CHILD WITH A MUSCULOSKELETAL CONDITION

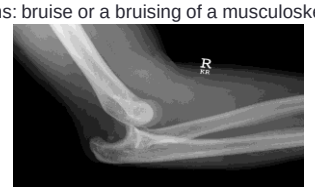
Linnard-Palmer & Coats
Chapter 33
https://www.youtube.com/watch?v=0Swzvm-gXHg

The Musculoskeletal System

- Major components
  - Bones
  - Joints
    - Synovial
    - Fibrous
    - Cartilaginous
  - Muscles
- Rapid formation of these structures make abnormalities somewhat common
- Assessment of an MS injury includes……
  - Inspection, palpation, ROM movements, lab tests, and radiographic tests

Common Childhood Injuries

- Soft-tissue injuries:
  - Strains: injury from the excessive use of a body part
  - Sprains: painful trauma to ligaments that range from a pull to a tear
- Dislocations: temporary displacement of a bone from its normal position
- Contusions: bruise or a bruising of a musculoskeletal structure



Common Childhood Injuries

- Soft-Tissue Injury Treatment
  - **RICE – r**est, **i**ce, **c**ompression, **e**levation
  - Neurovascular integrity (5 P's) ---
  - Maintain alignment
  - Use of assistive devices
  - Age-specific activity restrictions
  - Pain control
  - Family support

Pain
Pulse: distal
Pallor: paleness, absence of color
Paresthesia: distal sensation
Paralysis: distal movement

Fractures

- Often more complicated in children than in adults
  - Weakest point of long bones is the growth plate (epiphyseal plate)
    - Can disrupt normal growth
    - Treatment–open reduction and internal fixation (ORIF)
- Children in general
  - Heal faster
  - Shorter immobilization
  - 20% of children seeking attention for an injury
    - Clavicle
    - Distal radius
    - Hand
    - Elbow
    - Tibia

Clavicle-Most common

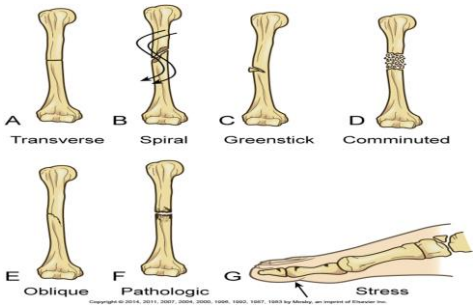
Distal Radius-Second

Fractures

Bone healing and remodeling

- Typically rapid healing in children
- Neonatal period: 2 to 3 weeks
- Early childhood: 4 weeks
- Later childhood: 6 to 8 weeks
- Adolescence: 8 to 12 weeks

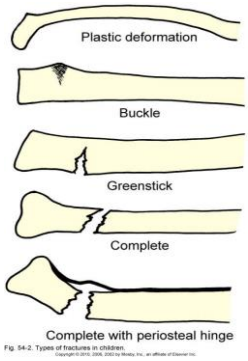
Fracture Types

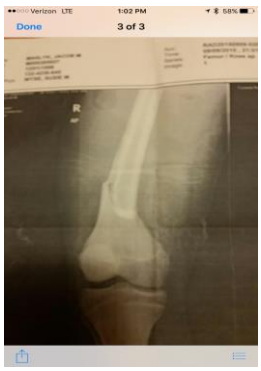


NCLEX Review

Types of Fractures:

- Plastic deformation
- Complete
- Buckle
- Greenstick
- Complete with periosteal hinge



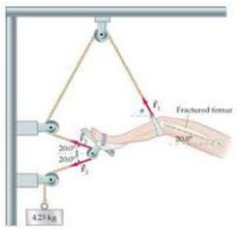


Fractures

- Diagnostic evaluation
  - Radiographs (X-ray)
  - History taking
  - Suspect fracture in a young child who refuses to walk or bear weight
- Therapeutic management goals
  - Regain alignment (reductions)
  - Retain alignment (immobilize)
  - Restore function
  - Prevent further injury

