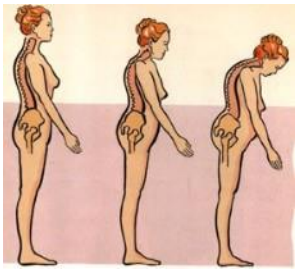

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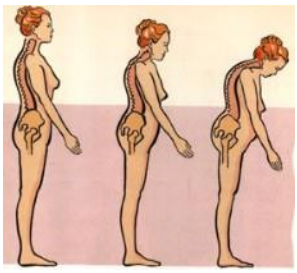


OSTEOPOROSIS

From Lectures of Dr. Janet Lang

Bone Structure

Bone is formed from a collagen-protein matrix (framework), into which minerals deposit. This combination allows bone to be strong and hard, as well as flexible.

Bone Composition

- ✓ Bone matrix is formed from specific proteins and collagen fibers. This framework is similar to the steel infrastructure of a building. It constitutes about 1/3 of bone composition.
- ✓ Mineral salts deposit within the matrix and make up about 2/3 of bone composition. Minerals harden bone like the concrete poured into the infrastructure of a building, only bone is much more flexible. The minerals that compose bone are calcium, phosphorus, magnesium, and a host of trace minerals including copper, zinc, manganese, boron, and silica.

Bone Remodeling

- ✓ Unlike buildings, bone is a living tissue and is constantly remodeling (that is, breaking down and building up).
- ✓ This is a normal and necessary process to maintain healthy bones.
- ✓ Remodeling requires a constant supply of bone-building material (protein and minerals).

Hormonal Control of Bone

- ✓ Progesterone supports new bone growth.
- ✓ Testosterone supports bone growth and promotes its strength and toughness.
- ✓ DHEA supports bone growth.
- ✓ Estrogen helps slow bone loss.
- ✓ Parathyroid hormone PTH:
    - When blood calcium decreases, PTH pulls calcium from the bone to normalize blood levels.
    - PTH stimulates the kidney to produce the active form of vitamin D, needed for calcium assimilation.

- ✓ Calcitonin (a thyroid hormone) – When blood calcium elevates, calcitonin inhibits bone resorption and encourages calcium deposition.
- ✓ NOTE: PTH and Calcitonin are primarily concerned with maintaining proper blood calcium levels. New studies suggest that PTH may also play a role in maintaining skeletal calcium in certain situations.
- ✓ Insulin Resistance – high insulin levels can interfere with bone health.
- ✓ Cortisol – Excess cortisol, often produced in response to chronic stress, can contribute to bone breakdown.
- ✓ Hyperthyroidism – Bone destruction can occur because of an abnormally elevated metabolism using bone-building materials, especially minerals, at an accelerated rate.

Mechanical Stress and Bone Health

- ✓ Bones grow and remodel largely due to the mechanical stresses, forces and demands placed on them.
- ✓ Gravity and exercise cause compression forces, and muscle tendons pulling on the bones exert tension and torquing forces.
- ✓ This is the reason exercise, especially weight training and weight-bearing exercise, strengthens bone.
- ✓ Without adequate movement, weight bearing and resistance exercises, bone mass is lost.

Initial Considerations

- Bone is a complex structure that requires a multitude of nutrients to grow.
- Bone is constantly remodeling, that is, breaking down and rebuilding.
- In a year's time, between 10-30% of the skeleton is remodeled.
- A variety of hormones interact to govern bone remodeling and mineral metabolism.
- Sufficient hydrochloric acid in the stomach (to reach a pH of 3 or lower) is required to digest calcium, magnesium, and most other minerals.
- People taking antacids or acid-stopping medications (Prilosec, Prevacid, Nexium) are prevented from making sufficient hydrochloric acid.
- Calcium and other mineral supplements made from ground up rocks and shells (calcium carbonate) are often difficult to digest, assimilate, and use effectively in the body.
- Calcium and other minerals need vitamins, enzymes, and other co-factor nutrients to function properly.
- Without essential fatty acids and vitamin K, for example, calcium won't enter or remain in bone.
- Without sufficient magnesium, calcium cannot be used effectively in the body. Dairy products have plenty of calcium, but very little magnesium content.

