GROUP WORK ON MUSCULOSKELETAL DISORDERS

BY

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**MUSCULOSKELETAL SYSTEM**

The musculoskeletal system consists of the bones of the skeleton, their joints and the skeletal muscles that moves the body. The body consists of 206 different bones.

Bones classification according according to shape:

* Long bones (e.g femur, humerus, radius)
* Short bones (e.g trasals, carpals)
* Flat bones (e.g skull, sternum, ribs, ilium)
* Irregular bones (e.g mandible, vertebrae, ear ossicles)

**Functions of the skeleton (BONES)**

* For Protection of vital organs
* For Support of body tissues
* For Hematopoiesis
* For Storage of mineral salts
* For movement

**DISORDERS OF MUSCULOSKELETAL SYSTEM**

**ARTHRITIS**

What is arthritis?

Arthritis means inflammation in a joint. This causes redness, warmth, swelling and pain within the joint. Arthritis in children is known as Juvenile arthritis or Juvenile idiopathic arthritis (JIA).

**RHEUMATOID ARTHRITIS**

**DEFINITION**

Rheumatoid arthritis is an inflammatory disease or an autoimmune disease that affects the joint. Juvenile idiopathic arthritis is arthritis that affects one or more joints for at least 6 weeks in a child age 16 or younger, unlike adult rheumatoid arthritis which is ongoing (chronic) and lasts a lifetime, children often outgrow JIA. But the disease can affect bone development in a growing child.

Juvenile Rheumatoid Arthritis (JRA) is an autoimmune disease that is most common chronic rheumatologic disease in children and is one of the most common chronic diseases of childhood. The etiology is unknown, and the genetic component is complex, making clear a distinction between the various subtypes difficult. Juvenile idiopathic arthritis can cause persistent joint pain, swelling and stiffness. Some children may experience symptoms for only a few months, while others have symptoms for the rest of their lives.

**CAUSES/RISK FACTORS**

• It is more common among girls

• Hereditary

- JIA is linked to part of a gene called HLA antigen DR4.

• Environmental factors

• Gene mutation

* Vitamin D deficiency

**TYPES OF RHEUMATOID ARTHRITIS**

* **Early:** No joint destruction
* **Moderate:** Some destruction of cartilage
* **Severe:** Cartilage and bone destruction
* **Terminal:** Cartilage and bone destruction and fibrous or body ankylosis present

**TYPES OF JUVENILE IDIOPATHIC ARTHRITIS (JIA)**

**• Systemic onset JIA**

This type affects one or more joints. There is often a high fever and a skin rash. It may also cause inflammation of internal organs, including the heart, liver, spleen, and lymph nodes. It is the least common type. It affects 1 in 10 to about 1 in 7 children with JIA.

**• Oligoarticular JIA**

 This type affects 1 to 4 joints in the first 6 months of disease. If no more joints are affected after 6 months, this type is called persistent. If more joints are affected after 6 months, it is called extended.

**Polyarticular JIA**

This type affects 5 or more joints in the first 6 months of disease. Blood tests for rheumatoid factor (RF) will show if this type is RF-positive or RF-negative.

• **Enthesitis-related JIA**

With this type, a child has arthritis as well as enthesitis. This is a swelling of the tissue where bone meets a tendon or ligament. It often affects the hips, knees, and feet.

• **Psoriatic arthritis**

With this type, a child may have both arthritis and a red, scaly skin disease called psoriasis. Or a child may have arthritis and 2 or more of the following: Inflammation of a finger or toe, Pits or ridges in fingernails, a first-degree relative with psoriasis.

• **Undifferentiated arthritis**

This is arthritis that has symptoms of 2 or more JIA types above. Or the symptoms might not match any type of JIA.

**PATHOPHYSIOLOGY**

 Rheumatoid arthritis (RA) is a systemic inflammatory disease mainly characterized by synovitis and joint destruction. Etiology of RA is unknown. The dominant feature is inflammation, primary in synovium. The synovial membrane in RA becomes hyperplastic. There is an increased number of both type synoviocytes and is infiltrated with immune and inflammatory cells: particularly macrophages, B- and T-lymphocytes, plasma cells and dendritic cells. Increased levels of cytokines are present. Cytokines play a central role in the perpetuation of synovial inflammation. The persistence of the chronic inflammatory response in conjunction with ongoing joint destruction (is finding in many patients with RA despite the use of effective anti-inflammatory agents and disease-modifying drugs) probably appears as a direct result of the sustained recruitment, inappropriate retention and impaired apoptosis.

**CLIICAL MANISFESTATIONS**

• Pain

• Swelling - Joint swelling is common but is often first noticed in larger joints such as the knee.

• Stiffness - particularly in the morning or after naps.

• Fever

• Swollen lymph nodes

• Rash

• Eye inflammation

• Warmth and redness in a joint

• Less ability to use one or more joints

• Fatigue

• Decreased appetite

• Poor weight gain

• Slow growth

**DIAGNOSIS**

A. Blood tests

Some of the most common blood tests for suspected cases include:

 Erythrocyte sedimentation rate (ESR)

The sedimentation rate is the speed at which your red blood cells settle to the bottom of a tube of blood. An elevated rate can indicate inflammation. Measuring the ESR is primarily used to determine the degree of inflammation.

 C-reactive protein

 This blood test also measures levels of general inflammation in the body but on a different scale than the ESR.

 Anti-nuclear antibody.

Anti-nuclear antibodies are proteins commonly produced by the immune systems of people with certain autoimmune diseases, including arthritis. They are a marker for an increased chance of eye inflammation.

 Rheumatoid factor

This antibody is occasionally found in the blood of children who have juvenile idiopathic arthritis.

