Bones

Question to ponder

Why is it recommended that children be concerned about increasing bone density?

The current research indicates that after the age of 35, bone breakdown occurs faster than bone growth. The degree that this balance shifts toward breakdown, however, is not drastic and there are many ways to mitigate it. The largest increase in bone density loss occurs in women after menopause.

What is Bone?

Bone is a strong, lightweight framework that is both dynamic and flexible. It has many bodily functions including providing support, shaping, maintaining anchor points for skeletal muscles to provide movement, storage site for body's minerals, and protection of internal organs.

Definitions

Long Bones (act as levers – body movement), Short Bones (limited movement mostly connectors), Flat Bones (protective), Irregular Bones ie vertebrae

Osteocyte: the cells that maintain the matrix

Osteoblasts: the cells that manufacture bone

Osteoclasts: the cells that erode the bone matrix

Remodeling: the process of bone cell creation and erosion balanced by the forces exerted on the bone – and the strength required- and the body's calcium balance

Modeling: Changes in bone structure on existing bone structure.

The Balance of Bone

The Bone Density Equation is just Resorption vs. Creation. When resorption occurs at a faster rate than creation, bone density decreases. When creation occurs faster, bone density increases. The body balances this by 2 hormones:

Calcitonin – Thyroid hormone that helps control the level of calcium in the blood by slowing the rate of bone resorption and speeding up the intake of calcium to make more bone matrix.

Parathyroid Hormone: Hormone that increases the calcium level in the blood by increasing the bone breakdown, by stimulating the uptake of calcium from food and by increasing the resorption of calcium back into the blood via the kidneys.

To increase bone density: decrease rate of resorption and increase rate of creation. How?

Exercise. Diet. Drugs.

Exercise

1. Weight Bearing
2. Resistance Training

Diet

1. Ensure nutrients available to build new bone (1,500 mg CA and 400-800iu of D)
2. Maintain calcium availability to be absorbed from digestion
3. Avoid Soft Drinks

Drugs – typically used for osteoporosis due to side effects

1. Antiresorptives: Biophosphonates, raloxifene, calcitonin and estrogen
2. Anabolic Drugs: those that stimulate new bone formation (teriparatide)