ORTHOPEDIC NURSING

Definition of terms

Orthopedic- it is a branch of medicine concerned with the correction or prevention of deformities, disorders, or injuries of the skeleton and associated structures (as tendons and ligaments).

Orthopedic nursing- is a nursing specialty focused on the prevention and treatment of musculoskeletal disorders.

Fractures- it is a break in the continuity of a bone structure

Osteo - referring to or in relation to bones.

Orthopedic conditions can be classified into three,

a) congenital
b) Traumatic
c) Degenerative

Congenital

These are all conditions that are present on the newborn at birth. They result from underdevelopment of body parts, altered development or genetic predispositions.
They include

1. **Metatarsus adductus**
2. **Clubfoot**
3. **Developmental dysplasia of the hip**
4. **Osteogenesis imperfecta/ brittle bone disease**
5. **Congenital muscular dystrophy**.

Traumatic

They are conditions that one attains upon a traumatic incidence like a fall, road traffic accident or home/occupational accidents. They include

1. **Fractures**
2. **Dislocations**
3. **Sprains**
4. **Strains**
5. **Impingement**

Degenerative

These are conditions that arise from disease process or with age. They include

1. **Arthritis**
2. **Muscular dystrophy**
3. **Osteoporosis**
4. **Osteomalacia**
5. **Paget's**

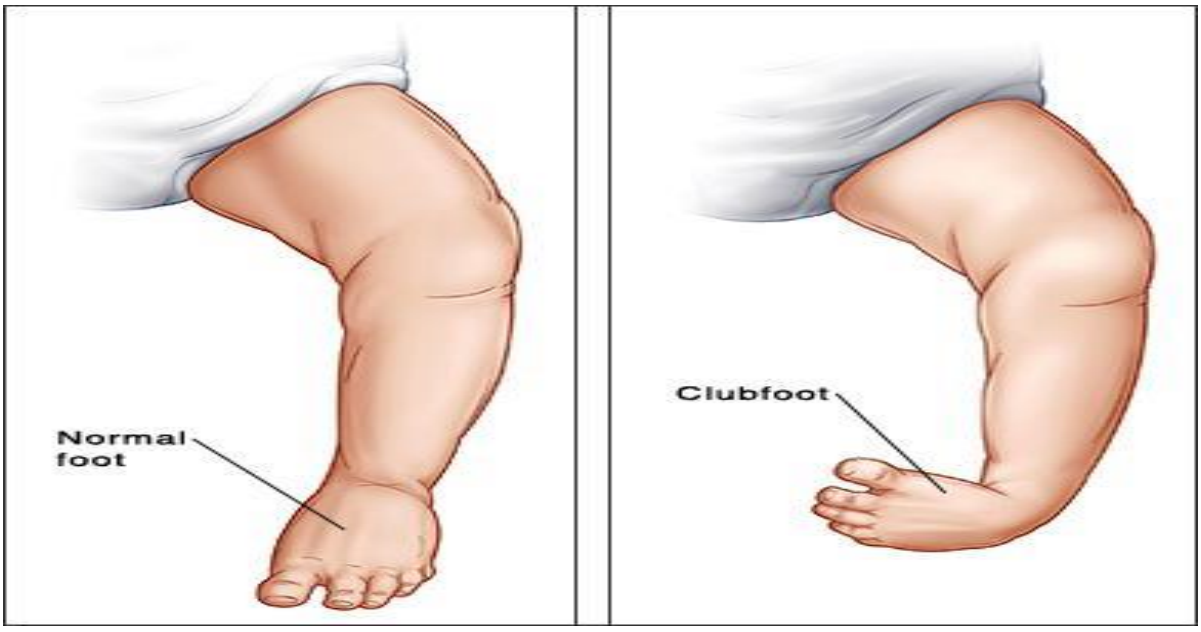
CONGENITAL LIMB DEFECTS

Clubfoot

Clubfoot is a birth defect where one or both feet are rotated inwards and downwards. The affected foot, calf and leg may be smaller than the other. In about half of those affected, both feet are involved. The tissues connecting the muscles to the bone (tendons) are shorter than usual. It is a fairly common birth defect and is usually an isolated problem for an otherwise healthy newborn. . Without treatment, people walk on the sides of their feet, which causes problems with walking.

Incidence

It occurs in about 1:1000 live births. Its least common among the chinese but more common among the maori of new zee land.



Etiology

The exact cause is not known, but the following are suspected to be the likely causes

Genetic predisposition

- mutations in genes involved in muscle development are risk factors for clubfoot, specifically those encoding the muscle contractile complex
- Clubfoot can also be present in people with genetic conditions such as loeys–dietz syndrome.

Gestational/pregnancy related causes

i) Early amniocentesis (11–13 weeks)- is believed to increase the rate of clubfoot because there is an increase in potential amniotic leakage from the procedure.

ii) Idiopathic underdevelopment of the bones and muscles of the embryonic foot

Signs

In clubfoot, one or both feet are rotated inwards and downwards. The affected foot, calf, and leg may be smaller than the other. In about half of those affected, both feet are involved. Most cases are not associated with other problems. Without treatment, people walk on the sides of their feet, which causes difficulty in walking

Diagnosis

It is a physical deformity that is diagnosed during the first physical exam of a newborn shortly after birth. The following characteristics are present on an affected neonate on physical examination

i) First, there is a higher arch on the inside of the foot. This component of the deformity can occur without the other aspects of clubfoot deformity. In isolation, this aspect of the deformity is called cavus deformity.

ii) Second, the forefoot is curved inward or medially (toward the big toe). This component of the deformity can occur without the other aspects of clubfoot deformity. In isolation, this aspect of the deformity is called metatarsus adductus.

iii) Third, the heel is turned inward. This is a natural motion of the heel and subtalar joint, typically referred to as inversion. In clubfoot deformity, the turning in (inversion) of the heel is fixed (not passively correctable) and considered a varus deformity.

iv) Fourth, and finally, the ankle is pointed downward. This is a natural motion of the ankle referred to as plantar flexion. In clubfoot deformity, this position is fixed (not correctable) and is referred to as equinus deformity.

A foot that shows all four components is diagnosed as having clubfoot deformity. These four components of a clubfoot deformity can be remembered with the acronym cave (cavus, forefoot adductus, varus and equinus).

Prenatal ultrasound

- sometimes it is possible to detect these deformities on ultrasound images taken during pregnancy. This early detection can be beneficial to the parents as it gives them n opportunity to make plans for proper treatment a soon as the baby is born.

Management

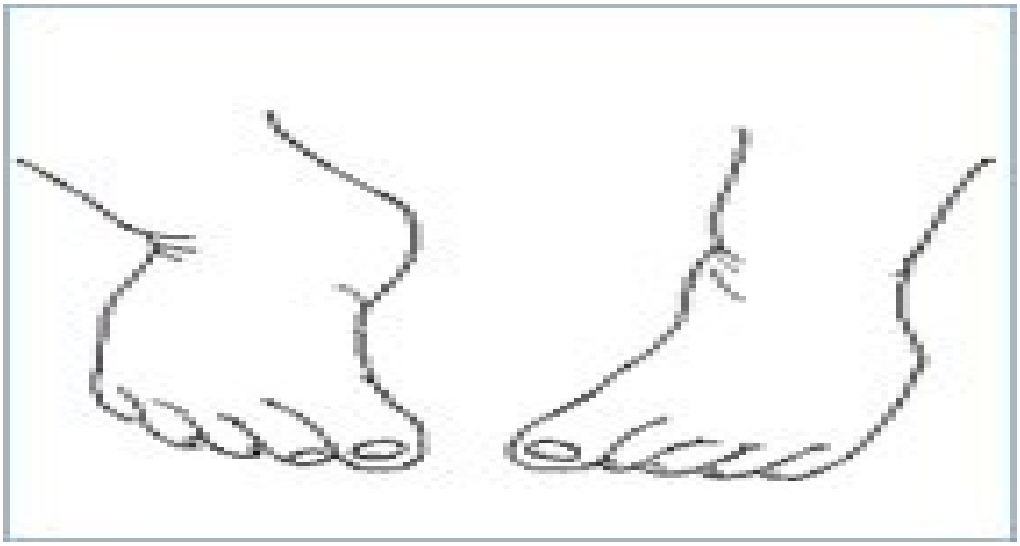
Ponseti method

This is a procedure that involves casting the foot in position for a specified period of time and later cutting the achilles tendon when the foot is rightly aligned.

Metatarsus adductus

The metatarsus is a group of bones in the middle section of the foot. Each foot has five metatarsal bones, each connected to the phalanges of the toes.

Metatarsus adductus refers to a condition where the metatarsal bones are turned toward the middle of the body. This causes a visible deformity, and both feet are often affected.



Causes

The cause of metatarsus adductus is unknown. No correlation has been found with the gestational age at birth, maternal age at birth or birth order. One theory is that the condition results from the fetus being tightly packed inside the uterus during development. This could lead to abnormal posture and foot deformity.

Diagnosis

It's made following physical examination at birth.

The major signs of this condition include the high arch and a visibly curved and separated big toe.

