CHAPTER I

INTRODUCTION

ORIGIN OF THE PROBLEM

Human body has an upright posture which supports his body on his two legs, whereas most mammals that carry themselves on four. This condition has challenges significant changes in mans mechanism of sitting, standing, sleeping, lying, running, blood circulation, respiration, muscular growth and development of body coordination etc. it also has an impact on placing visceral organs, heart, lungs, liver, kidneys, and intestines. Accordingly to all human beings this various systems of body require stability and movements to perform their work with efficiency and least strain on the body organs. (M.L.kamlesh)

Posture is defined as, “the position of one or many body segments in relation to one another and their orientation in space” (Ham et al, p26). Body ‘segments’ are referred to as the head, thorax, pelvis, lower limbs and feet, whilst the body ‘linkages’ are considered as the spinal joints, hips, knees, ankle and shoulder joints (Pope 2002). When considering posture, one should not consider it as static, but as an active and dynamic process which underpins movement and function (Hong 2005). Normally, our postures continuously shift and change position to facilitate movement to engage in functional activities. Pope (2002) identifies that posture is a prerequisite for movement. Howe and Oldham (2001) also highlight that posture and movement are inextricably linked, referring to posture as a temporary arrested movement, which is in a constant state of change. From a neuro developmental perspective Nichols (2001) suggests that the development of postural control and acquisition of motor milestones are intrinsically linked. Ham et.al, (1998) support this assumption highlighting that there is constant neuromotor activity being used to maintain body balance and posture. Engstrom (2002) further suggests that biological and physiological influences affect body position and posture. This is also in addition to the somatosensory, vestibular and musculoskeletal systems (Nichols 2001).
The importance of physical program is linked to a high quality of life as well as academic achievements it is well documented that regular physical activity participation in childhood and adolescence enhance strength, health build, healthy bones and muscular power hip control weights, reduce anxiety and stress increases self esteem and improve all the internal and external physiological as well as psychological system of the body being physically fit is an essential requirement of the human body.

It is rightly said that children are the nation builders. 21 century education has project based curriculum for life engaging children in addressing real world problem, issue important to humanity, like global warming up, earthquake tsunami and human hazards which are serious matter of human progress.

Today’s children are witnessed as digital natives moving with 3rd generation & latest virtual reality technology to cope with the need of the hour finding e learning system, smart phones, laptops and computers as their best devices for acquiring knowledge but apart from it, if a child is not physically fit he cannot fight with critical circumstances of the situation. Therefore child physical fitness has a vital role in functional continuity of organ system of the body, which indeed affects his social, moral, Physical and mental health.

Several research works indicate that postural deformities have a negative effect on physical fitness and may result in high physical strain during the study period of the child. Keeping in view the fact the student’s physical fitness has important health consequences during their study; a large number of studies on effect of postural deformities on physical fitness have been reported from different countries step to the world data on postural deformities and physical fitness of students from Denmark (knutgen,1961) England (cambell,s & Pohdof,1961) South Africa (slov,1966) Belgium (Hebbelink & Borus,1966) Israel (Ruskin ,978) Japan (Iskiko,1978) are available in the literature all this reports made the health planners realize the importance and the contribution of health education and physical fitness in the development of total fitness.

Physical fitness has an important role in the education of new generation in the frame of physical and mental health and nowadays it is placed as a peace of education in the
developed society’s education programmes and can be placed in a special order in the subject of school childrens.

Therefore these study endowers to examine the prevalence of postural deformities in school childrens in Marathwada region of Maharashtra and its effect on their selected physical fitness components

Now let us see what are posture and its deformities:

**POSTURE**

Posture is the correct alignment of all the body segments (Shyam Anand) it is difficult to define posture in absolute terms because it varies from person to person. The concept of posture varies with an actor, an artist and sportsmen. In a multi segmented and most complicated structure like the human body we cannot conceive of only one single posture in performing different activities, with different purposes in different body positions. In sitting, lying, standing, walking, running, throwing, jumping, climbing etc. the alignment of various parts of the body is different so are the postures resulting from movement mechanics. In other words, different require the body to adopt different posture most suitable to the performance of related skills in the respective movements. In simple words, posture signifies movement defines posture however posture is usually defined as a relative arrangement body parts or segments or as accustomed position which enable the body to function effectively (M.L.Kamlesh) a posture indicates the right body position so assumed while performing an action or otherwise that there is economy of effort and optimal gain in efficiency.

Postures are very truly expressed our physical appearance and mental status when we are happy, cheerful and optimistic we walk with elastic and stingy steps, holding the head erect and abdomen flat but we are in a pensive or sad mood our energy level is low and our walk lack enthusiasm zeal and vigor and is often uncoordinated similarly the way we recline in the chair or on the bed tells a lot about what goes in our mind at that particular time, the way we walk depends mostly on the way we think and feel.
and the way we stand it reflects a lot about our confidence level in various compartment of life.

There are sitting, lying, standing(static posture) and walking running (dynamic posture) all this have bearing on our activities and they have a great impact on our total body and wellbeing to a great extent in these positions as in others, we require to alter our body alignment when we get tired of keeping ourselves in a single position for a prolong period we can’t sit crossed legged or on a chair keep reclining on the left or right side or standing at attention all the time we change our position or shift our body weight from one side to the other so that we are not tired and stress is not occurred. Walking is the only movement in a single skill or activity.

**GOOD POSTURE.**

A good posture is that in which the skeleton is held erect and if an imaginary vertical line is drawn from the highest point of the skull downwards, it should pass through the weight bearing surfaces of the cervical and lumbar vertebrae and through the centre of the hip knee and ankle joint, and where minimum cost of energy is required in balancing and maximum advantage is taken in transferring body weight. Good posture is vital for functional strength and motor control and is absolutely necessary to produce efficient movement along the kinetic chain there is no single good posture there are many. Goodness of a posture consists in alignment of the body parts, in relaxation rather than tension and readiness for action.

**WHY GOOD POSTURE IS IMPORTANT**

The body is designed to work at the most economical level ,because to save energy for future uses, according to research a man spend more energy maintaining misaligned posture which can cause joints and muscle pain in the body. We compromise our body’s integrity by not maintaining proper posture, decreased in lots of detrimental conditions resulting within the body decreased blood circulation to the various parts of the body.
Women in general tend to have poor posture because of many factors. They have job which have improper postural habits causing damages to the posture, they also wear high heeled footwear which leads to an alteration and compensation of their posture. The development of breast tissues or the augmentation of breasts can cause postural changes. Women also have less musculature to maintain proper alignment, leading to rounded shoulders, forward head posture, hyper extended knees and increased thoracic and lumbar curves.

To avoid postural deformities and disorders and to maintain a healthy posture, regular physical exercise program must be implemented.

**VALUES OF GOOD POSTURE**

1. **Hygienic value.**
   As the body is erect and straight all the internal organs as well as visceral organs are held properly to function efficiently and perfectly.

2. **Economic value.**
   It is one of the most important values of modernization. By the way of good posture one can achieve his goals and also have a desired carrier to furnish his dreams.

3. **Social values.**
   Society has a significant relation and impact by good posture, through good postures which are always attractive and thereby get respect from the society. Good posture can be acquired to gain respect from the society.

4. **Spiritual value.**
   “Sound mind in a sound body” if a person is physically fit, ultimately he will be mentally fit. The spirit is uplifted with physical uplift of the trunk. The glory of the rising sun is never seen by walking with protruding head and abdomens and flat feet.

The correct posture does not call for erectness means to always stand in attention or erect like the gymnast. It only require that the line of the body be straight, the head posed on the top of the chest and not projecting forth at angle the abdomen flat and
contracted and the weight so balanced on both feet that the body can be moved readily in any direction.

No definition what so ever is capable of giving an accurate description of a well balanced posture whether in dynamic or static condition. It is generally required that the body should be in a proper position biomechanical where the body has least strain on it. The head and the chin held erect on the top of chest.

**IMPORTANCE OF GOOD POSTURE IN LIFE**

The human being desires to have a good posture for some or the other purpose. Whether in dynamic or static condition good posture is extremely important for attractive appearance, more importantly it is essential for the body to perform the function with an economy of efforts accurate mechanical use of the body permits the internal organs system to perform their function efficiently. But unfortunately the postures often recommended to us are stiff, and rigid, awkward, and unbearable. Many people walk awkwardly and inefficiently because they start with poor skeletal relationships. The beginning of a good movement is the balanced adjustment of body parts.

No one can deny the significance and importance of a good posture in our daily life. To convey a good impression on wellbeing and on others. It reflects the alertness, activeness agility and wholesomeness of an individual’s personality towards his fields and work. Correct posture implements minimum or economical use of energy, effort and time whereas poor posture concludes in excessive relationship between good posture and good health. Good health enforces an individual to follow good health habits so as to lead a healthy life.

It has been witnessed that an individual who possess good posture is more agile has better flexibility and active body.

