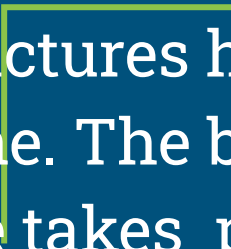






Bone Fractures





- Fractures happen when outside forces are applied to the bone. The bone cannot withstand the pressure and a fracture takes place.

- Fractures are commonly caused by a fall, strike from an object, or by twisting or bending of the bone.



- Children
- The elderly
- Women with potential Osteoporosis

Did You Know!

Statistic tell us that more than a third of people over the age of 65 will fall at least once. About half of them will have a fracture. Also, If you have established osteoporosis, the risk of a life-impeding fracture is elevated because once an osteoporotic bone is broken it is very difficult to heal.

Greenstick



Spiral



Comminuted



Transverse



Compound



Vertebral
Compression



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Typical Bone Fractures



Transverse



Stress



**Oblique,
Displaced**



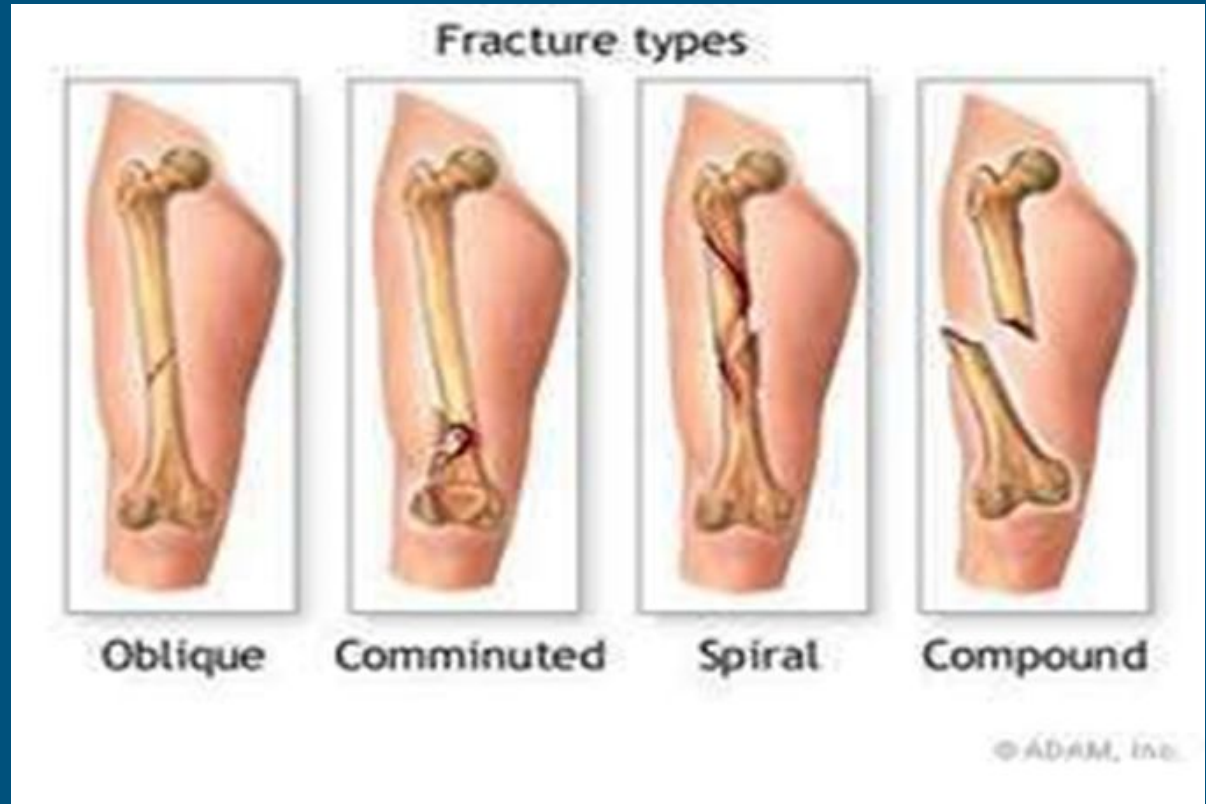
Greenstick



Comminuted

There are many types of bone fractures, but here's a example of four.

