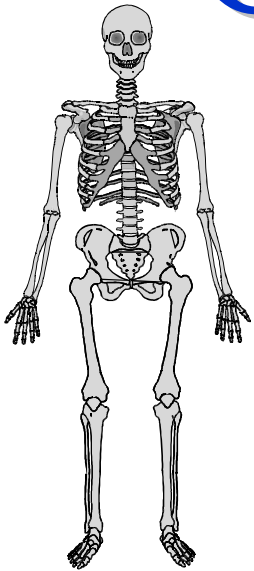


# OSTEOPOROSIS (BONE LOSS)



# What is Osteoporosis?

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- Reduced bone mineral density
- Bone resorption(breaking down) is greater than bone formation
- 80% women
- Afflicts 25 million Americans & 200 million worldwide
- **1 of 4 women over 50** experiences 1 or more fractures in a lifetime
- **1 of 2 women over 50** develops some type of risk factor
- **1 of 8 men over 50** develops osteoporosis
- By 2020 the # of Americans over age 50 will increase by 50%
- Men have lower incidence of hip fractures; usually **fracture ribs or wrists**. \*Results in delayed detection of condition
- 1.5 million(+) Americans suffer fractures: 275,000 hip, 500,000 spine, 200,000 wrist
- Costs **\$14 billion a yr.** Projected to increase to 60 billion in 2020 & 120 billion by 2090
- **12th leading cause of death in U.S.** (National Osteoporosis Foundation). 20% of hip fracture patients will die in the first year. Osteoporotic fractures result in approximately 50,000 deaths /yr in the U.S.



# Risk Factors

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- **Most Common Physical Factors:**

- ✧ Northern European heritage
- ✧ Small, slender frame
- ✧ Blue eyes
- ✧ Fair complexion
- ✧ Light hair
- ✧ Men over 50
  - Most of them have never talked to their doctor about osteoporosis
- ✧ Women over 40
  - Women lose a great deal of bone mass during the 1st **4 months of menopause due to estrogen loss**, 20% of total bone mass is at risk for loss over the next 5-7 yrs
  - More than 75% of women 45-75 have never discussed osteoporosis with a Doctor



# Medical Risk Factors

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- **Family history of osteoporosis**

- ✧ Parents, grandparents, siblings

- **Women with total hysterectomies**

- ✧ Decreased estrogen/hormonal imbalances

- **Recently pregnant & nursing mothers**

- ✧ Greater nutritional needs; fetus & nursing baby take away nutrients from mother

- **Menopause**

- ✧ Due to decreased estrogen & its role in calcium absorption
- ✧ Approximately 3,500 U.S. women enter menopause daily. By 2000, the U.S. will have approximately 50 million menopausal women. 1/3 to 1/2 of postmenopausal women develop osteoporosis.

- **Women who have never been pregnant**

- **Lactose intolerant/dairy allergies**

- ✧ May have difficulty assimilating nutrients
- ✧ Avoiding dairy products due to allergies, requires you to take supplements

# Medical Risk Factors (Continued)

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- **Heavy Metal Exposure: Lead /Aluminum**

- \* Displaces calcium in bone
- \* Direct influence on proper calcium metabolism
- \* Aluminum increases resorption of bone & decreases new bone formation
- \* Sources of lead/aluminum include:

**Aluminum**

Beverage cans  
Cookware  
Tap water  
Baking powder (w/ aluminum added)  
Food additives  
Processed cheeses  
Pickled foods

**Deodorants**

**Some Antacids**

**Lead**

Canned goods  
Tap water  
Industrial pollution  
Food chain (airborne lead falls to soil)  
Manufacturing (batteries, solder, pigments, pottery, linoleum, enamel, rubber, etc.)  
Some calcium supplements (oyster shell)

- **Vitamin D deficient**

- \* Necessary for calcium absorption

- **Repeated antibiotic use**

- \* Creates imbalance of natural bowel flora, impairing nutrient uptake

# Lifestyle Risk Factors

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- **Heavy alcohol consumers (less than 2 oz./day)**

