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| METABOLIC DISEASES IN BONES |  SYMPTOMS, |  CAUSES |
| OSTEOPOROSIS | Increased risk of fracture , BMD is reduced , microarchitecture deteriorates, amount and variety of proteins in bone are altered. Classified as :\*primary type 1 is common in women (postmenopausal osteoporosis)\*(Primary type 2 osteoporosis /senile) occurs after age 75 and is seen in both females and males at a ratio of 2:1 | 1.Insufficient amount of Ca & V.D2. A drop in estrogen in women at the time of menopause and a drop in testosterone in men is a leading of bone loss. 3.Lysosomal proteases present in ostecolasts deteriorate bone in order to stimulate resorption of calcium from bone to increase Ca concentration in blood 4. Low blood calcium stimulates parathyroid gland to release PTH. PTH promotes bone resorption leading to bone loss.5. amount of vitamin D3 |
| PAGET DISEASE | \*Symptoms are confused with those of arthritis include bone pain.\*It is disorder of osteoblasts and osteoclasts so bones become thickened, entarged but also brittle due to abnormal structural development. | 1.VIRAL2.GENETIC |
| OSTEOGENESIS IMPERFECTA (OI) | SLIDE 19 \*according to the type | DEFECT in collagen production ;collagen type-I deficiency due to :Substitution of glycine to bulkier A.A in collagen triple helix structure |
| BONE CANCERS | BONE PAIN1-EWING’S: \*4-15 Y.O \*most aggressive\*middle of long bones2-CHONDRO: \*over 40\*2nd most common \*(very aggressive or slow) \*can potentially spread to the lungs and lymph nodes\*males>females\*pelvis & hips3-OSTEOSARCOMA: \*10-25 y.o\*long bones/areas of rapid growth: around shoulders and knees of children | Majority : metastatic disease from other remote cancers (2ndry)1ry much rarer |
| RICKETS | Softening of bones in CHILDREN ,fractures and deformity,\*SLIDE 23 | deficiency or impaired metabolism D, phosphorus or calcium. \*The primary cause of rickets is a vitamin D deficiency. Vitamin D is required for proper calcium absorption from the gut.\* Sunlight, (UV) , lets human skin cells convert Vitamin D from an inactive to active state. |
| OSTEOMALACIA | IN ADULTSWeakened bones & abnormal formation | (1) insufficient Ca absorption from the intestine because of lack of dietary Ca or a deficiency of or resistance to the action of v.D(2) phosphate deficiency caused by increased renal losses. |
| ACROMEGALY | Overgrown bones in the face,hands ,and feet | Excess G.H production by the body , benign tumor of the pituitary gland in the brain |

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| FIBROUS DYSPLASIA | Normal bone is replaced with fibrous tissuesMostly in : skull,pelvis,shin,ribs,thigh,upper arm | Gene mutation |
| HYPOCALCAEMIA | \*low serum calcium levels in the blood In the blood, about half of all calcium is bound to proteins such as serum albumin, but it is the unbound, or ionized, calcium that the body regulates\* Numbness in hands, feet, around mouth and lips. | PTH deficiency /malfunction V.D deficiency |
| OSTEOMYELITIS | Bone painFever , ill-feeling , local swelling redness  | Bone infection (bacteria , fungi,germs) After bone surgery or from another organ  |
| HYPOPHOSPHATASIA | Condition which disrupts mineralization process\*hypophosphatasia weakens , softens of bones , causing skeletal abnormalities similar to rickets | MUTATION of ALPL gene \*\*this gene make enzyme (alkaline phosphatase) that plays essential role in mineralization of sk. &teeth |