Definition of Osteoporosis

→ Osteoporosis involves both the weakening of bone matrix and demineralization.
→ Women typically reach peak bone density at age 30.
→ From age 30 on, many women will lose bone mass at the rate of about 1% per year.

Most Common Factors Leading to Osteoporosis

1. Poor childhood nutrition.
2. Poor nutrition in puberty.
3. Poor nutrition in general, causing lack of ongoing building material for remodeling bone.
4. Dieting – gaining and losing weight multiple times, as well as being too thin.
5. Food disorders – bulimia, anorexia nervosa, sugar sensitivity/allergy.
6. History of exercise level and type throughout lifetime:
   - Too little exercise does not stimulate healthy bone remodeling.
   - Excessive exercise can cause excessive breakdown, and sometimes hormonal deficiency in women.
7. Smoking.
8. Excessive alcohol consumption.
9. Medications such as steroids, oral contraceptives, anticoagulants, diuretics, anticonvulsants, lithium, thyroxine (Greenwood-Robinson, Maggie, PhD, *The Bone Density Test),* Berkley Books, (2000) p17)
10. Hormonal imbalances:
    - Estrogen Dominance

- Low progesterone
- Low testosterone
- Low DHEA
- Low estrogen

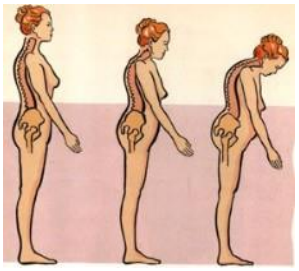
11. Premenopause Syndrome – this state of Estrogen Dominance/progesterone deficiency accelerates premenopausal bone loss.
12. Premature, surgical, or chemical menopause, especially if the ovaries are removed.
13. History of amenorrhea lasting more than a year.
14. Intake of high doses of alpha tocopherol ("vitamin E"), synthetic "vitamin A", or synthetic ascorbic acid ("vitamin C") can cause bone loss.

- Dr. Janet Lang

Do all women need to take calcium supplements to prevent osteoporosis?
Many women, especially those near menopause, are concerned about osteoporosis. A hair analysis also shows calcium levels as well as metabolism type which can then determine if one needs to take calcium supplements. If a woman is a fast metabolizer, she may be prone to Type I osteoporosis which is associated with a calcium deficiency due to decreased absorption and retention. Calcium supplements are needed, but they need to be taken with magnesium and vitamins C and D. The copper/zinc levels need to be taken into account as well. If a woman is a slow metabolizer, she may be prone to Type II osteoporosis which is associated with increased calcium absorption and retention, but instead of being absorbed by the bones, it is absorbed by soft tissues and can form deposits. Calcium and vitamin D supplements are not recommended in this case and may worsen a pre-existing condition. The woman needs to correct the underlying metabolic disturbance so that calcium can be utilized effectively by the body. Since there is a large proportion of women who are slow metabolizers (estimated at over 80%), the recommendation of taking calcium to prevent osteoporosis may apply to a smaller group of women. Calcium supplementation may benefit fast metabolizers, but can cause physical problems in slow metabolizers such as depression, conjunctivitis, chronic fatigue, constipation, and joint stiffness. It is vital that a woman knows what kind of metabolizer she is before taking calcium supplements. [Information taken in part from: Trace Elements and Other Essential Nutrients by Dr. David L. Watts.]

Options Center offers the following:

- ✓ Digestible forms of calcium for supplementation when your diet is inadequate.
- ✓ Hair Analysis to evaluate overall mineral metabolism. See Options' website: Health Glossary -> Hair Analysis.
- ✓ Female hormone testing using saliva testing. Patient literature available in Options' waiting room.
- ✓ **Bone Marker Test to evaluate bone metabolism (bone building and breakdown):**
  This test provides insight into how actively bone is being formed and broken down in the body. It can help identify early imbalances in bone health before changes appear on standard bone density tests and allows for more personalized nutrition and support recommendations.



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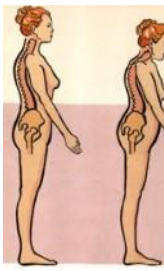

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