A physician can assess the degree of metatarsus adductus by testing the range of motion of the foot. There are two types of this condition: flexible and nonflexible.

i) flexible metatarsus adductus, the foot can be straightened up manually.
ii) nonflexible kind, the foot is stiff and doesn't return to its normal position with manual force.

Management and rehabilitation

- Stretching exercises may be recommended in some cases of metatarsus adductus. However, the condition goes away by itself in most children.
- Treatment with casts or special shoes is occasionally needed.
- Surgery is rarely necessary but can be recommended for children aged 4 or older with a severe deformity. There are various surgical procedures available to reshape the foot. All of them involve cutting certain bones (osteotomy) and then fixing them with plates or screws in a straighter position.

Prognosis

Flexible metatarsus adductus tends to persist until 1 – 2 years of age. In the majority of cases, the foot goes back to normal. In a small portion of cases, the foot stays moderately deformed. In rare cases, the foot continues to be stiff and deformed even after treatment. Children with metatarsus adductus are also more likely to have developmental dysplasia of the hip.

Developmental Dysplasia of The Hip

Developmental dysplasia of the hip (DDH) is a condition in which an infant's hip joint is not forming properly. The "ball" part of the femur is not securely fitting into the "socket." (acetabulum)

Causes

The cause of DDH is unknown in many cases. Contributing factors include
i) Low levels of amniotic fluid in the womb,
ii) Breech presentation- because of the stretch during delivery at the hip region

iii) Family history of the condition.
iv) Confinement in the uterus may also cause chd or contribute to it. This is why the baby is more likely to have this condition in primigravida mothers since the uterus hasn't been previously stretched.

Signs

i) Limb length inequality (legs with different lengths)
ii) Abnormal walking or gait

Risk factors

i) Girls
ii) First-born babies
iii) Babies born in the breech or feet-first position
iv) Family history of the condition

management and rehabilitation

Treatment varies with age and the severity of the dysplasia. Some infants may be simply observed for a period of time to ensure the hip joints form properly.

Bracing

Some infants may require treatment with a special brace called a pavlik harness. This brace is very effective and is used to position the baby's legs to encourage better formation of the hip joint. It can be used up to about 4 months of age.

Casting

Casting is another method used to encourage proper formation of the hip joint in patients with a dislocated hip. A spica body cast is used to maintain the corrected hip position.

Surgery

In some cases, surgery may be required to place the "ball" of the joint back into the "socket." The surgery may consist of correcting the ball or the socket or both, followed by spica body casting, to hold the corrected position. Sometimes there may also be tight muscles, preventing the ball from sitting in the socket. These muscles may be lengthened to allow for the ball to fit better into the socket.

Osteogenesis Imerfecta/ Brittle Bone Disease

It is a group of genetic conditions that results in bones that break easily. It is caused by defective genes that affect how the body makes collagen, a protein that helps strengthen bones. The condition can be mild, with only a few fractures during a person's lifetime or in more severe cases, it can involve hundreds of fractures that occur without any apparent cause.

Types of osteogenic imperfecta

Type 1

is the mildest form of the condition. People who have type i oi have bone fractures during childhood and adolescence often due to minor trauma when these individuals reach adulthood, they have fewer fractures.

Type 2

is the most severe form of oi. Infants with type ii have bones that appear bent or crumpled and fractured before birth. Their chest is narrow and they have fractured and misshapen ribs and underdeveloped lungs. These infants have short, bowed arms and legs; hips that turn outward; and unusually soft skull bones. Most infants with type ii oi are stillborn or die shortly after birth, usually from breathing failure.

Type 3

Also, has relatively severe signs and symptoms. Infants with oi type iii have very soft and fragile bones that may begin to fracture before birth or in early infancy. Some infants have rib fractures that can cause life-threatening problems with breathing. Bone abnormalities tend to get worse over time and often interfere with the ability to walk.

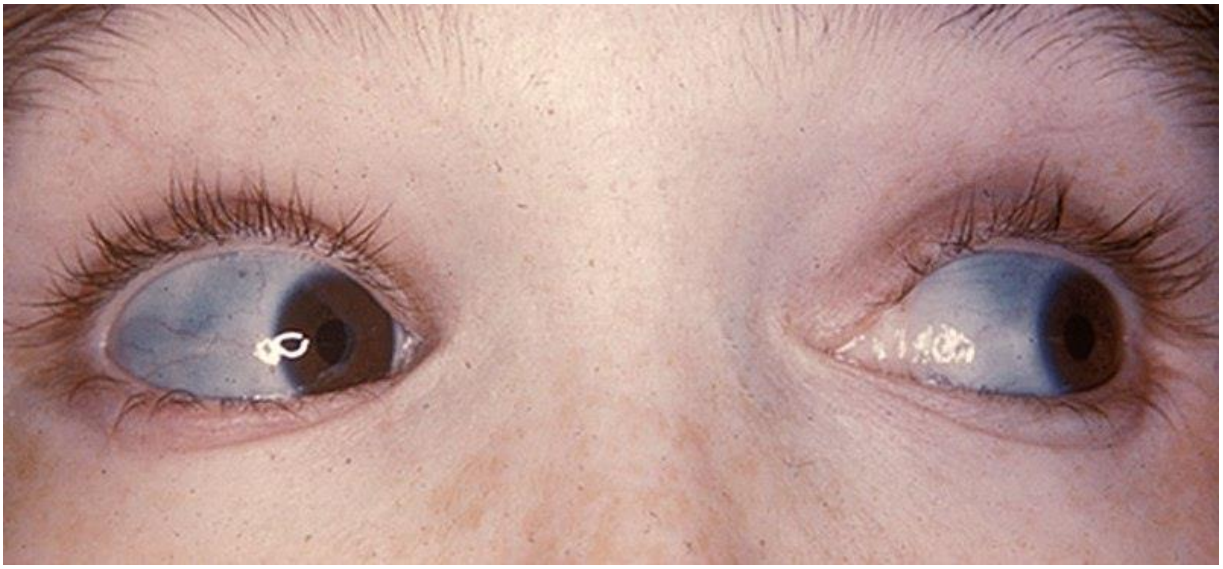
Type 4

Is the most variable form oi. Symptoms of oi type iv can range from mild to severe. About 25 percent of infants with oi type iv are born with bone fractures. Others may not have broken bones until later in childhood or adulthood. Infants with oi type iv have leg bones that are bowed at birth, but bowing usually lessens as they get older.

Signs

Other symptoms may include

i) A blue tinge to the whites of the eye,
ii) Short height,
iii) loose joints,
iv) Hearing loss that progresses with time
v) Breathing problems
vi) Teeth problems



Diagnosis

Oi is often inherited from an affected parent. The diagnosis of oi is made on the basis of family history and/or clinical presentation. Other diagnostic methods that may be used include

i) X-rays - findings include fractures that are at different stages of healing; an unexpected skull bone pattern called wormian bones; and bones in the spine called "codfish vertebrae."

ii) biochemical laboratory testing -involves studying collagens taken from a small skin biopsy. Changes in type i collagen are an indication of oi.

iii) DNA sequencing - used to identify the collagen gene mutation responsible for the altered collagen protein. DNA testing requires a blood sample for DNA extraction.

Management and Rehabilitation

There is currently no cure for oi. The available treatment involves supportive therapy to decrease the number of fractures and disabilities, help with independent living and maintain overall health. Oi is best managed by a medical team including the child's own doctor, and genetic, orthopedic and rehabilitation medicine. Supportive therapy is unique to each individual depending on the severity of their condition and their age.

i) Physical and occupational therapies to help improve their ability to move, to prevent fractures and to increase muscle strength are often useful.

ii) Fractures are treated as they would be in children and adults who do not have oi.

iii) Surgical management- intramedullary rodding (placing rods in the bones) is used to help with positioning of legs that helps with more normal functioning when necessary.

iv) Bisphosphonate drugs- are bone strengthening drugs used to help with bone formation and to decrease the need for surgery.

TRAUMATIC CONDITIONS

Dislocations

What is a dislocation?
A dislocation occurs when a bone slips out of a joint.
An untreated dislocation could cause damage to ligaments, nerves, or blood vessels.

causes

Dislocations occurs when there is an unexpected or unbalanced impact.

Symptoms of a Dislocation

Some of the other symptoms associated with dislocated joints include:

i. Loss of motion
ii. Pain during movement
iii. Numbness around the area
iv. Tingling feeling

Diagnosis

Physical exam

x-ray

Treatment

According to Johns Hopkins university, initial treatment for any dislocation involves rice: rest, ice, compression, and elevation. In some cases, the dislocated joint might go back into place naturally after this treatment.

If the joint doesn't return to normal naturally, the following treatments are used.

Manipulation or repositioning

Immobilization

Medication

Rehabilitation

Manipulation

In this method, your doctor will manipulate or reposition the joint back into place. You'll be given a sedative or anesthetic to remain comfortable and also to allow the muscles near your joint to relax, which eases the procedure.

Immobilization

After your joint returns to its proper place, your doctor may ask you to wear a sling, splint, or cast for several weeks. This will prevent the joint from moving and allow the area to fully heal. The length of time your joint needs to be immobile will vary, depending on the joint and severity of the injury.