 Cyclic citrullinated peptide (CCP)

 Like the rheumatoid factor, the CCP is another antibody that may be found in the blood of children with juvenile idiopathic arthritis.

In many children with juvenile idiopathic arthritis, no significant abnormality will be found in these blood tests.

B. Imaging scans

X-rays or magnetic resonance imaging (MRI) may be taken to exclude other conditions, such as fractures, tumors, infection or congenital defects.

Imaging may also be used from time to time after the diagnosis to monitor bone development and to detect joint damage.

 Bone scan. This uses a small amount of radiation to highlight the bones in a scanner.

 Joint aspiration (arthrocentesis). A small sample of the synovial fluid is taken from a joint. It's tested to see if crystals, bacteria, or viruses are present.

**MEDICAL MANAGEMENT**

A. Medications

The medications used to help children with juvenile idiopathic arthritis are chosen to decrease pain, improve function and minimize potential joint damage.

Typical medications include:

• Nonsteroidal anti-inflammatory drugs (NSAIDs)

 These medications, such as ibuprofen (Advil, Motrin IB, others) and naproxen sodium (Aleve), reduce pain and swelling. Side effects include stomach upset and liver problems.

• Disease-modifying antirheumatic drugs (DMARDs)

Doctors use these medications when NSAIDs alone fail to relieve symptoms of joint pain and swelling or if there is a high risk of damage in the future. DMARDs may be taken in combination with NSAIDs and are used to slow the progress of juvenile idiopathic arthritis. The most commonly used DMARD for children is methotrexate (Trexall). Side effects of methotrexate may include nausea and liver problems.

• Biologic agents

Also known as biologic response modifiers, this newer class of drugs includes tumor necrosis factor (TNF) blockers, such as etanercept (Enbrel) and adalimumab (Humira). These medications can help reduce systemic inflammation and prevent joint damage. Other biologic agents work to suppress the immune system, including abatacept (Orencia), rituximab (Rituxan), anakinra (Kineret) and tocilizumab (Actemra).

• Corticosteroids

 Medications such as prednisone may be used to control symptoms until another medication takes effect. They are also used to treat inflammation when it is not in the joints, such as inflammation of the sac around the heart (pericarditis).

These drugs can interfere with normal growth and increase susceptibility to infection, so they generally should be used for the shortest possible duration.

B. Physical Therapy – to maintain range of motion and muscle tone and keep joint flexibility

C. Occupational therapy- there might be need to recommend that your child make use of joint supports or splints to help protect joints and keep them in a good functional position.

D. Surgery - to improve the position of a joint

**NURSING MANAGEMENT**

• Getting regular exercise - Exercise is important because it promotes both muscle strength and joint flexibility. Swimming is an excellent choice because it places minimal stress on joints. Keep joints warm and active.

• Applying cold or heat - Stiffness affects many children with juvenile idiopathic arthritis, particularly in the morning. Although some children respond well to cold packs, most children prefer a hot pack or a hot bath or shower. Use an electric blanket on a timer that turns on 1 hour before a kid wakes up, which can help warms the joints and help a kid move better.

• Encourage child to eat well - Some children with arthritis have poor appetites. Others may gain excess weight due to medications or physical inactivity. A healthy diet can help maintain an appropriate body weight.

• Adequate calcium in the diet is important because children with juvenile idiopathic arthritis are at risk of developing weak bones (osteoporosis) due to the disease, the use of corticosteroids, and decreased physical activity and weight bearing.

**COMPLICATIONS**

• Eye problems - Some forms can cause eye inflammation (uveitis). If this condition is left untreated, it may result in cataracts, glaucoma and even blindness. Eye inflammation frequently occurs without symptoms, so it's important for children with this condition to be examined regularly by an ophthalmologist.

• Growth problems. Juvenile idiopathic arthritis can interfere with your child's growth and bone development. Some medications used for treatment, mainly corticosteroids, also can inhibit growth

• Joint damage

. Skeletal demineralization

. fractures

**GOUTY ARTHRITIS**

**DEFINITION:**

This is a disorder of uric acid metabolism whereby urate crystal deposits in the joints and other body tissues. It is usually caused by excessive concentration of uric acid in the blood and the disease affects the toe, foot, ankle, knee, hands and elbow joints. Gout is common in males than in females.

**CAUSES/ RISK FACTORS**

• Obesity

• Excessive alcohol intake

• Genetic predisposition

• High intake of food rich in purines e.g. sea foods

• Drugs e.g. Diuretics

• Injury to joints

• Prolonged kidney disease

**PATHOPHYSIOLOGY**

Excessive concentration of uric acid in the blood either due to over production or faulty disposal or elimination to the kidney leads to the accumulation and deposition of urate crystals within the joint tissues, thereby setting up irritation and local inflammatory response causing pain, tenderness and swelling of the affected joints. Small masses of the urate crystals, called tophi are also formed in the cartilage, kidneys and soft tissues of other parts of the body resulting in systemic symptoms like anorexia, nausea and fever.

**CLINICAL MANIFESTATION**

• Severe pain

• Tenderness in the affected joint

• Swelling of the affected joint

• Nausea

• Anorexia

• Fever

• Headache

• Constipation

• Warm, tight, shiny and red skin of affected joint

**DIAGNOSTIC EVALUATION**

• Examination of the joint and full medical history of severe pain, tenderness and swelling

• Blood analysis to reveal elevated uric acid level

• Aspiration of joint fluid to confirm presence of uric acid crystals

• X- ray of affected area

**MEDICAL MANAGEMENT**

• Non –steroidal anti-inflammatory drugs (NSAIDs) such as Indomethacin, diclofenac are taken to reduce duration and severity of the attack.

