at exercises various stages of life.



V. Art Integration

There's no easier way to make someone smile, or let them know you admire them than giving them a heartfelt compliment. It's amazing how much saying these kind words can lift someone up and really turn a person's day around. There are many ways to deliver a compliment. However, nothing can be as beautiful as saying it in a song.

Write and dedicate a song to the Female Sportsperson you admire most.

V. Case study Questions

1. Anjali, a student of class IX was diagnosed with 'knock knees' which is becoming quite common in children due to lifestyle choices. She has seeked help from her physical education teacher. The teacher has advised her to practice certain exercises on a daily basis.

   a. What are common causes for this postural deformity.

   b. Suggest any two exercises for curing knock knees.

   c. What other leg related postural deformities are there?

2. Priya, a student of class XI has very low BMI due to which her class teacher has asked the school counselor to help priya because it seems priya is not taking proper meals.

   a. List down the different types of eating disorders.

   b. What is the range for underweight students in BMI?

   c. What could be the possible causes of eating disorders?

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