Co ordinate rhythmical and graceful movements, good posture also make it possible to attain such position which is conducive to efficient movements such posture further helps in developing the strength, physical fitness and athletic ability in an individual. If the body is well aligned, the centre of gravity of each segment will fall in a straight
vertical line and the weight bearing segments will be in a proper alignment thereby providing stability and support with minimum stress and strain while standing as well as while in motion good posture enables an individual to feel relaxed. Comfortable and at ease while efficiently performing different kinds of movements necessary for daily living. To maintain good posture one exerts much less muscular effort as compared to a bad posture. Poor or bad posture adversely affect the body segments and joints structures and prolong postural strain on the same is definitely injurious to these structures. By assuming balanced posture our body exerts less pressure on different organs of the body, as a result the person feels less fatigued. Good postural patterns permit and encourage normal functioning of the vital physiological processes, particularly respiration, circulation and digestion.

Bad or poor posture may cause psychological problems, emotional disturbances and generate feeling of inferiority in an individual. By attaining good posture one can avoid such psychological problems. A person having a good posture is able to draw attention towards him and is able to gain social acceptability, recognition and social efficacy easily. The aesthetic appeal of correct posture and poise cannot be denied. Good posture also helps in improving his economic efficiency as his full of confidence and is able to properly interact with people. He is also able to perform his duty more effectively and efficiently, thereby improving his employment prospects.

**IMPORTANT POSTURE.**

Broadly there are two types of postures.

A) **Inactive posture** – When a person is sleeping or having a rest and body require minimum muscular efforts.

B) **Active posture**- Where integrated muscular actively required.

Active posture may be static or dynamic. Static posture is one where the body is passive not active or changing stance. And forces are acting in equilibrium. Dynamic posture is one where the body is motion active and changing its stance, postural position whether inactive or active (Static and dynamic) can be broadly classified in four categories.
1) Standing position or posture
2) Sitting position or posture
3) Lying position or posture
4) Walking position or posture

STANDING POSITION OR POSTURE

Standing position of an individual is generally considered as a basic posture from which all his other postures stem erect standing posture is to literally static it is in reality is movement upon a stationery base. The application of the principles of stability to a standing position balanced and free from muscular and ligamentous strain, would be that the line of gravity of the centre of head, chest, abdomen (trunk) and pelvis fall in a straight line. In standing position weight should be equally distributed between the ball of the foot and the heel.

Static erect posture should be deliberately avoided except for short periods, otherwise it will produce undue muscular strain and stress resulting in excessive fatigue in case one has to stand for a longer duration the effort should be made to shift the weight to one foot to another periodically. This will avoid undue neuromuscular stress and strain being caused due to the extensor muscles of any one leg. This can be done either by moving one leg sideways and later on moving the other one similarly, or by moving one leg backward and the other forward and changing their position frequently. In this way brains equilibrium centre adjust the tension of the postural muscles enabling them to function automatically so as to readjust the body balance. Accordingly good standing posture is a position of extension of weight bearing joints. This should be an easy extension and should not be accompanied by stress or strain by any kind.

Following are the criteria for a good posture.

1) Satisfies the most biomechanics criteria.
2) Provides bodily relaxation (not tension) and readiness for action.
3) Manifest balance, dynamism, elevation of thoughts and optimism.
4) Look aesthetically good.
5) Imbibes hygienic, economic, social and spiritual values, looks aesthetically good.
6) Imbibes hygienic, economic, social and spiritual values.

Though good posture is matter of common sense personal philosophy and value judgment, it can be easily distinguished from poor posture that ends up in an undue fatigue, muscular strain, and poor muscle tone. The persistent poor postures are any activity or situation may cause postural deformity, difficult to remedy later.

**SITTING POSITION AND POSTURES**

There are three types of sitting postures

1) simple sitting
2) Reading while sitting
3) Writing while sitting

Simple sitting – the simple sitting position is one in which a person occupies a position wherein the muscles involved in the process experience minimum stress and strain.

In simple sitting position, the parts of the body are well placed in proper alignment with each other, the trunk including the head and shoulders should be in a natural upright and relaxed position. Especially Kyphosis (outward curvature) of the lumbar spine should be avoided by maintaining the natural curves of the spine. The thighs should be placed horizontally, legs placed vertically and the feet resting on the ground in flat position. The hands flexed a little at the elbows, should rest on the thighs.

Frequent changes of position are important for preventing fatigue and the chair, allow the person to move about instead of restraining him in rigid sitting position. The weight of the sitter should be supported over the large area so as to equally distribute the pressure. The height of the seat should be designed to prevent when the foot is flat on the ground and the knee is bent at the right angle.
Chair should also have a back rest providing support to the lumbar region of the spine. The defective sitting posture has immersive adverse effects on the natural curve of the spine, resulting in the spinal deformities.

READING WHILE SITTING

The reading posture is almost similar to the simple sitting position. The only point to be kept in mind is the distance of the reading material and its angle from the eyes. Generally the distance between the eyes and the reading material should be about 30 centimeters and the angle of the reading material should be of 40 degree horizontally.

The back should be a little more erect as compared to simple sitting posture efforts should be made to have proper lighting arrangement so that the light falls on the reading material from the back of the person reading. Appropriate furniture should be used for sitting, it should not be too high or neither too low nor too inclined, hands should be placed on the table holding the reading material comfortably. It is being generally observed that while reading, the children assume faulty reading postures which may lead to various posture deformities as well as eye sight problems.

WRITING WHILE SITTING

In writing Posture, the chair should be drawn under the table so that the elbows of the child are resting on the table comfortably and the forearms should be approximately horizontal the thigh should be horizontally placed with the legs placed vertically and feet resting on the ground in flat position. It has to be kept in mind that height of the table should be according to that of the child and the chair. There should be a slight slop in the surface of the table towards the child to facilitate the writing process.

In this posture the child has to have a little forward inclination as compare to the reading posture. Writing posture, undue bending of the neck, forward or sideways should be avoided.
CORRECT METHOD OR TEACHING:

1) Keep trunk straight, do not allow spine to be curved.
2) Bend body at the hip joint.
3) Set far back in the chair to prevent bad trunk position.
4) Let the feet be on the floor.
5) Do not sleep.

LYING POSITION OR POSTURE:

The best lying posture is one in which the entire body segment are placed in such a position so as to exert minimum stress and strain. As one generally lies down to have rest or to relax, the best posture for this purpose is to lie down flat, keeping back on the floor or the bed with legs fully stretch forward, feet a little apart in a comfortable position arms straight to the side of the body this posture is almost similar to one in Shavasana in Yoga and is considered best for relaxation. The bending should be firm if not hard. Spring and sponge mattresses are highly undesirable and they make the body sink out of alignment. High pillows cost tension in the muscles of the neck and impeded to upper circulation of the blood to the head. While sleeping it is not good to sleep on ones back, nor its proper to sleep always on the same side, weather right or left it has been observed that sleeping on ones side with knees drawn up a little, in a comfortable position is considered as a good lying position while sleeping.

Lying posture is being generally neglected without having any proper knowledge about it. This posture is as much is not more important as any other posture one’s body and mind relaxes. Sleeping is not nearly an act it is an event, it rejuvenate both body and mind to face another day.

CORRECT TECHNIQUE.

1) Recline in a manner that muscles get relaxed.
2) Lying on back brings no relaxation.
3) Lye on the right or partially on the face (this favors muscular relaxation and makes less pressure on the heart)
**WALKING:**

In dynamic movements like walking, the force should be directed as much as possible in a straight line, intersecting major joints the foot, Knee, hip, and the shoulder. At the same time, the spinal curve should be held in a comfortable natural position the hands should move in a synchronized movements with legs. In a tension free movement it manner in which experience minimum stress and strain the neck moving forward should be a line of direction with heel touching first followed by toe pointing towards the direction of the movement and the weight of the body will be shifted on the toes along with the outer edge of the foot.

**CORRECT TECHNIQUE:**

1) Carry weight on outside of the feet.
2) Move feet parallel forward with natural strides steps neither too long nor too short.
3) Look straight ahead and carry the head tall, shoulders a little forward.
4) Swing arms naturally, swaying from side to side and be in rhythm.
5) Be relaxed, never lighten muscles.
6) Keep gait natural, do not drag feet.

Walking is an art. Perform it like an art confidently happy cheerful, optimistic nature express itself in walk with an elastic, springy step, holding the head erect and abdomen flat.

**IMPORTANCE OF POSTURE**

It increases the attractiveness of the person and influence self-concept and psychological implications.

**POOR POSTURE / BAD POSTURE**

Poor posture is the posture which reflects body clumsiness, faulty biomechanics of movement lack of skill or training. It is also defined as the state of body where in
working physical stress, strain and undue fatigue arising in the muscles and bones. Bad or poor posture may cause psychological problems, emotional disturbances and generate feelings of inferiority in an individual. It also adversely affects the body segments and joint structures and prolonged postural strain on the same is definitely injurious to these structures.