• Paracetamol is taken in conjunction with other medications.

• Aspirin should be avoided to reduce the amount of uric acid excrete by the body.

• Colchicines can be taken to block the production of uric acid

• Steroids e.g prednisone may be given in tablet form to reduce pain and inflammation.

• Allopurinol uricosuric drug can be administered to reduce uric acid production or increase the excretion of uric acid by the kidneys.

**NURSING MANAGEMENT**

• On admission, patient is placed on bed rest and the affected part is immobilized

• Hot or cold applications to the affected joints provides relief

• Restrict food high in purines. Food high in purines include shellfish, organ meats, yeast, potatoes and citrus fruits

• Advise patient against alcohol intake

• Patient should be encouraged to take plenty of fluid (2500-3000mls/day) which helps to flush the uric acid crystals out of the body.

• Maintain body weight to reduce stresss on the affected joint

• On discharge, advice patient family on copious fluid intake, proper diet, application of warm and cold water compress.

**COMPLICATIONS**

• Permanent damage to the joints

• Kidney stones

• Deformity

• Artherosclerosis

• Coronary thrombosis

• Hypertension

**SPRAIN AND STRAIN IN CHILDREN.**

Strains are injuries to muscle or tendons (which connect muscle to bone) due to over stretching. Sprains involve a stretch or a partial tear of ligaments (which connect two bones). Sprains and strains happen more often in teens than in younger children.

Symptoms for sprains and strains are similar and may include:

• pain and swelling in the injured area

• difficulty using or moving the injured area in a normal way

• warmth, bruising or redness in the injured area

**CAUSES**

Our bodies work hard day after day, so an occasional strain or sprain isn’t uncommon. Certain situations make you more likely to injure your joints. These include:

• athletic activities or exercise, including running or jogging

• accidents, such as falling or slipping

• lifting heavy objects

• overexerting yourself

• sitting or standing in an awkward position

• prolonged repetitive motion

**RISK FACTORS**

Anyone at any point can experience a sprain or strain, but certain risk factors increase your odds for over stretching a joint. These risk factors include:

• Being out of shape. Lack of proper conditioning leaves your muscles and joints weak and unable to fully support your movements.

• Using improper equipment. Equipment that is worn out or ill-fitting will increase your risk for a sprain or strain. It’s important you keep your shoes and any necessary gear maintained.

• Not warming up. Warming up and cooling down after exercise or athletic activity helps you prevent injury. Warming up gently stretches the muscles and increases your range of motion. A cool down stretch helps strengthen your muscles for better joint support.

• Being tired. When you’re tired, you don’t carry your body properly. Being tired means you’re less likely to practice good form. Schedule days off between exercise so your body can rest and heal.

• Your environment.Wet, slippery, or icy surfaces are treacherous for walking. These aren’t risk factors you can control, but being aware of when they’re around will help you avoid an injury.

**DIAGNOSIS**

* Doctors often diagnose a sprain or strain by excluding other causes for the symptoms. After a brief physical exam, your doctor may request an X-ray and if the X-ray is not conclusive then the doctor might request another type of imaging test called MRI.
* Physical examination

**MANAGEMENT**

Mild strains and mild sprains are treated with the same technique. This technique is known as RICE. RICE stands for:

• Rest: Stay off the affected joint, or try not to use it while it heals. This will give the joint time to heal.

• Ice: Ice helps reduce swelling and inflammation. Never apply ice directly to your skin. Instead, wrap a thin towel or piece of clothing around a bag of ice. Leave it on the affected area for 20 minutes, then remove the ice for 20 minutes. Repeat as much as you can for the first 24 to 48 hours.

• Compression: Compression will help reduce the swelling. Wrap the affected joint in a bandage or trainer’s tape. Do not wrap too tightly, however, or you can reduce the blood supply.

• Elevation: Try to keep the affected joint elevated above the level of your heart. This will help reduce swelling. If your knee or ankle is affected, that may mean you need to stay in bed or on the couch for up to two days after your injury. If you can’t keep it as high as your heart, parallel to the ground is also OK.

For the first 24 to 48 hours after your injury, RICE may make you more comfortable and reduce signs and symptoms.

More severe strains and sprains may require surgery to repair damaged or torn ligaments, tendons, or muscles. If you experience any of the following, see a doctor about your sprain or strain:

• difficulty walking or standing without pain

• inability to move or flex the affected joint

• feeling numbness or tingling around the joint

**OSTEOMYELITIS.**

Osteomyelitis is an Inflammation of the bone due to infection, for example, by the bacteria salmonella or staphylococcus. Osteomyelitis is sometimes a complication of surgery or injury, although infection can also reach bone tissue through the bloodstream. Both the bone and the bone marrow may be infected. Symptoms include deep pain and muscle spasms in the area of inflammation, as well as fever. Treatment includes bed rest, use of antibiotics, and sometimes surgery to remove dead bone tissue.

**Osteomyelitis in children.**

Acute osteomyelitis is an infection in the bone. It develops over a short time, usually about 2 weeks. In children, osteomyelitis is more common in the long bones of the arms and legs. But it can affect any bone in the body. Osteomyelitis can happen in children of any age. About half of the time, it happens in children under 5 years of age.

**TYPES OF OSTEOMYELITIS**

* **Acute:** This is the sudden onset may heal in 2 or 3 weeks or progress to chronic
* **Chronic:** A continuous persistent problem or exercerbation of previous problem.

**CAUSES OF OSTEOMYELITIS IN CHILDREN**

 • Bacteria can travel into the bone through the bloodstream from other infected areas in the body. This is called hematogenous (heh-meh-TAH-gen-us)osteomyelitis. It's the most common way that kids get bone infections.