Medication

Most of your pain should go away after the joint returns to its proper place. However, your doctor may prescribe a pain reliever or a muscle relaxant if you're still feeling pain.

Surgery

You will need surgery only if the dislocation damaged your nerves or blood vessels, or if your doctor is unable to return your bones to their normal position. Surgery may also be necessary for those who often dislocate the same joints, such as their shoulders. To prevent re-dislocation, it may be necessary to reconstruct the joint and repair any damaged structures. On occasion, a joint has to be replaced, such as a hip replacement.

Rehabilitation

Rehabilitation begins after your doctor properly repositions or manipulates the joint into the correct position and removes the sling or splint (if you needed one). You and your doctor will devise a rehabilitation plan that works for you. The goal of rehabilitation is to gradually increase the joint's strength and restore its range of motion. Remember, it's important to go slowly so you don't reinjure yourself before the recovery is complete.

Sprains & strains

Overview

Sprains and strains are very common injuries that share very common causes and symptoms. However, they both involve different parts of the body.

Sprain

A sprain occurs when ligaments are stretched or torn beyond their normal range. Ligaments are tough bands of fibrous tissue that connect bone to bone. Sprains commonly occur in the ankles, knees, wrists, and thumbs. The ankle is the most common joint to be sprained.
Causes
Excessive wrenching or twisting motion.

Types

First degree

caused by tearing of few ligamentous fibers. Its manifested by mild edema, local tenderness, and pain on moving the joint.

Second degree

It involves tearing of more fibers, it results in increased edema, tenderness, pain with motion, joint instability, and partial loss of normal joint function.

Third degree

ligament is completely torn, manifested by severe pain, tenderness ,increased edema, and abnormal joint motion.

Strain

A strain occurs when a muscle or tendon is stretched or torn beyond its normal range. A tendon is a fibrous cord of tissue that connects muscles to bones. The lower back and hamstrings are the most common muscles to be strained.

Causes

They result from overuse, overstretch or excessive stress to the mescle or tendon.

Symptoms

- Pain,
- swelling,
- bruising,
- muscle spasms, and a
- Limited ability to move the affected muscle.

Types

First degree- tearing of few muscle fibers. Its accompanied by minor edema, tenderness and mild muscle spasms without noticeable loss of function

Second degree- involves tearing of more muscles fibers and is manifested with a notable loss of load bearing strength with edema, tenderness, muscle spasm and ecchymosis.

Third degree- is the most severe type and involves complete disruption of at least one musculotendinous unit and it involves separation of muscle from muscle, muscle from tendon, or tendon from bone. Patient presents with significant pain, muscle spasm, ecchymosis, edema and loss of function.

Contusion

Is a soft tissue injury caused by blunt force such as a blow, a kick or a fall. Blood vessels rapture and bleed into the soft tissues forming a hematoma.

Signs

i. Pain
ii. Swelling
iii. Discoloration.

Treatment

Its treated with rice- rest, ice, compression, elevation.

- Resting- prevents additional injury
- Elevation of the affected part
- Applying cold – applied within the first 24-48 hrs, ice causes vasoconstriction that then reduces edema bleeding and discomfort.
    - Applying compression bandage- controls bleeding, reduce edema and provide support to the injured part.

In cases of 3rd degree in both strain and sprains, surgical repair or immobilization with casts is indicated.

#. After 48 hours, heat may be applied to facilitate vasodilation, absorption and repair and to relieve muscle spasm to promote healing

Fractures

A fracture is a break in the continuity of the bone. They result when the bone is subjected to greater force than it can absorb.

Types of fractures

1. **Simple(closed)** – bone does not break through the skin
2. **Compound(open)-**bone breaks or protrudes through the skin
3. **Complete fracture**- a break across the entire bone and frequently displaced
4. **Incomplete**- e.g. green stick -involves a break through only part of the cross section of the bone
5. **Comminuted fracture**- produces bone fragments.
6. **Depressed fracture**- a fracture where fragments are driven inwards. Especially on cranial and facial bones.
7. **Compression-** bone has been compressed -as in vertebral fractures
8. **Green stick**- a fracture where one side of the bone is broken and the opposite side is bent
9. **Avulsion-**a fracture where a fragment of bone has been pulled away by a tendon and its attachment
10. **Oblique**- a fracture that occurs at an angle across the bone
11. **Spiral-** that twists around the shaft of the bone
12. **Impacted-** bone fragment is driven into another bone fragment
13. **Transverse**- straight across the bone
14. **Pathologic-** that happens at an area of diseased bone and may occur without trauma or fall

- ❖ Open fractures can be graded into 3.

Grade1 – a clean wound less than 1 cm long

Grade2- a larger wound without excessive soft tissue damage

Grade 3- highly contaminated, has excessive soft tissue damage

Clinical manifestations

Pain- continuous until bone fragment is immobilized. Muscle spasm sets in 20 minutes after injury and results in more intense pain than was reported at the time of injury.

Loss of function- because normal muscle function depends on the integrity of the bones to which they are attached. Also, the presence of pain reduces function

Deformity- due to the possible displacement, angulation, or rotation of fragments. Also, from soft tissue swelling.

Shortening of extremity- due to the contraction of the muscle pulling the distal fragment proximally

Crepitus- it is a grantling sensation is felt when the fracture is examined with hands.

Local swelling

Discoloration- due to ecchymosis

Emergency management

Immobilize the injured part immediately before moving the patient. If they have to be moved first then the distal and proximal fragments are both supported.

Apply enough splinting both distally and proximally to avoid any more damage to tissues or blood vessels

Neurovascular assessment to be done quickly before and after application of splint before transporting.

For open fractures, a sterile gauze is applied on the wound to prevent contamination.

In the ER, the patient is quickly assessed, clothes removed gently of cut to expose injured part as gently as possible to avoid causing motion to the splinted part.

Medical management

The principles of fracture treatment include reduction, immobilization, and regaining of normal function and strength through rehabilitation.

Reduction

It means to restore the fracture fragment to its anatomical alignment and rotation. There are two types of reduction

i) Closed reduction. – the bone fragments are manipulated and aligned well under anesthesia and a cast applied to immobilize it. A traction is then placed to affect the fracture reduction and immobilization.

ii) Open reduction. -it's a surgical approach where the injured site is opened, internal fixation devices placed (nails, pins, wires, screws, plates, and rods) to hold the fragments into position until solid bone healing occurs. The internal fixation ensures a firm approximation and fixation of the bony fragments.

Immobilization.

after reducing the bones into place, immobilization is done either internally or externally. This immobilization is called fixation. External fixation uses bandages, casts, splints, continuous traction and external fixators.

Internal fixation is done with internal pins that srve as internal splints.

Maintaining and restoring function

ensuring immobilization is maintained. Edema is controlled by elevating injured extremity. Neurovascular status is monitored frequently. Physiotherapy as healing continues.

Proper wound care

to avoid infection-with administration of antibiotics, daily cleaning and dressing and proper hygiene.

Traction

It is the application of a pulling force to a part of the body. It is used to minimize muscle spasms, reduce bone fragments, align and immobilize, reduce the deformity, and increase space between the opposing surfaces.

Principles of traction

- Whenever a traction is applied, a countertraction must be used. The patient's body and bed adjustments provide it.
- Must be continuous to be effective
- Skeletal traction is never interrupted
- Weights are not removed unless intermittent traction is prescribed.
- Eliminate any factor that might reduce the effective pull, or alter its resultant line of pull
- Patient in good body alignment
- Ropes must be unobstructed
- Weights must hang freely
- Knots on the footplate must not touch the pulley or the bed.

There are two main types of traction

Skin traction

used to control muscle spasms. It is accomplished by using a weight to pull on traction tape or on a foam boot attached to the skin. Amount of weight applied should not exceed the tension of the skin. About 2-3kgs is normally used. Types of skin traction include

Hamilton-Russell traction

Hamilton Russell is a balanced traction system using vectors to affect a pull along the long axis of the femur. It is used to maintain the joint space at the hip, manage fractures of the acetabulum and support fractures of the shaft of the femur. Traction can be applied using below-knee skin traction or a skeletal pin (Clarke and Santy Tomlinson, 2014). This guidance can be used to apply Hamilton-Russell traction to all age groups. Variation in the way this modality is applied may exist in clinical practice, however. The application of Hamilton-Russell traction should be carried out by at least two health care practitioners (HCPs) who are trained in the procedure.

skeletal traction.

It is applied directly to the bone by use of a metallic pin or wire. It avoids nerve, vessels and tendons and is used for long bones e.g. femur, tibia and also in cervical spine. Varied weights are placed according to the type of bone

Bone Healing

Complications of bone healing

Delayed union

There are signs of bone healing, but they are taking longer than usual. Mostly 6 weeks

Non union

The diagnosis is generally made when there is no healing between two sets of x-ray. This is generally after 6–8 months. Nonunion is a serious complication of a fracture and may occur when the fracture moves too much, has a poor blood supply or gets infected. Patients who smoke have a higher incidence of nonunion.