**CAUSES OF POOR POSTURE**

1) Inherited factors
2) Environmental factors

**INHERITED FACTORS**

General reasons for poor posture or postural deformities may be sought either in the genetic (inherited) factors or the ones that happen to exist in the environment. Sometimes a person’s poor posture may be due to inherited factors in other world, the individuals may come into this world with physical defects either due to faulty genes or physical traumas to the foetus. For example, some individuals are born with limits of uneven length crooked spines, defective bones, twisted, arm club feet, weak muscles or deformities such as bowed legs or constitutional disorders. Inherited deformities of posture are easily rectifiable right in infancy or childhood but they leave some scar on the effected person depending upon the severity of the deformity and the degree and extent of medical care provided.

**The causes of poor posture can broadly be classified into two categories**

i) Acquired – due to some accident or disease

ii) Congenital - present at birth or hereditary

The deformities cause due to poor posture can be of two types

Functional divergence
Structural divergence

Structural - bone modification (condition cannot be rectified without surgery)

Functional – soft tissue such as muscular, ligaments (correction though exercise and induction procedure)

**ENVIRONMENTAL FACTORS**

1. Malnutrition – especially during infancy and childhood formative years can be a contributing factor in poor posture. Rickets are caused by malnutrition only the ability of the body to resist disease is considerably lowered, thereby increasing the chances of injury and deformity.

2. Habits - for the majority of people having poor posture is due most like to faulty or bad habits in sleeping, walking or sitting or example sitting or standing in a comfortable position for hours frequently at work place, during travel or elsewhere, largely due to compulsion, is not only injurious but also responsible for bad posture. Wearing too light or uneven dry clothing or tight shoes is also a cause for some postural deformity similarly, often people who are tall will walk with their hands down and their body bent thinking. Others will see them as not being tall at a person is required to keep standing for hours discharging some odd duty. Though he keeps on shifting body weight from one legs or the other the standing posture causes a hunched position leading to bad posture.

3. Fatigue – general weakness of the muscles and bones and nerves play their own roll in poor posture. When fatigue is allowed to become chronic over time, it can be a common cause of bad posture. As habits of slumping can be from muscle relaxation working over time or persisting on an activity much longer to the point of physical and mental exhaustion makes one liable to develop faulty posture or physical deformity. General weakness, which so frequently accompanies convalescence or
inactive lifestyle and is responsible for a large number of postural changes and compensation in people.

4. Heredity - Heredity is another factor which is responsible for poor or defective posture. Heredity defects like kyphosis and other genetic defects may cause poor posture.

5. Weakness - It is not possible to assume and maintain erect posture without expenditure of some energy. Such efforts therefore, require some strength and endurance. Experiments have shown that stumped or slouched position of body can be maintain with quite. Lungs metabolic energy as compared to the erect position the muscular weakness and lack of visibility is thus responsible for such faulty postures.

6. Occupational hazards - It is involved in several professions especially those with stereotypic activities, lead to deformation of body posture head load workers carrying heavy load on head or shoulders are prone to develop deformities in the neck, shoulders and or back bone having a profession where one deals with delicate work requiring very close concentration can be a factor contributing to poor posture. Sometimes a person can also have poor vision that leads to faulty posture as it would require training over to read. Habit and occupation are both associated with the posture of various portions of ours bodies. Those over time cause postural compensation, creep, hysteresis and sit and result in postural attitude alterations these changes in position and function cause serious biomechanical changes and joint complex dysfunction. The normal segmental weight bearing of the body is widely distributed and the function is often transferred to a joint or joints that are not intended for it i.e. asymmetrical overload syndromes or right and or left frontal plane, asymmetries are the result of such shift in the functional symmetry of joint surfaces.

7. Feeling and mental attitude - May be potential, causes for people to develop poor posture for instance, such status of mind as relation, happiness, relaxation, confidence, contentment satisfaction etc. help people to maintain erect posture whether standing, sitting or walking where as negative mind states as worry, anxiety, depression, unhappiness, despair humiliation, and frequent burst of negative emotions keep people in clumsy, awkward and abnormal positions such as frowns downcast eyes,
tense necks, clenched fists, dropping shoulders so on and so forth of look older for their age.

8. Disease - posture is greatly affected by the disease that weakens the bones or the muscles or causes the joints to lose their strength or mobility. The examples of this kind of disease are rickets caused due to the faulty nutrition of bone, and tubercular disease of joints or vertebral. Polymyosities may cause weakening or distorting of motor nerve cells in the spinal cord and thereby causing partial or complete loss of functions in certain muscle groups. These types of loss of power in muscles groups upset the body control and balance and also cause other kind of defects.

9. Injury - when a bone, ligament or muscle is injured, it is likely to weaken the support at that point and thrown the framework out of balance when such condition exists, it is not possible to have a perfect posture even after the injury has fully healed the habit developed during the injury may still persist, and the faulty posture may continues for a long time.

10. Thus is common type of poor posture caused by postural defects due to curvature of the spine. There exists in the human body four curves, two are present at birth and these are the sadal and thoracic. As a person matures and grows two others are added, the lumbar and cervical, with these four curves can be seen when viewed from the side this includes both a view of the front and the view from behind a person disturbance in the normal curvature of the spine by any seen or unseen factor.

11. Improper clothing - the type of dress one wears also has impact on the individuals’ posture for example wearing light fitted dress, tight shoes, high heel shoes etc. will result in adopting poor posture such improper clothing makes one uncomfortable and lead to faulty posture.

12. Over load - one may develop round shoulders and deformities of spine like kyphosis and scoliosis by continuously lifting and carrying heavy weight on shoulders and the upper back every day. Example of overloading can be observed as we find school children heavy bags on their back.
13. Imitation - due to over exposure of the children to the popular media like TV, network etc there is general tendency among children to imitate their favorites heroes, models, stars teachers, friends etc. such imitation may distort their natural posture and may cause postural diversions.

14. Unhygienic conditions - it is very common to find crowded class rooms improper sitting arrangements improper furniture, improper and insufficient lighting arrangements etc. in our country such unhygienic conditions results in postural deviations.

15. Lack of exercise - exercise tone up the spinal nerves and abdominal organs, improve appetite and digestion, promote flexibility and co-ordination reduce mental strain, provide energy improve the physical ability and efficiency lack of exercise has several adverse effects which may lead to postural deformities and defects.

16. Lack of awareness - many people are unaware regarding the concept of proper posture and continue to follow wrong, or faulty postures this becomes their permanent habit and a life style which leads to postural defects and deformities.

17. Obesity - obesity or undue body overweight puts extra stress and strain on the muscular. As well as skeletal structure of the body this may result in postural deviations.

18. Poverty - lack of essential and basic facilities due to poverty is another important factor which may lead an individual to adopt bad or faulty posture.

**INEVITABLE EFFECTS OF POOR POSTURE**

Poor posture can affect the health of a person as there exists a cramped position of the internal organs in the body. These organs consist of varied abdominal, the lungs and the heart, the body cannot function normally if the organs are pushed against each other by the presence of poor posture. The circulation of the body is slowed down and ligaments can be strained when the body is not allowed to function normally then the
diminished blood flow can lead to chronic disorders. When the blood is not allowed to flow as it properly should then other parts of the body can become congested with blood. The pelvic organ can suffer if the other organs are sagging. If a person try to read by looking down too far or by looking up too high than the eye balls can become distorted. Poor sitting habits can lead to poor reading habits and also then to defective vision neuromuscular fatigue can result from poor posture and cause to body to have less energy. The joint become strained and also painful. A person can also become pot bellied with constant fatigue and stretching of nerves in the spinal cord. The abdominal organ in the body can also sag sometimes. The result of poor posture can be a great deal of foot pain as the feet fatigued very easily.

Over the period of years the habits that have been formed in sleep, sitting, or walking can affect the skeletal in some way or the others. The spine has bones and cartilage disks that are very sensitive. The vertebrae in our spine are stacked one upon the other there are many major nerves that enter and leave these spaces between the vertebrae and if damaged has developed over many years to the cartilage disk or the bones than the nerves can become pinched this caused pain to occur that can feel like an electric shock to certain areas such as the legs, back, shoulders or neck.

PREVENTION BY PRACTICE OF GOOD POSTURE.
The manner in which you sit, stand or work will determine the quality of your posture. the efficiency of your body will depend on your having good posture the weight of your body will be distributed more evenly along the body’s centre of gravity each activity if accomplished correctly will allow freedom of movement with the least use of energy. finally a person with a poor posture not only looks clumsy in appearance, sometimes offending too, but is also rated poorly on the standards of beauty or handsome, which lowers his/her social significance.

PREVENTION AND REMEDIAL MEASURES OF A POOR POSTURE
The appropriate remedial action should be started as soon as possible. Immediate attention is required as bad posture exerts unusual and a typical stress on the soft
tissues, muscles and ligaments of the body segments. Time to time screening of the body position will go a long way in preventing postural defects. It must be remembered that the means of correcting postural deviations must be based upon medical diagnosis and recommendations. As ignorance regarding the basic concept of posture is one of the major causes for postural divergences, proper knowledge regarding the importance of posture and appropriate guidance for correcting the same is necessary so as to develop a postural sense regarding body mechanics in the mind of an individual.