• A direct infection can happen when bacteria enter a wound and travel to the bone (like after an injury or surgery). Open fractures — breaks in the bone with the skin also open — are the injuries that most often develop osteomyelitis.

• Sometimes the bacteria can spread from a nearby infection. For example, an untreated infection in skin or a joint can spread to the bone.

. Respiratory tract infection

**PATHOPHYSIOLOGY.**

Osteomyelitis tends to occlude local blood vessels, which causes bone necrosis and local spread of infection. Infection may expand through the bone cortex and spread under the periosteum, with formation of subcutaneous abscesses that may drain spontaneously through the skin. In vertebral osteomyelitis, paravertebral or epidural abscess can develop. If treatment of acute osteomyelitis is only partially successful, low-grade chronic osteomyelitis develops.

**CLINICAL MANIFESTATION.**

These are common symptoms of osteomyelitis:

•Fever

•Fussiness or irritability

•Tiredness

The following may happen in the area of the infected bone:

•Tenderness or pain

•Not using the affected arm, leg or other part of the body

•Swelling

•Redness

**DIAGNOSTIC EVALUATION**.

•To confirm a clinical diagnosis of osteomyelitis, adequate radiologic and laboratory data are necessary.

•The WBC count is elevated in only one half of patients with or without thrombocytosis.

•The C-reactive protein and erythrocyte sedimentation rate (ESR) are almost always elevated (except in small bones infections).

•There are many methods to attempt to recover the organism causing the bone infection, such as blood, bone, or joint aspirate cultures. It is important to obtain these cultures before any antibiotics are given.

•However, at times cultures may be negative or difficult to obtain and therapy should be guided by the most common causes in local area.

•If one is able to obtain bone and/or joint fluid aspirate for culture, a Gram stain is vital, as the procedure itself can be bactericidal.

•Consult with the microbiology laboratory prior to obtaining cultures to ensure proper culture mediums and technique are used.

•If a clinician is considering, Kingella kingae,notify the microbiology department as recovery is improved by inoculating synovial fluid directly into blood culture bottles.

•Consider performing a bone biopsy if the patient does not respond to standard therapy.

**MEDICAL MANAGEMENT.**

•Optimal antibiotic selection, adequate dosing, and a sufficiently prolonged antibiotic course with monitoring for clinical response and for the toxicity of therapy are essential.

•Promptly initiate antibiotic treatment, preferably after obtaining blood and bone aspirates for culture.

•The usual choice is an antistaphylococcal antibiotic; nafcillin, vancomycin, clindamycin, and cefazolin are the preferred agents

•Linezolid has good Gram-positive coverage, including MRSA and has excellent oral bioavailability and additional studies supporting its varied use.

•Intravenous therapy is still recommended for initial treatment

•When treating neonatal osteomyelitis, consider nafcillin and tobramycin or vancomycin and gentamicin combinations to provide coverage of bacteria from the Enterobacteriaceae family, in addition to group B streptococci and S. aureus.

•In children and adolescents with penetrating trauma of the foot, perform surgical debridement before considering antipseudomonal treatment. Infection can occur days to weeks before initial presentation, as history is vital to the diagnosis.

**NURSING MANAGEMENT OF OSTEOMYELITIS**.

•The nursing of children who suffer from heavy musculoskeletal infections; for a wide range of evaluation it requires a multidisciplinary team approach that consists of as well as the hospital staff and services, pediatricians, vorthopedists and infectious diseases specialists

•Isolation should be applied to children with an open wound. In wound care, the prescribed medicines are used. In addition, the insertion of antibiotic solutions into the wound care is very effective

•The received-removed fluid amount is continuously measured and recorded. Moreover, the wound drainage is also recorded. The state of healing of the wound tissue is evaluated and recorded

•To provide immobility, plaster is used and in such cases, routine plaster maintenance is performed

**COMPLICATION.**

* The most common complication in children with osteomyelitis is recurrence of bone infection. Although adverse outcomes are common with delays in treatment, chronic infection may still develop in 5-10% of patients treated appropriately. Common complications in children younger than 18 months include bone destruction, chronic osteomyelitis, and impaired bone growth, especially when the growth plate is affected. Although rare, extreme bone destruction or thinning of the cortex can lead to pathologic fractures.

**OSTEOPOROSIS**

Osteoporosis is a disorder of bone metabolism in which there is a reduction of total bone mass, making bones abnormally prone to fracture. Osteoporosis in children means porous bone. This most often happens in children between ages 8 and 14.

**CAUSES OF OSTEOPOROSIS**

* Liver diseases
* Scurvy
* Trauma
* Alcoholism
* Nutritional deficiency
* Rheumatoid arthritis
* Malabsorption of calcium

**PATHOPHYSIOLOGY**

Osteoporosis is characterized by reduced bone mass, deterioration of bone matrix, and diminished bone architectural strength. Normal homeostatic bone turnover is altered; the rate of bone resorption that is maintained by osteoclasts is greater than the rate of bone formation that is maintained by osteoblasts, resulting in a reduced total bone mass. The bones become porous, brittle, fragile; they fracture easily under stresses that would not break normal bone.

The postural changes result in relaxation of the abdominal muscles and a protruding abdomen.Calcitonin and estrogen decrease with aging, while parathyroid hormone increases, increasing bone turnover and resorption. The consequence of these changes is net loss of bone mass over time.

