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Lecture title: Orthopedics & Fractures
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Clinical signs of fracture

1) **Pain:** Localized pain at the site of the fracture, often worsened by movement or pressure.
2) **Swelling:** Due to soft tissue injury and inflammation around the fracture site.
3) **Deformity:** Visible abnormal alignment or shape of the affected area.
4) **Bruising or discoloration:** Caused by bleeding into the surrounding tissues.
5) **Loss of function:** Inability to move the affected limb or body part normally.
6) **Crepitus:** A grinding or crackling sound or sensation when the fractured ends of the bone rub against each other.
7) **Tenderness:** Painful sensitivity upon palpation of the fracture site.
8) **Abnormal mobility:** Movement at a site where movement should not occur (observed in severe fractures).
9) **Shortening of the limb:** Seen in displaced fractures when bone fragments overlap.

Diagnosis of Fracture

A- Clinical Assessment

1) **Case history:** Mechanism of injury (e.g., trauma, fall, twisting).
2) **Symptoms:** such as pain, swelling, inability to bear weight, or restricted movement.
3) **Physical Examination:**

B- Imaging Studies

1) **X-rays:** Standard views: At least two views of the affected area.
2) **Computed Tomography (CT):**
3) **Magnetic Resonance Imaging (MRI):**
4) **Laboratory Tests:** In cases of pathological fractures, check for osteoporosis, bone infections, or cancer.

Fracture management

- ✓ **Patient assessment.**
- ✓ **Fracture treatment.**

Patient assessment: In the patient assessment must be notice the following points: -

1) Assure adequate ventilation by oxygen therapy.
2) Control hemorrhages.
3) Shock treatments by fluid therapy.
4) Prevent infection.
5) Control pain by giving analgesic or narcotic drugs.
6) Temporarily immobilization of the fractured limb or limbs.

Fracture treatment: The principles of fracture treatment are:

A. Accurate Reduction: The objective of fracture reduction is to achieve optimal alignment of bone fragments to facilitate healing.

- **i. Closed Reduction.**
  1) **Closed Reduction by Manipulation**
  2) **Closed Reduction by traction and counter traction.**
- **ii. Open Reduction.**

B. Stable Fixation (Immobilization).

- **i. External Fixation**
- **ii. Internal Fixation**

Closed Reduction: Is manipulation of fractured bone fragments without surgical exposure of the fracture fragments and that the fracture site remains covered by the surrounding soft tissues and skin.

1. Closed Reduction by Manipulation:

- Usually is achieved by using the hands to maneuver the fractured bone pieces.
- **The steps of closed reduction with manipulation are: -**

a) Angulations.
b) Both cortices touching each other, to form fulcrum.
c) Gradually extend the limb to overcome over-riding of all muscles spasm.

2. Closed Reduction by traction and counter traction.

- In this technique: **Traction:** This involves applying a pulling force to the affected limb or body to overcome muscle spasms and to align the bone fragments. **Counter-Traction:** An opposing force is applied to stabilize the limb or body and prevent undue movement during the procedure

Possible Risks during a Closed Reduction:

1) The nerves, blood vessels, and other soft tissues near the fractured bone may be injured. A hematoma could form.
2) New fractures may be occur with the reduction

Open Reduction

- Involves making an incision at the injured site to directly access the fractured bone and manually reposition it into its proper alignment.

Indications of Open Reduction:

1) When closed reduction is unsuccessful or inappropriate.
2) For complex fractures (e.g., comminuted or displaced fractures).
3) For joint dislocations that cannot be realigned without surgery.
4) When soft tissue, nerves, or blood vessels are trapped or damaged in the fracture site.

Advantages of Open Reduction:

1) Accurate reduction.
2) Accurate placement of implants.
3) Early return to normal function.

Disadvantages of Open Reduction:

1) Contaminations.
2) Interference with local blood supply.

Stable Fixation (Immobilization)

The fundamental aims of fracture fixation are:

1) Restoring the normal alignment and position of the fractured bone.
2) Ensuring adequate stability to allow proper healing of the fracture while maintaining the alignment.
3) Avoiding excessive damage to the surrounding soft tissues and preserving the blood supply to the bone for optimal healing.
4) Reducing pain by stabilizing the fracture and preventing abnormal movement at the fracture site.
5) Facilitating early movement and function of the affected area to minimize complications like stiffness, muscle atrophy, and joint contractures.

Characteristics of good fixation:

1) Maintain stable reduction.
2) Allow free range of movements for animal.
3) No interference with blood supply
4) Easily inserted and easily removed.
5) Tolerated by the patient.
6) Economical.

Types of fracture Immobilization (Fixation):

- ✓ **External Fixation**
- ✓ **Internal Fixation**