Whenever faulty posture is caused due to any disease, the disease must be treated first before anything else is attempted if faulty posture is due to an injury, the injury must be treated and allowed to heal. In general the cause or the reason must be removed or curved before any measures for improvement of posture can be effectively implemented. The treatment of patients with severe injury or disease may often require surgical operations as general muscular weakness is also one of the common cause of poor posture. An active childhood involving vigorous exercise by engaging in games, sports and developmental exercise, is perhaps the best preventive measure that can be undertaken. The type of activity or game selected is equally important proper attention should be given while preparing time table for school colleges etc. the time tables for schools, colleges etc. the time table must provide for extracurricular and recreational activity along with intermittent rest intervals an hour in the gymnasium will not sure bad posture when many hours are spent in the environment that caused it this highlights the necessity of improving hygienic condition and making environment conducive to healthy living some cases of faulty posture are due to fatigue, mental strain, improper digestion and assimilation of food, malnutrition or similar causes. Rest and proper nutrition are equally as important as a programme of corrective activities, government and non government organizations should make sincere efforts to elevate the standards of living of poor people and new drives or programmes like mid day meals, free education, free vaccination and free health checkups should be launched.

Due care should be taken to identify the cause of each individual’s shortcomings and corrective procedures on line with best educations and orthopaedics practice should be instituted. Postural defects which cannot be corrected by an individual’s own efforts are known as resistant or structural defects and are such cases should be
reference to a physician or orthopaedics surgeon, coaches and physical education teachers make a valuable contribution when they recognize postural defects and deformities and make appropriate remedial suggestions.

3. WHAT ARE DEFORMITIES?

Deformity is an alteration in the shape of the limb. The deformity may be the result of bony distortion or alterations in the topography of the soft tissue, the deformity can lead to an impairment or even loss of function of the limb (Prakash .P. kotwal)

Causes – deformities may arise from abnormality in bone (e.g. malunited fracture), joint e.g. tuberculosis of the knee), or soft tissues (e.g. clubfoot), these may be either congested or acquired (j maheshwari)

CONGENITAL DEFORMITIES

These are deformities or malformation present at birth (e.g. clubfoot) some of these malformations, though present at birth, may become apparent only later in life (e.g. spine bifida). The deformity may be severe and incompatible with life (e.g. osteogenesis imperfecta congenita) and can only be found in still born infants on the other hand, it may be very minor and have no practical significance.

The underlying causative factors may be i) a genetic abnormality e.g. diaphysical aclasis, mongorium etc) ii) environmental factors e.g.phocomelia and iii) combined - genetic and environmental factors (e.g. congenital dislocation of the hip, clubfoot)

ACQUIRED DEFORMITIES

Deformities acquired later in life may be divided into those arising at a joint or in a bone

Deformities arising at a joint

A joint may become deformed because of any of the following factors
a) Dislocations and subluxations – these may be traumatic (e.g. most dislocations and subluxations seen in day to day practice) or pathological (e.g. following acute septic arthritis) classific deformities are produced in some subluxation or dislocation.

b) Muscle imbalance – all joints are spanned by two opposing groups of muscles normally these muscle maintain a balance so that the joint can be kept in any position in some diseases an unbalanced action of the muscles may hold the joint in a particular position with time the other soft tissues around the joint (the capsule, ligaments etc) also contract and prevent the joint from returning to its neutral position the muscle imbalance may arise from paralysis of a group (e.g. polio) or over activity e.g. spasticity in cerebral palsy.

c) Tethering or contractive of muscle and tendons - joint movement is associated with contraction of a group of muscle and elongation of opposing group to add from gliding of tendons also happens in this process if by some disease, these functions are interrupted, the joint is presented from moving full range for example, the muscles or tendons, may get tethered to the underlying bone (e.g. tethering of the quadriceps to the femur in a fracture) the muscle may get contractive (e.g. volkmann’s ischemic contractive of the flexor muscles of forearms, leading to flexion deformity of the wrist and fingers.

d) Contractive of soft tissue other than muscles a part from muscles, contractive of other soft tissue like skin, deep fascia etc. any account for the deformity for example contractive of palmer aponeurosis may pull the metacarpo – phalangeal joints of one or more fingers, similarly, contractive of the scarred skin on the flexor. Aspect of the elbow or knee following a bar may result in a flexion deformity of the respective joint.

e) Arthritis - joint deformity may result from arthritis this may occur i) because of sustained spasm of a group of muscles in response to pain or ii) as a result of damage to important structures like ligaments, cartilage etc. by the arthritic process.
DEFORMITIES ARISING IN A BONE

Three major causes of deformity arising in a bone are fracture, bone diseases and abnormally growing bones.

a) Fracture: this is the commonest cause of deformity of a bone. This results when a fracture unites in a mal-aligned position.

b) Bone diseases: some diseases of the bone result in a softening and bending of the bones. Most of these are generalized disorders where several or all of the bones are affected. The following are some examples.

<table>
<thead>
<tr>
<th>Deformity</th>
<th>fracture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gun stock deformity (cubitus varus)</td>
<td>supracondylar fracture of the humerus</td>
</tr>
<tr>
<td></td>
<td>fracture lateral condyle of humerus</td>
</tr>
<tr>
<td>dinner fork deformity</td>
<td>collies fracture</td>
</tr>
<tr>
<td>mallet finger</td>
<td>avulsion of the extensor tendon from base</td>
</tr>
<tr>
<td></td>
<td>of distal phalanx</td>
</tr>
<tr>
<td>coxa vara</td>
<td>inter-trochanteric fracture</td>
</tr>
<tr>
<td>genu valgum</td>
<td>condylar fractures of tibia (e.g. bumper</td>
</tr>
<tr>
<td>varus valgus at ankle</td>
<td>fracture )</td>
</tr>
<tr>
<td>metabolic disorders</td>
<td>ankle injuries</td>
</tr>
<tr>
<td>endocrine disorders</td>
<td>Rickets, osteomalacia.</td>
</tr>
<tr>
<td>disorders of unknown aetiology –</td>
<td>Parathyroid osteodystrophy</td>
</tr>
<tr>
<td></td>
<td>cushing’s syndrome.</td>
</tr>
<tr>
<td></td>
<td>Paget’s disease, fibrous dysplasia, senile</td>
</tr>
<tr>
<td></td>
<td>osteoporosis.</td>
</tr>
</tbody>
</table>
c) Abnormal bone growth: bone deformity may result uneven growth occurring at the epiphyseal plate. Unequal growth of one of the two bones in a part of the limb with two bones (e.g. forearm or left), may result in deformity at the adjacent (e.g. wrist or ankle). The common causes of uneven growth at the epiphyseal plate are as follows.

- Crushing fracture involving the epiphyseal plate (grade-v, Salter and Harris epiphyseal injury).
- Infection from a nearby osteomyelitis or arthritis, spreading to the epiphyseal plate, and damaging it.
- A tumor may retard the growth of a nearby epiphyseal plate (e.g. enchondroma in ollier’s disease). Occasionally, the tumor may stimulate uneven growth of the adjacent plate by causing local hyperaemia (e.g. haemaangioma).
- Dysplasia: In some epiphyseal dysplasias, abnormal growth at the epiphyseal results in joint deformities.

TREATMENT

Many deformities do not need treatment, as they are of no significant functional or cosmetic concern. A simple reassurance and watchful neglect may be appropriate in these cases. Most other deformities cause functional impediment or cosmetic concerns, and have to be corrected. Some deformities (e.g. bow legs), may not be of immediate functional concern, but may cause problem in long term, and thus may need to be corrected. This methods used for correction of deformities may be non operative or operative.

NON OPERATIVE METHODS

Wherever possible, non operative methods are attempted first. These are suitable for deformities due to soft tissue contracture. The method essentially consists of stretching the contracted soft tissue, and then maintaining the correction by splints. The disadvantage of this method is that the treatment is long drawn, and an equally prolonged effort at maintenance is required. Recurrence of deformity is common. Correction of deformity by non operative methods is done by the following ways.

a) Manipulative correction: the contracture is gently manipulated, so as to stretch it. Once corrected, it is maintained in the corrected position in a plaster cast or splint. An example of use of this method is treatment of a club foot by manipulation and pop.
b) Wedging cast: in the technique, a cast is applied on the limb with deformed joint. A wedge of plaster is cut out on the convex side of the deformity, the wedge closed by forcing the part, thus achieving correction.

c) Traction: gradual traction can stretch out contracted soft tissues. The contraction is subsequently maintained in a splint or calipers.

d) Splints: these are special splints which permit gradual stretching of the soft tissues, leading to the correction of deformities (e.g. turn-buckle splint)

**OPERATIVE METHODS**

In cases where the non operative methods fail for the deformity is primarily bony, operative correction may be required. The following methods are used.

a) Soft tissue release: the contracted soft tissues are released. Tethering of soft tissues is removed.

b) Osteotomy: it is used for correcting bony deformity. The deformed bone is cut and suitably realigned in a corrected position (e.g. for genu varum and genu valgum)

c) Arthodesis (fusion of the joint) this method is adopted where a joint is not only deformed, but its articulating surfaces damaged beyond repair. Arthodesis suitable for joints where loss of motion at the joint does not produce much functional disability (e.g. wrist). In other situations, such as hip and knee joint replacement is a better option. With the availability and better longevity of artificial joints, Arthodesis become less popular. There are situations where joint replacement cannot be done (e.g. joint infection, paralyzed limb) and Arthodesis remains the only option. The producer involves opening up the joint removing its cartilage, and immobilizing it in functional position. the raw bone ends unit (as in a fracture), resulting infusion.

d) Arthoplasty the term arthoplasty means reconstructing a joint. Reconstruction can be done by two methods i) by excising a part of the deformed joint, thereby relaxing the surrounding soft tissues, and thus correcting deformity or ii) by replacing the joint with artificial components. The former is called excision arthoplasty, and is done for joints damaged due to infection. The latter is called replacement arthoplasty (joint replacement), and is done for most other damaged and deformed joints (e.g. osteoarthritis knee).
e) Correction of deformity by selective retardation of epiphyseal growth. This is useful in cases where the cause of deformity is unequal epiphyseal growth, and the child has residual growth potential. Here, the faster growing side of the epiphyseal is temporarily or permanently stopped by surgical means. (Stapling, direct damage etc.) Over a period of time, the slower growing side keeps growing, while the stapled side does not, resulting in correction of the deformity. This is performed in selected cases of genu varum or valgum in a growing child. It is a minimally invasive operation, but a little unpredictable.