- Greenstick
- Oblique
- Spiral
- Impacted



Greenstick fracture

- Greenstick - an incomplete fracture with one side splintered and the other side bent.
- These type of fractures is most common with children, and the elderly.
- Greenstick fractures usually occur most often during childhood when bones are soft.

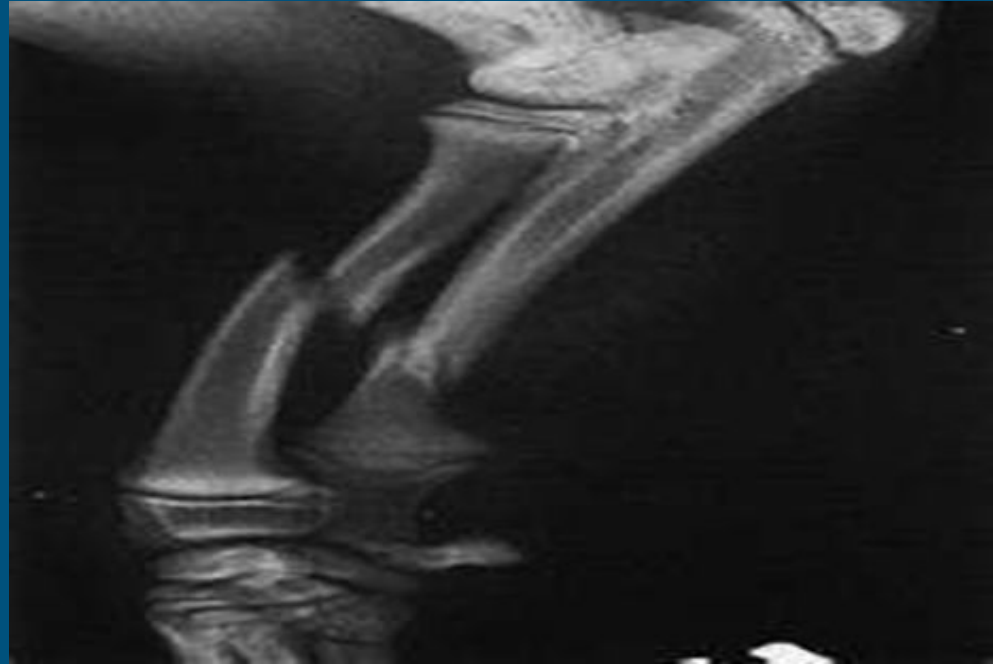


There are three basic forms of greenstick fracture.

- In the first a transverse fracture occurs in the cortex, extends into the mid portion of the bone and becomes oriented along the longitudinal axis of the bone without disrupting the opposite cortex.
- The second form is a torus or buckling fracture, caused by impaction.
- The third is a bow fracture in which the bone becomes curved along its longitudinal axis.

Oblique fracture

- Oblique - is a fracture in which the line of the fracture extends in an angle direction.
- A bone fracture can be a result of high force impact or stress.



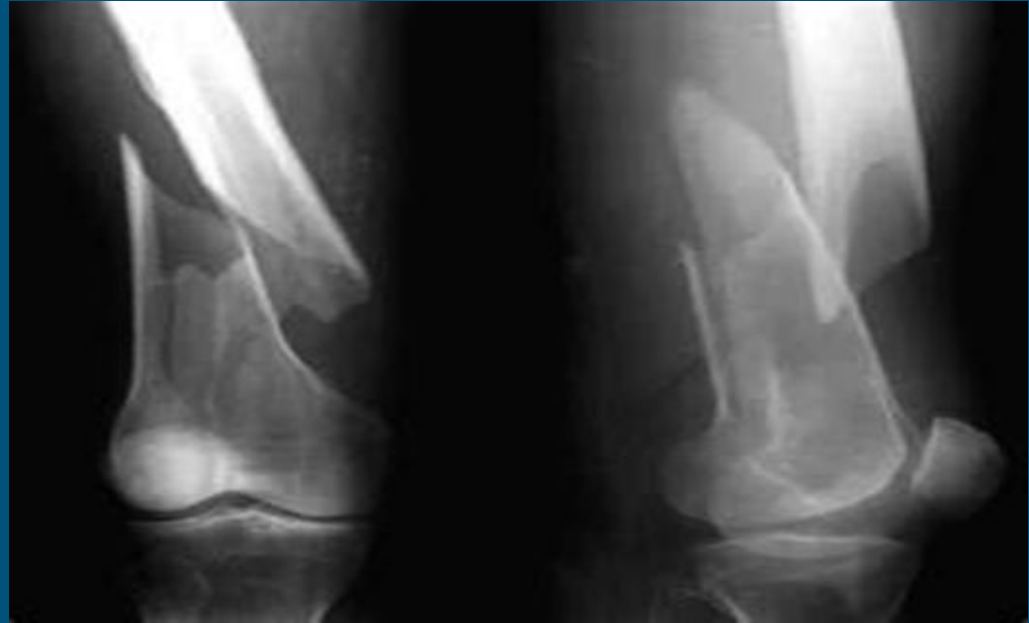
Need to know!