- ✧ Usually malnourished
- ✧ Will decrease bone mass

- **Heavy soft drink/cafeine consumers**

- ✧ Caffeine increases urinary excretion of calcium (300 mg./day)
- ✧ Soft drinks (canned) are high in phosphorus. Alters phosphorus/calcium ratio, inhibiting calcium absorption. Acidic foods may inhibit calcium absorption

- **Heavy exercisers**

- ✧ Places greater nutritional demands on body...Depleting calcium



# Lifestyle Risk Factors (Continued)

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- **Sedentary occupations/lifestyles**

- ✧ Usually have poor diets & lack weight bearing activity

- **Smoking**

- ✧ Shown to decrease bone mass

- **Teenage girls now considered risky due to high sugar diets, sodas & inadequate calcium**

- ✧ National Institutes of Health suggest building bone mass in early teens in preparation for menopause



# Disease Factors

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- Rheumatoid Arthritis
- Depression
- Chronic Diarrhea
- Some Kidney Diseases
- Chronic Obstructive Pulmonary Disease
- Diabetes Mellitus
- Metabolic Acidosis
- Liver or Thyroid Disease
- Several other less common diseases

*Create varying situations within the body that can impair nutrient absorption, decrease calcium secretion & nutrient depletion. Often treated with medications depleting body of nutrients, including calcium.*



# Medications Affecting Bone Loss

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- **Corticosteroids**

- ✧ Affect calcium absorption in GI tract
- ✧ Increase urinary excretion of calcium
- ✧ Inhibit formation of osteoblasts (cells concerned with bone formation)

- **Thyroid Hormones**

- ✧ Increase osteoclastic activity
  - Involved with absorption/removal of unwanted tissue in bone

- **Heparin**

- ✧ Can increase osteoclastic activity/decrease osteoblastic activity

- **Methotrexate**

- ✧ Increases urinary excretion of calcium/interferes with osteoblasts

- **Anticonvulsants**

- ✧ Decrease calcium absorption/vitamin D activity



# Medications Affecting Bone Loss (Continued)

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- **Aluminum Containing Antacids**

- ✧ Decreases calcium/phosphorus absorption
- ✧ Increases urinary calcium excretion

- **Glucocorticoids**

- ✧ Inhibits absorption of calcium in GI tract leading to reduction of tubular reabsorption of calcium in kidney → results in hypercalciuria (increased calcium in urine) → leading to development of secondary hyperparathyroidism, suppressing gonadal hormone secretion → inhibits the recruitment & synthetic function of osteoblasts increasing osteoclastic bone absorption → PTH (pituitary thyroid hormone) effects on bone remodeling are augmented, leading to myopathy & reduced physical activity



