Common postural deviation, their causes and remedial exercise for kyphosis, scoliosis, lordosis, knock knee, bow leg and flat feet.

Introduction

The adult human skeletal system consists of 206 bones, as well as a network of tendons, ligaments and cartilage that connects them. The skeletal system performs vital functions, such as support, movement, protection, blood cell production, calcium storage and endocrine regulation that enable us to survive. The skeletal system gives the body its basic framework, providing structure, protection and movement. When there is an imbalance in function of the soft tissue as well as bone, skeletal deformity may occur. Some of the deformities are kyphosis, scoliosis, lordosis, knock knee, bow leg and flat feet.

Kyphosis

Kyphosis, also known as round back or hunchback, is a condition in which the spine in the upper back has an excessive curvature. The upper back, or thoracic region of the spine, is supposed to have a slight natural curve. The spine naturally curves in the neck, upper back, and lower back to help absorb shock and support the weight of the head. Kyphosis occurs when this natural arch is larger than normal.

Common causes of kyphosis

Kyphosis can affect people of any age. It rarely occurs in newborns because it is usually caused by poor posture. Kyphosis caused by poor posture is called postural kyphosis.
Other potential causes of kyphosis include:

1. aging, especially if patient have poor posture
2. muscle weakness in the upper back
3. Scheuermann's disease, which occurs in children and has no known cause
4. arthritis or other bone degeneration diseases
5. osteoporosis, the loss of bone strength due to age
6. injury to the spine
7. slipped discs
8. scoliosis, or spinal curvature

Exercise for kyphosis

Weak, tight muscles in the chest and back are common symptoms of kyphosis. For the chest, a simple wall stretch will suffice. Stand with one side against the wall, the arm up and palm flat against the wall, then turn to face away from the upturned arm. Do this for both sides. For the back, try a hanging lat stretch. Find a pullup bar, grab it with an overhand grip, relax and hang from the bar. Perform each stretch for 30 seconds

Scoliosis

Scoliosis is a condition that causes the spine to curve to the side. It can affect any part of the spine, but the most common regions are the chest area (thoracic scoliosis) and the lower section of the back (lumbar scoliosis).

Some of the possible causes of scoliosis:

1. Neuromuscular conditions - these affect the nerves and muscles and include cerebral palsy and muscular dystrophy.
2. Congenital scoliosis (present at birth) - this is rare and occurs because the bones in the spine developed abnormally when the foetus was growing inside the mother.
3. Genes - at least one gene is thought to be involved in scoliosis.
4. Leg length - if one leg is longer than the other, the individual may develop scoliosis.
5. Other causes - bad posture, carrying backpacks or satchels, and some injuries.

Signs and symptoms of scoliosis

1. The head is slightly off centre
2. The ribcage is not symmetrical - the ribs may be at different heights
3. One hip is more prominent than the other
4. Clothes do not hang properly
5. One shoulder, or shoulder blade, is higher than the other
6. The individual may lean to one side
7. Uneven leg lengths

Treatment of scoliosis

Braces

If the patient has moderate scoliosis and the bones are still growing, a brace is recommended. This will prevent further curvature, but will not cure or reverse it. Braces are usually worn all the time, even at night. The more hours per day the patient wears the brace, the more effective it tends to be. When the bones stop growing, braces are no longer used.

Casting

Casting instead of bracing is sometimes used for infantile scoliosis to help the infant's spine to go back to its normal position as it grows. This can be done with a cast made of Plaster of Paris.

The cast is attached to the outside of the patient's body and will be worn at all times. Because the infant is growing rapidly, the cast is changed regularly.

Exercise for scoliosis

1) Pelvic Tilts
2) Cat-Camel
3) Double-Leg Abdominal Press
4) Single Leg Balance (If possible, perform in front of a mirror to help visualize a straight spine.)
5) Tea Pot (If possible, perform in front of a mirror to help visualize a straight spine.)
6) Side Shift

Lordosis

Lordosis is a condition where there is an increased inner curvature of the spine. The spine has a natural curve which is very mild and it helps the spine in its proper function. This natural curve is formed due to the shape of the individual vertebrae that make up the spine. If this spinal curvature increases, then it puts a lot of pressure or strain on the other regions of the spine resulting in pain.

Causes of lordosis

There is a syndrome called “lower crossed syndrome” in which muscles surrounding the hip and the spine become tense or weak along with getting stretched. All these different conditions of muscles such as tight and weak muscles result in muscular imbalance. The muscles which are usually tight are: Trunk extensors, hip flexors (especially the iliopsoas muscle) and these tense muscles need stretching.

The muscles which are usually weak and stretched are: Abdominal muscles (rectus abdominis, internal oblique and external oblique) and hip extensors (hamstrings and gluteus maximus).

Symptoms of Lordosis

Usually, patients with lordosis do not have any symptoms except for the exaggerated spinal curvature. Other symptoms which may appear according to the severity of the curvature are:

- Low back pain and Pain may radiate down the legs.
- Changes in bowel and bladder, although this is rare.
- If patient has other problems along with lordosis, then the patient may experience developmental dysplasia of the hip, dystrophy of the muscles or neuromuscular problems.