Traction

- Bryant traction
- Russell traction
- Buck extension



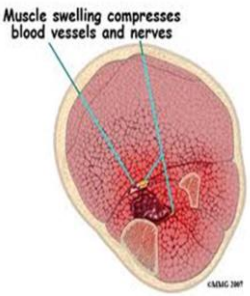
Use of Casts

- Cast application
  - Explain what they might feel
- Nursing care management
  - Support with pillows, assess for hot spots
- Cast care at home
  - Parent education, swelling, supportive equipment
- Cast removal
  - Educate on what they will see and hear
- Skin care
  - Bathing and use of moisture

Compartment Syndrome

- Symptoms
  - Intense pain unrelieved with elevation and increased with movement
  - Paresthesia and/or numbness
  - Pallor
- Nursing Management
  - Prevention
  - Loosen constrictive dressing
  - Frequent assessment of the extremity
  - Ice (keep affected extremity at the level of the heart)
  - Prepare child and parents for fasciotomy

Compartment Syndrome



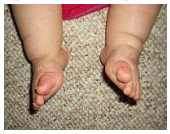
Common Musculoskeletal Disorders

- Congenital
  - Clubfoot
  - Congenital Hip Dysplasia (DDH)
  - Duchenne's Muscular Dystrophy
  - Osteogenesis Imperfecta (OI)

- Acquired
  - Legg-Calve-Perthes Disease
  - Scoliosis
  - Juvenile Rheumatoid (Idiopathic) Arthritis
  - Osteomyelitis

Clubfoot

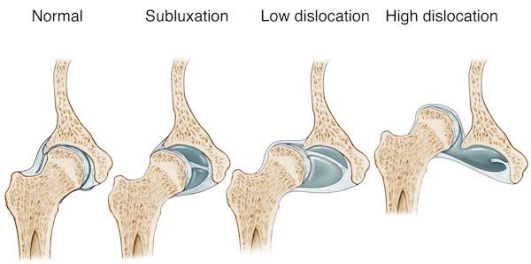
- Congenital, heal turns inward
- Foot plantar flexed with rigid adduction
- Assessment
  - Noted during ultrasound/initial newborn assessment
- Interventions
  - Painless- goal to correct before infant begins to bear weight
  - Serial casting due to rapid growth
  - Family support



Congenital Hip Dysplasia

- Also called developmental dysplasia of the hips (DDH) and congenital dislocating hips (CDH)
  - Dysplasia – hip socket does not fully cover the ball portion of the femoral head
  - Dislocation – femoral head loses contact with the acetabulum and is displaced
    - Ligaments become elongated and tight
  - Subluxation – incomplete dislocation

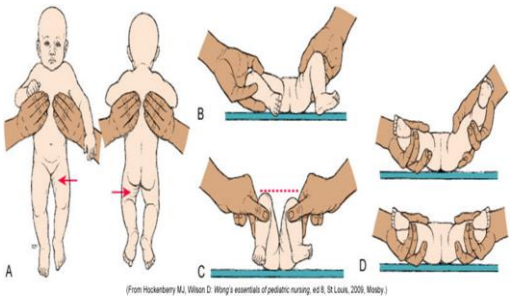
Subluxation vs. Dislocation



Clinical Presentation - Infant

- Shortened limb on affected side
- Restricted abduction on affected side
- Unequal gluteal folds
- Positive Ortolani test
- Positive Barlow test
- Galeazzi sign

Clinical Presentation - Infant

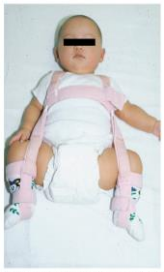


(From Hockenberry MJ, Wilson D. Wong's essentials of pediatric nursing, ed 8, St Louis, 2009, Mosby.)