**CLINICAL MANIFESTATION OF OSTEOPOROSIS**

* Trouble with walking
* Pain
* Fractures
* Constipation
* Protruded abdomen
* Decreased exercise tolerance

**DIAGNOSTIC EVALUATION**

-history taking

-Physical Examination

-Bone density scan

-X-ray

-Bone densitometry

-Blood tests

**MEDICAL MANAGEMENT**

-Diet-A diet rich in calcium and vitamin D throughout life, with an increased calcium intake during adolescence, young adulthood, and the middle years, protects against skeletal demineralization

-Exercise

-Fracture management

-pharmacological therapy: Non opoid analgesics such as acetaminophen and application of heat to treat mild and moderate pain

-Surgery

**NURSING MANAGEMENT**

- Admission

- History taking

- Physical examination-Physical exam may disclose a fracture, kyphosis of the thoracic spine, or shortened stature.

- Encourage child to take part in physical activities

- Physical care such as Bed bathing

- Increase calcium diet in child-including dairy products (such as milk, cheese and yoghurt) and other sources of calcium (such as leafy green vegetables, tofu, nuts, legumes) and calcium-fortified foods (for example, soy milk)

- Encourage intake of vitamin D

- Avoid caffeine

- Administer prescribed medication such as biphosphonates

- Advice on discharge

- Follow up care

**COMPLICATIONS**

* Fractures
* Loss of height
* Humped back( dowager’s hump)

**OSTEOMALACIA**

**DEFINITION**

 Osteomalacia can be defined as softening of bones, most often caused by severe vitamin D deficiency. The softened bones of children with osteomalacia can lead to bowing during growth, especially in weight-bearing bones of the legs.

Any child who doesn't get enough vitamin D or calcium either through their diet, or from sunlight, can develop osteomalacia. But the condition is more common in children with dark skin, as this means they need more sunlight to get enough vitamin D, as well as children born prematurely or taking medication that interferes with vitamin D.

**CAUSES**

• Osteomalacia results from a defect in the bone-maturing process. The body uses the minerals calcium and phosphate to help build strong bones. Osteomalacia can be developed if enough of these minerals is not adequate in diet or if the body doesn't absorb them properly. These problems can be caused by:

• Vitamin D deficiency. Sunlight produces vitamin D in the skin. Dietary vitamin D is usually from foods to which the vitamin has been added, such as cow's milk.

• People who live in areas where sunlight is limited, get little exposure to sunlight or eat a diet low in vitamin D can develop osteomalacia. Vitamin D deficiency is the most common cause of osteomalacia worldwide.

• Certain surgeries. Normally, the stomach breaks down food to release calcium and other minerals that are absorbed in the intestine. This process is disrupted if you have surgery to remove part or all of your stomach or to bypass your small intestine and can result in vitamin D and calcium deficiency.

• Celiac disease. In this autoimmune disorder, foods containing gluten, a protein found in wheat, barley and rye, can damage the lining of your small intestine. A damaged intestinal lining doesn't absorb nutrients well, and can lead to vitamin D and calcium deficiency.

• Kidney or liver disorders. These organs are involved in activating vitamin D in the body. Problems with the kidney or liver can affect the body's ability to make active vitamin D.

• Drugs. Some drugs used to treat seizures, including phenytoin (Dilantin, Phenytek) and phenobarbital, can cause severe vitamin D deficiency and osteomalacia.

**RISK FACTORS**

• Antiseizure medications DEFINITION

• Cancer patients p

• Diet that has little variety or is strictly vegetarian

• Intake of diet that is low in milk products

• Intake of diet that is low in phosphate

• Intake of diet that is low in vitamin D

• Environmental conditions, such as limited sunlight and smog

• Family history of vitamin D metabolism disorders

• Kidney failure

• Liver disease (includes any type of liver problem, such as hepatitis, cirrhosis and liver failure)

• Overuse of sunblock

• Previous gastrectomy surgery (removal of stomach)

**SYMPTOMS**

• Dull, aching pain associated with osteomalacia most commonly affects the lower back, pelvis, hips, legs and ribs. The pain might be worse at night or when pressure is put on the bones. The pain is rarely relieved completely by rest.

• Decreased muscle tone.

• Extensive swelling

• Inability to move a body part

• Numbness or coldness in the area of the fracture

• Visible deformity of the affected bone or joint

• Bowed legs

• Difficulty in walking

• Muscle cramps

**DIAGNOSIS**

Osteomalacia can be difficult to diagnose. To pinpoint the cause and to rule out other bone disorders, such as osteoporosis, one or more of the following test of might be undergone:

• Blood and urine tests. These help detect low levels of vitamin D and problems with calcium and phosphorus.

• X-rays: used to detect structural changes and slight cracks in bones.

• Bone biopsy: Using general anesthesia, a surgeon inserts a slender needle through the skin and into the pelvic bone above the hip to withdraw a small sample of bone. Although a bone biopsy is accurate in detecting osteomalacia, it's rarely needed to make the diagnosis.

**MEDICAL MANAGEMENT**

• Vitamin D supplements

• Calcium supplements

• Phosphate supplements

• Patients who have osteomalacia can take vitamin D, calcium or phosphate supplements, depending on the individual case. For instance, people with intestinal malabsorption (the intestines cannot absorb nutrients or vitamins properly) may need to take larger quantities of vitamin D and calcium.

• Surgery can be done to correct bone deformities (in severe cases)

**NURSING MANAGEMENT**

• Admission

• History taking

• Physical examination-Physical exam may disclose a fracture.

• Encourage child to take part in physical activities

• Physical care such as Bed bathing

• Encourage intake of vitamin D

• Avoid caffeine

• Administer prescribed medication

• Advice on discharge

• Educate parents of the child on the following:

• having a diet rich in vitamin D

• getting a healthy amount of sunshine

• exercising regularly

• maintaining a healthy weight.

• Wearing braces for the child to reduce or prevent bone irregularities if indicated.