# Warning Signs of Calcium Metabolism Problems

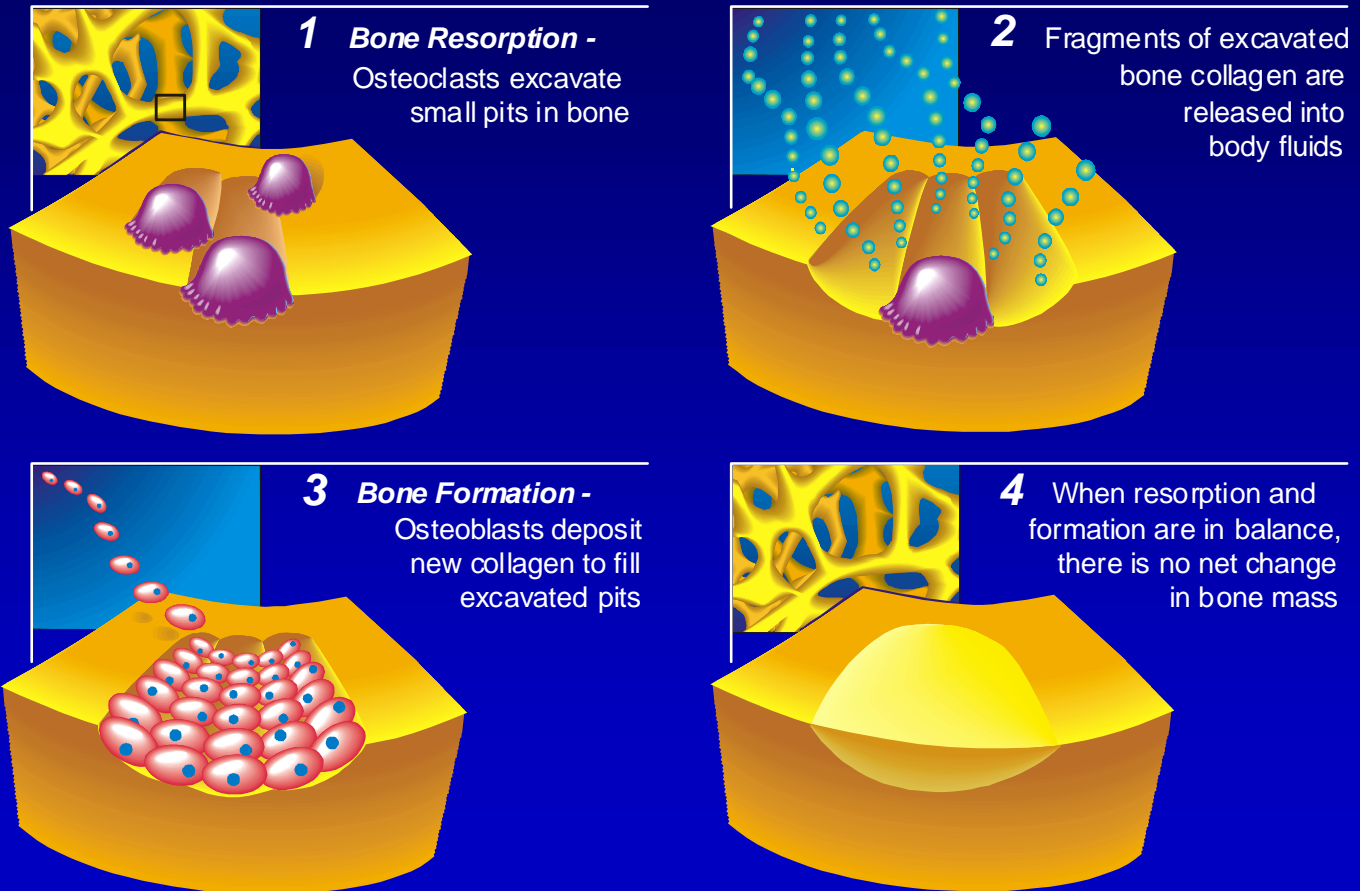
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- Low back pain/curvature of lower spine
- Bone pain
- Broken bones
- Loss of height/deformities
- Brittle/soft fingernails
- Leg/foot cramps
- Periodontal disease
- Premature graying of hair (50% gray by age 40)

**(NOTE: Up to 40% of peak bone mass loss occurs before detected. National Osteoporosis Foundation reports, the average doctor sees 11 patients/wk who have osteoporosis but only diagnoses 1 of them.)**



# Bone Remodeling Process



# Types of Calcium

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- **Not all are created equal**
- **Absorb differently**
- **Different forms have different levels of bioavailability**
  - ❄ **MCHC (Microcrystalline Hydroxyapatite Calcium)** - whole bone extract shown in studies to improve bone mass
    - Contains protein, calcium, mucopolysaccharides, phosphorus, magnesium and trace minerals
    - Deposits in Trabecular (inner) & Cortical (outer) sections of bone - proven to increase cortical bone mass
    - Bone tissue matrix containing properties naturally found in bone & will correct ratios
    - Reduces bone pain/joint symptoms
    - Promotes skeletal healing
    - Non-toxic



# Types of Calcium (Continued)

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- **Calcium Citrate**

- ✧ Well absorbed even in low stomach acid environments
- ✧ Offers decreased risk of kidney stone formation

- **Calcium Carbonate & Salts**

- ✧ Require acidic stomach to be ionized
- ✧ Risk of kidney stones
- ✧ Recent concerns over lead concentration in carbonate forms
- ✧ Can cause gas/constipation

– *Tums and many OTC brands fall into this category*

- **MOST MULTIVITAMINS DO NOT CARRY THE AMOUNT OF CALCIUM RECOMMENDED BY THE NATIONAL INSITUTES OF HEALTH -**

900-1300 mg./day. Most only contain 162 mg., and even that is usually not a bioavailable form.