- Treatment. Immediate first aid consists of splinting the bone, without any attempt to reduce the fracture; it should be splinted.



Spiral fracture

- Spiral - is a fracture in which the line of the fracture — extends in a spiral direction along the shaft of the bone. One in which the bone has been twisted apart.



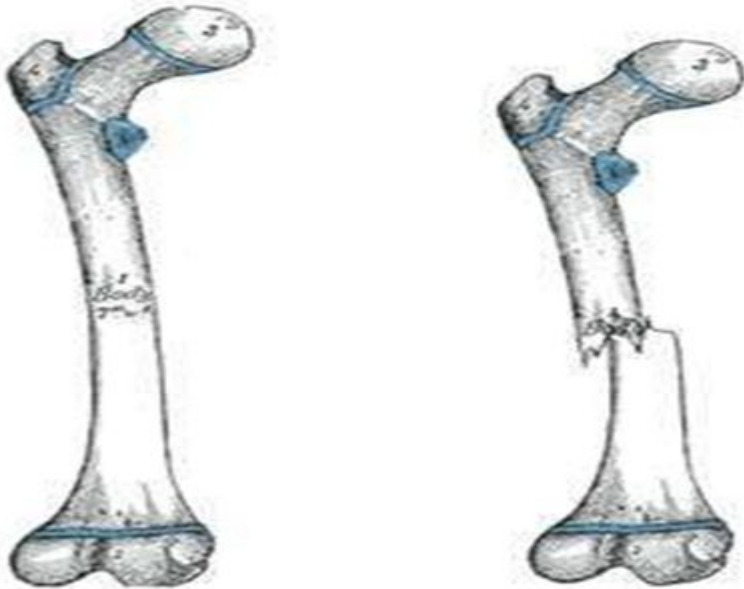
Need to Know!

- To diagnose a spiral fracture, a doctor may want to take x-rays of the site and examine them. The x-rays will confirm that the issue is a fracture, and a close examination of the image can provide information about what kind of fracture is involved. Depending on the situation, the doctor may recommend surgery to pin the bone, ensuring proper healing in the event of a severe break, or the limb may simply be set in a cast to hold it still while the fracture heals.

