Lecture title: Orthopedics & Fractures

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Fracture

- Fracture is defined as a break or disruption in the continuity of a bone, typically resulting from trauma, pathological conditions (such as osteoporosis or neoplasia), or stress. Fractures can vary in severity, type, and location.

Causes of Bone Fractures:

i. Existing Causes:

1) Extrinsic forces: -

a) **Direct violence: -** Like falling from high places, car accidents, violent beating of an animal with strong stick.

b) **Indirect violence: -** The site of trauma is far from the site of fracture as falling on leg with fracture of the back or pelvic bones

2) Intrinsic forces: -

a) **Muscle spasm:** Severe muscular traction during racing

b) **Bone diseases:** Cancer, rickets, or osteomalacia

ii. Predisposing Causes:

1) Hereditary:

2) Age:

3) Sex:

4) Nutritional:

5) **Hormonal:** Hyperthyroidism increases blood Ca and P and reduces them in bone.

6) **Aim of animal use:** Galloping, jumping, drafting horses are more susceptible to fracture than show or fantastic horses.

7) **Nature of land:** Fracture is less frequent on soft land and its incidence increases on slippery or hard lands.
8) **Animal temper:** Fracture is less frequent in calm animals and more frequent in vicious animals.
9) **Animal condition and diseases:** Cancer or other diseases predisposes to fracture.

Classification of Fracture

A. According to complications

1) **Simple fracture (closed fracture):** Is a type of bone fracture where the bone is fractured, but the surrounding tissue and skin remain intact.
2) **Compound fracture (Opened fracture):** It is a fracture with skin injury (wound)
3) **Complicated fracture:** It is fracture associated with injury to nerve, artery or vein, opening of a joint, opening of a body cavity (like chest).

B. According to degree of damage

1) **Incomplete fracture:**
    i. **Green stick fracture:**
    ii. **Hairline fracture (Fissure cracks or fissure lines):**
2) **Complete fracture:**
    i. **According to the number of fracture lines:**
    ii. **According to the site of fracture line:**
    iii. **According to the direction of fracture line or pattern of fracture line:**
    iv. **According to the position of fractured fragments:**

Green stick fracture:

- It is a type of fracture affects long bones of young animals especially those with rickets.
- The increased pressure over the convex surface of the affected bone predisposes to fracture.

Hairline fracture (Fissure cracks or fissure lines):

- A thin crack that doesn't fully separate the bone

- They are single or multiple fractures lines; parallel or not; of different directions (transverse, longitudinal, or oblique), of traumatic origin and usually affect flat bones like scapula.

Complete fracture: According to the number of fracture lines:

1) **Single fracture line**: Is a fracture line divides the bone into two pieces
2) **Multiple fracture lines:** It is a fracture lines where the bone is divided into more than two pieces.
3) **Comminuted fracture lines:** The bone is divided into more than two pieces but the fracture lines of which interconnect.

According to the site of fracture line:

1) Epiphyseal
2) Metaphyseal
3) Diaphyseal (shaft fracture)

According to the direction of fracture line or pattern of fracture line:

1) **Longitudinal fracture (Linear):** The fracture line is parallel to the longitudinal axis of the bone.
2) **Transverse fracture:** The fracture line is perpendicular to the longitudinal axis of the bone.
3) **Oblique fracture:** The fracture line is oblique to the longitudinal axis of the bone, typically forming an angle greater than 30 degrees.
4) **Spiral fracture:** The fracture line is spiral in shape, with at least a portion of the bone being twisted.

According to the position of fractured fragments:

1) **Overlapped fracture:** It is a fracture in which the two fragments overlap each other and can be observed in case of oblique fracture.
2) **Angulated fracture:** It is a fracture characterized by angle formation between the two bone fragments.
3) **Spiral fracture:** It is a fracture type characterized by rotation of one bone fragment around its long axis.

4) **Star shape fracture:** It is a fracture characterized by presence of cracks around the gunfire giving it star shape
5) **Wedged or impacted fracture:** It is a fracture characterized by no displacement with wedging of the two fractured fragments like wedge or like suture of flat bones of skull
6) **Depressed fracture:** It is a traumatic fracture of flat bone over a cavity leading to displacement of a disc of bone into this cavity, like frontal bone.
7) **Compressed fracture:** It is a fracture with shortening and thickening of the bone as that with vertebrae
8) **Destructed fracture:** Fracture characterized by wide separation of the bone fragments due to pulling action of ligament like fracture of patella
9) **Avulsion fracture:** Occur on bony prominences where large tendons attach: such as supraglenoid tuberosity, olecranon, greater trochanter, tibial tuberosity.