# Other Nutrients Needed to Ensure Maximum Bioavailability

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- **Vitamin D**

- ❄ Stimulates absorption of Calcium in small intestine
- ❄ Due to today's lifestyle (time being spent indoors & sunscreen usage), many people are vitamin D deficient
- ❄ Recommended dosages
  - 200 IU/daily premenopausal
  - 400-800 IU/daily menopausal; increases over age 50
  - 800 IU/daily postmenopausal
    - ❖ Dark skinned people may not need 800 IU/d
    - ❖ Debilitated and/or does not get outside much needs 800 IU/d

- **Magnesium**

- ❄ Important in proper ratios with calcium for absorption
- ❄ May actually improve trabecular bone mass & aid in reversal of bone loss
- ❄ Regulates PTH secretion & tissue sensitivity
- ❄ Americans estimated to be deficient by as much as 100 mg/day



# Other Nutrients Needed to Ensure Maximum Bioavailability (Continued)

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- **Manganese**

- ✧ Necessary for creation of enzymes needed to develop ground matrix allowing calcification
- ✧ Deficiency decreases amount of bone calcification

- **Boron**

- ✧ Needed to optimize calcium metabolism
- ✧ Highest concentrations occur in parathyroid glands (key to calcium metabolism)
  - Exact mechanism is not known

- ✧ **Vitamin K**

- ✧ Important in bone mineralization
- ✧ High deficiency occurrence with GI disturbances
- ✧ Some drugs interfere with vitamin K absorption
  - Questran, Colestid, Antibiotics, Neomycin, Coumadin





# Other Nutrients Needed to Ensure Maximum Bioavailability (Continued)

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- **Vitamin B-6, Folic Acid, Vitamin B-12 (The Homocysteine Connection)**

- ✧ B vitamin deficiency can increase homocysteine levels known contributor to heart disease
- ✧ Homocysteine levels increase in menopause
- ✧ Homocysteine can interfere with collagen cross-linking weakening bone matrix contributing to osteoporosis development
- ✧ B-6 aids in enhancement of bone strength/collagen structures
- ✧ Environmental pollutants/stress contribute to B-6 depletion, as well as some medications
- ✧ Medications depleting Vitamin B-6, B-12 & folic acid include:
  - B-6: Premarin, Estrace, Menest, Estratest, Oral Contraceptives, Diuretics, Tetracycline, Antibiotics, Isoniazid, Theophylline
  - B-12: Oral Contraceptives, Questran, Colestid, Phenytoin, Colchicine, Col-Benemid, Tetracycline, Neomycin, Glucophage, Axid, Pepcid, Tagamet, Zantac, Prilosec, Prevacid, Kaon, Micro-K, Slow-K
  - Folic Acid: Oral Contraceptives, Premarin, Estrace, Menest, Estratest, Dyazide, Maxzide, Questran, Colestid, Phenobarbital, Barbiturates, Dilantin, Tegretol, Azulfidine, Indocin, Ibuprofen, Naproxen, Zulindac, Axid, Pepcid, Tagamet, Zantac



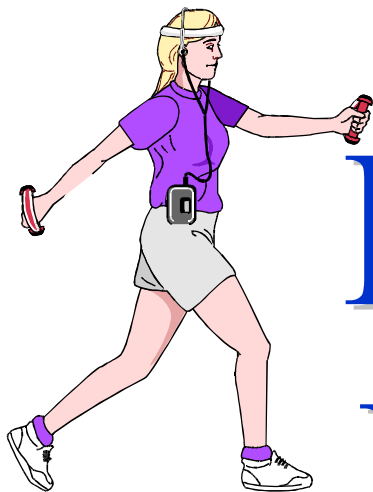
# Other Nutrients Needed to Ensure Maximum Bioavailability (Continued)