• Follow up care

**COMPLICATIONS**

• Further risk of bone fractures

• Growth deformity in children

• Hypocalcemic seizures

• Kidney failure

• Physical disability

• Recurrence or progression of osteomalacia

**FRACTURE**

WHAT IS A FRACTURE?

 A fracture is also a complete or incomplete disruption in the continuity of the bone structure and is defined according to its type and extent. A significant percentage of bone fractures occurbecause of high force impact or stress. However, a fracture may also be the result of some conditions which weaken the bones, for example osteoporosis, some cancers, or osteogenesis Medical imperfecta (also known as brittle bone diseases). A fracture caused by a medical condition is known as a pathological fracture.

A child bone fracture or a pediatric fracture is a medical condition in which a bone of a child (a person younger than the age of 18) is cracked or broken. About 15% of all injuries in children are fracture injuries. Bone fractures in children are different from adult bone fractures because a child's bones are still growing.

**TYPES OF FRACTURE**

 The bones of a child are more likely to bend than to break completely because they are softer and the periosteum is stronger and thicker. The fractures that are most common in children are the incomplete fractures; these fractures are the greenstick and torus or buckle fractures

 Avulsion fracture; a muscle or ligament pulls on the bone, fracturing it.

 Comminuted fracture; the bone is shattered into many pieces.

 Greenstick fracture; the bone partly fractures on one side, but does not break completely because the rest of the bone can bend. This is more common among children, whose bones are softer and more elastic.

 Hairline fracture; a partial fracture of the bone. Sometimes this type of fracture is harder to detect with routine xrays.

 Impacted fracture; when the bone is fractured, one fragment of bone goes into another.

 Intraarticular fracture; where the break extends into the surface of a joint

 Longitudinal fracture; the break is along the length of the bone.

 Oblique fracture; a fracture that is diagonal to a bone’s long axis.

 Pathological fracture; bone fracture caused by an underlying disease/condition that weakened the bone

 Spiral fracture; a fracture where at least one part of the bone has been twisted.

 Stress fracture; more common among athletes. A bone breaks because of repeated stresses and strains.

 Torus (buckle) fracture; bone deforms but does not crack. More common in children. It is painful but stable.

 Transverse fracture; a straight break right across a bone.

**SYMPTOMS OF A FRACTURE**

 The signs and symptoms of a fracture vary according to which bone is affected, the patient’s age and general health, as well as the severity of the injury. However, they often include some of the following:

• pain

• swelling

• bruising

• discolored skin around the affected area

• angulation – the affected area may be bent at an unusual angle

• the patient is unable to put weight on the injured area

• the patient cannot move the affected area

• the affected bone or joint may have a grating sensation

• if it is an open fracture, there may be bleeding

When a large bone is affected, such as the pelvis or femur:

• the sufferer may look pale and clammy

• there may be dizziness (feeling faint)

• feelings of sickness and nausea.

**CAUSES**

Fractures occur when a force that is stronger than the bone itself is applied to a bone. Fractures can occur from;

1. falls,

2. trauma,

3. and a direct blow to a bone.

4. Repetitive forces caused among professional sport people can cause a fracture, as well. These running fractures are often called stress fractures; these are small cracks in the bone.

5. Osteoporosis may also cause a fracture in older people(also known as pathological fracture).

**RISK FACTORS**

Children with a higher risk of a fracture

1.Low bone mineral content; Children with generalized disorders such as renal diseases, cystic fibrosis, diabetes mellitus, growth hormone deficiency, and osteogenesis imperfecta disorders are at risk.

Neuromuscular disorders: children with cerebral palsy, spina bifida, and arthrogryposis, have a higher risk of a fracture because of the combination of joint stiffness and poor mineralization.

2.Fracture personality; Children in general are at greater risk because of their high activity levels. Children that have risk-prone behaviors are at even greater risk.

3. Disuse of muscles or bed rest

4. Sudden twisting motion

5. Forceful muscle contraction

**DIAGNOSIS** .

Diagnostic Evaluation includes:

①　X-ray

②　MRI

③　CT SCAN

④　Bone scan

⑤　Coagulation profile

⑥　Complete blood count

⑦　Urine creatinine clearance

⑧　Arteriograms

**PREVENTION**

1. Nutrition and sunlight – the human body needs adequate supplies of calcium for healthy bones. Milk, cheese, yoghurt, and dark green leafy vegetables are good sources of calcium. Our body also needs vitamin D to absorb calcium – exposure to sunlight, as well as eating eggs and oily fish are good ways of getting vitamin D.

2. Physical activity – the more weight-bearing exercises you do, the stronger and denser your bones will be. Examples include skipping, walking, running, and dancing – any exercise where the body pulls on the skeleton. In Older age not only results in weaker bones, but often in less physical activity, which further increases the risk of even weaker bones. It is important for people of all ages to stay physically active.

**MEDICAL MANAGEMENT**

Management of a patient with fracture can belong to either emergent or post-emergent.

• Immediately after injury, if a fracture is suspected, it is important to immobilize the body part before the patient is moved.

• Adequate splinting is essential to prevent movement of fracture fragments.

• In an open fracture, the wound should be covered with sterile dressing to prevent contamination of the deeper tissues.

• Fracture reduction refers to restoration of the fracture fragments to anatomic alignment and positioning and can be open or closed depending on the type of fracture.

**NURSING MANAGEMENT**

Nursing management for close and open fractures;

• **Close fracture**.

1. The patient with close fracture is assessed for absence of opening in the skin at the fracture site.

2. Encourage patient not to mobilize fracture site.

3. Exercise to maintain the health of unaffected muscles using assistive devices e.g crutches, walker.

4. Teach patient how to use assistive device safely.

5. Patient teaching includes self care, medication information, monitoring for potential complications and the need for continuing health care supervision.