Malunion

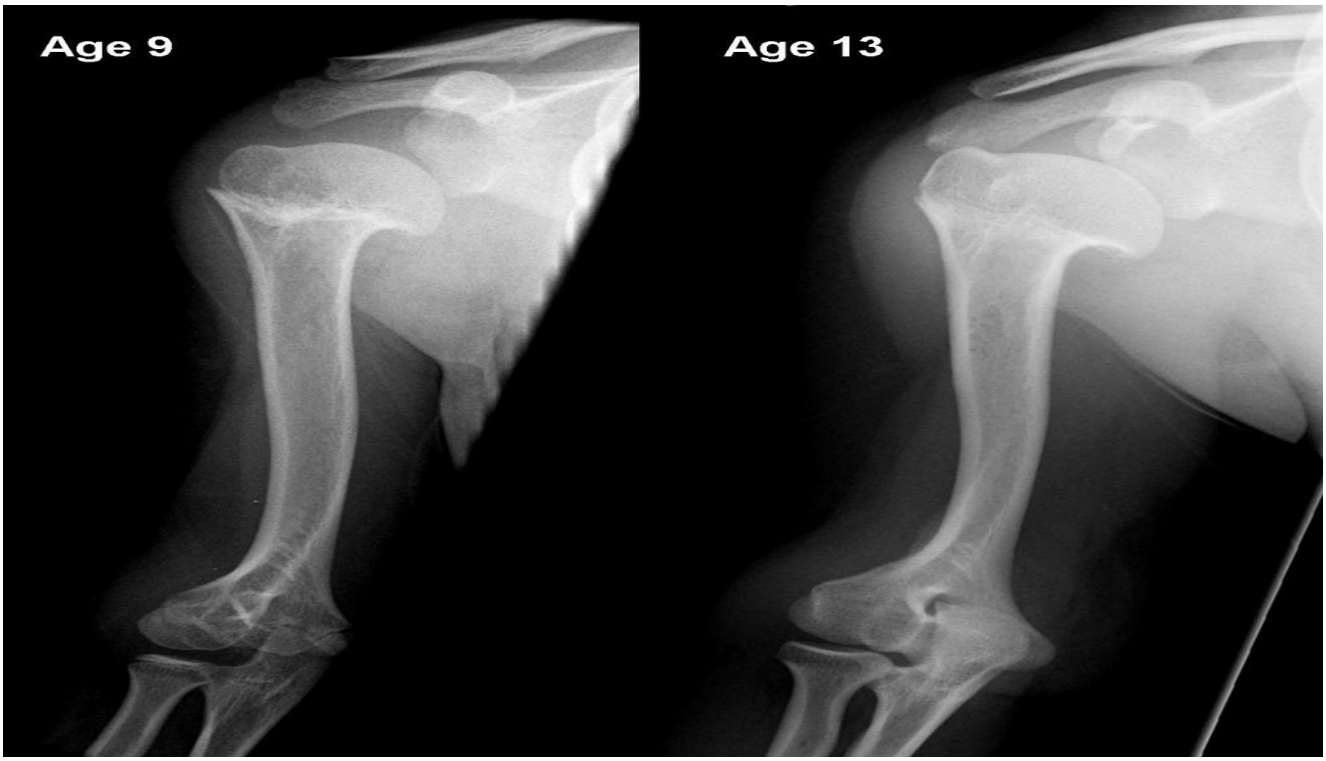
hen a fracture heals in a deformed position or with shortening of the limb, this is called a malunion

Osteomyelitis

Infection of the bone fracture site that has spread into the bone

Premature physeal closure

Due to fractures to the distal ends of long bones, the young patients may experience closure of epiphyseal plates on the affected bone thus stopping further bone growth.



Osteomyelitis

It is infection of the bones

Causes

Caused by many strains of bacteria and fungi that include staphylococcus epidermidis, s. Aureus, pseudomonas aeruginosa, serratia marcescens and Escherichia coli.
Some are caused by fungal infections.
The microbes get to the bones through any of the following means

i) Extension of soft tissue infection surrounding the bone
ii) Direct bone contamination from bone surgery, fracture or traumatic injury.
iii) Hematogenous spread from another site of infection. It happens in an area of trauma or lowered resistance.

Pathophysiology

Once the causative organism has arrived at the site and colonized it, the initial response, inflammation is initiated. There's increased vascularity and edema in the first 2-3 days. Followed by thrombosis of the blood

vessels in that region resulting in bone ischemia and necrosis. The infection then spreads into the medullary cavity and under the periosteum and may spread into the adjacent soft tissues and joints. If prompt treatment is not done, a bone abscess form. The abscess contains dead bone tissue called sequestrum that does not easily liquify to drain, therefore the cavity cannot collapse and heal as in a soft tissue injury. A new bone growth called an involucrum forms around the sequestrum.

Although healing appears to have taken place, the enclosed abscess produces recurring abscesses throughout the patient's life. At this point, it is referred to as chronic osteomyelitis.

Clinical manifestations

- Pain in the bones
- Whole body: chills, fatigue, fever, malaise, or night sweats
- Skin: ulcers or redness on the skin surrounding the infected bone
- Swelling
- Oozing pus from wounds close to the infected bone

Treatment

treatment is usually surgery to remove portions of bone that have died. This is followed by strong antibiotics, often by an iv, for at least six weeks. A central catheter is preferred for administration of antibiotics

Degenerative conditions

Muscular dystrophy

Muscular dystrophy is a group of diseases that cause progressive weakness and loss of muscle mass. In muscular dystrophy, abnormal genes (mutations) interfere with the production of proteins needed to form healthy muscle.

There are many different kinds of muscular dystrophy. Symptoms of the most common variety begin in childhood, mostly in boys. Other types don't surface until adulthood.

Risk factors

Family history of muscular dystrophy

Causes

Certain genes are involved in making proteins that protect muscle fibers from damage. Muscular dystrophy occurs when one of these genes is defective. Each form of muscular dystrophy is caused by a genetic mutation particular to that type of the disease. Many of these mutations are inherited. But some occur spontaneously in the mother's ova or in the developing embryo and can be passed on to the next generation.

Symptoms

The main sign of muscular dystrophy is progressive muscle weakness. Specific signs and symptoms begin at different ages and in different muscle groups, depending on the type of muscular dystrophy.

Duchenne type muscular dystrophy

This is the most common form of muscular dystrophy. It's much more common in boys. About one-third don't have a family history of the disease, possibly because the gene involved may be subject to sudden abnormal change (spontaneous mutation).

Signs and symptoms

- typically appear in early childhood and may include:

i. Frequent falls
ii. Difficulty rising from a lying or sitting up position
iii. Trouble running and jumping
iv. Waddling gait
v. Walking on the toes
vi. Large calf muscles
vii. Muscle pain and stiffness
viii. Learning disabilities

Becker muscular dystrophy

Signs and symptoms are similar to those of duchenne muscular dystrophy, but tend to be milder and progress more slowly. Symptoms generally begin in the teens but may not occur until the mid-20s or even later.

Other types of muscular dystrophy

Some types of muscular dystrophy are defined by a specific feature or by where in the body symptoms first begin. Examples include:

Myotonic.

also known as steinert's disease, this form is characterized by an inability to relax muscles at will following contractions. Myotonic muscular dystrophy is the most common form of adult-onset muscular dystrophy. Facial and neck muscles are usually the first to be affected.

Facioscapulohumeral (FSHD).

muscle weakness typically begins in the face and shoulders. The shoulder blades might stick out like wings when a person with FSHD raises his or her arms. Onset usually occurs in the teenage years but may begin in childhood or as late as age 40.

Congenital.

this type affects boys and girls and is apparent at birth or before age 2. Some forms progress slowly and cause only mild disability, while others progress rapidly and cause severe impairment.

Limb-girdle.

Hip and shoulder muscles are usually the first affected. People with this type of muscular dystrophy may have difficulty lifting the front part of the foot and as a result may trip frequently. Onset usually begins in childhood or the teenage years.

Diagnosis

i) Enzyme tests.- damaged muscles release enzymes, such as creatine kinase (ck), in blood. In a person who hasn't had a traumatic injury, high blood levels of ck suggest a muscle disease — such as muscular dystrophy.

ii) Electromyography. An electrode needle is inserted into the muscle to be tested. Electrical activity is measured as you relax and as you gently tighten the muscle. Changes in the pattern of electrical activity can confirm a muscle disease.

iii) Genetic testing. Blood samples can be examined for mutations in some of the genes that cause different types of muscular dystrophy.

iv) Muscle biopsy. A small piece of muscle can be removed through an incision or with a hollow needle. Analysis (biopsy) of the tissue sample can distinguish muscular dystrophies from other muscle diseases.

v) Heart-monitoring tests (electrocardiography and echocardiogram). These tests are used to check heart function, especially in people diagnosed with myotonic muscular dystrophy.

vi) Lung-monitoring tests. These tests are used to check lung function

Treatment

There's no cure for any form of muscular dystrophy. But treatment can help prevent or reduce problems in the joints and spine to allow people with muscular dystrophy to remain as mobile as long as possible.

Treatment options include medications, physical and occupational therapy, and surgical and other procedures.