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- **Proanthocyanidins**

- ✧ Flavonoids stabilizing collagen structure of bones
- ✧ Increase cross-linking of collagen fibrils, strengthening collagen matrix of skeleton



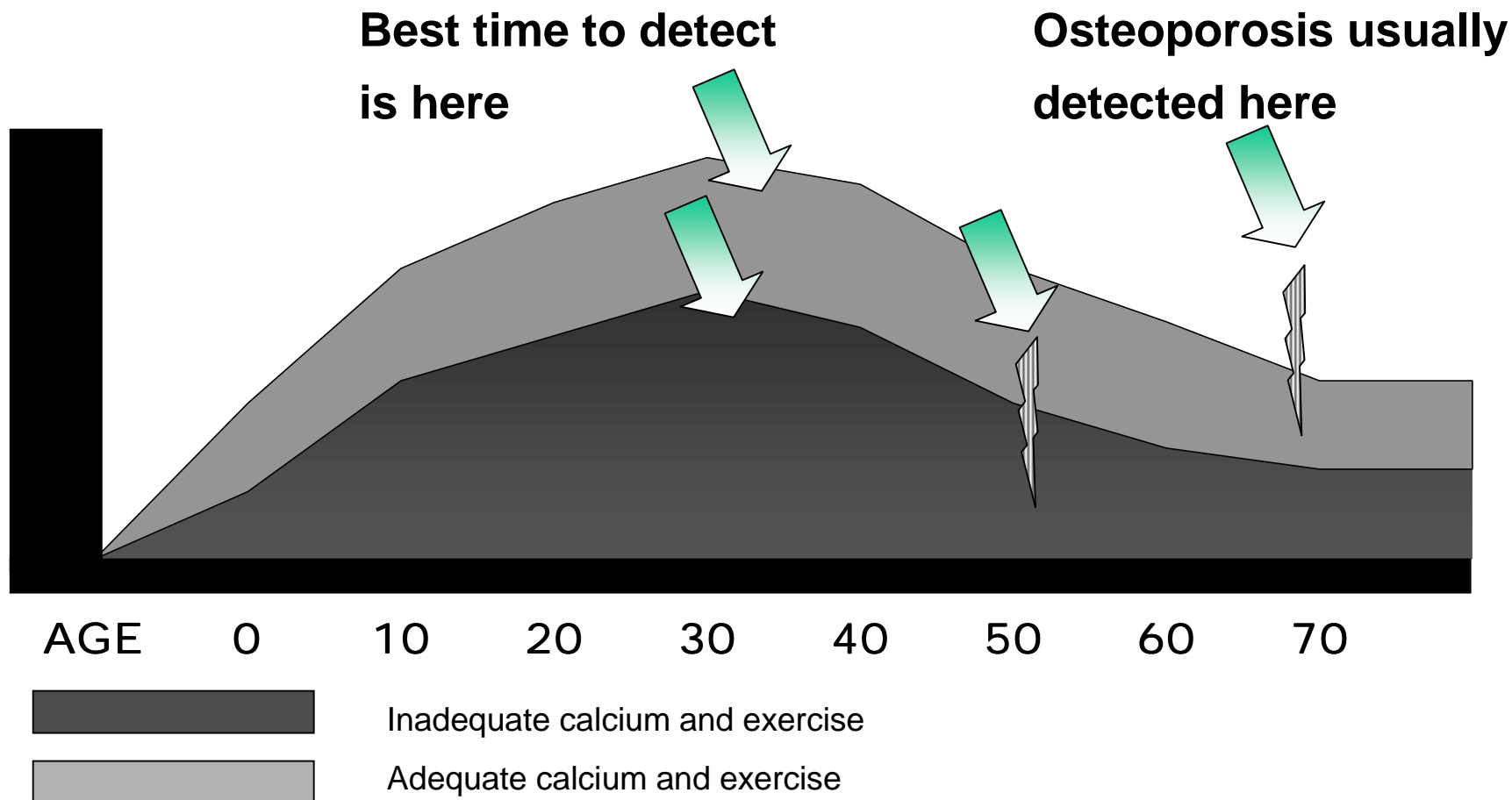


# HOW DO I PREVENT OSTEOPOROSIS?



# Osteoporosis Prevention - Early Detection

## Bone Mass Growth & Decline



# Prevention

- Average 35-50 yr old woman may not be at risk for a fracture now. NTx testing can indicate metabolic trend that is consistent with bone loss that may risk a fracture in the future.
- **Sahara Clinical Bone Sonometer**
  - ✧ **The diagnostic screening machine of choice**
  - ✧ Performs a **quantitative ultrasound measurement of the calcaneus** (heel bone), the results of which can be used in conjunction with other clinical risk factors as an aid in the identifying osteoporosis and medical conditions leading to reduced bone density, and ultimately in the determination of fracture risk.
  - ✧ Measures the speed of sound (SOS, in m/s) and broadband ultrasonic attenuation (BUA, in dB/MHz) of an ultrasound beam passed through the heel, and combines these results to obtain the Quantitative Ultrasound Index (QUI). This output is used to calculate an estimate of the Bone Mineral Density (BMC, in g/cm<sup>2</sup>) of the heel.
  - ✧ Sahara is the only ultrasound bone densitometer that **estimates BMD and determines T-scores**. Sahara results can be used to derive Z-scores, which are important for predicting fracture risk. .



# Doesn't My Diet Fulfill My Daily Requirements?

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## NO!

- Research indicates most women only get **1/3 to 1/2 the needed calcium** in daily diets



# As Long as I Get the RDA, am I Okay?

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## NO!

- The RDA is the minimum amount you need to prevent disease, It does not take into consideration what is optimal to prevent disease as well as maintain wellness, nor does it take into consideration factors such as lifestyle, heredity, medications, etc.
- Nutritional values of foods are no longer within adequate levels due to food processing and agricultural practices which deplete the nutrients from the soil.



# Is Dairy the Best Source of Calcium?

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## NO!

- While dairy is an easy way to obtain calcium, it may not be the best choice, and certainly isn't for those who are allergic or sensitive. Many leading Healthcare Professionals who are experts in preventative care now **discourage dairy product use**. Almonds, broccoli, molasses, green leafy vegetables are good food sources of calcium.





