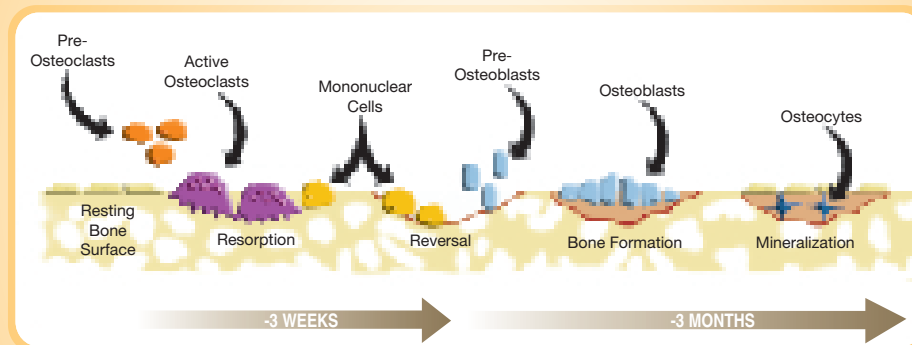




# Bone Disorder

- Bone disorders are conditions that result in the impairment of normal bone function resulting in weak bones
- Osteoporosis, in particular, is an important public health problem affecting approximately 1 in 3 women and 1 in 8 men worldwide

## Bone Remodeling Cycle



## Bone Formation Markers

### Bone G1a protein (BGP) (Osteocalcin)

- Increased levels are found in bone diseases (e.g. Paget disease of the bone, cancer accompanied by bone metastases, primary and secondary hyperparathyroidism, secondary osteosarcoma, renal osteodystrophy)
- Identifies women at risk of developing osteoporosis, for monitoring bone metabolism during perimenopause and postmenopause, and during antiresorptive therapy
- Serves as a useful index in evaluating the therapeutic management of the patient

### Alkaline phosphatase, Bone specific

- Provides a general index of bone formation and a specific index of total osteoblast activity
- Increased in osteoporosis as well as in hyperthyroidism, osteomalacia, Paget's disease, primary hyperparathyroidism, and other metabolic bone diseases
- Increased by 77% in women within 10 years of menopause
- Useful for monitoring bone formation therapies

## Bone Resorption Marker

### Deoxypyridinoline (Pyrilinks-D)

- Pylilinks-D is a urinary assay that provides a quantitative measure of the excretion of deoxypyridinoline crosslinks as an indicator of bone resorption
- Elevated levels may be associated with increased bone loss, decreased bone mineral density and increased risk for bone fractures
- Levels are increased in osteoporosis, primary hyperparathyroidism, Paget's disease, hyperthyroidism, and metastatic bone cancer

## Bone Resorption Marker

### Para Thyroid Hormone (PTH) (Intact molecule)

- Discriminates primary hyperparathyroidism from tumor type hypercalcemia
- Diagnoses hypoparathyroidism
- Monitors severity of secondary hyperparathyroidism in chronic renal failure
- Assesses disorders of calcium metabolism

### Bone biopsy

- Confirms the diagnosis of a bone disorder
- Evaluates bone pain or tenderness
- Determines the cause of an unexplained infection or inflammation
- Used to distinguish between malignant tumors and benign bone disease such as osteoporosis and osteomyelitis

### 1-25 Dihydroxy cholecalciferol

- Aids in the diagnosis of primary hyperparathyroidism, hypoparathyroidism, pseudohypoparathyroidism, renal osteodystrophy, vitamin D resistant rickets
- Increased in sarcoidosis and hyperparathyroidism, cases of hypercalcemia associated with malignant lymphoma
- Decreased in rickets, type I vitamin D-resistant rickets, hypoparathyroidism, pseudohypoparathyroidism, and renal osteodystrophy and psoriasis

## Metropolis Bone Disorder Test Profiles

### Bone profile

Calcium, Phosphorous, Alkaline phosphatase, Proteins, Uric acid

### Osteoporosis profile (Maxi)

Calcium, Phosphorous, Alkaline phosphatase-total and bone fraction, Deoxypyridinoline (Pyrilinks-D), Osteocalcin, Vitamin D<sub>3</sub>, Parathyroid hormone, Estradiol

### Osteoporosis profile (Mini)

Calcium, Phosphorous, Alkaline phosphatase-total and bone fraction, Deoxypyridinoline (Pyrilinks-D)

### Osteomyelitis profile

Bone biopsy (Culture and sensitivity), Blood culture and sensitivity

### Rickets profile

1-25 Dihydroxy cholecalciferol, 25-Hydroxy cholecalciferol

### Parathyroid panel

Parathyroid hormone (Intact molecule), Proteins, Magnesium, Alkaline phosphatase, Creatinine, Calcium (Total/Ionized)

### Bone tumor profile

Bone biopsy for histopathophysiological examination and acid phosphatase, Bone profile (Calcium, Phosphorous, Alkaline phosphatase, Proteins, Uric acid)

#### Sources:

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- Bone Health and Osteoporosis: A Report of the Surgeon General; U.S. Department of Health & Human Services
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- J Bone Miner Res 11:1531-1538, 1996

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