**. Open fracture.**

①　The patient with open fracture is assessed for risk for osteomyelitis, tetanus, and gas gangrene.

②　Administer tetanus prophylaxis if indicated.

③　Wound irrigation and debridement in the operating room are necessary.

④　Wound is cultured.

⑤　Intravenous antibiotic are prescribed to prevent or treat infection.

⑥　Any damage to blood vessels, soft tissues, muscles, nerves and tendons are treated.

⑦　Fracture is carefully reduced or stabilized by external fixation.

⑧　Heavily contaminated wounds are left unsutured and dressed with sterile gauze to permit wound drainage.

Also When assessing a patient with a fracture, check the "5 P's"--pain, pulse, pallor, paresthesia, and paralysis.

 (1) Pain. Determine where the pain is located and if it is worse or better? Worsening pain may indicate increased edema, lack of adequate blood supply, or tissue damage.

 (2) Pulse. Check the peripheral pulses, especially those distal to the fracture site. Compare all pulses with those on the unaffected side. Pulses should be strong and equal.

 (3) Pallor. Observe the color and temperature of the skin, especially around the fracture site. Perform the capillary refill (blanching) test.

 (4) Paresthesia. Examine the injured area for increase or decrease in sensation. Can the patient detect tactile stimulation such as a blunt touch or a sharp pinprick? Does the patient complain of numbness or tingling?

 (5) Paralysis. Check the patient's mobility. Can he wiggle his toes and fingers? Can he move his extremities?

**COMPLICATIONS**

* Non-union
* Mal-union
* Shock
* Gangrene
* Pressure sore

**DISLOCATION**

**DEFINITION**

A dislocation is a joint injury. It occurs when the ends of 2 connected bones come apart. It is not common in younger children. This is because their growth plates are weaker than the muscles or tendons. Growth plates are the areas at the end of long bones where the bones grow. Dislocations happen more often among teens.

 What causes a dislocation in a child?

A dislocation happens when extreme force is put on a joint. It can occur if a child falls or takes a hit to the body, such as while playing a contact sport. When a dislocation occurs, ligaments can be torn. Ligaments are flexible bands of fibrous tissue. They join various bones and cartilage. They also bind the bones in a joint together. The hip and shoulder joints, for example are called ball and socket joints. Lots of force on the ligaments in these joints can cause the head of the bone to partly or fully come out of the socket. The most commonly dislocated joint is the shoulder.

**Risk factors**

Children can also be at a greater risk for dislocations if they are unsupervised or play in an area that hasn’t been childproofed. Those who practice unsafe behavior during physical activities put themselves at higher risk for accidents such as dislocations.

Risk factors for a joint dislocation include:

* Susceptibility to falls. Falling increases your chances of a dislocated joint if you use your arms to brace for impact or if you land forcefully on a body part, such as your hip or shoulder.
* Heredity. Some people are born with ligaments that are looser and more prone to injury than those of other people.
* Sports participation. Many dislocations occur during high-impact or contact sports, such as gymnastics, wrestling, basketball and football.
* Motor vehicle accidents. These are the most common cause of hip dislocations, especially for people not wearing a seat belt.

**Symptoms of a dislocation**

* Each child may feel symptoms a bit differently. But below are the most common symptoms a child will have in the dislocated area:
* Pain

Swelling

* Bruising or redness
* Numbness or weakness
* Deformity
* Trouble using or moving the joint in a normal way

**Diagnostic Evaluation**

* Your child’s healthcare provider makes the diagnosis with an exam. During the exam, he or she will ask about your child’s health history and how the injury happened. Your child may also need:
* X-rays. This test makes images of internal tissues, bones, and organs.
* MRI. This test uses a combination of large magnets, radio waves, and a computer to make detailed images of organs and structures within the body. An MRI is usually done only if surgery may be needed.

**Medical management**

Treatment of the dislocation depends on the site and severity of your injury. It might involve:

* Reduction. Your doctor might try gentle maneuvers to help your bones back into position. Depending on the amount of pain and swelling, you might need a local anesthetic or even a general anesthetic before manipulation of your bones.
* Immobilization. After your bones are back in position, your doctor might immobilize your joint with a splint or sling for several weeks. How long you wear the splint or sling depends on the joint involved and the extent of damage to nerves, blood vessels and supporting tissues.
* Surgery. You might need surgery if your doctor can't move your dislocated bones into their correct positions or if the nearby blood vessels, nerves or ligaments have been damaged. Surgery may also be necessary if you have had recurring dislocations, especially of your shoulder.
* Rehabilitation. After your splint or sling is removed, you'll begin a gradual rehabilitation program designed to restore your joint's range of motion and strength.

**Nursing Management**

* Pain. Determine where the pain is located and if it is worse or better? Worsening pain may indicate increased edema, lack of adequate blood supply, or tissue damage.
* Pulse. Check the peripheral pulses, especially those distal to the fracture site. Compare all pulses with those on the unaffected side. Pulses should be strong and equal.
* Pallor. Observe the color and temperature of the skin, especially around the fracture site. Perform the capillary refill (blanching) test.
* Paresthesia. Examine the injured area for increase or decrease in sensation. Can the patient detect tactile stimulation such as a blunt touch or a sharp pinprick? Does the patient complain of numbness or tingling?

**Complications**

Complications of a joint dislocation can include:

* Tearing of the muscles, ligaments and tendons that reinforce the injured joint
* Nerve or blood vessel damage in or around your joint
* Susceptibility to reinjury if you have a severe dislocation or repeated dislocations • Development of arthritis in the affected joint as you age

**Prevention**

You can prevent a dislocation if you practice safe behavior. General tips to prevent dislocations include:

* Use handrails when going up and down staircases.
* Keep a first aid kit in the area.
* Use nonskid mats in wet areas, such as bathrooms.
* Move electrical cords off the floor. • Avoid use of throw rugs.
* To prevent children from possible dislocations, consider practicing the following:
* Teach children safe behaviors.
* Watch and supervise children as needed.
* Ensure that your home is childproof and safe.
* Put gates on stairways to prevent falls.