# Should I Worry About Osteoporosis Before Menopause?

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## YES!

- Prevention needs to start early in life through awareness and good dietary habits, exercise, and lifestyle habits. The **National Institutes of Health recommends preparation in early teen years.**

*Note: Even children may not be getting their requirements on today's average American diet.*



## Can Exercise and Calcium Supplementation Prevent Osteoporosis?

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# NO!

- Other factors play an important role in one's risk for developing osteoporosis, such as genetics, the **type of exercise (weight bearing is best), smoking, medications, caffeine and alcohol** consumption.



# Can I Reverse Osteoporosis?

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# YES!

- Studies have shown appropriate supplementation, dietary, and lifestyle changes, **can actually reversed Osteoporosis.**



## Can Estrogen Replacement Therapy Prevent Osteoporosis?

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# NO!

- For some women, this may be true, but for a large percentage there are now **natural supplementation options** that may suffice. There are also plant-based estrogens **(phytoestrogens) available that have fewer side effects** and do not require as large a dosage as the animal-based estrogens.



## Why Do Asian Women Have Fewer Problems With Osteoporosis and Menopause?

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- Several studies have indicated **soy protein can effectively prevent rises in cholesterol associated with ovarian hormone deficiency** & significantly increase bone mineral content & density in lumbar spine. Heart disease, stroke, cancer, hot flashes, & osteoporosis are significantly lower in cultures where soy is main source of protein.



# Osteoporosis Prevention Suggestions

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- **Calcium** 1500-2000 mg/day
- **Magnesium** 500-100 mg/day
  - ❄ Best if taken at different time of day than calcium if there is a possible magnesium deficiency
- **Boron** 3 mg/day
- **Vitamin D** 400-800 IU/d
  - ❄ Be sure to take a bioavailable form
- **B vitamin supplementation**
- **Digestive enzymes**
  - ❄ Most people over 40 don't produce enough enzymes, (essential to metabolism of food & assimilation of nutrients)
- **Acidophilus/Enterobiotics**
  - ❄ "Friendly" bacteria occurring in the intestinal tract & playing key roles in digestion of food, production of vitamins & prevention of some diseases.