Medications

Eteplirsen -it is an orphan drug for these condition, it works by promoting translation in the rna of muscles skipping the defective genes.

i) Corticosteroids, such as prednisone, which can help muscle strength and delay the progression of certain types of muscular dystrophy. But prolonged use of these types of drugs can cause weight gain and weakened bones, increasing fracture risk.
ii) Heart medications, such as angiotensin-converting enzyme (ace) inhibitors eg enalapril,lisinopril or beta blockers eg propranolol, atenolol, -if muscular dystrophy damages the heart.

Therapy

Several types of therapy and assistive devices can improve the quality and sometimes the length of life in people who have muscular dystrophy. Examples include:

i) Range-of-motion and stretching exercises. Muscular dystrophy can restrict the flexibility and mobility of joints. Limbs often draw inward and become fixed in that position. Range-of-motion exercises can help to keep joints as flexible as possible.
ii) Braces. Braces can help keep muscles and tendons stretched and flexible, slowing the progression of contractures. Braces can also aid mobility and function by providing support for weakened muscles.
iii) Mobility aids. Canes, walkers and wheelchairs can help maintain mobility and independence.
iv) Breathing assistance. As respiratory muscles weaken, a sleep apnea device may help improve oxygen delivery during the night. Some people with severe muscular dystrophy may need to use a machine that forces air in and out of their lungs (ventilator).

Surgery

Surgery may be needed to correct a spinal curvature that could eventually make breathing more difficult.

Nb: preventing respiratory infections

Respiratory infections may become a problem in later stages of muscular dystrophy. So, it's important to be vaccinated for pneumonia and to keep up to date with influenza shots. Try to avoid contact with children or adults who have an obvious infection.

Complications

i) The complications of progressive muscle weakness include:
ii) Trouble walking. Some people with muscular dystrophy eventually need to use a wheelchair.

iii) Shortening of muscles or tendons around joints (contractures). Contractures can further limit mobility.
iv) Breathing problems. Progressive weakness can affect the muscles associated with breathing. People with muscular dystrophy may eventually need to use a breathing assistance device (ventilator), initially at night but possibly also during the day.
v) Curved spine (scoliosis). Weakened muscles may be unable to hold the spine straight.
vi) Heart problems. Muscular dystrophy can reduce the efficiency of the heart muscle.
vii) Swallowing problems. If the muscles involved with swallowing are affected, nutritional problems and aspiration pneumonia may develop. Feeding tubes may be an option.

Osteoporosis

It is a metabolic disorder that progressively results in reduction of bone density and a change in bone structure leading to increased susceptibility to fracture.it results when the normal homeostatic bone turnover is altered; the rate of bone resorption is greater than the rate of bone formation. Bones become progressively porous brittle and fragile.
The individual is then predisposed to compression fractures of the thoracic and lumber vertebra, intertrochanter regions of the femur, and collies fracture of the wrist. These fractures are the 1st clinical manifestations of osteoporosis.
There is a gradual collapse in the vertebra that is asymptomatic and is observed as progressive kyphosis

Pathophysiology

Normal bone remodeling increases gradually until age 30. In this period, bone density progressively increases and peaks in the 4th decade when it starts to decrease slowly due to metabolic changes that come with age.
i) Calcitonin that inhibits bone resorption and promotes bone formation is decreased
ii) Parathyroid hormone that causes bone resorption increases with age
iii) Estrogen that prevents bone breakdown is decreased after menopause or on oophorectomy

Secondary osteoporosis results from

i) Nutrition and lifestyle- poor calcium diet, smocking, caffeine, carbonated drinks like soda
ii) Co-existing medical conditions eg, malabsorption syndromes, renal and liver failure, hyper thyroidism.
iii) Medications- such as corticosteroids affects bodies use for calcium

Risk factors

- Women
- Increased age
- Estrogen deficiency/oophorectomy
- Family history
- Low initial bone mass
- Co-existing medical condition
- Prolonged corticosteroid use
- Lifestyle-cigarette alcohol, lack of weight bearing exercises

Diagnosis

i) Dual energy x-ray absorptiometry- DEXA- it is a special x ray of the spine and hip and gives their bone mass density (BMD)
ii) Random x-rays- when suspecting fractures and also could detect osteoporosis in its late stages after 25-40% bone density loss.
iii) Laboratory studies for serum calcium, phosphate, urine calcium, urine calcium are done to rule out other conditions.

Medical management

- Diet rich in vitamin d and calcium- like dairy products
- Calcium supplements
- Regular weight bearing exercise
- Estrogen therapy in case of surgical menopause
- Manage all fractures with internal fixation.

Osteomalacia

It is a metabolic disorder that is characterized by inadequate mineralization of bones causing weakening of the skeleton. It causes pain, tenderness, bowing of bones and pathological fractures.

Skeletal deformities such as kyphosis and bowed legs give the patient an unusual appearance and a waddling limping gait.

Due to calcium deficiency, muscle weakness and unsteady gait, there is increased risk of a fall.

Pathophysiology

1. The primary defect in Osteomalacia is deficiency of activated vitamin d(calcitriol) which promotes calcium absorption from the git. As a result, the supply of calcium and phosphate in the extracellular is low.

   Vitamin d also facilitates the movement of calcium and phosphates to the calcification cites in the bones.

2. Disease processes that cause malabsorption syndrome or that which results in excessive loss of calcium from the body also result in Osteomalacia. For example, diseases like celiac disease that cause reduced absorption of fats secondarily lead to non-absorption of fat soluble vitamins like vit d and thus cause its deficiency
3. Hyperparathyroidism also leads to decalcification of bones.

Signs

- A dull aching pain that may spread from the hips to the limbs, ribs and lower back
- Irregular heart rhythms
- Numbness in the hands, mouth and feet.
- Frequent fractures
- Bowed legs
- Kyphosis
- Abnormal gait.
-

Management

management begins by identifying the cause of calcium and vitamin d deficiency. When cause is found and treated there is improvement in the patients well being

- Malabsorption – increase the amount of vit d intake
- Exposure to sunlight to help activate vitamin d
- Poor diet is corrected by changing to a healthy diet

Paget's disease(osteitis deformans)

It is a localized rapid bone turnover mostly affecting the skull, femur, tibia, pelvic bones, and vertebrae.

Pathophysiology

There is a primary proliferation of osteoclasts which produce bone resorption. This is followed by a compensatory increase in osteoblastic activity that replaces the bone . As bone turnover continues, a classic mosaic (disorganized) pattern of bone develops.

Due to the disease process and changes taking place, the bone becomes highly vascularized and structurally weak. Pathological fractures occur. Structural bowing of legs begins causing malalignment of the hip, knee, and ankle joints leading to development or arthritis , back and joint pains.

Clinical manifestations

It is an asymptomatic disease. Patients may not report of pain but the re is visible deformity. Most diagnoses are made following a routine physical exam with x-rays that may reveal the various deformities.

However, some may present with the following symptoms and signs

- Pain in the back, bones, hip, joints, or neck
- bone deformities-eg bowed legs,
- Abnormality walking/gait,
- Bone fracture- pathological
- Persistent headache
- Joint stiffness,

Sensation of pins and needles- due to the mal alignments and deformities disrupting or pressing on nerve fibers.

Diagnosis

Presenting symptoms and Physical assessment

Radiological images

Treatment

Pain- NSAIDS

Gait problems – walking aids and shoe lifts

Asymptomatic patients are given calcium and vitamin d supplements

anti-osteoclastic therapy is prescribed and they reverse the course of the disease.

Calcitonin therapy also helps to improve bone resorption

Complications

including fractures, arthritis, and hearing loss are managed promptly to avoid worsening or complete disability.

Arthritis

Arthritis is a group of diseases that cause inflammation of joint surfaces causing pain, and stiffness.

There are more than 100 different types of arthritis and related conditions. People of all ages, sexes and races can and do have arthritis, and it is the leading cause of disability in many parts of the world. Some types of arthritis affect other parts of the body including the heart, eyes, lungs, kidneys and skin.

Types of arthritis

Osteoarthritis

Osteoarthritis is the most common form of arthritis worldwide. It occurs when the protective cartilage on the ends of your bones wears down over time.

Although osteoarthritis can damage any joint in your body, the disorder most commonly affects joints in in the hands, fingers, knees, hips and spine.

Osteoarthritis symptoms can usually be effectively managed, although the underlying process cannot be reversed. Staying active, maintaining a healthy weight and other treatments may slow progression of the disease and help improve pain and joint function

Pathophysiology

It is an active metabolic disorder of the articular cartilage and subchondral bone (boney plate that supports the articular cartilage) . normally, there should be a balance between the mechanical stress and the ability of the joint tissues to resist the stress. In osteoarthritis however, there is deterioration of the articular cartilage due to the physiologic imbalance between the stress applied to the joint and its ability to withstand the stress. This may result from

1. Either the articular cartilage underlying the bone is normal-but excessive loads applied to the joints causing the tissues to fail or
2. Articular cartilage of the bone is defective and is affected even with reasonable load applied.

whatever the cause, it results to irritation or injury to the articular cartilage, this then leads to inflammation process to repair the damage. This repair however causes reduced articular space and as more load is applied, the more it increases. The poor healing that results leads to poorly replaced tissue. This repeats itself through the persons life until the cartilage is completely lost and bones begin to rub upon each other causing the pain.