Treatment for Lordosis

- If the lordosis is mild, then treatment is usually not required.
- If the patient is experiencing symptoms or discomfort, then the patient can enroll in a physical therapy program where exercises can be done, under the guidance of a therapist, in order to strengthen the muscles and to increase the range of motion.
- Medications such as NSAIDs or pain killers can be used to decrease pain or swelling if any.
- If lordosis is detected during childhood, then braces should be worn to prevent further worsening of this condition.
- For severe cases of lordosis, which does not benefit from the above measures, surgery is required where the spine is straightened using metal rod, screws or hooks. During surgery, bone grafting can also be done to promote new growth and to stabilize the spine.

Exercise of lordosis

1. Hip Flexor Stretch
2. Lower Back Stretch
3. Abdominal Crunch
4. Twisting Crunch
5. Bridge

Knock knee

Genu valgum, commonly called "**knock-knee**", is a condition in which the knees angle in and touch one another when the legs are straightened.

Causes of Knock knee

- Knock knees are usually part of the normal growth and development of the lower extremities.

- Some cases, especially in a child who is of 6 years or older, may be a sign of an underlying bone disease, such as osteomalacia or rickets.

- Obesity can contribute to knock knees .

- The condition can occasionally result from an injury to the growth area of the shin bone (tibia), which may result in just one knocked knee.

Treatment of Knock knee

Persons with knock knees often have collapsed inner arches of their feet, and their inner ankle bones are generally lower than their outer ankle bones. Adults with uncorrected genu valgum are typically prone to injury and chronic knee problems such as chondromalacia and osteoarthritis. These in turn can cause severe pain and problems in walking.

It is normal for children to have knock knees between the ages of two and five years of age and almost all of them resolve as the child grows older. If symptoms are prolonged and pronounced or hereditary, doctors often use orthotic shoes or leg braces at night to gently move a child's leg back into position. If the conditions persists and worsens later in life, surgery may be required to relieve pain and complications resulting from severe or hereditary genu valgum. Available surgical procedures include adjustments to the lower femur and total knee replacement (TKR).

Exercises for knock knee

1. Activating and developing the arches of the feet,
2. Waking up the outer leg muscles (abductors),
3. Learning how to move the inner ankle bone inwards towards the outer ankle bone, and upwards towards the knee.
4.

Bow legs

Genu varum (also called bow-leggedness, bandiness, bandy-leg, and tibia vara), is a physical deformity marked by outward bowing of the lower leg in relation to the thigh, giving the appearance of an archer's bow. Usually medial angulations of both femur and tibia.

Causes of Bow legs (Genu Varum)

Rickets are the primary cause of this physical deformity. Bow-leggedness remains persistent under the following conditions:

1. if a child is unwell due to rickets
2. If he or she is suffering from any disorder which restricts the ossification of the bones
3. If the child is not properly fed

In a few cases, infants suffer from one-sided bow-leg problems due to tumors, skeletal problems or infections. A few other possible medical disorders, which can lead to GVR in the body of the patient, may include:

1. Pseudoachondroplasia
2. Hyperostosis corticalis deformans juvenilis
3. Caffey's disease
4. Camptomelic dysplasia
5. Osteofibrous dysplasia
6. Osteomalacia
7. Osteoarthritis
8. Kyphomelic dysplasia
9. Achondroplasia
10. Blount's disease
11. Vitamin C deficiency

Treatment of Bow legs

In infants, GVR resolves with age. The correction generally initiates between 3-4 years of age. If GVR in infants become severe, it can be treated with surgical and non-surgical treatment.

Surgical Treatment

In rare cases, when GVR does not resolve completely, it gives rise to cosmetic concerns among parents of an affected kid. If the physical deformity is severe, medical surgery is often recommended to such patients to correct the bowing completely.

Non-Surgical Treatment

If bowing does not resolve within 6 months of its occurrence, doctors often recommend non-surgical procedures for such patients. These techniques include use of medicines and drug.

Exercise for bow leg

Leg Strengthening – By performing leg strengthening exercises we can help to strengthen the muscles surrounding knees and hence alleviate some of the pressure that is being placed on bow legs. These are most effective in people who only have a slight bow in their legs and generally involve placing a weight between the feet and bending and re-straightening the legs.

Flat feet

Flat feet (also called **pes planus** or **fallen arches**) is a postural deformity in which the arches of the foot collapse, with the entire sole of the foot coming into complete or near-complete contact with the ground.

Causes of Flat feet

1. Tarsal coalition: This is a condition that develops during early childhood wherein an abnormal fusing of some foot bones makes the foot stiffer and quite flat.
2. Tibialis posterior or tendon dysfunction: In this condition a large ankle tendon can degenerate causing it to stretch and cease working correctly
3. Overweight**:** Excessive laxity in the joints due to sudden weight gain could also be a possible cause
4. Arthritis: Especially if it occurs in the back or middle of the foot, it could be really painful.

Treatment of Flat feet

There are both non-surgical and surgical options to treat flat foot syndrome.

The non-surgical options: If the affected foot is flat but flexible then it can be treated with simple insoles and physiotherapy. The idea is to support the foot to stop it from getting worse.

The surgical options: Surgery is sometimes required if the condition is more severe. The following procedures may be considered:

1. The calcaneal osteotomy
2. A tendon transfer
3. Fusion of joints of foot.

Exercise for flat feet

1. Toes flexion
2. Calf muscle stretching
3. Heel raise
4. Faradic stimulatin.

Conclusion

From all these discussions, it is well known that musculoskeletal deformities can cause imbalance of entire alignment of the human body. These deformities affect not only socio-economic status of the patient but also mental status. Early diagnosis and treatment has considered to be potentially success and worth considering for the purpose of enhancing intervention effectiveness, successful implementation and prevention of prolonged deformity.