Ilizarov’s technique: this is a versatile technique of correcting deformity. Its utility is more when the deformity is associated with shortening, or if the deformity is in more than one plane. The apparatus provides an opportunity for correcting the deformity very accurately.

Postural patterns and Movement are vital components in a child’s physical and emotional growth and development. Movement is usually considered as flowing and dynamic, while posture is observed as a static state of body characterized by lack of movement. But regarding posture as an independent factor unconnected to the overall functioning of the body system is fundamentally incorrect. The word “posture” means a position in which the whole body, or part of it, is held. A “multi-limbed” dynamic living organism such as the human body cannot be defined as having only one posture. It performs many postures, very rarely holding any one of them for very long.

The initial and most important function of the skeletal and muscular system is movement, and any static state in which the body finds itself is only part of this basic activity, since posture “follows” movement like a shadow. Expanding on this idea, Roaf (1978) defined posture as “a temporary position” assumed by the body in preparation for the next position. Therefore, static standing is not “real” posture, as we hold such a position so rarely.

To discuss the broad essence of the term “posture”, we must address a number of the factors affecting it.
KINESIOLOGICAL AND OTHER FACTORS AFFECTING HUMAN POSTURE

PHYSICAL ACTIVITY

Adapted physical activity contribute to a great extends to the normal and optimum development of the body and to improve movement and postural patterns, but in cases where activities performed unable to maintain body balance, the result may be functional, skeletal limitations and impairment of optimal movement patterns.

EMOTIONAL STATE

Postural patterns are a visual clue to human emotional state. From initial stages old development, movement patterns become so intertwined with emotional and cognitive impressions that the cumulative muscular stress in the body can be seen as a mirror of the body’s expression. People experiencing emotional stress, anxiety, grief or lack of confidence, bear their bodies in a manner that externally reflects these feelings.

Where these interrelationships persist over long periods of time, the result may be habitual patterns. In other words, emotional processes may help to perpetuate fixated bodily patterns. Effective movement therapy for postural disorders is based on physical exercise that addresses the psychomotor domain as well. As noted, in this approach the physical, the emotional, and the cognitive, constitute a multidimensional entity that finds its expression in postural patterns.

HEREDITY

The genetic cargo people are born which affects their physical development and postural patterns. Details such as physique (ectomorphic, mesomorphic, and endomorphic) and the length and weight of bones are givens at birth and together comprise a dominant factor in postural development.
AGE

Postural patterns change from time to time during the age life cycle, from the moment of birth, through all developmental stages and into old age. Cogent examples of these changes can be seen mainly in:

• The gradual development of the structure of the foot arches.
• The position of the lower extremity joints.
• The position and stability of the pelvis
• Development of the spinal curves.
• Stability of the shoulder girdle.

GENDER

There are several differences which are physiological as well as psychological evident between the posture of men and of women and are generally attributable to anatomical and physiological differences. These variations are especially visible in the following examples (Gould & Davies, 1985):

• A greater lumbar pelvic angle among women (which affects the position of the pelvis and the lumbar spinal column)
• Higher percentages of fat tissue in women (which has an overall effect on body structure and postural patterns).

ENVIRONMENTAL CONDITIONS

Environmental conditions affect all areas in which human beings conduct their lives, among them:

• Work environment – the job one holds, the activities performed during the day, even prevailing dressing habits (a tailored suit, high heels or casual clothes?) have a cumulative effect on postural and movement patterns (Hales & Bernard, 1996).
• Social factors – including social norms affect posture such as the way people walk and dress, etc. Examples might be the “relaxed” posture favored by teenagers, the
slouching walk affected by fashion
Models or the ramrod erectness of military officers.

**ASPECTS OF POSTURE**

The posture of human body is an inter connected segment to various other areas of body like physiological system, psychological system and biomechanical dimensions of the body. In actual term of posture we cannot say that this is right or wrong posture because its meaning and position differ from person to person, what might suit a 17 year old with an endomorphic body structure is not necessarily suitable to a 12 year old ectomorphic body type person same way the approach will also differ in treating the postural disorders. The patients having postural disorders must be considered as a unique one and should try to sublimate their disorders within their body structure

Here is some suggestive measure given by research scholar to accomplish normal posture.

1. Optimal load on the skeletal system

   According to the strength and its physical rigidity, bone tissue is dynamic in nature and responds to loads imposed on it. The study of bone growth indicates that bone grows in direct proportion to the load placed on it, within physiological limits.

   In postural disorders, there is an imbalance in the loads imposed on different areas. In these situations where loads exceed normal physiological limits consistently and over prolonged periods of time, structural changes occur in the skeletal bones. Damage of this type is usually irreversible (Norkin & Levangie, 1993).

2. Balance between antagonistic muscle groups

   Constant muscle tone facilitates balance and stability in body joints. In normal posture, antagonistic muscle groups work in different directions in order to stabilize the body and keep it in a state of balance. Upsetting this functional balance between opposing muscle groups may lead in time to the development of postural disorders
(Kendall & McCreary, 1983).

3. Optimal activity for internal body system.
   Long term postural disorders may also impair the normal functioning of internal body system. This emphasizes the fact that maintenance of body health depends first and foremost upon proper functioning of internal system and not necessarily on the functioning of the muscular system.
   The primary symptoms of postural disorders is often detected in skeletal muscles it create negative chain reactions over the time that affect the functioning of internal systems and not necessarily on the functioning of the muscular system.

**POSTURAL DEFORMITIES**

Here are the deformities which occur due some or the other above mentioned causes.

**CUBITUS VALGUM DEFORMITY**

In this deformity the angle of the elbow region is abnormal and increased in comparison to normal angle of the humerus and the ulna bone of the arm. Specifically it’s the growth at the lateral curvature side of the distal humerus epiphysis results in a cubitus valgus deformity. Malunion is the most common complication of the supracondylar fracture of the humerus and results in a cubitus deformity. This deformity occurs if the fracture of the elbow joint is allowed to medial tilt and internal rotation of the distal fragment.

**KYPHOSIS**

This is a general term used for excessive backward convexity of the spine. It is of two types round or angular.

**Round kyphosis**

Means a gentle backward curvature of the spinal column. It is caused by diseases affecting a number of vertebrae (e.g. senile kyphosis).such a kyphosis may be localized to a segment of the spine, or it may be diffuse.
Angular kyphosis

Means a sharp backward prominence of the spinal column. It may be prominence of only one spinous process because of the collapse of only one vertebral body as may occur in a compression fracture of a vertebrae. This is called knuckle they may be kyphosis localized to a few vertebrae and is called as gibbus. It is seen commonly in tuberculosis where usually two or more vertebrae are affected.

Causes

The following are the common causes of diffuse kyphosis

A) Postural - this is the commonest type, seen in tall individuals, especially in some tall women, because of their tendency to stand with a forward stoop. It occurs in the upper dorsal spine, and can be corrected by postural training and physiotherapy.

B) Compensatory - if there is an exaggerated lumbar lordosis due to some disease the thoracic spine develops compensatory kyphosis.

C) Scheurmann’s disease - it is a common type. There is a gentle round kyphosis in the lower thoracic spine. It is due to osteochondritis affecting the ring - epiphyses of the vertebral bodies. On x rays, the vertebral bodies appear wedge – shaped, narrower in front. There may be a dull constant pain during early stages of the disease, but later, only kyphosis remains. Conservative treatment is adequate for most patients with pain as the complaint. If the deformity is severe, especially if it is compromising the activities in any way, surgical interventions may be required.

D) Ankylosing spondylitis – the disease produces a stiff and kyphotic spine. it begins in young men as low backache, which gradually spreads to affect the whole spine. Chest expansion is reduced because of the limitations of movement at the costo vertebral joints. In a few cases, hips and shoulders are also affected.