Signs and symptoms

- Pain. Your joint may hurt during or after movement.
- Tenderness. Your joint may feel tender when you apply light pressure to it.
- Stiffness. Joint stiffness may be most noticeable when you wake up in the morning or after a period of inactivity.
- Loss of flexibility. -inability to move joint through its full range of motion.
- Grating sensation. A grating sensation on using the joint.
- Bone spurs. extra bits of bone, which feel like hard lumps, may form around the affected joint.

Causes/risk factors

- Older age. The risk of osteoarthritis increases with age.
- Sex. Women are more likely to develop osteoarthritis, though it isn't clear why.
- Obesity. Carrying extra body weight contributes to osteoarthritis in several ways. Increased weight puts added stress on weight-bearing joints, such as hips and knees. In addition, fat tissue produces proteins that may cause harmful inflammation in and around your joints.
- Joint injuries. Injuries, such as those that occur when playing sports or from an accident, may increase the risk of osteoarthritis. Even injuries that occurred many years ago and seemingly healed can increase your risk of osteoarthritis.

- Certain occupations. Jobs that include tasks that place repetitive stress on a particular joint, that joint may eventually develop osteoarthritis.
- Genetics. Some people inherit a tendency to develop osteoarthritis.
- Bone deformities. Some people are born with malformed joints or defective cartilage, which can increase the risk of osteoarthritis.

Diagnosis

- Physical exam and clinical presentation
- X-rays
- Laboratory exams - blood tests. Although there is no blood test for osteoarthritis, certain tests may help rule out other causes of joint pain, such as rheumatoid arthritis.
  Joint fluid analysis. – an aspiration taken from the joint is studied for inflammatory mediators.

Treatment/management

Currently, the process underlying osteoarthritis cannot be reversed, but symptoms can usually be effectively managed with lifestyle changes, physical and other therapies, medications, and surgery. Exercising and achieving a healthy weight are generally the most important ways to treat osteoarthritis. Your doctor may also suggest:

Medications

Osteoarthritis symptoms, primarily pain, may be helped by certain medications, including:

- Acetaminophen. Acetaminophen (tylenol, others) has been shown to be effective for people with osteoarthritis who have mild to moderate pain. Taking more than the recommended dosage of acetaminophen can cause liver damage.
- Nonsteroidal anti-inflammatory drugs (nsaids). Over-the-counter nsaids, including ibuprofen (advil, motrin ib, others) and naproxen sodium (aleve, others), taken at the recommended doses, typically relieve osteoarthritis pain. Stronger nsaids, available by prescription, may also slightly reduce inflammation along with relieving pain.

  Nsaids can cause stomach upset, cardiovascular problems, bleeding problems, and liver and kidney damage. Topical nsaids have fewer side effects and may relieve pain just as well.

- Duloxetine (cymbalta). Normally used as an antidepressant, this medication is also approved to treat chronic pain, including osteoarthritis pain.

Therapy

- Physical therapy. A physical therapist can work with you to create an individualized exercise program that will strengthen the muscles around your joint, increase your range of motion and reduce pain. Regular gentle exercise that you do on your own, such as swimming or walking, can be equally effective.
- Occupational therapy. An occupational therapist can help you discover ways to do everyday tasks or do your job without putting extra stress on your already painful joint. For instance, a toothbrush with a

large grip could make brushing your teeth easier if you have finger osteoarthritis. A bench in your shower could help relieve the pain of standing if you have knee osteoarthritis.

- Tai chi and yoga. These movement therapies involve gentle exercises and stretches combined with deep breathing. Many people use these therapies to reduce stress in their lives, and research suggests that tai chi and yoga may reduce osteoarthritis pain and improve movement. When led by a knowledgeable instructor, these therapies are safe. Avoid moves that cause pain in your joints.

Surgical and other procedures

- Cortisone injections- corticosteroid injected directly into the joint.
- Lubrication injections. Injections of hyaluronic acid may offer pain relief by providing some cushioning in your knee
- Realigning bones. If osteoarthritis has damaged one side of the knee more than the other, an osteotomy might be helpful. In a knee osteotomy, a surgeon cuts across the bone either above or below the knee, and then removes or adds a wedge of bone. This shifts your body weight away from the worn-out part of the knee.
- Joint replacement. In joint replacement surgery (arthroplasty), the surgeon removes the damaged joint surfaces and replaces them with plastic and metal parts. Surgical risks include infections and blood clots. Artificial joints can wear out or come loose and may need to eventually be replaced.

Lifestyle and home remedies

Lifestyle changes can make a significant difference in osteoarthritis symptoms. Other home treatments also might help. Some things to try include:

- Exercise. Exercise can increase endurance and strengthen the muscles around the joint, making the joint more stable- walking, biking or swimming. Patient is advised to stop the practice session if they feel new joint pain
- Weight loss
- Use heat and cold to manage pain.
- Over the counter creams to ease pain
- Braces or shoe inserts- to immobilize the joint thus reducing the discomfort
- Use assistive devices. Assistive devices can make it easier to go about your day without stressing your painful joint.

Rheumatoid arthritis

It is an autoimmune disease that causes inflammation in joints resulting in their damage. About 1 out of every 5 people who have rheumatoid arthritis get lumps on their skin called rheumatoid nodules. These often form over joint areas that receive pressure, such as over knuckles, elbows, or heels.

Pathophysiology

After a viral or bacterial infection, the immune system of the affected patient is unable to distinguish between the pathogen and body tissues and it begins to destroy the joint tissues.

Symptoms

- Pain, stiffness, and swelling in your hands, wrists, elbows, shoulders, knees, ankles, feet, jaw, and neck. Rheumatoid arthritis usually affects multiple joints.
- More than one swollen joint. Usually, it's small joints in your wrists, hands, or feet.
- A symmetrical pattern. When the knuckles on your left hand are inflamed, the knuckles on your right hand probably will be as well. After some time, you may notice more of your joints feel warm or become painful or swollen.
- Morning stiffness than can last for hours or even most of the day. You may also feel fatigued and notice that your appetite is down and you've lost weight.

Diagnosis

Blood test for rheumatoid arthritis

- **Rheumatoid factor test**: This blood test checks for a protein called rheumatoid factor. High levels of rheumatoid factor are associated with autoimmune diseases, especially RA.
- **Anticitrullinated protein antibody test (anti-CCP)**:This test looks for an antibody that's associated with RA. People who have this antibody usually have the disease. However, not everyone with RA tests positive for this antibody.
- **Antinuclear antibody test:** This tests your immune system to see if it's producing antibodies. Your body may make antibodies as a response to many different types of conditions, including RA.
- **Erythrocyte sedimentation rate**: This test helps determine the degree of inflammation in your body. The result tells your doctor whether inflammation is present. However, it doesn't indicate the cause of the inflammation.
- **C-reactive protein test**: A severe infection or significant inflammation anywhere in your body can trigger your liver to make C-reactive protein. High levels of this inflammatory marker are associated with RA.

- Radiological exams- x-ray, ultrasound and MRI all show damage made to the joints and the extent to which it has spread.

Rheumatoid arthritis medications

Anti-inflammatories and analgesia

- nonsteroidal anti-inflammatory drugs (NSAIDs)

- corticosteroids
- acetaminophen

The following drugs work to slow the damage that RA can cause to your body:

- **Disease-modifying antirheumatic drugs (DMARDs)**: DMARDs work by blocking your body's immune system response. This helps to slow down RA's progression.
- **Biologics**: These new generation DMARDs provide a targeted response to inflammation rather than blocking your body's entire immune system response. They may be an effective treatment for people who don't respond to treatment with more traditional DMARDs.
- **Janus kinase (JAK) inhibitors**: These are a new subcategory of DMARDs that block certain immune responses. These are drugs that your doctor may use to help prevent inflammation and stop damage to your joints when DMARDs and biologics don't work for you.

Behavioral modifications

Certain home remedies and lifestyle adjustments may help to improve your quality of life when living with RA:

Exercise

Low-impact exercises can help to improve the range of motion in thejoints and increase mobility. Exercise can also strengthen muscles, which can help to relieve some of the pressure from the joints.

Get enough rest

Getting enough sleep will help to reduce inflammation and pain as well as fatigue.

Apply heat or cold

Ice packs can help to reduce inflammation and pain.

Try assistive devices

Certain devices such as splints and braces can hold the joints in a resting position.

Psoriatic arthritis

Psoriatic arthritis (PsA) is an inflammatory condition that presents with sore joints of arthritis with psoriasis of the skin. Psoriasis causes itchy, scaly red patches to appear on your skin and scalp. Psoriasis causes patchy, raised, red and white areas of inflamed skin with scales. It usually affects the tips of the elbows and knees, the scalp, the navel, and skin around the genital areas or anus. Only about 10% to 30% of people with psoriasis will also get psoriatic arthritis.