# Osteoporosis Prevention Suggestions (Continued)

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- **Citric Acid**

- ✧ Promotes GI absorption and helps inhibit formation of calcium oxalate crystals and possible renal or urinary calculi due to high dose calcium.

- **Good Quality Water**

- **Weight bearing exercise**

- ✧ Start at 10 minutes/day, 3-5 days/wk & build to 30-60 minutes/day, 3-5 days/wk



# Osteoporosis Prevention Measures (Continued)

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- **Flavonoids**

- ❄ Consider grape seed, pycnogenol, hawthorn berry, blackberry, blueberry, raspberry
  - Contain flavonoids stabilizing collagen structure of bone. Many provide support to female reproductive organs.

- **Estrogen Replacement Therapy Options**

- ❄ If you are having problems with Estrogen Replacement Therapy, discuss with your doctor a plant-based estrogen or a progesterone (wild yam) (progesterone actually stimulates bone formation).

- **Phytoestrogens**

- \* Good alternative for those who prefer natural alternatives.
- ❄ Activity is 1/400th of estrogen, however, low estrogen levels tend to increase estrogenic activity and **high levels bind to estrogen receptors**, decreasing the effects.
  - Black cohosh (*Cimicifuga racemosa*) is an herb used for this purpose.
    - ❖ Recommended dosage is 40 mg. BID





# Osteoporosis Prevention Suggestions (Continued)

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- **Herbs** (other herbs with proven estrogenic activity)
  - \* **Dong Quai**
  - \* **Unicorn Root**
  - \* **Fennel**
  - \* **False Unicorn Root**
- **Homeopathics** (are helpful, especially in treating pain associated with osteoporosis)
  - \* **Ruta**
    - Bruised feeling in spine & limbs. Pain in small of back & loin area, from back down hips/thighs & in bones of feet/ankles. Worse lying down, cold/wet weather.
  - \* **Aurum**
    - Tearing pains in joints, weak knees. Worse with cold.
  - \* **Mezereum**
    - Pain in neck /back, hip/knee, with burning in tibia & long bones. Worse in cold air, night. Better in open air.
  - \* **Calcarea phos**
    - Pain in bones & joints, stiffness with pain, soreness in sacra-iliac area. Worse in cold/damp. Better in warm/ dry.
  - \* **Fluoric Acid**
    - Necrosis of long bones. Worse with warmth, better with cold.



# Aromatherapy Alternatives

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- **Essential oils to help build and strengthen skeletal system**

- ✧ **Black Pepper**
  - Replenishes/assists in rebuilding skeletal/muscular system
- ✧ **Angelica Root**
  - Strengthens/eliminates toxins from system. Assists with muscular aches/pains
- ✧ **Clary Sage**
  - Uplifting, excellent for female regulations, PMS, antispasmodic
- ✧ **Coriander**
  - Digestive stimulant, fatigue, nervous tonic, fluid retention, diarrhea, flatulence
- ✧ **Thyme**
  - Anti-infectious, circulation, anemia, pain relief, arthritis
- ✧ **Sage**
  - Respiration, circulation, fatigue, hair care, liver tonic
- ✧ **Cedarwood**
  - Muscular aches/pains, circulation, arthritis, rheumatism
- ✧ **Vetiver**
  - Strengthens skeletal system, good circulatory aid, excellent for muscular aches/pains, stiffness



# Aromatherapy Alternatives (Continued)

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- **Three steps to decrease pain**

- ❄ **Pain Relievers**

- Birch, Wintergreen, Peppermint, Angelica Root, Tarragon, Black Pepper, Red Thyme

- ❄ **Release Toxins/Increase Flexibility**

- Juniper, Rosemary, Cypress, Grapefruit, Lemongrass, Bay Laurel

- ❄ **Assist with Spasms/Inflammation**

- Lavender, Blue Chamomile, Marjoram, Clary Sage