SCOLIOSIS

Scoliosis is the sideways curvature of the spine.
Types – it is of two types - non structural (transient) and structural (permanent) in structural scoliosis, the vertebrae in addition to sideways tilt are rotated along their long axis in non structural scoliosis they are not.

Nonstructural scoliosis - this is a mobile or transient scoliosis it has three subtypes as discussed below.

1. Postural scoliosis - it is the commonest overall type, often seen in adolescent girls. The curve is mild and convex usually to the left the main diagnostic feature is that the curve straightens completely when the patients bend forward.

2. Compensatory scoliosis – in this type the scoliosis is a compensatory phenomenon, occurring in order to compensate for the tilt of the pelvis (e.g.in a hip disease or for a short leg) the scoliosis disappears when the patient is examined in a sitting position in case the leg is short) or when the causative factor is removed.

3. Sciatic scoliosis – this is as a result of unilateral painful spasm of the paraspinal muscles as may occur in a case prolapsed intervertebral disc.

Structural scoliosis – it a scoliosis with a component of permanent deformity the following are the different subtypes.

1. **Idiopathic** – commonest type of structural scoliosis it may begin during infancy childhood or adolescence infantile scoliosis begins in the first year of life and is different from the other. In that, it can be a resolving or progressive type scoliosis begins in later life progresses at a variable rate and leads to an ugly deformity. The deformity is most obvious in thoracic scoliosis because of the formation of a rib hump. In the lumbar region even a moderate curve goes unnoticed because it gets masked by the compensatory curvature of the adjacent part of the spine. Idiopathic curves progress until the cessation of skeletal growth.

2. **Congenital** – this type is always associated with some form of radiologically demonstrable anomaly of the vertebral bodies these are i) hemi vertebrae(only one half of the vertebra grows) ii) block vertebrae( two vertebral bodies fused ) or iii) unsegmented bar ( a bar of b)
4. Causes the joining two adjacent vertebrae on one side, thereby preventing growth on that side) these curves grow, often at a very fast rate. Sometimes, there are associated anomalies in the growth of the neural structures, leading to a neurological deficit in the lower limbs.

5. **Paralytic scoliosis** - an unbalanced paralysis of the trunk muscles results in paralytic scoliosis of the spine. Poliomyelitis is the commonest cause in developing countries. Other common causes are cerebral palsy and muscular dystrophies.

6. **Other pathologies** – there are other causes of structural scoliosis such as neurofibromatosis which produces a sharp kyphoscoliosis.

**Pathology**

The main pathology is lateral curvature of a part of the spine. This is called primary curve. The spine above or below the primary curve undergoes compensatory curvature in the opposite direction.

These are called the compensatory or secondary curves. The lateral curvature is associated with rotation of the vertebrae. In curves of the thoracic spine, rotation of the vertebrae leads to prominence of the rib cage on the convex side giving rise to a rib hump.

Any part of the thoraco lumbar spine may be affected. The pattern of the curve and its natural evolution is fairly constant for each site. the following types are recognized i) dorsal scoliosis, ii) dorso lumbar scoliosis and iii) lumbar scoliosis

**Diagnosis**

Clinical features – In most cases, visible deformity is the only symptom. Pain is occasionally a feature in adults with a long standing deformity.

In exceptional cases of severe long standing scoliosis, sharp angulations of the spinal cord over the ape of the curve may result in interference with cord functions, leading to a neurological deficit.
Radiological features. For proper assessment of scoliosis a full anteroposterior X-ray of the spine in supine and erect positions, plus a lateral view is necessary. Severity of the curve is measured by the Cobb’s angle an angle between the lines passing through the margins of the vertebrae at the ends of the curve. Radiological assessment regarding the likelihood of progress of the curve can be made by looking at the iliac apophysis. It fuses with the iliac bone at maturity and indicates the completion of growth, and thus no possibility of the curve worsening. This is called Risser sign. Rotation of vertebrae can be appreciated by looking at the position of the spinous processes and pedicles on view. Normally a spinous process is in the centre of the vertebral body. In case where there is a rotation of vertebrae, the spinous process is shifted to one side, also there will be asymmetry in the position of the pedicles on the two sides.

On congenital scoliosis, one may find wedging, hemi vertebrae, unsegmented bone bar between the vertebrae, fused ribs etc. in scoliosis associated with neurofibromatosis an erosion of the vertebral bodies may be seen. Intervertebral foramina may be widened in a dumbbell shaped neurofibroma producing scoliosis.

**Treatment**

Principles of treatment - aim of treatment is to assess the prognosis of the curve in terms of the visible deformity it is likely to produce. This depends upon (i) the type of the curve (ii) age at onset (iii) the site of the curve. Congenital curves progress at a variable rate depending upon the type of vertebral malformation, but overall they grow faster than idiopathic curves. Neurofibromatotic curves progress faster. In general, younger the patient, the worse the prognosis. Thoracic curves produce the worst deformities. As soon as it is realized that a curve is likely to progress and result in an ugly deformity, the affected part of the spine is fused. The basic guiding principle is that a straight, stiff spine is better than a curve, flexible one. Treatment of postural curves is non operative. Proper training and exercises form the mainstay of treatment. Structural curves of less than 30 degree and well balanced double curves can also be successfully treated by non operative methods. The following are the indications for surgical interventions.

- Congenital scoliosis, where the radiological signs suggest the possibility of fast progression of the curve, especially those in the thoracic spine.
• Curves showing deterioration radiologically, and are in the region where they are likely to produce ugly deformities at pubertal growth spurt.

• Scoliosis associated with backache.

For all curves, patient is stared on a non operative regimen consisting of exercises and a brace. The progress of the curve is monitored clinically and radiological every 6 months. Following are the non operative and operative methods of treatment.

NON OPERATIVE METHODS

These consist of exercises to tone up the spinal muscles and give support to the spine. Following supports are commonly used.

• Milwaukee brace – this named after the city of Milwaukee where it was designed.
• Boston brace - it is cosmetically more acceptable.
• Residder’s turn buckle cast - this is a body cast with a turn buckle in between. Tightening of the turn buckle stretches the concave side of the curve, thus correcting the deformity.
• Localizer cast – this is a body cast applied with the spine in traction. A special localizer table is required for this.

OPERATIVE METHODS

Operative methods comprise of fusion of the spine. In congenital scoliosis, simple fusion is sufficient. In idiopathic scoliosis, the spine is fused after achieving some correction by stretching the spine. Stretching could be done pre operatively by traction (cotrel Traction) localizer cast, or halo pelvic distraction system. It could be achieved per operatively by Harrington’s distraction system, Dwyer’s compression assembly and luque – hartshill systems.
BOW LEGS (GENU VARUM)

This is a condition where the knees are abnormally divergent and the ankles abnormally approximated.

Causes – idiopathic is the commonest type. In others, causes similar to those for genu valgum can be identified, except that the defective growth is on the medial side of the epiphyseal plate. Blount’s disease is a special type of genu varum where the posteromedial part of the proximal tibial epiphysis fails to grow during the first 3 years of life.

Clinical features – an ugly deformity is the main complaint. Severity of deformity can be estimated by measuring the distance between the two knees with the ankles held together. If the distance is more than 8cm, further investigations for an underlying cause are required.

Treatment - idiopathic type usually corrects spontaneously. Shoes with an outer raise (3/16 inch) are usually prescribed. If bowing persists beyond childhood, surgical correction may be required.

KNOCK KNEE (GENU VALGUM)

This is a condition where the knees are abnormally approximated and the ankles abnormally divergent.

Causes – the commonest type is idiopathic, almost invariably bilateral. The deformity basically results from the unequal growth of two sides of the growth plate of the lower epiphysis

Clinical features – physiological genu valgum appears at the age of 2-3 years and nearly always corrects by the age of 6. It may be associated with flat feet. The degree of deformity is estimated by measuring the intermalleolar distance, with the child lying supine, with the knees in contact. In genu valgum secondary to a disease such as rickets, there will be findings suggestive of the primary disease.
Causes of genu valgum

Idiopathic

Post traumatic

- Fractures of the lateral femoral or tibial condyles.
- Damage to the lateral side of the lower femoral or upper tibial epiphyses or epiphyseal plates.

Post inflammatory

- Damage to the lateral side of the lower femoral or upper tibial epiphyses or epiphyseal plates by infection.

Neoplastic causes

- A tumor causing a growth disparity at the epiphyseal plate e.g. chondroblastoma
- Bone softening
- Rickets and osteomalacia
- Bone dysplasia
- Rheumatoid arthritis
- Stretching of joints
- Charcot’s disease
- Paralytic disease
- Cartilage thinning

- OA of the lateral compartment of the knee

**Treatment** - spontaneous recovery in most idiopathic cases. A medial shoe raise (3/16) is sometimes prescribed. It has no proven scientific rationale but does helps in satisfying anxious parents. If the malleolar distance is 10 cm or more by the age 4, the child may need an operation. A supracondylar closed wedge osteotomy is performed.
FLAT FOOT

This is a foot with less developed longitudinal arches.