Symptoms:

General symptoms of PsA include:

- swollen, tender joints on one or both sides of your body
- morning stiffness
- swollen fingers and toes
- painful muscles and tendons
- scaly skin patches, which may get worse when joint pain flares up
- flaky scalp
- fatigue
- nail pitting
- separation of your nail from the nail bed
- eye redness (conjunctivitis)
- eye pain (uveitis)

Spondylitis PsA, in particular, can also cause the following symptoms:

- spinal pain and stiffness
- pain, swelling, and weakness in your hips, knees, ankles, feet, elbow, hands, wrists, and other joints
- swollen toes or fingers

Treatment

The goal of PsA treatment is to improve symptoms like skin rash and joint inflammation. You have many different treatment options. A typical treatment plan will include one or more of the following:

Nonsteroidal anti-inflammatory drugs (NSAIDs)

These medications help control joint pain and swelling. Over-the-counter (OTC) options include ibuprofen (Advil) and naproxen (Aleve), meloxicam .

When used incorrectly, NSAIDs can cause:

- stomach irritation
- stomach bleeding
- heart attack
- stroke
- liver and kidney damage

Disease-modifying antirheumatic drugs (DMARDs)

These medications decrease inflammation to prevent joint damage and slow the progression of PsA. You get these medicines by injection or infusion.

The most commonly prescribed DMARDs include:

- methotrexate (Trexall)
- leflunomide (Arava)
- sulfasalazine (Azulfidine)

Apremilast (Otezla) is a newer DMARD that's taken orally. It works by blocking phosphodiesterase 4, an enzyme involved in inflammation.

DMARD side effects include:

- liver damage
- bone marrow suppression
- lung infections

Biologics

Biologic drugs, also known as tumor necrosis factor-alpha (TNF-alpha) inhibitors, block the effects of the protein tumor necrosis factor-alpha. This reduces inflammation and improves symptoms like stiff and swollen joints.

Commonly prescribed biologic drugs include:

- adalimumab (Humira)

- certolizumab (Cimzia)
- golimumab (Simponi)
- etanercept (Enbrel)
- infliximab (Remicade)

Steroids

These medications can bring down inflammation. For PsA, they're usually injected into affected joints. Side effects include pain and a slight risk of joint infection.

Immunosuppressants

Medications like azathioprine (Imuran) and cyclosporine (Gengraf) calm the overactive immune response in PsA. They're not used as often now that TNF-alpha inhibitors are available. Because they weaken the immune response, immunosuppressants can increase your risk for infections.

Topical treatments

Creams, gels, lotions, and ointments can relieve the itchy PsA rash. These treatments are available over the counter and with a prescription.

Options include:

- anthralin
- calcitriol or calcipotriene, which are forms of vitamin D-3
- salicylic acid
- steroid creams
- tazarotene, which is a derivative of vitamin A

Light therapy and other PsA medicines

Light therapy uses medicine, followed by exposure to bright light, to treat psoriasis skin rashes.

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Can lifestyle changes ease psoriatic arthritis symptoms?

There are things you can do at home to help improve your symptoms:

Add exercise to your daily routine- Keeping your joints moving can ease stiffness

Break bad habits-Smoking is bad for your joints — as well as the rest of your body.

Relieve stress- Tension and stress can make arthritis flares even worse.

Use hot and cold packs- Warm compresses and hot packs can ease muscle soreness. Cold packs can also reduce pain in your joints.

Consider natural supplements and spices

Omega-3 fatty acids have anti-inflammatory properties. These healthy fats, found in many supplements, reduce inflammation and stiffness in joints.

Diagnosing psoriatic arthritis

Presenting symptoms are seconded with imaging and blood tests to rule out gout

These imaging tests look for damage to joints and other tissues:

- X-rays. - check for inflammation and damage to bones and joints. This damage is different in PsA than it is in other types of arthritis.
- MRIs. Radio waves and strong magnets make images of the inside of your body.
- CT scans and ultrasounds. To determine how advanced PsA is and how badly joints are affected.

Blood tests for these substances help assess any inflammation present in your body:

- C-reactive protein.- produced by the liver when there's inflammation in the body.
- Erythrocyte sedimentation rate. This reveals how much inflammation is in the body. However, it can't determine if the inflammation is from PsA or other possible causes.
- Rheumatoid factor (RF). This auto-antibody is produced by your immune system. It's usually present in RA but negative in PsA.
- **Joint fluid.** This test involves removal of a small amount of liquid from your knee or other joint. If uric acid crystals are in the fluid, you might have gout instead of PsA.
- **Red blood cell.** Low red blood cell count from anemia is common in people with PsA.

Risk factors for psoriatic arthritis

You're more likely to get PsA if you:

- have psoriasis
- family history of PsA
- are between the ages of 30 and 50 (though children can get it, too)
- have had strep throat
- have HIV

PsA puts you at risk for complications that include:

- psoriatic arthritis mutilans
- eye problems, such as conjunctivitis or uveitis
- cardiovascular disease

Gout

Gout is a kind of arthritis caused by a buildup of uric acid crystals in the joints. Uric acid is a breakdown product of purines that are part of many foods we eat. An abnormality in handling uric acid and crystallization of these compounds in joints can cause attacks of painful arthritis, kidney stones, and blockage of the kidney filtering tubules with uric acid crystals, leading to kidney failure. Gout has the unique distinction of being one of the most frequently recorded medical illnesses throughout history.

Causes

May results from one of three things:

i) Your body is making more uric acid.
ii) Your kidneys can't process the uric acid your body makes.
iii) You're eating too many foods that raise uric acid levels eg all meats, all alcohols and beverages

Symptoms:

They may just appear suddenly

- Intense joint pain in the big toe, but it could also be in ankles, knees, elbows, wrists, or fingers.
- Discomfort: even after the sharp pain goes away, joint will still hurt.
- Inflammation and redness: the joint will be red, swollen, and tender.
- Stiffness in the joint.

Treatment

Treatment involves both personal behavioral changes and medical management.

During an acute attack, anti-inflammatory medications can help relieve pain and shorten the length of the attack. Patients with chronic gout can use behavioral modification such as diet, exercise and decreased intake of alcohol to help minimize the frequency of attacks. Additionally, patients with chronic gout are often put on medications such as colchicine.

Self-care

Physical exercise, Weight loss, and Ice packs

Medications

Analgesic- Relieves pain.

Uric acid reducer- Helps reduce production or increase elimination of uric acid.

Nonsteroidal anti-Inflammatory drug- Relieves pain, decreases inflammation and reduces fever. Eg brufen, aspirin, diclofenac, naproxane

Steroid- Modifies or simulates hormone effects, often to reduce inflammation or for tissue growth and repair. Corticosteroids like hydrocortison

Lupus

Lupus (also called SLE or systemic lupus erythematosus) is an autoimmune disease that causes the body's immune system attacks your own tissues and organs. Inflammation caused by lupus can affect many different body systems — including joints, skin, kidneys, blood cells, brain, heart and lungs.

Lupus can be difficult to diagnose because its signs and symptoms often mimic those of other ailments. The most distinctive sign of lupus — a facial rash that resembles the wings of a butterfly unfolding across both cheeks — occurs in many but not all cases of lupus

Women of childbearing age are more likely to get lupus than men. It affects african-american women more often than white women. It usually appears between ages 15 and 44.

Symptoms:

- Painful, swollen joints
- fatigue
- headaches
- Swelling in the feet, legs, hands, or around the eyes
- rashes, including a "butterfly" rash across the cheeks
- mouth sores
- Sun sensitivity
- hair loss
- Blue or white fingers or toes when exposed to cold (raynaud's phenomenon)
- blood disorders, like anemia and low levels of white blood cells or platelets
- chest pain from inflammation of the lining of the heart or lungs
-

Diagnosis

Diagnosing lupus is difficult because signs and symptoms vary considerably from person to person. Signs and symptoms of lupus may vary over time and overlap with those of many other disorders.

No one test can diagnose lupus. The combination of blood and urine tests, signs and symptoms, and physical examination findings leads to the diagnosis.

Laboratory tests

Blood and urine tests may include:

- **Complete blood count.** This test measures the number of red blood cells, white blood cells and platelets as well as the amount of hemoglobin, a protein in red blood cells. Results may indicate you have anemia, which commonly occurs in lupus. A low white blood cell or platelet count may occur in lupus as well.

- **Erythrocyte sedimentation rate.** This blood test determines the rate at which red blood cells settle to the bottom of a tube in an hour. A faster than normal rate may indicate a systemic disease, such as lupus. The sedimentation rate isn't specific for any one disease. It may be elevated if you have lupus, an infection, another inflammatory condition or cancer.
- **Kidney and liver assessment.** Blood tests can assess how well your kidneys and liver are functioning. Lupus can affect these organs.
- **Urinalysis.** An examination of a sample of your urine may show an increased protein level or red blood cells in the urine, which may occur if lupus has affected your kidneys.
- **Antinuclear antibody (ANA) test.** A positive test for the presence of these antibodies — produced by your immune system — indicates a stimulated immune system. While most people with lupus have a positive ANA test, most people with a positive ANA do not have lupus. If you test positive for ANA, your doctor may advise more-specific antibody testing.

