# INTRODUCTION TO COMMON BONE DISORDERS

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By the end of this seminar, we should be able to understand:

- Bone and it's importance
- Division of bone disorders
- Brief characteristics of each bone disease

#### What is Bone?



 Bone is living tissue that provides <u>shape and</u> <u>support</u> for the body, as well as <u>protection</u> for some organs.

 Bone also serves as a <u>storage site</u> for minerals and provides the <u>medium</u>(marrow) for the development and storage of blood cells.

## **Bone disease**

Refers to the medical conditions which affect the bone. It is a condition that damages the skeleton and makes bones weak and prone to fracture



#### 1. Osteogenesis Imperfecta

- Brittle Bone Disease
- Caused by abnormal type I collagen synthesis
- resulting in bone fragility and susceptibility to fractures.



#### 2. Achondroplasia

 Point mutation in the fibroblast growth factor receptor 3 (FGFR3) that results in its constitutive activation.

Inhibits chondrocyte proliferation

Suppress expansion of normal epiphyseal growth plate

Severely stunted long bone growth



#### 3. Osteopetrosis

 A group of rare genetic disorders characterized by reduced osteoclast-mediated bone resorption → defective bone remodelling

 Result in dense but architecturally unsound bone



#### **Acquired/Metabolic Bone Disease**

Disorders of bone strength, usually caused by abnormalities of minerals (such as **calcium** or **phosphorus**), **vitamin D**, **bone mass** or **bone structure**.

#### 1. Osteoporosis

- 2. Paget Disease (Ostitis Deformans)
- 3. Rickets and Osteomalacia
- 4. Hyperparathyroidism

#### **1. Osteoporosis**

- The most common bone disease.
- This condition is caused by a reduction in bone density, which leads to more fragile bones and a higher risk of fractures.



#### 2. Paget Disease (Ostitis Deformans)

- The bone remodeling is disturbed and not synchronized.
- The net effect of this process is a gain in bone mass; however, the newly formed bone is disordered and lacks strength



Paget's disease



#### 3. Rickets and Osteomalacia

- Manifestations of vitamin D deficiency or its abnormal metabolism
- Defective bone mineralization

   overabundant
   non-mineralised osteoid



#### 4. Hyperparathyroidism

 Primary or secondary over production of PTH (hyperparathyroidism)



 Increased osteoclast activity and bone resorption



#### **Arthritis**

• Arthritis is one of the most common conditions in the world.

• Arthritis literally means joint inflammation.



### Normal Articular cartilage

#### Cross Section CMC Joint

Arthritic

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Healthy hip joint

Osteoarthritis

Rheumatoid arthritis



- Importance of bones:
  - Support
  - Protection
  - Storage site
  - Medium
- Division of bone disorders:
  - Congenital
  - Acquired



#### References

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# THANK YOU® Any Question?