Relevant anatomy – a normal foot has longitudinal and transverse arches. The longitudinal arch consists of medial and lateral components resting on a common pillar posteriorly – the tuberosity of the calcaneum. The talus is the keystone of the arches. It receives the body weight and transmits it to the arches below. Through the arches, the weight is transmitted to the ground via the tuberosity of the calcaneum and the heads of first and fifth metatarsals.

The integrity of the arches is maintained by the plantar ligaments, the planter aponeurosis, the extrinsic and intrinsic muscles and the structure of the bones of the foot. Ligaments are the most important of these structures, especially the spring ligament, long planter ligament, short plantar ligament, interosseous ligaments and plantar sponeurosis. Of the muscles, tibialis posterior and peroneus longus are more important.

Causes

Idiopathic flat foot is the commonest. There are factors related to the anatomical development of the foot which predispose to formation of a flat foot. Some common causes of flat foot are here:

**Biomechanical causes**

**Congenital**

- Infantile or physiological
- Congenital vertical talus

**Acquired**

- Occupational
- Obesity
- Postural
- Secondary to anatomical defect elsewhere
- External rotation of the limb genu valgum
• Equines deformity of the ankle varus deformity of the foot.

Others

Paralytic – flaccid flat foot
Spasmodic – due to peroneal spasm
Arthritic – rheumatoid arthritis
Traumatic – fracture calcaneum

CONGENITAL FLAT FOOT (VERTICAL TALUS)

The feet of all newborns appear flat because the postural tone of the intrinsic muscles has not yet developed, but in some, the foot is only flat but also its undersurface is convex (rocker bottom foot) such a foot may be in severe valgus. This is due to a congenital anomaly where the talus lies in a vertical position rather than the normal horizontal. Diagnosis can usually be confirmed by taking an x-ray of the foot (lateral view), on which one can see the head of the talus facing vertically downwards. The navicular, along with rest of the foot, rests on the dorsal surface of the talus. Treatment is difficult. In mild cases, the footwear is modified to provide an arch support at mid foot. In severe cases corrective surgery is required.

INFANTILE FLAT FOOT

This is the most common type. The child is brought usually soon after he starts walking with the complaints that he walks on flat feet. There is sometimes a tendency for frequent falls. Arches develop as the child grows, and no special treatment is required. In some children, the feet may remain flat but there are no symptoms. Either of the parents usually have flat feet. Such are prone to developing foot strain and are unfit for joining professions requiring high levels of physical fitness. Foot exercises are taught and arch support is given in the shoes. In late adulthood, pain in the foot and stiffness after physical exertion and common complaints.
ACQUIRED FLAT FOOT

These are static flat feet, where there has been a structural change in the foot e.g., flail foot in a fat person, post traumatic flat foot following in a fracture of the calcaneum, flat foot secondary to genu valgum etc. The other types is spasmodic flat foot where there is a spasm of the peronei muscles due to some painful condition of the foot such as rheumatoid arthritis, tuberculosis, inter tarsal bar etc.

The above mentioned literature of posture gave us the knowledge about Human body structure with respect to other mammals. Posture, good posture, importance of good posture, values of good posture, Importance of good posture in life, important types of posture, correct technique, poor posture , causes of poor posture , inevitable effect of poor posture, remedial measure of poor posture , postural deformities, treatment, kinesiological, biomechanical and other factors affecting posture. This was the detailed descriptions of posture, hence posture is significant in the development of healthy living standard of internal and external body organs to perform their work with efficiency.

PHYSICAL FITNESS

Physical fitness is generally defined in relation to the ability of a person to perform the task at hand if the human body possesses the required anatomical, mental, as well as physiological capabilities to complete the task then the human is said to be physically fit (Krishna Shantanu) in simple terms, physical fitness can be understood as, the ability of a person to perform the tasks of daily routine without feeling undue fatigue and also has some energy left to do extra work physical fitness is actually the relations between the individual’s ability to perform a task and the task at hand.

Don Hoskins describes physical fitness as, “the ability to move with the desired speed, balance, agility and strength gained through proper exercise and nutrition on the other hand (kroles) defines physical fitness as: the successful adaption to the stresses of one’s lifestyle. According to (David R.Lamb) “physical fitness is the capacity to meet the present and potential physical challenges of life with success
FACTORS AFFECTING PHYSICAL FITNESS

Physical fitness differs from person to person. Some factors that influence physical fitness are in our control whereas other factors are not in our control.

FACTORS OUTSIDE OUR CONTROL

- Genes
  As mentioned earlier there are many things that influence a person’s physical fitness and wellness and some of these things are hereditary. You get them directly from your parents or indirectly from the family. Such features are called hereditary features and these cannot be changed. Majority of these features are related to the anatomy of a person, for example, the color of the eyes, health condition such as diabetes, high blood pressure, mental imbalance and the likes. The anatomy of a person also decided the type of activity that a person can undertake for example, a lean and athletic person would be more suited for athletic events rather than for wrestling or weight lifting. Similarly, a person who is suffering from diabetes will face a lot of problems in undertaking activities such as marathons as these require endurance.

- Environment
  The environment at the house, school and the neighborhood play a crucial role in the proper growth and development of an individual. If a person receives a good base for development in his childhood, he is likely to be fit physically and mentally in the later stages of his life and for a longer period of time. Even the climatic conditions of a person influence the physical fitness of a person, for example a person who resides in a cold climate is said to be more physically fit than a person who lives in a warmer climate. Apart from these factors, even the social standing or the social conditions of a person also affect the level of physical fitness of a person. For example, in certain states like Haryana, physical fitness is a way of life in Haryana, a child is trained to be physically fit with the help of a lot of games and sports and good nutrition.

FACTORS IN OUR CONTROL

- Proper diet
  A proper diet is an essential factor for determining the physical fitness and wellness of a person a proper diet helps in the proper growth and development of the individual. It
also helps in protecting oneself from diseases, faster recovery and faster repairing of tissues. In order to take a proper diet, a person should take a balances diet that consists of appropriate amounts of food from all the five major food groups. If a person does not have a well balanced diet than chances are that the person might suffer from deficiency or overdose diseases of certain vitamin these are causes when particular vitamin or mineral in either taken in less quantities or are taken in too much quantity. If a person does not take sufficient diet, then he/she may face deformity, retardation of growth, loss of body weight, relaxed muscles, fatigue depression or the improper working of a body part. Any or all of these factors would leads to lowered physical fitness.

• regular exercise and training
Exercising regularly is an important feature of physical fitness. If a person exercises regularly, the person can greatly improve the conditioning and functioning of his body. In fact a person, who exercises regularly, is always ready for emergencies. For example, when a person is running a marathon, his blood sugar level drops considerably, but because the athlete is trained, his liver is able to maintain the required blood sugar levels in his body.

• Regular training also effects the levels of physical fitness. In order to improve the level of physical fitness, a particular amount of training is necessary. If the training does not reach that level, then the level of physical fitness cannot be improved. The intensity of the training program can be increased slowly so that a person does not get fatigued and his body is able to adjust to the training program.

• Proper rest and sleep
A person’s body needs to recuperate and recover after any kind of strenuous exercise. This can be done only when a person rests and sleeps. Only if a person is able to rest properly, will he is able to perform more strenuous work the next day. Therefore, proper rests, relaxation and sleep are necessary for a person to be physically and mentally fit. A person should take care that he does not sleeps a lot as too much rest destroys the body with the body losing stamina and getting easily fatigued.

• Being free form stress
Though everybody has some type of tension or the other, some people area able to
cope with them while others are not. The people who are able to cope with stress remain fit, but the people who are not able to cope with stress find it extremely detrimental in their life. In order to maintain the physical fitness, a person should try to eliminate all types of stresses from their life.

- **Good posture**
  A good posture reflects not only a good physical condition, but also good health. An erect posture makes a person radiate confident and pride.

- **Avoiding drugs and other forms of intoxication**
  Drugs and other forms of intoxication adversely affect the physical fitness of a person. Though temporarily, these things enhance speed, performance, concentration and delay fatigue, in the long run, there cause massive damage to the body. In fact prolonged use of drugs and others forms of intoxication can cause a person to lose control over his body as the central nervous system loses its balance and control. The ill effects of drugs can be judged from the fact that all government authorities have banned drugs.

**STATEMENT OF THE PROBLEM**

In the light of the above, the investigator become interested in determining the Prevalence of Postural deformities in School childrens in Marathwada region of Maharashtra the deformities selected were Kyphosis, Scoliosis, Bow legs, Knock Knee and flat foot and their effect on selected Physical fitness components (Agility, Explosive leg strength, Speed) The problem was stated as “A Study of Postural Deformities Prevalence in School Childrens in Marathwada Region of Maharashtra.” Taken up to assess the level of selected Postural deformities occurrence and its effect on selected physical fitness components.
SIGNIFICANCE OF THE STUDY

1. This study will be helpful to the physical education teachers and other peoples to know the different type of postural deformities prevalent in school childrens.

2. This study will be helpful to the physical education teachers and government administration to know the ill effects of postural deformities among school childrens.