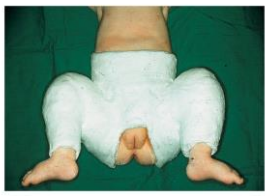
Management

- Early intervention is key
  - Newborn up to 6 months – Pavlik harness for abduction of the hip
  - Age 4 months to 2 years
    - Traction
    - Open or closed reduction
    - Spica cast
  - Nursing interventions
    - Circulation checks
    - Bleeding
    - Pain management

Pavlik Harness



Spica Cast



Duchenne's (Pseudohypertrophic) Muscular Dystrophy

- Progressive degeneration of muscles
- Duchenne's progresses rapidly when compared to other forms
- Recessive, sex-linked, affects 1 in 3,500 male births
  - Genetic counseling suggested for parents
  - Genetic mutation greatly reduces the protein dystrophin
- Assessment
  - Early; difficulty running, climbing stairs, riding bi/tricycle
  - With progression, waddling gait and Gower's sign
  - Muscles firm on palpation
  - Profound muscle dystrophy
  - Mortality from respiratory disease, failure, arrest

Duchenne's Muscular Dystrophy

Interventions

- No known treatments
- Family support
- Promote optimal function
  - Treat infections early
  - Tracheostomy care
  - Mechanical ventilation
  - OT to help with progressive weakness

Nursing Considerations

- Focus of pediatric nurse
  - Prevent injury
  - Growth and development
  - Preservation of skills
- Emotional/spiritual support
- Parental encouragement

Osteogenesis Imperfecta (OI) – "Brittle Bone Disease"

- Inherited disorder, bones fracture with little external trauma
- Fractures often noted at birth
- ER visits for fractures often prompts SW or Child Protective Services to get involved to r/o abuse
- Can lead to growth plate deformities
- Treatment and Nursing Interventions
  - Use caution when repositioning
  - Fall prevention
  - Educate staff/parents to use caution
  - Osteogenesis Imperfecta Foundation (education, support, guidance)

Legg-Calve-Perthes (LCP) Disease

- A loss of blood supply to the femoral head
- Affects males more that females 5:1
- Unilateral 90% of the time
- Common cause of limping
- Presentaion:
  - Pain that increases with movement, decreases with rest
  - Decreased ROM
  - Leads to avascular (aseptic) necrosis

Avascular (Aseptic) Necrosis

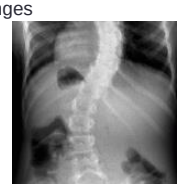
- The younger the child is at the time of diagnosis, the better the outcome
- The AVN process includes telltale stages of development and remodeling (1-4 years)
  - Prenecrosis
    - Initial insult causing loss of blood supply
  - Necrosis
    - Femoral head w/o blood; still intact; child may be asymptomatic
  - Revascularization
    - New bone deposition; dead bone reabsorption; femoral head weak and susceptible to injury
  - Bone healing
    - Reossification occurs gradually; reabsorption stops; bone returns to normal strength

Treatment of LCP

- Goal is to:
  - Eliminate hip irritation
  - Restore and maintain ROM
  - Attain a spherical femoral head, contained in the rim of the acetabulum
- Traction
- Casting
- Surgery

Scoliosis

- Curvature or deviation from normal spinal alignment
- Largely considered idiopathic
  - Occurs for no known reason
- Respiratory and cardiovascular compromise can result as the shape of the thoracic cage changes
- Occurs in several groups
  - Congenital or Infantile
  - Juvenile
  - Adolescent Idiopathic
  - Nueromuscular



Presentation

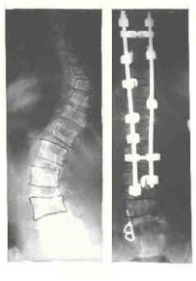
- Forward bend test
- Asymmetry of shoulder height
- Decreased ROM of upper trunk
- Often pain-free

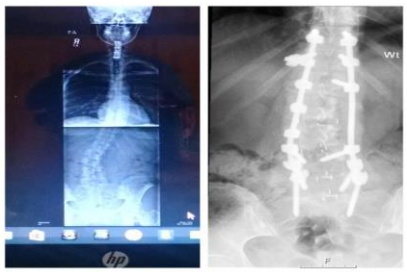
Treatment

- Depends on the severity of curvature
  - Bracing/exercise to guide spine
  - Casting (Risser cast)
  - Surgery
    - Rods (Harrington or Cotrel-Dubosset rods)
    - Spinal Fusion

Risser Cast

Harrington Rods





Juvenile Rheumatoid (Idiopathic) Arthritis (JRA)