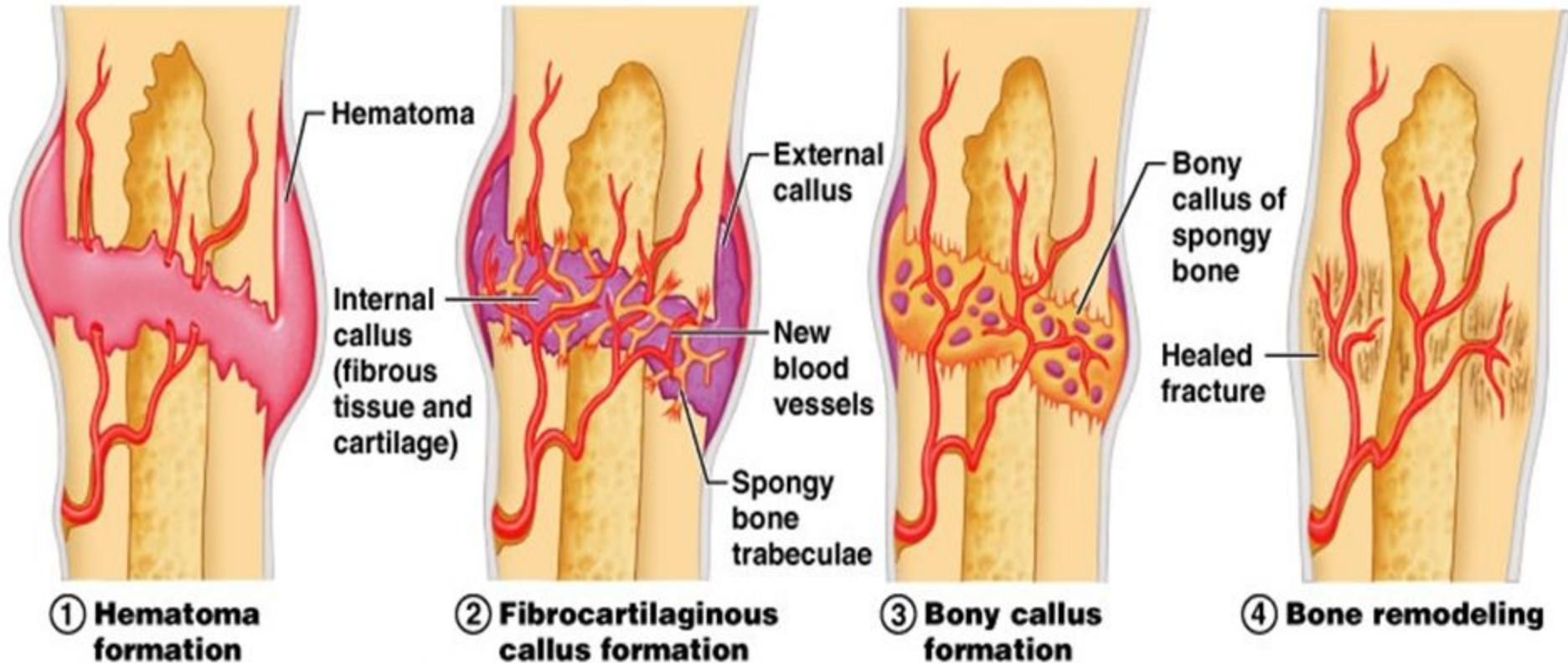


Impacted fracture

Impacted - is a comminuted fracture in which more than two fragments are driven into each other.



Stages in the healing of a bone fractures



Stages in the healing of a bone fractures

- hematoma forms - torn blood vessels hemorrhage. Clot (hematoma) forms. site becomes swollen, painful, and inflamed
- Fibrocartilaginour callus forms - phagocytic cells clear debris. Osteoblasts begin forming spongy bone within 1 week. mass of repair tissue now called fibrocartilaginous callus (soft)
- Bony callus formation - new trabecular form a bony (hard) callus. Bony callus formation continues until firm union is formed in about 2 months.
- Bone remodeling (ongoing process) - in response to mechanical stressers over several months, and final structure resembles original.

Available Dataset in Bone Fractures

MURA (musculoskeletal radiographs)

MURA:-

- Is one of the largest public radiographic image datasets.
- This dataset available to the community and hosting a competition.

MURA (musculoskeletal radiographs)

How MURA is collected:-

- It's a dataset of musculoskeletal radiographs consisting of **14,863 studies** from **12,173 patients**, with a total of **40,561** multi-view radiographic images.
- Each belongs to one of seven study types: elbow, finger, forearm, hand, humerus, shoulder, and wrist.
- The dataset has 9,045 normal and 5,818 abnormal musculoskeletal radiographic

Dataset Types

Elbow



Normal

Finger



Abnormal

Forearm



Abnormal

Humerus



Abnormal

Dataset Split

Train Data

The dataset has been split into Training Set:-

- 11,184 patients
- 13,457 studies
- 36,808 images

Validation Data

Validation Set:-

- 783 patients
- 1,199 studies
- 3,197 images

Test Data

Test Set:-

- 206 patients
- 207 studies
- 556 images

Resources

- <https://stanfordmlgroup.github.io/competitions/mura/>
- <https://www.mdpi.com/2076-3417/10/4/1507/htm>
- <http://www.dline.info/jmpt/fulltext/v4n3/1.pdf>
- http://share.iofbonehealth.org/EU-6-Material/Reports/IOF%20Report_EU.pdf

Presented By :-

- Ahmed Moustafa
- Ahmed Shehata

Thank YOU ^_^