3. This study will be helpful to the physical education teachers to provide the correct exercise or therapeutic exercise to minimize the postural deformities among school childrens.

4. This study will be helpful to the parents to know the different type of postural deformities prevalent in school childrens.

5. This study will be helpful to physical education teachers to provide correct motivational counseling.

6. This study will provide guidelines to parents, coaches, physicians, physical educationist and sports trainers that how to improve the awareness regarding body posture.

7. This study will provide valuable Information for a better understanding of posture related concepts.

8. This study will be helpful to physical education teachers, physician, orthopaedics surgeons to make strategies and techniques for improving the posture of the school childrens.

9. This study will be helpful to administrators, school authorities for making properly designed furniture for efficient sitting arrangement for the childrens.
OBJECTIVE OF THE STUDY

PRIMARY OBJECTIVE:

The Primary aim of the study was to determine the Prevalence of Postural deformities in School childrens in Marathwada region of Maharashtra, the deformities selected were Kyphosis, Scoliosis, Bow legs, Knock Knee and Flat foot and their effect on selected Physical fitness components Agility, Explosive leg strength, Speed.

SECONDARY OBJECTIVES

- The objective was to study and examine the prevalence of postural deformities in school childrens in Marathwada region of Maharashtra.

- The objective was to study and examine the prevalence of Kyphosis postural deformity in school childrens in Marathwada region of Maharashtra.

- The objective was to study and examine the prevalence of Scoliosis postural deformity in school childrens in Marathwada region of Maharashtra.

- The objective was to study and examine the prevalence of Bow legs postural deformity in school childrens in Marathwada region of Maharashtra.

- The objective was to study and examine the prevalence of Knock Knee postural deformity in school childrens in Marathwada region of Maharashtra.

- The objective was to study and examine prevalence of Flat Foot postural deformity in school childrens in Marathwada region of Maharashtra.

- The objective was to evaluate the effect of postural deformities on Agility of school childrens in Marathwada region of Maharashtra.

- The objective was to evaluate the effect of postural deformities on Explosive leg strength of school childrens in Marathwada region of Maharashtra.
- The objective was to evaluate the effect of postural deformities on Speed of school childrens in Marathwada region of Maharashtra.

- The objective was to evaluate the effect of Kyphosis postural deformity on Agility of school childrens in Marathwada region of Maharashtra.

- The objective was to evaluate the effect of Kyphosis postural deformity on Explosive leg strength of school childrens in Marathwada region of Maharashtra.

- The objective was to evaluate the effect of Kyphosis postural deformity on Speed of school childrens in Marathwada region of Maharashtra.

- The objective was to evaluate the effect of Scoliosis postural deformity on Agility of school childrens in Marathwada region of Maharashtra.

- The objective was to evaluate the effect of Scoliosis postural deformity on Explosive leg strength of school childrens in Marathwada region of Maharashtra.

- The objective was to evaluate the effect of Scoliosis postural deformity on Speed of school childrens in Marathwada region of Maharashtra.

- The objective was to evaluate the effect of Bow legs postural deformity on Agility of school childrens in Marathwada region of Maharashtra.

- The objective was to evaluate the effect of Bow legs postural deformity on Explosive leg strength of school childrens in Marathwada region of Maharashtra.

- The objective was to evaluate the effect of Bow legs postural deformity on Speed of school childrens in Marathwada region of Maharashtra.

- The objective was to evaluate the effect of Knock Knee postural deformity on Agility of school childrens in Marathwada region of Maharashtra.
The objective was to evaluate the effect of Knock Knee postural deformity on Explosive leg strength of school childrens in Marathwada region of Maharashtra.

The objective was to evaluate the effect of Knock Knee postural deformity on Speed of school childrens of Marathwada region of Maharashtra.

The objective was to evaluate the effect of Flat foot postural deformity on Agility of school childrens in Marathwada region of Maharashtra.

The objective was to evaluate the effect of Flat foot postural deformity on Explosive Leg Strength of school childrens in Marathwada region of Maharashtra.

The objective was to evaluate the effect of Flat foot postural deformity on Speed of school childrens in Marathwada region of Maharashtra.

**DELIMITATIONS**

1. The study was delimited to school childrens of Marathwada region of Maharashtra.
2. The study was delimited to school childrens of 9 to 14 years of age group.
3. The study was delimited to boys only.
4. The study was delimited to private and government schools of Marathwada region of Maharashtra.
5. The study was delimited to the following Orthopaedics variables.
   - Kyphosis
   - Scoliosis
   - Bow legs
   - Knock Knee
   - Flat foot
6. The study was delimited to the following Physical fitness components.

- Agility
- Explosive Leg Strength
- Speed

LIMITATIONS.
1. The background of the childrens was considered as a limitation of the study.
2. The different morphological characteristics were considered as a limitation of the study.
3. Demographic characteristics were considered as a limitation of the study.

HYPOTHESIS
1. There would not be postural deformities in school childrens in Marathwada region of Maharashtra.
2. There would not be postural deformities with respect to Kyphosis in school childrens in Marathwada region of Maharashtra.
3. There would not be postural deformities with respect to Scoliosis in school childrens in Marathwada region of Maharashtra.
4. There would not be postural deformities with respect to Bow legs in school childrens in Marathwada region of Maharashtra.
5. There would not be postural deformities with respect to Knock Knee in school childrens in Marathwada region of Maharashtra.
6. There would not be postural deformities with respect to Flat Foot in school childrens in Marathwada region of Maharashtra.
7. There would not be significant effect of selected postural deformities on Agility of school childrens in Marathwada region of Maharashtra.

8. There would not be significant effect of selected postural deformities on Explosive leg strength of school childrens in Marathwada region of Maharashtra.

9. There would not be significant effect of selected postural deformities on Speed of school childrens in Marathwada region of Maharashtra.

10. There would not be significant effect of Kyphosis deformity on Agility of school childrens in Marathwada region of Maharashtra.

11. There would not be significant effect of Kyphosis deformity on Explosive leg strength of school childrens in Marathwada region of Maharashtra.

12. There would not be significant effect of Kyphosis deformity on Speed of school childrens in Marathwada region of Maharashtra.

13. There would not be significant effect of Scoliosis deformity on Agility of school childrens in Marathwada region of Maharashtra.

14. There would not be significant effect of Scoliosis deformity on Explosive leg strength of school childrens in Marathwada region of Maharashtra.

15. There would not be significant effect of Scoliosis deformity on Speed of school childrens in Marathwada region of Maharashtra.

16. There would not be significant effect of Bow legs deformity on Agility of school childrens in Marathwada region of Maharashtra.

17. There would not be significant effect of Bow legs deformity on Explosive leg strength of school childrens in Marathwada region of Maharashtra.
18. There would not be significant effect of Bow legs deformity on Speed of school childrens in Marathwada region of Maharashtra.

19. There would not be significant effect of Knock Knee deformity on Agility of school childrens in Marathwada region of Maharashtra.

20. There would not be significant effect of Knock Knee deformity on Explosive leg strength of school childrens in Marathwada region of Maharashtra.

21. There would not be significant effect of Knock Knee deformity on Speed of school childrens in Marathwada region of Maharashtra.

22. There would not be significant effect of Flat Foot deformity on Agility of school childrens in Marathwada region of Maharashtra.

23. There would not be significant effect of Flat Foot deformity on Explosive leg strength of school childrens in Marathwada region of Maharashtra.

24. There would not be significant effect of Flat Foot deformity on Speed of school childrens in Marathwada region of Maharashtra.
DEFINITION OF TECHNICAL TERMS

- **POSTURE**
  It is the correct alignment of all the body segments.

- **DEFORMITY**
  Is an alteration in the shape of the limb.

- **CERVICAL SPINE**
  Seven vertebrae’s C1 to C7 the uppermost part of the spine, neck region.

- **THORACIC SPINE**
  Twelve vertebrae’s T1 to T12 mid region of spine to which the ribs are hinged.

- **LUMBAR SPINE**
  5 vertebrae’s L1 to L5 that extend from the lower thoracic spine (chest) to the sacrum bottom of the spine.

- **KYPHOSIS**
  This is a general term used for excessive backward convexity of the spine.

- **SCOLIOSIS**
  A lateral curvature of the spine is termed as scoliosis.

- **BOW LEGS**
  It is malalignment at the knee joint in the frontal (coronal) plane where the tibia is deviated towards the mid line.

- **KNOCK KNEE**
  In knock knee the tibia bone is deviated away from the midline.
- **FLAT FOOT**
  Normally the foot has longitudinal and transverse arches. The Normal longitudinal is visible on the medial side of the foot. When this Arch is less developed, it is called flat foot.

- **MALLEOLAR**
  The bony protuberances on the either side of the ankles.

- **CONDYLER**
  The rounded prominence at the end of knee joint bone.

- **AGILITY**
  Agility is the ability of the body to change the direction of the body efficiently and effective manner to achieve the desired movement.

- **EXPLOSIVE LEG STRENGTH**
  Explosive leg strength refers to the ability of the legs to exert strength or force as rapidly as possible in a given action.

- **SPEED**
  Shortest possible time taken to complete any movement is called speed.