- Chronic inflammatory joint disease
- Leads to painful destruction of the joints
- Joints enlarged, abnormally shaped

- Treatment is often sought after the child has experienced pain in several joints for months
  - Ankles, knees, hips are common initial problem areas

- Most common cause of rheumatic illness in children
  - Significant cause of long and short-term disability

JRA Interventions

- Control of pain and inflammation
- Preserving function, proper positioning to prevent complications
- Promoting normal growth and development
- Promoting psychological well being

- Physical Management
  - PT/OT
  - Splints
  - Promote self-care, independence

Osteomyelitis

- Infection of the bone/marrow
  - From bloodstream or nearby tissue
  - Usually affects long bones in children/infants
- Causes:
  - Otitis media infections, puncture wounds, dental abscesses, open fractures, surgical contamination
- Usual causative organisms:
  - Infants: *Escherichia coli*
  - Children: *Staphylococcus aureus*
- As bone is destroyed
  - Significant discomfort
  - Delayed treatment can lead to severe bone/joint damage, death

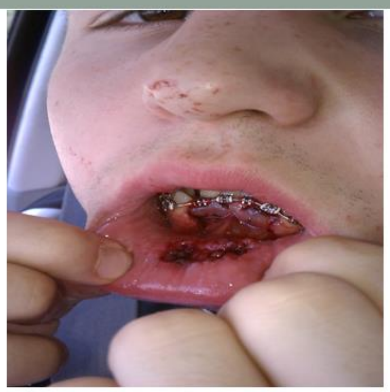
Assessment

- Assess risk factors/ symptoms
  - Recent surgery, trauma, infection?
  - Refusal to walk or bear weight?
  - Guarding, pain, warmth at site, fever, leukocytosis?

- Causative agent needs to be identified
  - Culture aspirated fluid
  - Blood culture
  - Drainage

Interventions

- Empiric antibiotics started immediately
- When causative agent identified
  - Long-term, targeted antibiotic therapy
  - Infection is in the bone, **IV** antibiotics will be needed for at least **3-4 weeks**
  - PICC line will likely be placed
  - This will likely be followed by oral antibiotics
  - May require surgery
  - Treat fever
  - Ensure appropriate caloric intake



The End…

Which would the nurse assess in a child diagnosed with osteomyelitis? **Select all that apply.**

- 1) Unwillingness to move affected extremity.
- 2) Severe pain.
- 3) Fever.
- 4) Previous closed fracture of an extremity.
- 5) Redness and swelling at the site.

Which is the nurse's best explanation to the parent of a toddler who asks what a greenstick fracture is?

- 1) It is a fracture located in the growth plate of the bone.
- 2) Because children's bones are not fully developed, any fracture in a young child is considered a greenstick fracture.
- 3) It is a fracture in which a complete break occurs in the bone, and small pieces of bone are broken off.
- 4)It is a fracture that does not go all the way through the bone.

The nurse should tell the parents of a child with Duchenne (pseudohypertrophic) muscular dystrophy that some of the progressive complications include:

- 1) Dry skin and hair, hirsutism, protruding tongue, and mental retardation.
- 2) Anorexia, gingival hyperplasia, and dry skin and hair.
- 3) Contractures, obesity, and pulmonary infections.
- 4) Trembling, frequent loss of consciousness, and slurred speech.

Which foods would be best for a child with Duchenne muscular dystrophy?

- 1) High-carbohydrate, high protein foods.
- 2) No special food combinations.
- 3) Extra protein to help strengthen muscles.
- 4) Low-calorie foods to prevent weight gain.

The nurse expects the blood culture report of an 8-year-old with osteomyelitis to grow which causative organism?

- 1) *Streptococcus pneumoniae.*
- 2) *Escherichia coli.*
- 3) *Staphylococcus aureus.*
- 4) *Neisseria gonorrhoeae*

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- https://www.youtube.com/watch?v=ylhiGkrQ8A8
- https://www.youtube.com/watch?v=7EHdCQn6M4Y
- https://www.youtube.com/watch?v=Z7d27bBwX3E
- The End……

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