Imaging tests

If lupus is suspected to be affecting the lungs or heart:

- **Chest X-ray.** An image of your chest may reveal abnormal shadows that suggest fluid or inflammation in your lungs.
- **Echocardiogram.** This test uses sound waves to produce real-time images of your beating heart. It can check for problems with your valves and other portions of your heart.

Biopsy

Kidney biopsy- FNA or by incision

Skin biopsy is sometimes performed to confirm a diagnosis of lupus affecting the skin.

Treatment

Treatment is depended upon the presenting symptoms. The medications most commonly used to control lupus include:

- **Nonsteroidal anti-inflammatory drugs (NSAIDs).** Over-the-counter NSAIDs, such as naproxen sodium (Aleve) and ibuprofen (Advil, Motrin IB, others), may be used to treat pain, swelling and fever associated with lupus. Stronger NSAIDs are available by prescription. Side effects of NSAIDs include stomach bleeding, kidney problems and an increased risk of heart problems.
- **Antimalarial drugs.** Medications commonly used to treat malaria, such as hydroxychloroquine (Plaquenil), affect the immune system and can help decrease the risk of lupus flares. Side effects can include stomach upset and, very rarely, damage to the retina of the eye. Regular eye exams are recommended when taking these medications.
- **Corticosteroids.** Prednisone and other types of corticosteroids can counter the inflammation of lupus. High doses of steroids such as methylprednisolone (A-Methapred, Medrol) are often used to control serious disease that involves the kidneys and brain. Side effects include weight gain, easy bruising, thinning bones (osteoporosis), high blood pressure, diabetes and increased risk of infection. The risk of side effects increases with higher doses and longer term therapy.

- **Immunosuppressants.** Drugs that suppress the immune system may be helpful in serious cases of lupus. Examples include azathioprine, mycophenolate mofetil and methotrexate. Potential side effects may include an increased risk of infection, liver damage, decreased fertility and an increased risk of cancer.
- **Biologics.** A different type of medication, belimumab- administered intravenously, also reduces lupus symptoms in some people. Side effects include nausea, diarrhea and infections. Rarely, worsening of depression can occur.
- **Rituximab (Rituxan)** can be beneficial in cases of resistant lupus. Side effects include allergic reaction to the intravenous infusion and infections.

Common upper extremity problems

1. **Bursitis and tendinitis**- inflammation of the tendons and bursa. Commonly found in the shoulder- treated with rest and NSAIDs
2. **Loose bodies**- may occur in a joint as a result of wear and tear and bone erosion. They interfere with bone movement locking the joint and causing painful motion. They are removed by orthopedic surgeon
3. **Impingement syndrome** – painful inflammation around joint due to overuse of joints. Treated with joint injections, rest, NSAIDS, and physiotherapy
4. **Carpal tunnel syndrome**- a neuropathy that results when the medial nerve at the wrist is compressed- presents with pain, numbness, paresthesia. Caused by repetitive wrist movements, - treated by rest of the wrist, NSAIDS, and laser surgery in severe cases
5. **Ganglion**- is a collection of gelatinous material near the tendon sheath. It appears as a round, firm cyst usually on the dorsal of the wrist. More frequent in patients below 50 years. Treated by corticosteroid injections, aspiration and surgical excision.
6. **Dupuytren's Disease**- disease that results to slowly progressive contracture of the planter facia causing flexion of the 3^{rd}, 4^{th} and 5^{th} fingers rendering them useless. Seen mostly in men older than 50. Associated with arthritis, DM, gout and alcoholism. Treated with surgery and physiotherapy.

Common foot problems

1. **Plantar fasciitis**- inflammation of the foot supporting facia- begins with pain in the anterior mid aspect of the heel and diminishes with a little stretching. Management is stretching exercises, putting on shoes with socks, and NSAIDS.
2. **Corn**- an area of hyperkeratosis(overgrowth of a horny layer of epidermis) produced by internal pressure -treated by soaking and scrapping off the layer and using a more spacious shoe as prevention.
3. **Callus**- thickened are of skin that has been exposed to persistent pressure or friction. More frequent at the heels, treated by scrapping off and application of ointment.
4. **Ingrown nail**- the free edge of the nail penetrates into the surrounding tissues. Infection may set in secondarily. Treatment is soaking the foot daily, washing feet twice a day, application of topical antibiotic and incision to expose it if infection is severe
5. **Hammer toe**- flexion deformity where the toe(toes) are pulled upwards forcing metatarsal bones downwards mostly due to tight shoes or socks. Treatment, wearing spacious shoes and socks, manipulation exercises to restore normal position

6. **Hallux valgus**- the big toe deviated laterally, caused by too tight shoes, aging, osteoarthritis. A bursa may also form under the deflected foot. Treatment- excision of the bursa, toe flexion exercises.
7. **Pes cavus** – a deformity of high arch and a fixed equinus deformity of the forefoot. Causes-DM, family history, syphilis. Exercises help to restore the foot.
8. **Morton's neuroma**- a swelling of the 3rd lateral branch of the medial planter nerve. Treatment-local hydrocortisone injection, or surgical removal.
9. **Flatfoot-** the longitudinal arch of the foot is diminished- its associated with bone/ligament injury, posture imbalances, muscle fatigue, poor fitting shoes Is congenital. Foot exercises may help to restore structure

Bone Tumors

Bone Tumors

It's rare for bone tumors to develop within the bone itself. They tend to develop from other cancers in the breast, kidney, lung, prostate and thyroid. Although there are no specific causes found in most cases for bone tumors, possible causes include inherited genetic mutations, radiation and trauma.

The most common types of bone tumors include:

- Multiple Myeloma – Multiple myeloma, which develops in the plasma cells in bone marrow, typically affects middle-aged or elderly persons, and it is more common in men than women and in African Americans than Caucasians. Early myeloma may cause no overt symptoms, but as the disease develops, typical symptoms include bone pain, anemia, kidney failure and frequent infections.

- Osteochondroma – The most common benign bone tumors are osteochondromas that occur often in people between the ages of 10 and 20. These tumors usually form at the shoulder or knee as a cartilage-capped bony spur or outgrowth.

- Osteosarcoma – The most common malignant bone tumor is osteosarcoma that occurs often in people between the ages of 10 and 30. These tumors develop most often in the arms, legs and pelvis and are more common in men than women.

- Chondrosarcoma – The second most common form of malignant bone tumor is chondrosarcoma, which is commonly found in both men and women between 20 and 75. It usually occurs in the cartilage cells of the arms, spine, legs and pelvis bones.

- Ewing's Sarcoma – Children and adolescents most commonly develop Ewing's sarcoma, and is 10 times more common in Caucasian children than African-American, African and Asian children. This type of tumor often develops in the middle portion of the long bones of the legs and arms and can cause fever, weight loss, fatigue, paralysis, incontinence or numbness.

Symptoms of bone tumors include but are not limited to:

- Bone pain and tenderness that increases with time

- Development of a large, painful mass

- Pressure and stiffness around the mass
- Increased pain with activity or lifting
- Limping or decreased movement of the affected limb

Muscle Tumors

Tumors within the muscle are very rare and are found to be benign most of the time. If a muscle tumor is found to be malignant, it can spread very rapidly and those with malignant tumors have a high mortality rate.

Common types of muscle tumors include:

- Leiomyoma – Both men and women can develop leiomyoma, a benign tumor of the smooth muscle that starts from the walls of blood vessels. They are most commonly found in women as uterine fibroids, which can cause heavy menstrual periods, pelvic cramping and pressure in abdomen.
- Rhabdomyoma – This is a rare benign tumor of the skeletal muscle. They may either be cardiac or extracardiac, with cardiac tumors most commonly found in infants and children. It is mostly associated with the tongue and heart.
- Leiomyosarcoma – Most commonly found in adults and specifically older adults, leiomyosarcomas are malignant tumors of the smooth muscles and can grow anywhere in the body.
- Rhabdomyosarcomas – Children are affected more by these tumors than adults. Rhabdomyosarcomas are malignant tumors of the skeletal muscle that grow in the arms and legs and can occasionally begin in the head and neck area and reproductive and urinary organs.

Symptoms of muscle tumors include but are not limited to:

- A muscle tumor first appears as a painless lump but becomes more painful as it grows.
- If the tumor is in the abdomen, it can cause abdominal pains mistaken for menstrual cramps, indigestion or constipation.

Surgery is the most common treatment for bone and muscle tumors, however if the tumor is malignant, treatment depends on the stage of cancer. Our orthopedic oncologists use special technology to remove the tumor and rebuild the bone or muscle with tissue transplantation or with specialized implants to preserve the limb's function. Radiation therapy and chemotherapy may be used before surgery to shrink the tumor or after surgery to kill any remaining cancer cells. Learn more by talking to one of our skilled orthopedic oncologists.

Assignment. Take away cat, tb of the spine, ankylosis, lordosis, kyphosis,

Psalms 119:129-130

129 Thy testimonies are wonderful: therefore doth my soul keep them.
130 The entrance of thy words giveth light; it giveth understanding unto the simple.