REFERENCES.

Arnold S R, Elias D, Buckingham S C, et al. Changing patterns of acute hematogenous osteomyelitis and septic arthritis: emergence of community-associated methicillin-resistant Staphylococcus aureus. J Pediatr Orthop. 2006;26:703–708. [[PubMed](/pubmed/17065930)]

Berger RA. A method of defining palpable landmarks for the ligament-splitting dorsal wrist capsulotomy. J Hand Surg [Am]. 2007 Oct. 32(8):1291-5. [Medline].

Blyth M J, Kincaid R, Craigen M A, Bennet G C. The changing epidemiology of acute and subacute haematogenous osteomyelitis in children. J Bone Joint Surg Br. 2001;83:99–102. [[PubMed](/pubmed/11245548)] [[Google Scholar](https://scholar.google.com/scholar_lookup?journal=J+Bone+Joint+Surg+Br&title=The+changing+epidemiology+of+acute+and+subacute+haematogenous+osteomyelitis+in+children&volume=83&publication_year=2001&pages=99-102&pmid=11245548&)]

Cierny G, III, Mader J T, Penninck J J. A clinical staging system for adult osteomyelitis. Clin Orthop Relat Res. 2003;414:7–24. [[PubMed](/pubmed/12966271)] [[Google Scholar](https://scholar.google.com/scholar_lookup?journal=Clin+Orthop+Relat+Res&title=A+clinical+staging+system+for+adult+osteomyelitis&volume=414&publication_year=2003&pages=7-24&pmid=12966271&)]

Cooney WP, Linscheid RL, Dobyns JH, eds. The Wrist: Diagnosis and Operative Treatment. St. Louis, Mo: Mosby-Year Book; 1998. 32-46, 62-70, 73-104, 106-22, 385-8, 393-6,403-10, 417, 421-5, 431-45.

De Jonghe M, Glaesener G. Type B Haemophilus influenzae infections. Experience at the Pediatric Hospital of Luxembourg. Bull Soc Sci Med Grand Duche Luxemb. 1995;132:17–20.[[PubMed](/pubmed/7497542)] [[Google Scholar](https://scholar.google.com/scholar_lookup?journal=Bull+Soc+Sci+Med+Grand+Duche+Luxemb&title=Type+B+Haemophilus+influenzae+infections.+Experience+at+the+Pediatric+Hospital+of+Luxembourg&volume=132&publication_year=1995&pages=17-20&pmid=7497542&)]

Dennis HH, Sze AC, Murphy D. Prevalence of carpal fracture in Singapore. J Hand Surg Am. 2011 Feb. 36(2):278-83. [Medline].

Garcia-Elias M, Dobyns JH, Cooney WP 3rd, Linscheid RL. Traumatic axial dislocations of the carpus. J Hand Surg [Am]. 1989 May. 14(3):446-57. [Medline].

Gelberman RH, Bauman TD, Menon J, Akeson WH. The vascularity of the lunate bone and Kienböck's disease. J Hand Surg [Am]. 1980 May. 5(3):272-8. [Medline].

Lew D P, Waldvogel F A. Osteomyelitis. N Engl J Med. 1997;336:999–1007.[[PubMed](/pubmed/9077380)] [[Google Scholar](https://scholar.google.com/scholar_lookup?journal=N+Engl+J+Med&title=Osteomyelitis&volume=336&publication_year=1997&pages=999-1007&pmid=9077380&)]

Mayfield JK, Johnson RP, Kilcoyne RK. Carpal dislocations: pathomechanics and progressive perilunar instability. J Hand Surg [Am]. 1980 May. 5(3):226-41. [Medline].

Meier J L, Beekmann S E. Mycobacterial and fungal infections of bone and joints. Curr Opin Rheumatol. 1995;7:329–336.[[PubMed](/pubmed/7547111)] [[Google Scholar](https://scholar.google.com/scholar_lookup?journal=Curr+Opin+Rheumatol&title=Mycobacterial+and+fungal+infections+of+bone+and+joints&volume=7&publication_year=1995&pages=329-336&pmid=7547111&)]

Rhee PC, Jones DB, Moran SL, et al. The Effect of Lunate Morphology in Kienbock Disease. J Hand Surg Am. 2015 Feb 18. [Medline].

Song K M, Sloboda J F. Acute hematogenous osteomyelitis in children. J Am Acad Orthop Surg. 2001;9:166–175.[[PubMed](/pubmed/11421574)] [[Google Scholar](https://scholar.google.com/scholar_lookup?journal=J+Am+Acad+Orthop+Surg&title=Acute+hematogenous+osteomyelitis+in+children&volume=9&publication_year=2001&pages=166-175&pmid=11421574&)]

Waldvogel F A, Medoff G, Swartz M N. Osteomyelitis—a review of clinical features, therapeutic considerations and unusual aspects. 3: osteomyelitis associated with vascular insufficiency. N Engl J Med. 1970;282:316–322.[[PubMed](/pubmed/4987436)] [[Google Scholar](https://scholar.google.com/scholar_lookup?journal=N+Engl+J+Med&title=Osteomyelitis—a+review+of+clinical+features,+therapeutic+considerations+and+unusual+aspects.+3:+osteomyelitis+associated+with+vascular+insufficiency&volume=282&publication_year=1970&pages=316-322&pmid=4987436&)]